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William J. Hughes Technical Center
Aviation Research Division
Atlantic City International Airport
New Jersey 08405

Construction Cycle 8 (CC8) Construction Report

Date 3/19/2018

Final Report

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16. Abstract

The National Airport Pavement Test Facility (NAPTF) was commissioned on April 12, 1999 through joint funding provided by the US Federal Aviation Administration (FAA) and the Boeing Company to generate full-scale pavement performance data to support the development and verification of airport pavement thickness design procedures. The FAA Airport Pavement Research and Development Section finalized the Construction Cycle 8 (CC8) project objectives in November 2014. The FAA project team, which consisted of members from the FAA (owner/principal investigator), CSRA (prime contractor), ARA (quality assurance/construction management), and Gemini (subject matter experts), formalized the conceptual designs detailing the construction and project sequencing. Three test areas were considered for CC8: Overload and Overlay, Joint Comparison, and Strength and Fatigue. The pavement structures of CC8 spanned 365 ft. in length, 60 ft. in width, and depths up to 5 ft. The instrumented structures were constructed on medium and low-strength subgrade with CBR between 3 and 8. This report details the material selection, construction practices, and material acceptance and characterization data for each test area.

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LIST OF ACRONYMS

APT – Accelerated Pavement Testing
ASTM – American Society for Testing and Materials
BDF – Bridge Deck Finisher
CBR – California Bearing Ratio
CC – Construction Cycle
DCP – Dynamic Cone Penetrometer
D-PSPA – Portable Seismic Pavement Analyzer for Soils
FAA – Federal Aviation Administration
FAARFIELD – FAA Rigid and Flexible Iterative Elastic Layered Design
HWD – Heavy Weight Deflectometer
ICAO – International Civil Aviation Organization
JMF – Job Mix Formula
LWD – Light Weight Deflectometer
M – Modified
MR – Modified Research
NAPTF – National Airport Pavement Test Facility
NAPTV – National Airport Pavement Test Vehicle
NJDOT – New Jersey Department of Transportation
PCC – Portland Cement Concrete
PI – Principal Investigator
PWL – Percent within Limit
SCI – Structural Condition Index
WJHTC – William J. Hughes Technical Center

1. INTRODUCTION

1.1 National Airport Pavement Test Facility (NAPTF)

The introduction of new generation aircraft such as the Boeing 777 in 1995 created a fundamental need to develop new airport pavement design procedures based on sound theoretical principles and rational models verified from full scale test data. New generation aircraft have more landing wheels packed into approximately the same space than their predecessors, posing a concern that the pavement design procedures developed for older generation models may not accurately predict load interaction.

The National Airport Pavement Test Facility (NAPTF) was commissioned on April 12, 1999 through joint funding provided by the US Federal Aviation Administration (FAA) and the Boeing Company to generate full-scale pavement performance data to support the development and verification of airport pavement thickness design procedures. Additionally, the NAPTF would provide full-scale pavement response and failure information for use in airplane landing gear design and configuration studies (Hayhoe 2004) as well as for the verification of pavement life curves that had been revised by the United States Army Corps of Engineers (Barker et al. 1994),

The NAPTF is located at the FAA William J. Hughes Technical Center (WJHTC), Atlantic City International Airport, New Jersey. Figure 1 displays an aerial view of the NAPTF building, while Figure 2 shows the NAPTF building during a construction cycle. Figure 3 shows the original plan and profile As-Built for NAPTF.

Figure 1. Aerial View of NAPTF Building

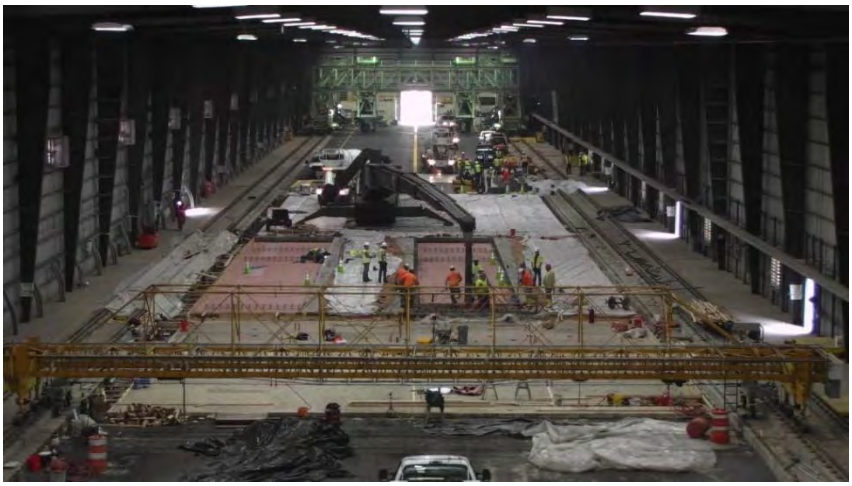

Figure 2. NAPTF during Construction

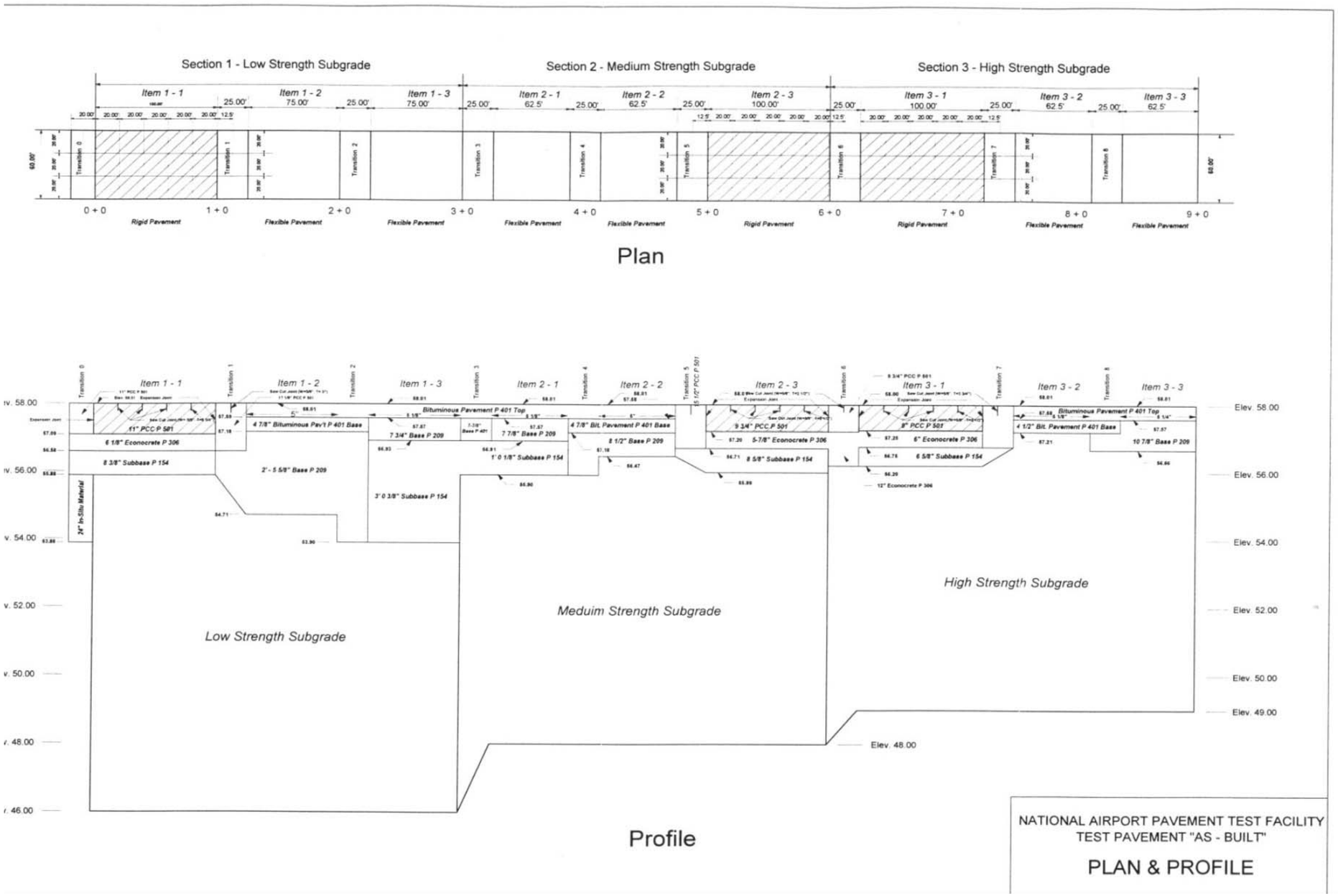

Figure 3. Original Plan and Profile As-Built for NAPTF

The NAPTF contains a fully-enclosed and instrumented test track 900 ft. long by 60 ft. wide. Indoor stationing and benchmarks have been established within the facility so that all testing and construction can be performed in an efficient and consistent manner. The test track can be divided into independent test items on various subgrade classifications that are designed, constructed, and trafficked to failure. Each pavement test item is designated by its Construction Cycle (CC) number. Each CC within the NAPTF includes: test pavement construction, instrumentation installation, traffic testing, post traffic testing, and demolition of the test item. A typical CC in the NAPTF would commence with the demolition of an existing pavement structure(s), followed by the test pavement construction, traffic testing, and finally the post traffic testing of the failed test structure. The information gathered from CCs are utilized to provide input for FAA Advisory Circulars (FAA 2018).

The National Airport Pavement Test Vehicle (NAPTV) is essential to full-scale testing in the NAPTF (Figure 4). The NAPTV is a rail-based test vehicle capable of simulating an aircraft weighing up to 1.3 million pounds to conduct full-scale pavement testing. The NAPTV is comprised of two carriages that can accommodate up to five load modules each. Each load module can support two wheels. This allows configurations of up to 20 wheels to represent modern aircraft gear configurations. The NAPTV can apply loads of up to 75,000 pounds per wheel and simulates aircraft wander by varying the lateral position of the carriages. This allows the NAPTV to simulate a normal distribution of aircraft traffic during traffic testing. The FAA airport pavement test group uses CCs to investigate industry concerns as well as to support national and international research needs.

Figure 4. The National Airport Pavement Test Vehicle (NAPTV)

At the time of this report, a total of seven CCs had been completed and trafficked. Below is a brief synopsis on these previous CCs. All information provided for these CCs were taken from the

FAA's NAPTF website, which includes resources on test plans, material testing data, and other reports (FAA 2018).

Construction Cycle 1

Construction of both NAPTF and CC1 was completed in April 1999, with CC1 pavement being completed in May 1999. There were a total of nine test items examined in CC1: 6 flexible (constructed using asphalt concrete) and 3 rigid (constructed using Portland cement concrete (PCC)) pavements. For the flexible sections, the pavement was constructed on either P-209 or an asphalt stabilized base. For the rigid sections, the pavement was constructed on P-306MR cement stabilized base. Each of these pavements were constructed on 3 different subgrades: California Bearing Ratio (CBR) = 3, CBR = 8, and CBR = 20. Trafficking of CC1 concluded in November 2001. The objectives for CC1 were as follows:

- Provide additional traffic data for incorporation into new thickness design procedures under development by the FAA
- Provide full-scale pavement response and failure information for use in airplane landing gear design and configuration studies
- Examine the CBR method of design for flexible pavements

Construction Cycle 2

The rigid pavements tested in CC1 prematurely failed during the early stages of trafficking. It was determined that corner cracks developed due to curling of the slab corners, and therefore the test data obtained from the experiment reflected abnormal conditions. Several investigations were conducted between CC1 and the main CC2 pavement construction. Most of these investigations included the geometric design, concrete mix design, construction methods, curing, curling and warping, and trafficking of a test strip. The main CC2 experiment was conducted in 2004, and trafficking concluded in December 2004. In CC2, CC1 test items were replaced with a CBR = 8 subgrade and consisted of three rigid pavements constructed either on grade P-154 uncrushed aggregate or P-306 cement stabilized base. The objectives for CC2 were as follows:

- Compare life and performance for the different support conditions
- Compare the pavement life and performance under 4-wheel versus 6-wheel traffic using the same dual and tandem distances in both gears
- Update the failure model for rigid pavement design
- Compare the joint efficiency date obtained from HWD tests and sensors at the joints to the 25% load transfer assumption in the design procedure
- Compare interior and edge stresses under gear loads
- Measure the slabs shrinkage and curling
- Measure early-age strength gain to evaluate criteria for early opening

Construction Cycle 3

Existing CC1 test items were replaced during CC3, and an additional PCC test strip with four flexible pavement sections and varying subbase thicknesses (16, 24, 34, and 43 in.). The CC3 pavement structure consisted of P-401 HMA over P-209 crushed stone base over P-154 subbase over existing clay subgrade. Construction for CC3 was completed in August 2002, and trafficking concluded in October 2002. The objectives for CC3 were as follows:

- Provide full-scale test data to improve FAA thickness design procedures for flexible pavements supporting 4-wheel and 6-wheel aircraft gears
- Use comparative performance data for the 4-wheel and 6-wheel gear traffic from these tests to validate new alpha factors in the ACN-PCN method

Construction Cycle 4

CC4 replaced three concrete test items and three transitions from the CC2 experiment, in addition to replacing an asphalt overlay from CC2 with an unbonded concrete overlay. CC4 was broken into two phases. Phase 1 included the following structure: CBR = 8 conditioned subgrade, P-154 subbase, underlying concrete layer, bituminous bondbreaker layer, and overlay concrete layer. Phase 2 replaced the bituminous bondbreaker and overlay concrete layer in kind after trafficking in order to allow the underlying concrete layer to further deteriorate. Phase 1 and Phase 2 were completed in October 2006 and April 2008, respectively. The objectives for CC4 were as follows:

- Improve the understanding of the influence of design parameters on unbonded concrete overlays of airfield pavements
- Determine the overlay response
- Study the effect of underlying discontinuities on overlay response
- Observe the relative deterioration of the overlay and underlying pavement after trafficking
- Observe the deteriorations in terms of distress and structural response as compared to the SCI Model

Construction Cycle 5

CC5 replaced the four flexible test items from CC3 with similar test items. CC5 was broken up into two components: a test strip and the main test item. The test strip replaced two test items from CC3 with similar test items in order to evaluate the adequacy of DuPont Clay for use as a stable, low-strength subgrade material. The main test item involved removing the remaining CC3 test items and test strip, and replacing the test strip with HMA, P-209, P-154 (or dense-graded aggregate), and DuPont Clay. Trafficking of the test strip and the main test item was completed in March 2007 and October 2012, respectively. The objectives of CC5 were as follows:

- Produce data on the relative performance of flexible pavements supporting simple 4-wheel and 6-wheel gears, versus large gear assemblies consisting of multiple 4-wheel and 6-wheel landing gears in close proximity
- Quantify the different in performance provided by two different subbase materials (P-154M and dense-graded aggregate)

Construction Cycle 6

CC6 replaced the test items from CC4 with six different rigid pavement structures. Three different strength types of P-501 were evaluated (500 psi, 750 psi, and 1000 psi) on two variations of underlying material: HMA over P-154 over CBR = 8 subgrade and P-306 over P-154 over CBR = 8 subgrade. Trafficking was completed in April 2012, and post-traffic investigations continued through 2014. The objectives of CC6 were as follows:

- Determine the effect of concrete flexural strength on rigid pavement structural life
- Perform side-by-side comparisons of rigid pavements on different stabilized base materials
- Perform comparisons of two types of isolation joints – thickened edge and steel-reinforced

Construction Cycle 7

CC7 replaced the flexible test items from CC5 with new flexible test items. CC7 was broken up into two tests: perpetual pavement test (north side) and overload test (south side). The perpetual pavement test was conducted in order to apply the perpetual pavement concept to airport pavements by limiting failure to the surface layer and preventing structural failures (e.g. rutting in subgrade, bottom-up fatigue cracking). To accomplish this, six test items were constructed with a clay subgrade (design CBR = 5.5), variable thickness P-154 layer, and variable thickness P-401 layer. Two of the test items incorporated additional base layers (P-209 aggregate base or asphalt treated drainable base). Trafficking of the perpetual pavement test began in September 2014 and concluded after over 37,000 passes. The objectives of the perpetual test were as follows:

- Develop a perpetual pavements design criterion for airport pavements
- Determine the vertical strain threshold in the HMA layer to limit rutting
- Determine the horizontal strain threshold at the bottom of the HMA layer to prevent bottom-up fatigue cracking
- Determine the relationship between laboratory fatigue strain thresholds and measured field HMA strains
- Study the strain distribution within the HMA layer

Similarly to the perpetual test, the overload pavement test consisted of six constructed test items. These test items were constructed with a clay subgrade (design CBR = 5), 20 in. P-154 layer, 6 in. P-209 layer, and 3 in. P-401 layer. Trafficking of the perpetual pavement test began in October 6, 2014 and concluded on October 13, 2016 with all test items having failed. The objectives of the overload test were as follows:

- Determine the allowable overload criteria for flexible pavements
- Link the overload criteria to the cumulative damage factor, which would allow individual overloads to be related to consumed life

1.2 NAPTF Terminology

Several terms and phrases are commonly used at the NAPTF and may not be as readily understood by outside agencies. To eliminate confusion, below are several of these common terms and a brief description of each.

Construction Cycle:

A CC includes test pavement and instrumentation layout, traffic pre and post-test plans, materials testing data, construction test data, traffic data and post-traffic testing (trenching activities and other tests), and pavement removal. All pertinent data and information collected at the NAPTF is arranged by CCs.

Test Area:

Each CC is divided into independent test areas that are designed and constructed to meet specific test objective(s). For instance, there are three CC8 test areas: Overload and Overlay, Joint Comparison, and Strength and Fatigue.

Test Item:

Each test item represents one or more sections within a test area that is subjected to a unique traffic test. Test items are normally used to differentiate two sides of the test pavement, north and south.

Wander Pattern:

A typical wander pattern consists of 66 passes arranged in 9 wheel tracks. The distance between each wheel track was 10.25 in., providing a standard deviation similar to that measured on airfield taxiways.

P-152 Excavation, Subgrade, and Embankment:

This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans (FAA 2014).

P-154 Subbase Course:

This item shall consist of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course in accordance with these specifications, and in conformity with the dimensions and typical cross-section shown on the plans (FAA 2014).

P-306 Lean Concrete Base Course:

This item shall consist of a subbase material, herein termed lean concrete, that is composed of aggregate and cement uniformly blended together and mixed with water. The mixture may also include approved cementitious additives, in the form of fly ash or slag, and chemical admixtures. The mixed material shall be spread, shaped, and consolidated using concrete paving equipment in accordance with these specifications and in conformity to the lines, grades, dimensions, and typical cross-sections shown on the plans (FAA 2014).

P-404 Fuel Resistance Asphalt Mix Pavement:

This item shall consist of surface courses composed of mineral aggregate, fuel-resistant asphalt binder, and additives mixed in a central mixing plant and placed as asphalt mix pavement in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. This mix is to be used only as a surface course. The purpose of this fuel-resistant asphalt is to provide a fuel-resistant surface where pavements are subjected to fuel spills. The minimum course thickness shall be 1 in. (25 mm) and the maximum course thickness shall not exceed 1 in. (50 mm) (FAA n.d.).

P-501 Portland Cement Concrete (PCC) Pavement:

This work shall consist of pavement composed of PCC with or without reinforcement, constructed on a prepared underlying surface in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross-sections shown on the plans (FAA 2014).

1.3 Construction Cycle 8 (CC8) Objectives

The FAA Airport Pavement Research and Development Section finalized the CC8 project objectives in November 2014. The FAA project team, which consisted of members from the FAA (owner/principal investigator), CSRA (prime contractor), ARA (quality assurance/ construction management), and Gemini (subject matter experts), formalized the conceptual designs detailing the construction and project sequencing. Three test areas were considered for CC8: Overload and Overlay, Joint Comparison, and Strength and Fatigue. The team planned a two-phased construction effort to complete CC8 in order to facilitate the rigid on rigid overlay pavement structure in the Overlay testing objective. The Overlay drawings included preliminary designs for the Overload, Joint Comparison, and Strength and Fatigue test areas. Construction drawings for

the Overlay test area were finalized in January 2015. Finalized drawings, detailing the Overload, Joint Comparison, and Strength and Fatigue test areas of CC8, were completed in June 2016.

The pavement structures of CC8 spanned 365 ft. in length, 60 ft. in width, and depths up to 5 ft. The instrumented structures were constructed on medium and low-strength subgrade with CBR between 3 and 8.

1.3.1 Overload and Overlay Test Objectives (3+00 to 4+00)

The Overload and Overlay test area was broken into two construction phases and consisted of the rigid on rigid test pavement between stations 3+00 to 4+00. The primary objective of the Overload and Overlay test area was to evaluate a PCC overlay on an existing PCC with Structural Condition Index (SCI) in the 50-80 range. The specified SCI range was intended to fill significant gaps in data from previous NAPTF rigid overlay tests (CC4), which considered only new (SCI = 100) and highly deteriorated (SCI < 40) base pavements. The target pavement condition at the end of the Overload test was SCI = 80. A secondary objective of these sections was to perform full-scale tests which would be utilized to develop rational overload criteria for rigid pavements. The results would be compared to the current International Civil Aviation Organization (ICAO) Annex 14 criteria, allowing occasional overload by aircrafts with an aircraft classification number up to 5% above the reported pavement classification number.

1.3.2 Joint Comparison Test Objectives (4+00 to 5+00)

The Joint Comparison Test area consisted of a conventional PCC test pavement between stations 4+00 and 5+00. The primary objective of this section was to compare the performance between Type E (Doweled construction) and nonstandard sinusoidal keyed longitudinal joints. Currently, Type E is the only standard joint available for longitudinal construction joints. In field applications, European contractors have experienced success using the S-keyway along longitudinal joints. If the S-keyway can be shown to provide similar performance in testing, it may be considered as an alternative to doweling. Additionally, this section would provide a comparison of the performance of Type C (Doweled contraction) and Type D (Dummy) transverse joints. It has become the de facto practice for many engineers to install dowels at all transverse contraction joints, even though this is not required by FAA standards. Tests will verify whether there is any benefit to this in terms of fatigue life.

1.3.3 Strength and Fatigue Test Objectives (5+00 to 6+55)

The Strength and Fatigue Test Area consisted of the rigid test pavement between stations 5+00 and 6+55. The primary objective of this section is to obtain slab strength (rupture strength) for full-scale slabs under a monotonically increasing aircraft gear load. The results will be evaluated for consistency with FAARFIELD design assumptions, which are based on the modulus of rupture obtained from ASTM C78 beam tests. FAARFIELD is the standard thickness design software

used in conjunction with AC 150/5320-6F Airport Design and Evaluation. Additionally, the fatigue performance of slabs under full-scale loading will be evaluated in this section. Fatigue performance is defined as the number of passes needed to propagate an initial crack through a slab, for both top-down and bottom-up cracks. These results will be compared to the fatigue strength predicted from laboratory beam fatigue tests and FAARFIELD rigid failure models. Finally, the effect of higher strength/thinner slabs vs. lower strength/thicker slabs on fatigue performance will be analyzed. The results will be compared to the performance predicted by FAARFIELD's rigid failure model. As a secondary objective, this section will assist in evaluating the effect of modulus of subgrade reaction (k-value) versus CBR in characterizing subgrade support for rigid pavement performance.

2. DESIGN, CONSTRUCTION, AND INSTRUMENTATION

2.1 CC8 Design

The FAA Airport Technology Research and Development Section developed the testing objectives for CC8 in conjunction with the Airport Technology Research Plan and industry demand. These objectives were discussed in Sections 1.3.1, 1.3.2, and 1.3.3 of this document. In order to meet the objectives, the FAA project team drafted a conceptual design for three rigid test areas to be constructed within CC8 (Figure 5 and Figure 6). Each test area was designed to meet the selected testing objectives. The three test areas include:

1. Overload and Overlay Test Area
2. Joint Comparison Test Area
3. Strength and Fatigue Test Area

CC8 was designed in such a way that by varying individual layer thicknesses, the above three test areas would have the same design life (year/failure passes). It should be noted that for the original design, only medium strength subgrade (CBR = 7-8) was considered. FAARFIELD v. 1.305 was utilized with the following assumptions:

- NAPTV configuration – 2D (4-wheel) and 55,000 lbs per wheel
- Design Flexural Strength – 650 and 900 psi
- Layer Moduli – P-501MR = 4,000,000 psi; P-306MR = 700,000 psi; P-154M = 19,500 psi

Within these test areas, contraction and construction joints were used. Contraction joints were used to control cracking of the pavement due to moisture loss or temperature drops. Construction joints were utilized due to the concrete placement sequence. The five types of joints utilized on the project were as follows: contraction joint (Type C Doweled), contraction joint (Type D Dummy), construction joint (Type E Doweled), construction joint (Type F Butt), and construction joint (sinusoidal keyway). Images of each joint type are provided below in Figure 7 and Figure 8.

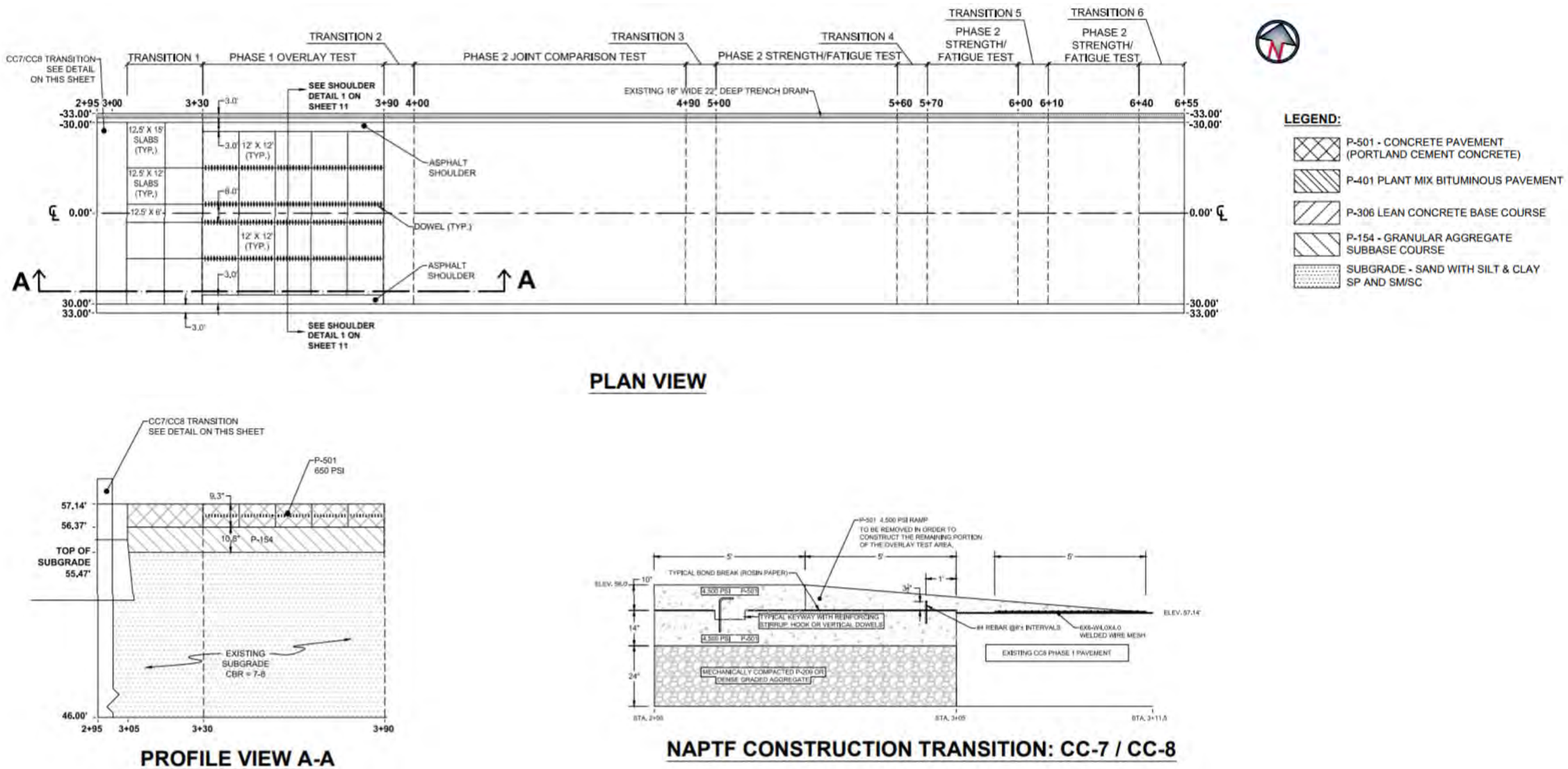

Figure 5. Plan (Top) and Profile (Bottom) Design for CC8 with Overload Test Area

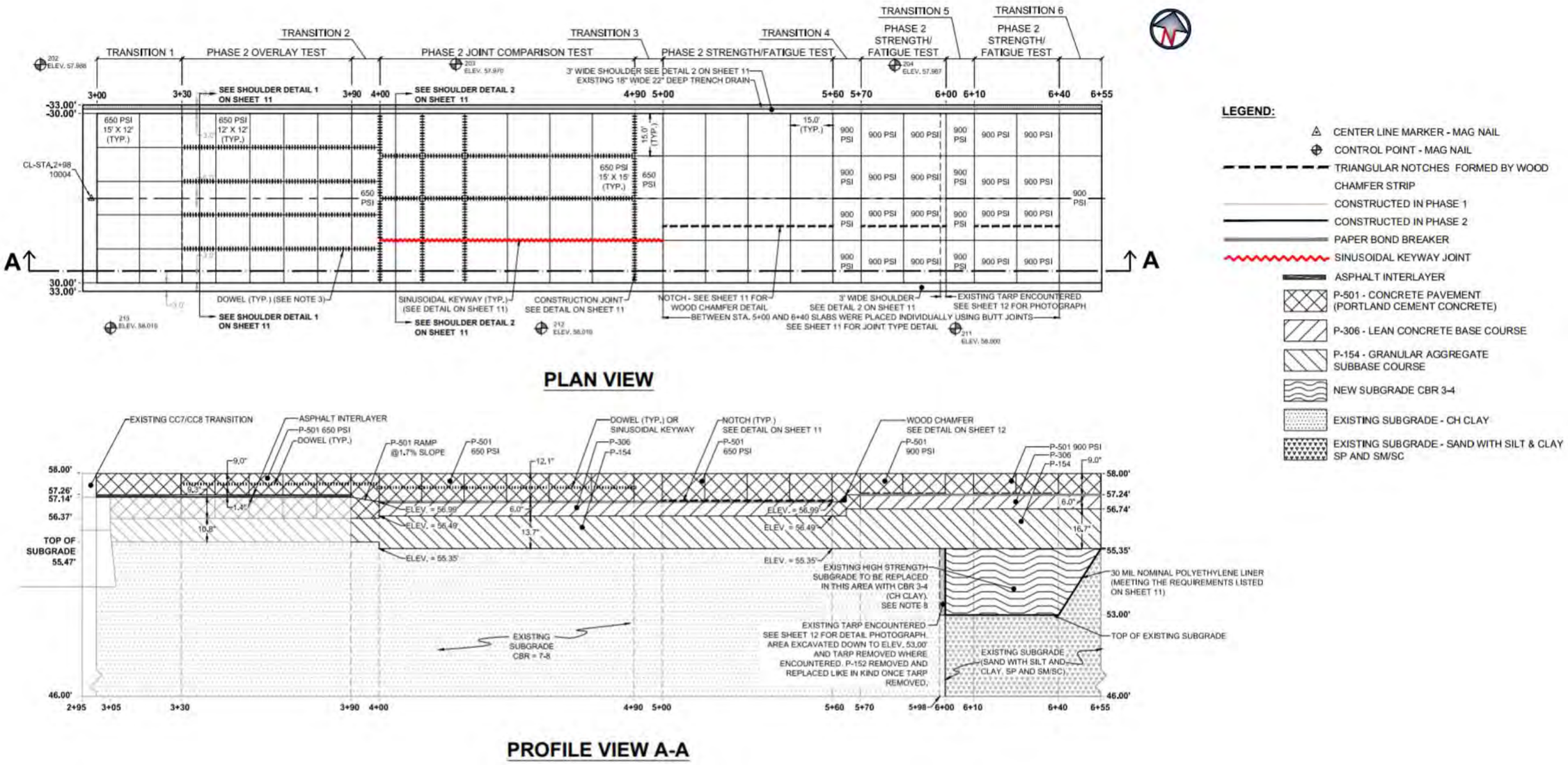

Figure 6. Plan (Top) and Profile (Bottom) Design for CC8 with Overlay Test Area

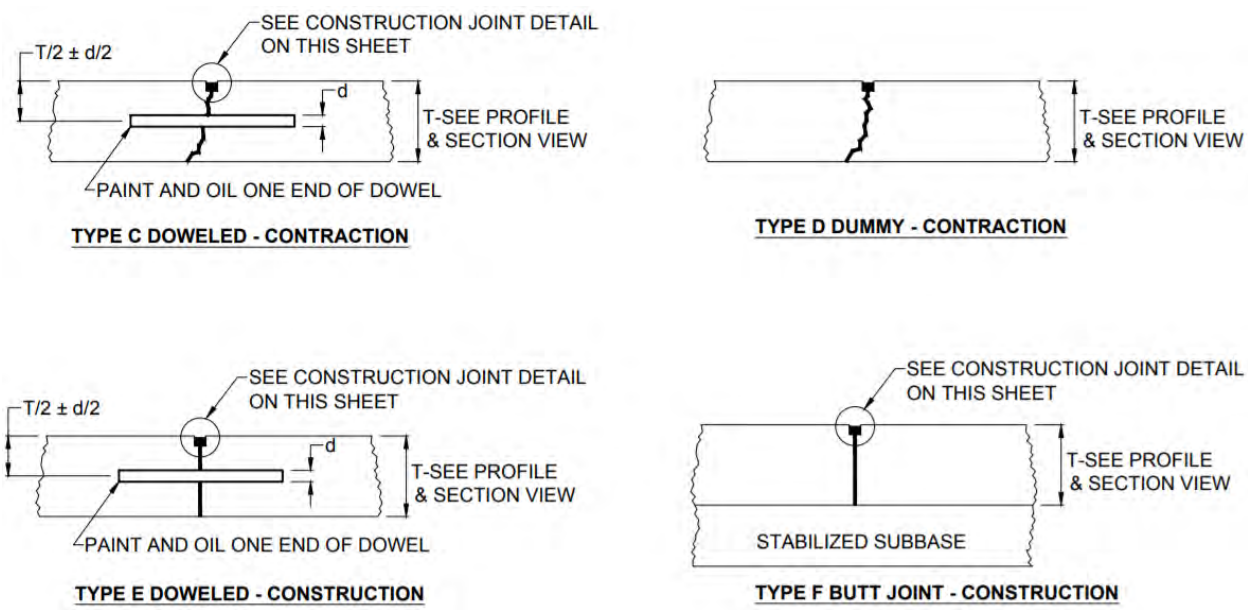

Figure 7. Construction and Contraction Joints Utilized on CC8 (FAA 2009)

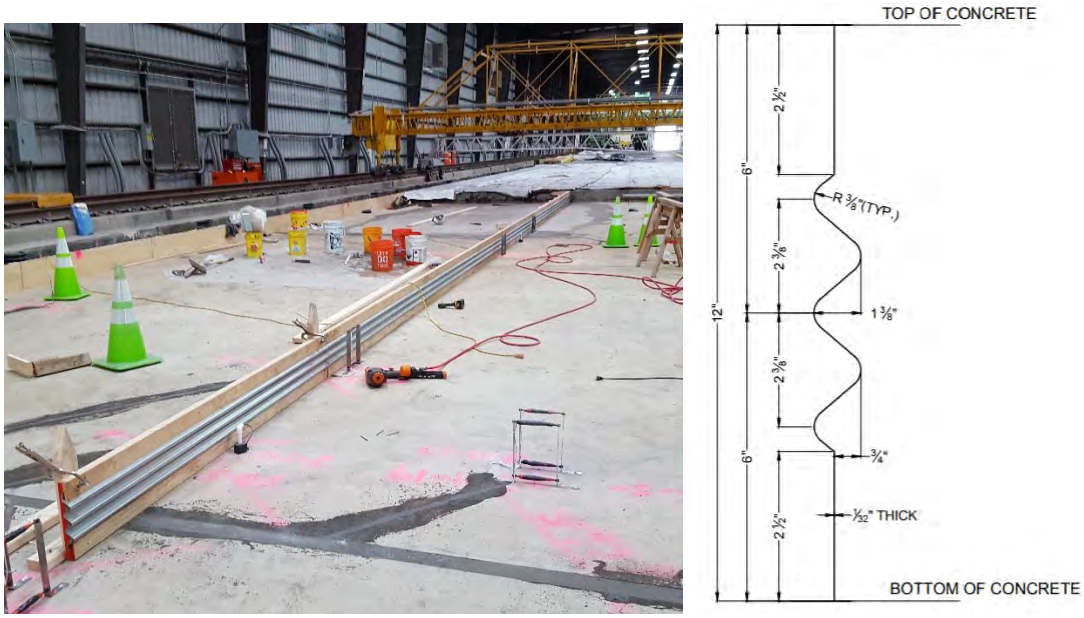

Figure 8. Sinusoidal Keyway Construction Joint

2.1.1 Overload Test Design

Construction for the Overload test design included demolition of the existing CC6 PCC pavement structure, conditioning of the in-situ P-152M subgrade to a target CBR = 7-8, placement of two lifts of P-154M subbase, and placement of one lift of P-501MR PCC surface course. The design thicknesses for the Overload section were as follows: P-154M = 10 in. and P-501MR = 9 in. The Overload test area was constructed between Stations 3+30 and 3+90 and was flanked between Transition 1 (Station 3+00 to 3+30) and Transition 2 (3+90 to 4+00). Transitions were utilized as

a way to distinguish test items as well as to allow time for the NAPTV to get up to speed and apply a constant load. The width of the section ran from -33 ft. (north side) to +33 ft. (south side), which included 6 ft. of existing subbase shoulders on both sides. For the P-501MR layer, longitudinal joints were placed such that the pattern across the remaining 54 ft. width produced ten 12 ft. by 12 ft. slabs each on the north and south sides of the test area, with the middle 6 ft. slabs being utilized as transitions. The transverse joints of the test area slabs were contraction joint Type D Dummy, and all longitudinal joints were construction joint Type E Doweled using 3/4 in. diameter dowels. Compression seals were utilized for all joints. Figure 9 shows the as-built plan and profile drawings for the Overload test design (Note: due to construction variance, as-built elevations may differ from the design).

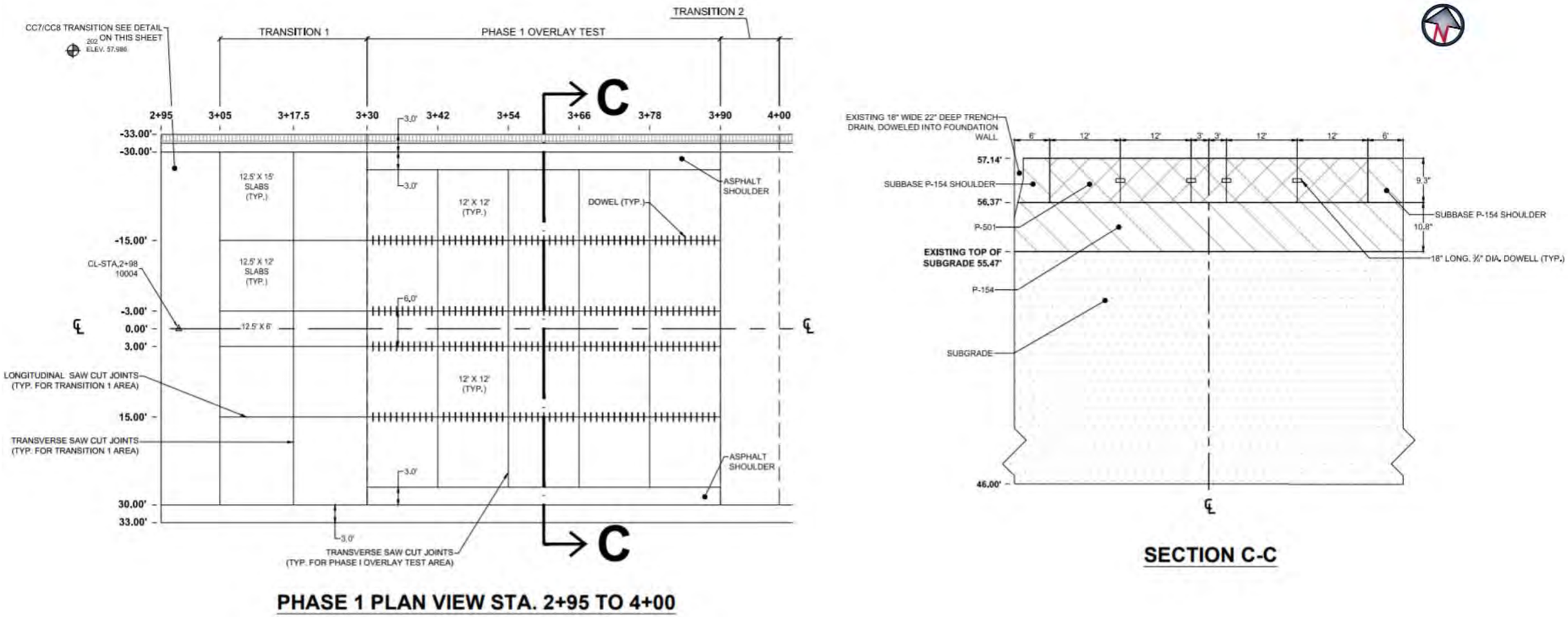

Figure 9. As-Built Plan (Left) and Profile (Right) for the Overload Test Design

2.1.2 Overlay Test Design

The Overlay test design included placement of the P-404MR bituminous bondbreaker layer and one lift of the P-501MR PCC surface course on top of the already constructed and tested Overload test design. The design thicknesses for the Overlay section were P-404MR = 1 in. and P-501MR = 9 in. The stationing and transition locations for the Overlay test area were the same as those described in Section 2.1.1. The width of the section ran from -33 ft. (north side) to +33 ft. (south side). However, the section included only 3 ft. of subbase shoulders on both sides where the Overload section included 6 ft. on each side. For the P-501MR layer, five lanes were poured along the 60 ft. width, resulting in longitudinal joints being offset 3 ft. from the longitudinal joints on the Overload test area. Transverse joints were cut such that twenty-five 12 ft. by 12 ft. slabs were formed in the test area. The transverse joints of the test area slabs were contraction joint Type D Dummy, and all longitudinal joints were construction joint Type E Doweled using 3/4 in. diameter dowels. Compression seals were utilized for all joints. Figure 10 shows the as-built plan and profile drawings for the Overlay test design (Note: due to construction variance, as-built elevations may differ from the design).

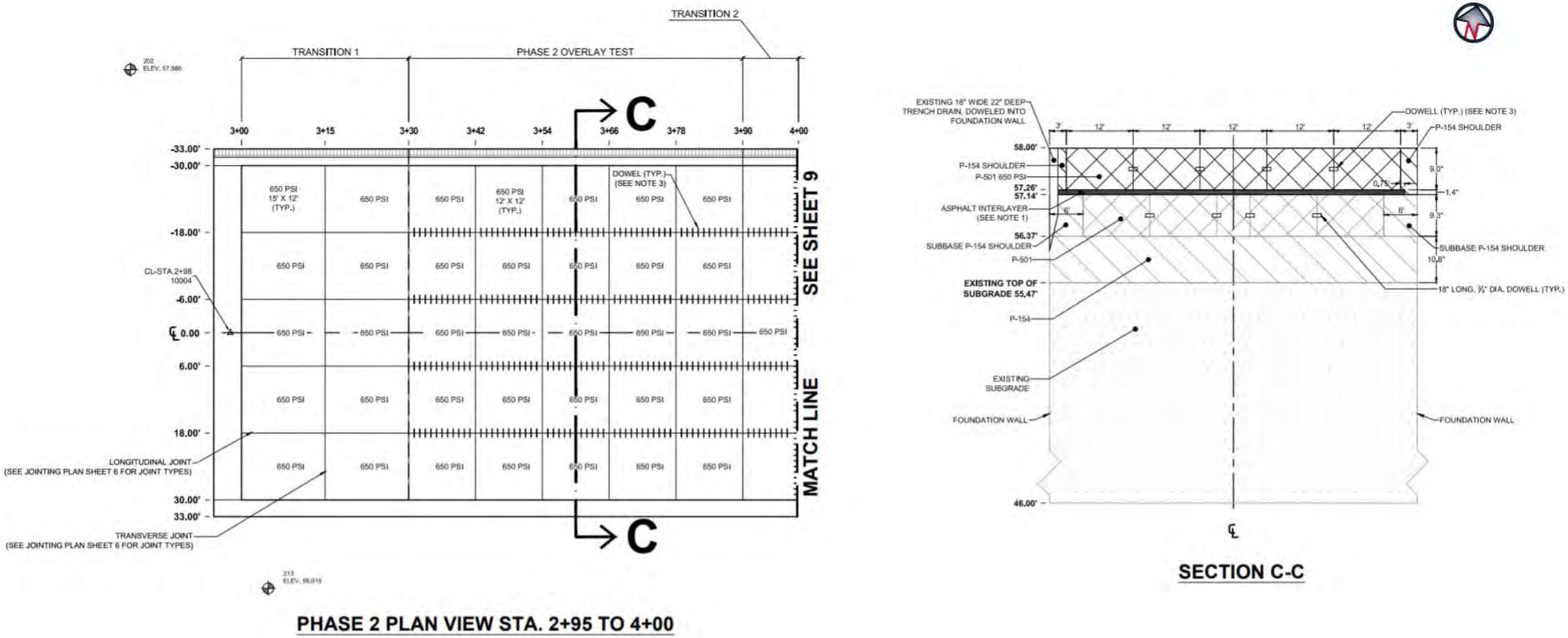

Figure 10. As-Built Plan (Left) and Profile (Right) for the Overlay Test Design

2.1.3 Joint Comparison Test Design

The Joint Comparison test design included the conditioning of the in-situ P-152M subgrade to a target CBR = 7-8, placement of two lifts of P-154M subbase, placement of one lift of P-306MR lean concrete base course, and placement of one lift of P-501MR PCC surface course. The design thicknesses for the Overload section were P-154M = 13 in., P-306MR = 6 in., and P-501MR = 12 in. The Joint Comparison test design was constructed between Stations 4+00 and 4+90 and was flanked between Transition 2 (Station 3+90 to 4+00) and Transition 3 (4+90 to 5+00). The width of the section ran from -30 ft. (north side) to +30 ft. (south side), with an additional 3 ft. of P-154M subbase on each side for shoulders. For the P-501MR layer, a total of twenty-four 15 ft. by 15 ft. slabs were constructed in the test area. Longitudinal joints were construction joint Type E Doweled using 1 in. diameter dowels at an offset of -15 ft. (north side) and along the centerline. Longitudinal joints at an offset of +15 ft. (south side) were constructed using a construction sinusoidal keyway joint. Transverse joints were constructed with contraction joint Type C Doweled using 1 in. diameter dowels at Stations 4+00, 4+15, 4+30, and 4+90 and contraction joint Type D Dummy otherwise. Compression seals were utilized for all joints. Figure 11 shows the as-built plan and profile drawings for the Joint Comparison test design (Note: due to construction variance, as-built elevations may differ from the design).

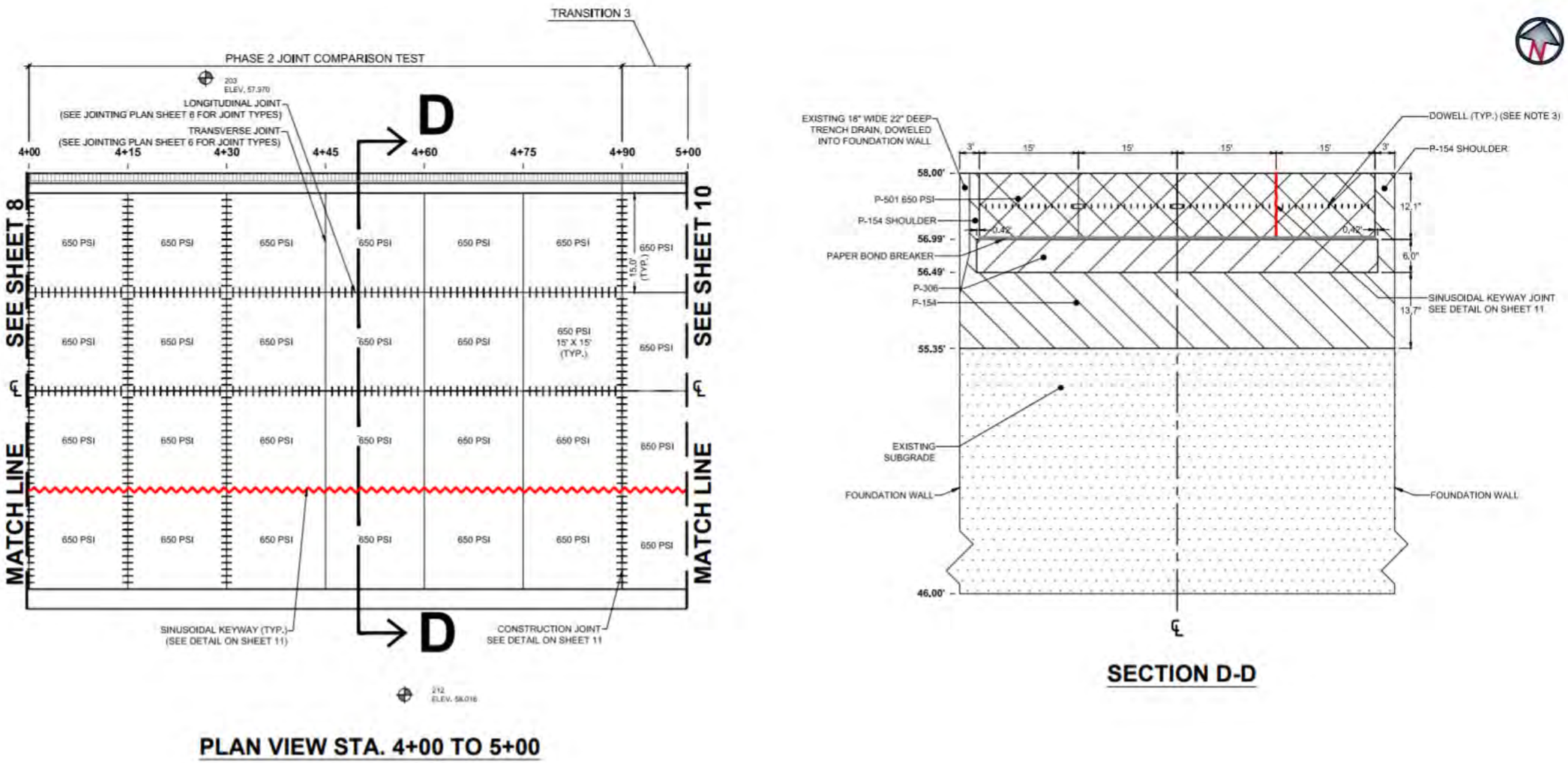

Figure 11. As-Built Plan (Left) and Profile (Right) for the Joint Comparison Test Design

2.1.4 Strength and Fatigue Test Design

The Strength and Fatigue test design included conditioning of the in-situ P-152M subgrade (Station 5+00 to 6+00) to a target CBR = 7-8, placement of three lifts of P-152M subgrade (Station 6+00 to 6+40) to a target CBR = 3-4, placement of two lifts of P-154M subbase, placement of one lift of P-306MR lean concrete base course, and placement of one lift of P-501MR PCC surface course. The design thicknesses for the Strength and Fatigue section (5+00 to 6+00) were P-154M = 13 in., P-306MR = 6 in., and P-501MR = 12 in. The design thicknesses for the Strength and Fatigue section (6+00 to 6+55) were P-154M = 16 in., P-306MR = 6 in., and P-501MR = 9 in. The Strength and Fatigue test design has three different test items:

- Medium strength subgrade (CBR = 7-8) with 650 flexural strength P-501MR (Station 5+00 to 5+60)
- Medium strength subgrade (CBR = 7-8) with 900 flexural strength P-501MR (Station 5+70 to 6+00)
- Low strength subgrade (CBR = 3-4) with 900 flexural strength P-501MR (Station 6+10 to 6+40)

Transition 4 (5+60 to 5+70), Transition 5 (6+00 to 6+10), and Transition 6 (6+40 to 6+55) were located within the Strength and Fatigue test area. The width of the section ran from -30 ft. (north side) to +30 ft. (south side), with an additional 3 ft. of P-154M subbase on each side for shoulders.

For the first test area (Station 5+00 to 5+60), a total of (16) 15 ft. by 15 ft. slabs were constructed. For the second and third test areas (Station 5+70 to 6+00 and Station 6+10 to 6+40), a total of (8) 15 ft. by 15 ft. slabs were constructed for each section. A triangular wood chamfer ran longitudinally along the test areas at an offset of +10 ft. (south side) to guarantee bottom-up cracking. All transverse and longitudinal joints were constructed using construction Type F Butt Joints and compression seals. Figure 12 shows the as-built plan and profile drawings for the Strength and Fatigue test design (Note: due to construction variance, as-built elevations may differ from the design).

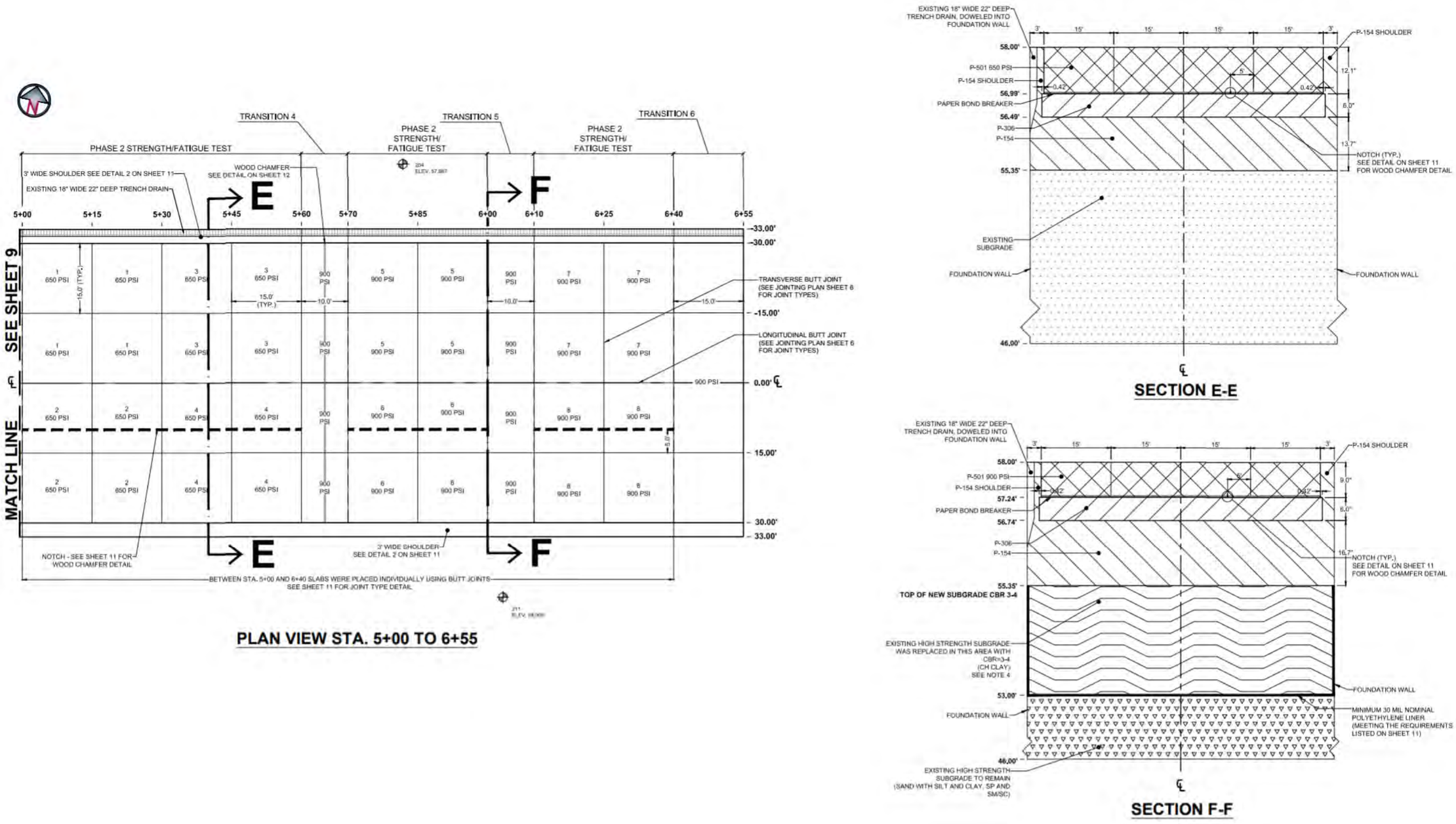

Figure 12. As-Built Plan (Left) and Profile (Right) for the Strength and Fatigue Test Design

2.2 CC8 Material Selection

Material specifications for CC8 were adapted from the FAA Advisory Circular 150-5370-10G, Standards for Specifying Construction of Airports. Modifications to the standards were made in order to reflect the construction practices and site conditions relative to the NAPTF. When necessary, the FAA project team modified the material acceptance and testing criteria to meet the project's objectives. The modified versions of the project specifications have been labelled with an "M" for Modified, or "MR" for Modified Research. The full set of CC8 project specifications can be found in APPENDIX A: SPECIFICATIONS. The materials used for CC8 were: P-152M subgrade, P-154M subbase, P-306MR lean concrete base course, P-404MR bituminous bondbreaker layer, and P-501MR PCC surface course. A general overview of each material and the specifications of each material for CC8 are provided below.

2.2.1 P-152M Excavation, Subgrade, and Embankment

2.2.1.1 Overview

The Unified Soil Classification System of the in-situ subgrade material is CH, fat clay (ASTM 2011). The P-152M was a fairly homogenous material that was mined offsite and originally transported to NAPTF when the building was constructed. An additional delivery of the P-152M occurred during the CC6 build. The material has been stored in Building 207A at the NAPTF and is exposed to the weather. Depending on the construction practices, the P-152M is either reprocessed in-situ to the target CBR or new material is added from the stockpile at Building 207A and processed to the target CBR. A subgrade study was conducted on the stockpiled and in-situ material as the strength/stiffness of the material varied over time. This study, found in APPENDIX C: CC8 SUBGRADE STUDY, looked into potential aging of the P-152M material as well as developed relationships between moisture and CBR for lab and field based tests.

2.2.1.2 Specifications

A material testing plan was developed for both acceptance of the P-152M and material characterization purposes. Table 1 lists the specific tests and requirements for each based on its material testing plan and CC8 specifications.

Table 1. Acceptance and Material Testing for P-152M

Purpose	Test	Requirement(s)
Acceptance	CBR (Low Strength)	-Average of two CBR tests is between 3.0 and 4.0. -The difference between the highest and lowest CBR values for the penetrations at a given location cannot exceed 1.0.
	CBR (Medium Strength)	-Average of four CBR tests is between 7.0 and 8.0. -The difference between the highest and lowest CBR values for the penetrations at a given location cannot exceed 1.0.
	Smoothness, Grade*	-The final surface shall be measured with a 12 ft. straightedge and shall not show any deviation in excess of ½ in. -The final surface shall not be more than 0.05 ft. from true grade.
Characterization	Density & Moisture	-To be taken at the same time and location of CBR tests.
	Vane Shear, DCP, LWD, D-PSPA	-To be conducted on the surface of the top layer at offsets ±25 ft., ±15 ft., and ±5 ft. at Stations 3+45, 3+60, 3+75, 4+25, 4+50, 4+75, 5+20, 5+40, 5+80, 5+90, 6+20, and 6+30.
	Plate Load, Resilient Modulus	-To be conducted on the surface of the top layer at offsets ±15 ft. at Stations 3+60, 4+50, 5+40, 5+90, and 6+30.

**Note: NAPTF has access to a Leica Scanner so this was used to scan each layer that was placed in order to determine grade, thickness, and smoothness.*

2.2.2 P-154M Subbase Course

2.2.2.1 Overview

The approved subbase was an argilite based granular material that conformed to the gradation requirements provided in Table 2. The actual gradation is provided in Figure 13. The material passing the No. 40 sieve was confirmed by the NAPTF NextGen Pavement Materials Laboratory to be non-plastic with no value for the liquid limit.

Table 2. Gradation Requirements for P-154M

Sieve Designation	Percent Passing
3 in.	100
No. 10	60-90
No. 40	5-60
No. 200	0-15

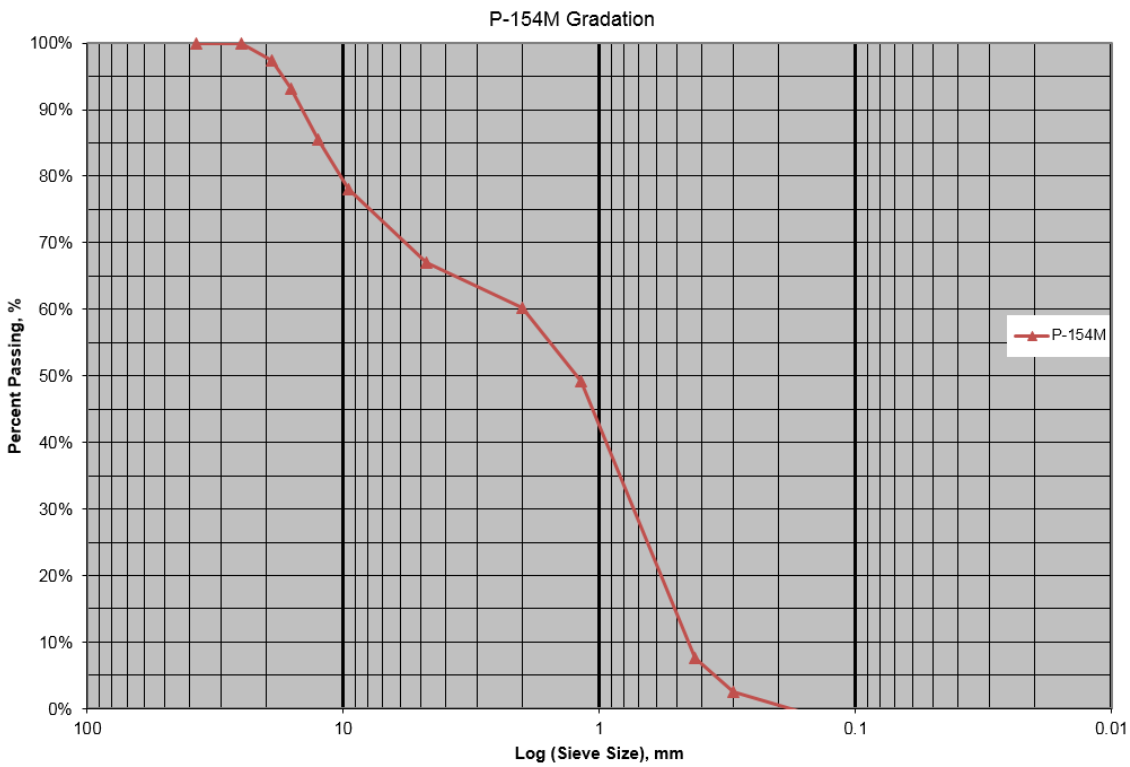

Figure 13. Gradation for P-154M

In addition to the sieve analysis, two modified proctors (ASTM D1577) were performed on the P-154M to determine the optimum water content and maximum dry density. The first modified proctor occurred at the start of construction (12/27/2016) and yielded an optimum water content of 7.6% and maximum dry density of 126.2 pcf. The second modified proctor occurred during the middle of construction (3/13/2017) and yielded an optimum water content of 7.7% and a maximum dry density of 133.2 pcf. These two proctor curves can be found in Figure 14 and Figure 15, respectively.

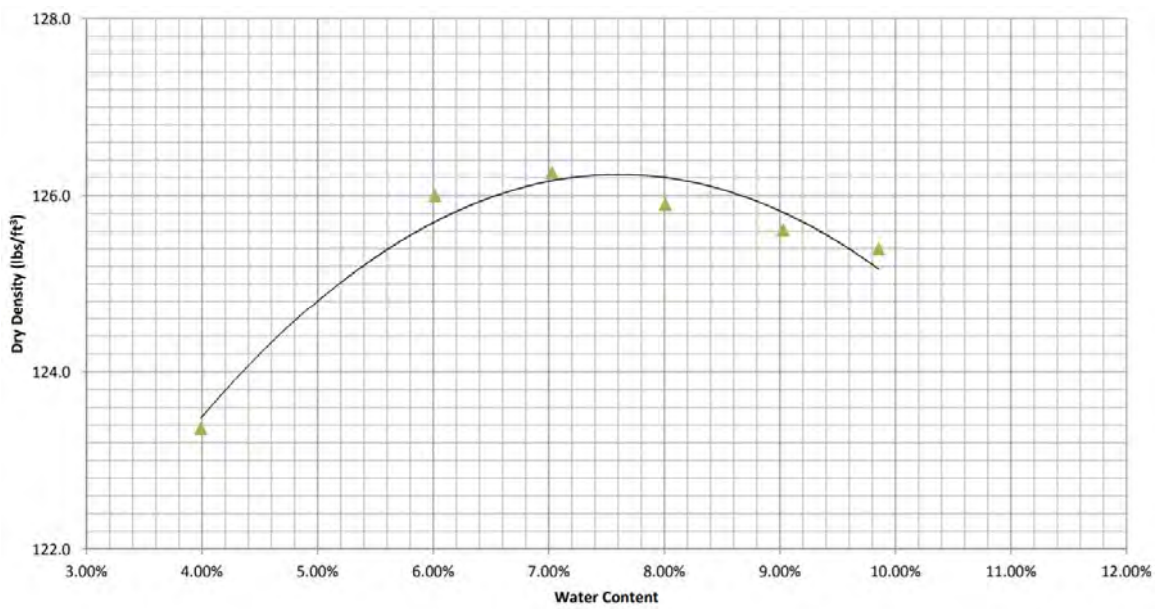

Figure 14. Modified Proctor Performed on P-154M (12/27/2016)

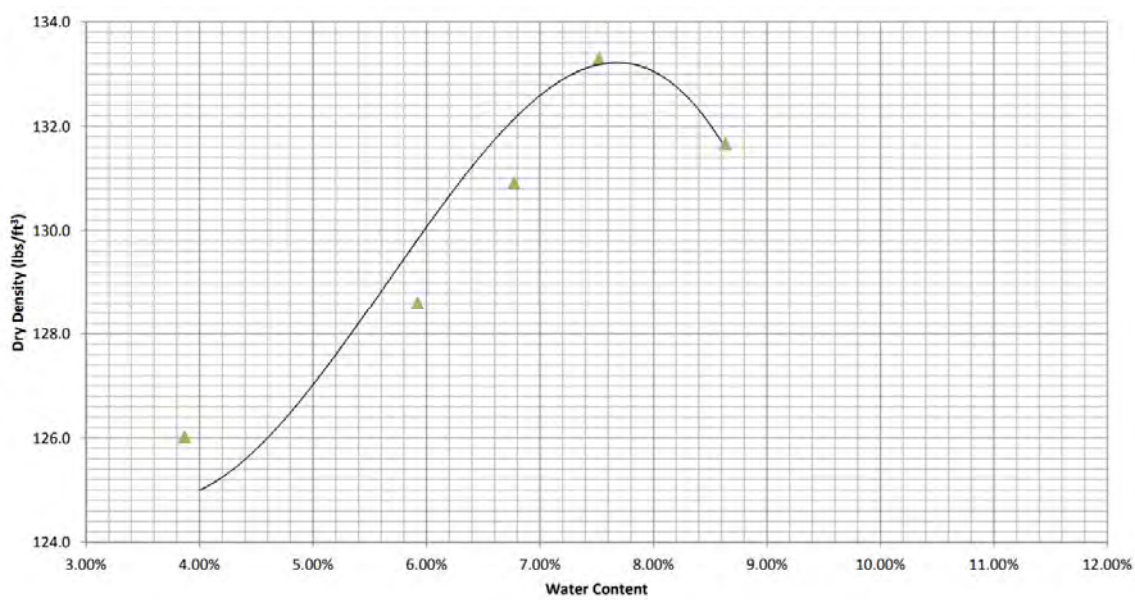

Figure 15. Modified Proctor Performed on P-154M (3/13/2017)

2.2.2.2 Specifications

A material testing plan was developed for both acceptance and material characterization purposes of the P-154M. Table 3 lists the specific tests and requirements for each of the tests, based on the material testing plan and the CC8 specifications.

Table 3. Acceptance and Material Testing for P-154M

Purpose	Test	Requirement(s)
Acceptance	Density	-Six 6 in. sand cone tests to be performed on every lift at random locations. The dry density must be at least 95% of the maximum dry density at target moisture for the first lift and greater than 100% of the maximum dry density at the target moisture content for the other lifts. -The difference between the highest and lowest CBR values for the penetrations at a given location cannot exceed 1.0.
	Smoothness, Grade*	-The final surface shall be measured with a 12 ft. straightedge and shall not show any deviation in excess of 3/8 in. -A 5 ft. by 5 ft. grid shall be used and the grade shall not vary more than 3/8 in. from true grade.
Characterization	Nuclear Density Gauge	-To be taken at the same locations as sand cone tests in addition to offsets ±25 ft., ±15 ft., and ±5 ft. at Stations 3+45, 3+60, 3+75, 4+25, 4+50, 4+75, 5+20, 5+40, 5+80, 5+90, 6+20, and 6+30.
	DCP, LWD, D-PSPA	-To be conducted on the surface of the top layer at offsets ±25 ft., ±15 ft., and ±5 ft. at Stations 3+45, 3+60, 3+75, 4+25, 4+50, 4+75, 5+20, 5+40, 5+80, 5+90, 6+20, and 6+30.
	Plate Load, Resilient Modulus	-To be conducted on the surface of the top layer at offsets ±15 ft. at Stations 4+50, 5+40, 5+90, and 6+30.

**Note: NAPTF has access to a Leica Scanner so this was used to scan each layer that was placed in order to determine grade, thickness, and smoothness.*

2.2.3 P-306MR Lean Concrete Base Course

2.2.3.1 Overview

The lean concrete base course is a material composed of cement and aggregates that conformed to the gradation requirements provided in Table 4. The CC8 specifications called for the cement to be Type II, however, it was decided that Type I cement would be acceptable since the P-154M did not pose any sulfate risks.

Table 4. Gradation Requirements for P-306MR

Sieve Designation	Percent Passing
2 in.	100
1 in.	55-85
3/4 in.	50-80
No. 4	30-60
No. 40	10-30
No. 200	0-15

The mix design provided by the contractor is given in Table 5. Source and consensus properties of the aggregates as well as individual and combined gradations utilized in the suggested mix design are given in Table 6 and Figure 16.

Table 5. Mixture Design for P-306MR

Material	Design Qty.
Sand	1795 lb
3/4 Stone	1800 lb
Type I Cement	191 lb
Fly Ash	29 lb
Water	21 Gal
Air Entrainment	2.7 oz
Non Retarding Water Reducer	6.6 oz

Table 6. Source and Consensus Aggregate Properties for P-306MR Aggregates

Properties	Tuckahoe Sand	Berks #57
Absorption, %	0.4	0.4
Bulk SG	2.621	2.751
Unit Weight, pcf	100	88
LA Abrasion, %	N/T	19
Sand Equivalency, %	91	N/T
Uncompacted Voids, %	41.8	49

ASR, %	0.17	0.13
Clay Lumps & Friables, %	0.1	0
Fineness Modulus	2.73	N/T

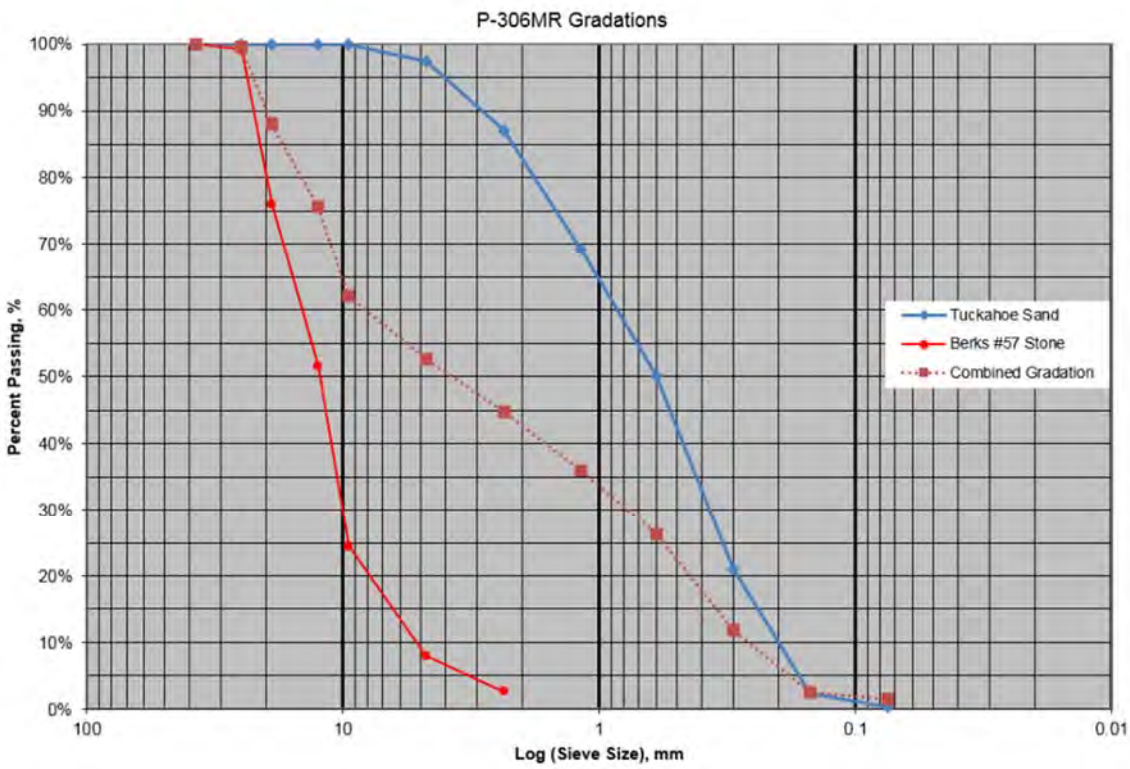

Figure 16. Individual and Combined Gradations for P-306MR Aggregates

The mix design proportions were reviewed and accepted by the FAA project team for trial batching. For the trial batch, a 15 ft. by 20 ft. test bed was constructed. On 1/20/2017, approximately 6 yds^3 of P-306MR material was delivered to NAPTF and poured into the test bed. Personnel from the NAPTF NextGen Pavement Materials Laboratory were on site to test the P-306MR for temperature, air content, slump, and unit weight in addition to casting cylinders for compressive strength testing. Initial testing yielded slump results that were deemed too low by the contractor for workability purposes so additional water was added to the concrete truck. Once the material was at the desired slump, a total of (12) 6 in. by 12 in. cylinders were cast. The P-306MR material that was not used for material testing was poured into the test bed and consolidated with practices outlined in Section 2.3.3. The mix design was approved for construction based on the results from ASTM C39 in Table 7.

Table 7. Compressive Strength Results for P-306MR Trial Batch

Compressive Strength	Average	Standard Deviation	COV, %
3-day, psi	247	5.8	2.3
7-day, psi	697	40.4	5.8

2.2.3.2 Specifications

A material testing plan was developed for both acceptance and material characterization purposes of the P-306MR. Table 8 lists the specific tests and requirements for each of the tests, based on the material testing plan and the CC8 specifications.

Table 8. Acceptance and Material Testing for P-306MR

Purpose	Test	Requirement(s)
Acceptance	Compressive Strength	-2 replicates per sublot. The 7-day strength should be between 500 psi and 800 psi. Only 20% of the cylinders in a given lot can be greater than 800 psi. If more than 20% are greater than 800 psi, transverse joints should not be constructed and a bondbreaker should be used.
	Air Content	-Taken for the first three truckloads. The air content should be between 4% and 8%
	Thickness, Surface Tolerance, Grade*	-The average lot thickness should not be deficient by more than 1/2 in. from the plan thickness. -The final surface shall be measured with a 12 ft. straightedge and shall not show any deviation in excess of 3/8 in. -A 5 ft. by 5 ft. grid (maximum) shall be used and the grade shall not vary more the 1/2 in. from true grade.
Characterization	Compressive Strength	-2 replicates per sublot should be tested for 28-day compressive strength breaks.
	Resonant Frequencies	-2 replicates per sublot to be tested at 7-days and 28-days.

**Note: NAPTF has access to a Leica Scanner so this was used to scan each layer that was placed in order to determine grade, thickness, and smoothness.*

2.2.4 P-404MR Fuel-Resistant Asphalt Mix Pavement

2.2.4.1 Overview

To simulate a typical, unbonded, rigid-on-rigid pavement structure, the Overlay structure utilized P-404MR as a bituminous bondbreaker interlayer. The material was a composition of mineral aggregates and asphalt binder that met New Jersey Department of Transportation (NJDOT) specifications for a HMA 9.5M64 mix. The material composition of the P-404MR that was provided for the shoulder placement (12/9/2016) and lane placement (12/12/2016) are provided below in Table 9.

Table 9. Material Composition for P-404MR

Mix	Sieve	JMF	12/9/2016	12/12/2016
			%	%
9.5M64	3/4 in.	100.0	100.0	100.0
	1/2 in.	100.0	100.0	100.0
	3/8 in.	92.5	96.3	95.8
	No. 4	60.3	55.9	63.9
	No. 16	29.8	26.2	32.8
	No. 50	11.2	10.4	13.1
	No. 200	4.5	3.1	4.5
	Asphalt Content	5.40	5.44	5.58
	VMA	16.9	17.4	16.4

Additional tests were conducted on the aggregate mixture and asphalt mixture during the annual approval by the NJDOT. Table 10 shows the results of these tests as well as the test criteria for the 9.5M64 asphalt mixture that was submitted to the NJDOT for approval on November 30, 2016.

Table 10. P-404MR Aggregate and Asphalt Mixture Properties as Approved by NJDOT

Test Performed	**Test Results**	**Test Criteria**	
		Min	*Max*
Sand Equivalence, %	82.3	45	
Flat and Elongated, %	0.5		10
Fine Aggregate Angularity, %	46.1	45	
Coarse Aggregate Angularity Fracture Faces, %	100	95/90	
Air Voids, %	4.0		
VMA, %	16.9	15.0	
VFA, %	72.2	65	78
Dust/Asphalt Ratio	0.9	0.6	1.2 (1.3)
Maximum Specific Gravity (Gmm)	2.644		
Bulk Specific Gravity (Gmb)	2.538		
% Gmm @ Nini	89		89
% Gmm @ Nmax	97		≤98
Effective Specific Gravity of Blend (Gse)	2.902		
Specific Gravity of Binder (Gb)	1.039		
Specific Gravity of Aggregate Blend (Gsb)	2.890		
Moisture Sensitivity (TSR), %	91	80	
Pounds/Square Yard/Inch	118.8		
Ignition Oven Aggregate Correction Factor (CF), %		0.22	
Absorbed AC, %		0.18	

2.2.4.2 Specifications

A material testing plan was developed for acceptance purposes of the P-404MR. Table 11 lists the specific tests and requirements for each of the tests, based on the CC8 specifications. Table 12 provides the job mix formula (JMF) as well as the acceptance criteria for the P-404MR, based on the CC8 specifications.

Table 11. Acceptance and Material Testing for P-404MR

Purpose	Test	Requirement(s)
Acceptance	Density	-Mat readings should have a density reading of at least 92% of the theoretical maximum density. Joint readings should have a density reading of at least 90% of the theoretical maximum density.
	Mix Design	-The material composition should conform to the criteria provided in Table 12.
	Smoothness, Grade*	- The final surface shall be measured with a 16 ft. straightedge and shall not show any deviation in excess of 3/8 in. -A 5 ft. by 5 ft. grid (maximum) shall be used and the grade shall not vary more the 1/2 in. from true grade.

**Note: NAPTF has access to a Leica Scanner so this was used to scan each layer that was placed in order to determine grade, thickness, and smoothness.*

Table 12. Material Composition Acceptance Criteria for P-404MR

Sieve	JMF	Acceptance Criteria
3/4 in	100	JMF ± 9%
1/2 in	100	JMF ± 9%
3/8 in	92.5	JMF ± 9%
No. 4	60.3	JMF ± 9%
No. 16	29.3	JMF ± 7.5%
No. 50	11.2	JMF ± 4.5%
No. 200	4.5	JMF ± 3%
Asphalt Content	5.40	JMF ± 0.70%
VMA	16.9	> (JMF – 1.50)%

2.2.5 P-501MR PCC Pavement

2.2.5.1 Overview

P-501MR is a non-reinforced pavement composed of PCC. For CC8, two mix designs meeting flexural strengths of 650 psi and 900 psi were required. Mixes previously used at the NAPTF containing standard FAA material proportions were found to obtain flexural strengths well above 900 psi, causing concern that the PCC at the NAPTF would not represent standard mixes used at airports throughout the United States. To remedy this concern, 650 psi was chosen as a weaker mix design as it was statistically different from 900 psi. Where appropriate, modifications were made to the total cementitious material content, water/cement ratio, and aggregate proportioning of the mix designs.

650 Flex Mix

Numerous trial batches were tested in order to produce the 650 Flex mix due to difficulties in obtaining a P-501MR mix with sufficiently low flexural strength. Some batches included the minimum allowable amount of cement, while others included the maximum allowable amount of fly ash. Combinations of these parameters were also tried, but a P-501MR mix with 650 psi flexural strength could not be achieved. It was later determined, however, that a 650 psi flexural strength could be achieved by utilizing a rounded rock (Tuckahoe 5/8 in. stone). Although this is in violation of the FAA specification for fractured faces, it was selected by the FAA project team as the best compromise to the P-501MR mix when other alternatives exceeded the maximum allowable fly ash content or the minimum allowable cement content.

Four mix designs were created and tested with the Tuckahoe 5/8 in. stone to achieve the desired flexural strength of 650 psi. In addition, the FAA project team targeted a water/cement ratio of 0.45 and an air content of 6.0%, respectively, to prevent flexural strength above the established target. Type F fly ash (30% by weight) was used as a partial replacement for cement in order to control the Alkali-Silica Reactivity observed in CC6. Four local aggregates were considered, and gradation charts of all four aggregates are shown in Figure 17. A total of four blended gradations were obtained using roughly 60% coarse aggregate and 40% fine aggregate by total volume so that the intermediate particles would fill major voids and reduce the need for the fine material, therefore aiding in mix mobility. Blended gradations are given in Figure 18. The four mix designs that were developed are listed in Table 13. Source and consensus properties of the aggregates used in this mix are provided in Table 14.

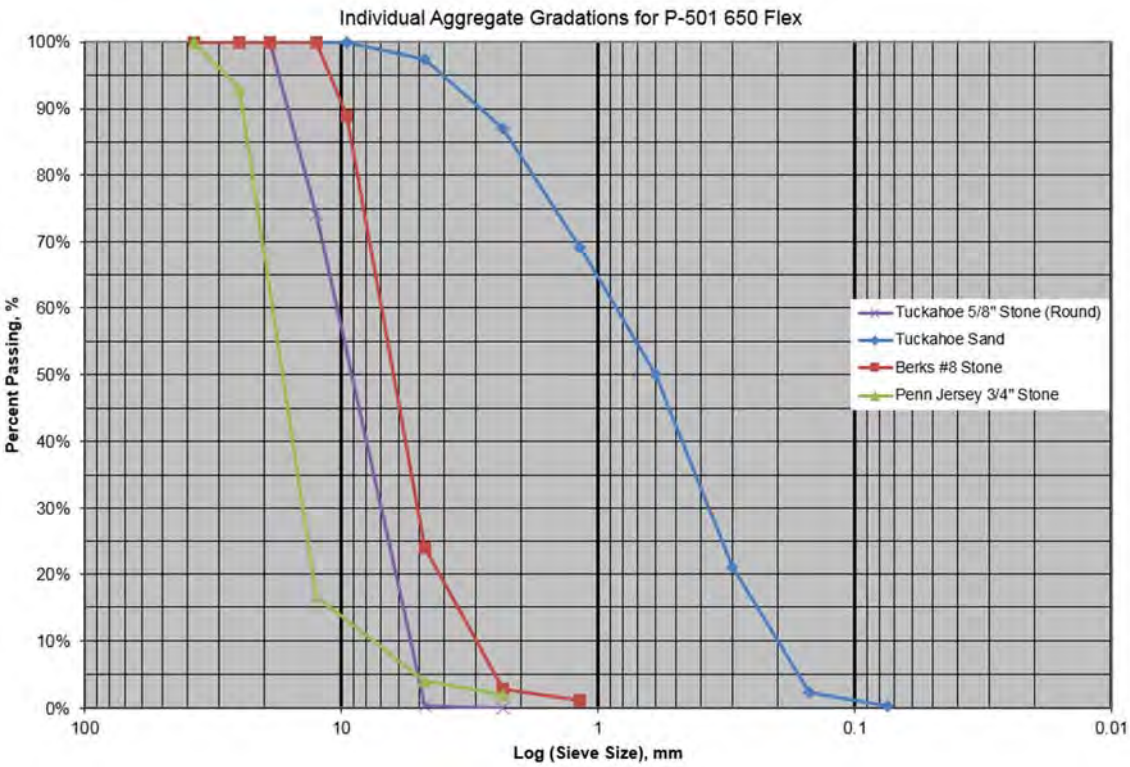

Figure 17. Gradation Chart of Individual Aggregates for 650 Flex Mix

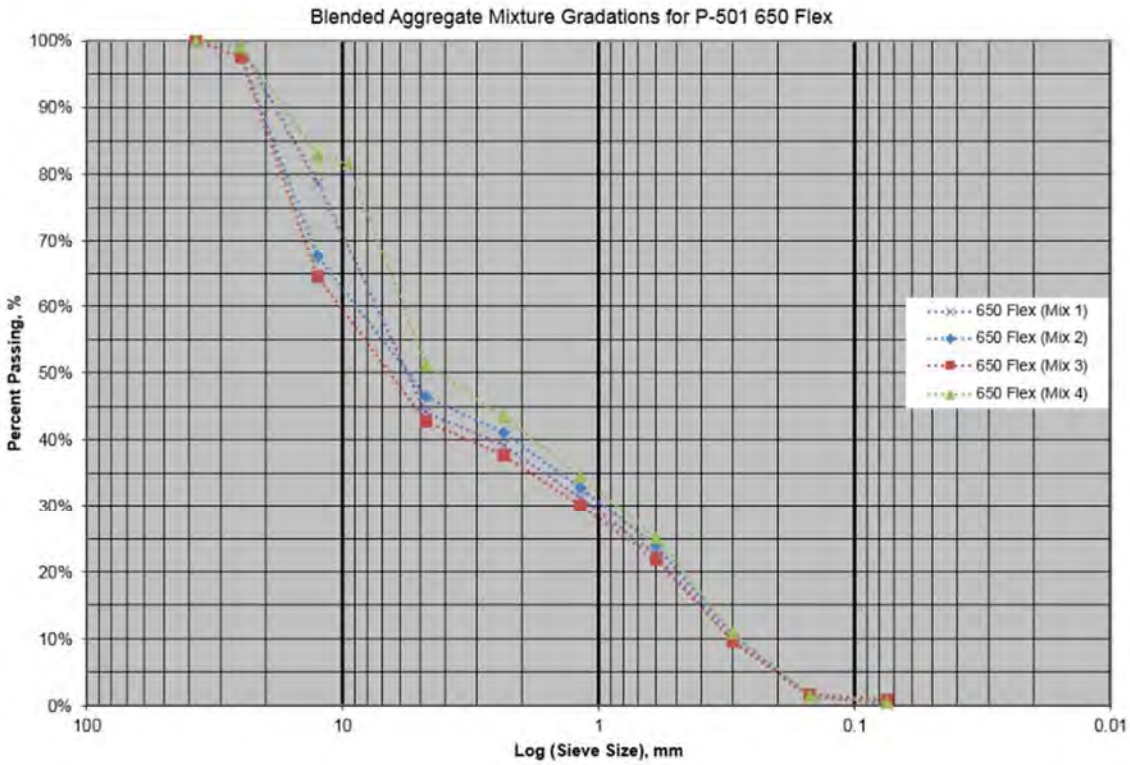

Figure 18. Gradation Chart of Blended Aggregates for 650 Flex Mix

Table 13. Trial Mix Designs for P-501MR 650 Flex

Materials	Proportions, lbs/cy			
	Mix Design 1	**Mix Design 2**	**Mix Design 3**	**Mix Design 4**
Tuckahoe 5/8 in.	1315	650	660	860
Penn Jersey 3/4 in.	365	983	1090	368
Berks #8	0	0	0	336
Tuckahoe Sand	1355	1410	1285	1520
Water	212			
Type 1 PCC	329			
Type F Fly Ash	141			
Air Content, %	6			
W/C Ratio	0.45			

Table 14. Source and Consensus Properties for P-501MR Aggregates

Properties	Tuckahoe Sand	Tuckahoe 5/8 in.	Penn Jersey 3/4 in.	Berks #8	Berks #57
Absorption, %	0.4	TBD	TBD	0.4	0.4
Bulk Specific Gravity	2.621	TBD	TBD	2.751	2.753
Unit Weight, pcf	100	TBD	TBD	88	88
LA Abrasion, %	N/T	TBD	TBD	19	19
Sand Equivalency, %	91	TBD	TBD	N/T	N/T
Uncompacted Voids, %	41.8	TBD	TBD	49	49
ASR, %	0.17	TBD	TBD	0.13	0.13
Clay Lumps & Friables, %	0.1	TBD	TBD	0	0
Fineness Modulus	2.73	N/T	N/T	N/T	N/T

Blended aggregates were first evaluated using the Shilstone coarseness-workability chart. As shown in Figure 19, Mix 1 and 3 are within Zone II, which is generally considered to be a workable mix. Zone I is gap graded with very little amounts of intermediate aggregates and Zone III, which Mix 4 fell into, has a large majority of intermediate and very little coarse aggregate. Zone IV, which Mix 2 fell within, and Zone V correlate with extreme sandiness and rockiness. It should be noted that for Mix 1, Mix 2, and Mix 3, the cumulative percent retained on the 3/8 in. sieve had to be interpolated since the submittal gradations did not include the 3/8 in. sieve.

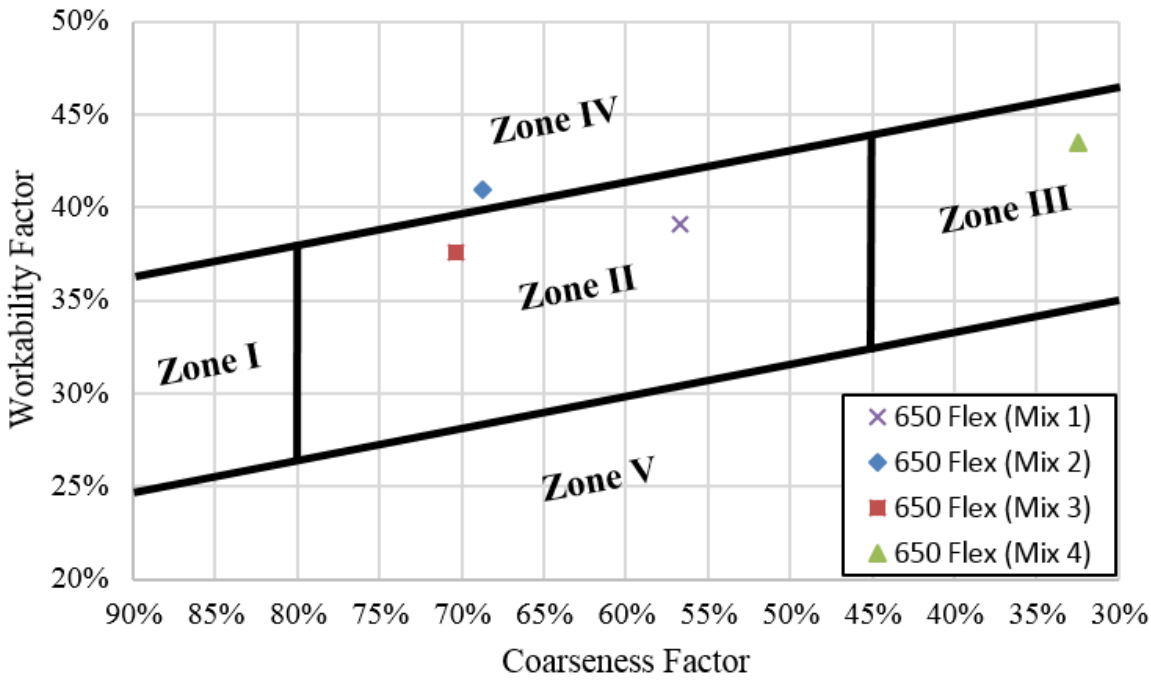

Figure 19. Coarseness-Workability Chart for 650 Flex Mix

The second tool used to evaluate the blended aggregates was Percent Retained (PR) chart. This chart is typically used as an indicator of the workability and low water demand of a mixture. The PR chart is commonly called the "8-18 chart" due to a minimum of 8% and a maximum of 18% required as gradation limits for sieves between 1 in. and #30. These limits are marked as red solid lines on Figure 20. As shown in Figure 20, Mix 1 through Mix 3 fell outside the limits on the coarse and intermediate aggregate size portion of the chart. Mix 4 had a low spot and high spot in the intermediate aggregate size of the portion of the chart, but was typically found to be within the limits. Although all mixtures fell outside the "8-18" band, it did not necessarily indicate the mixtures would be unacceptable.

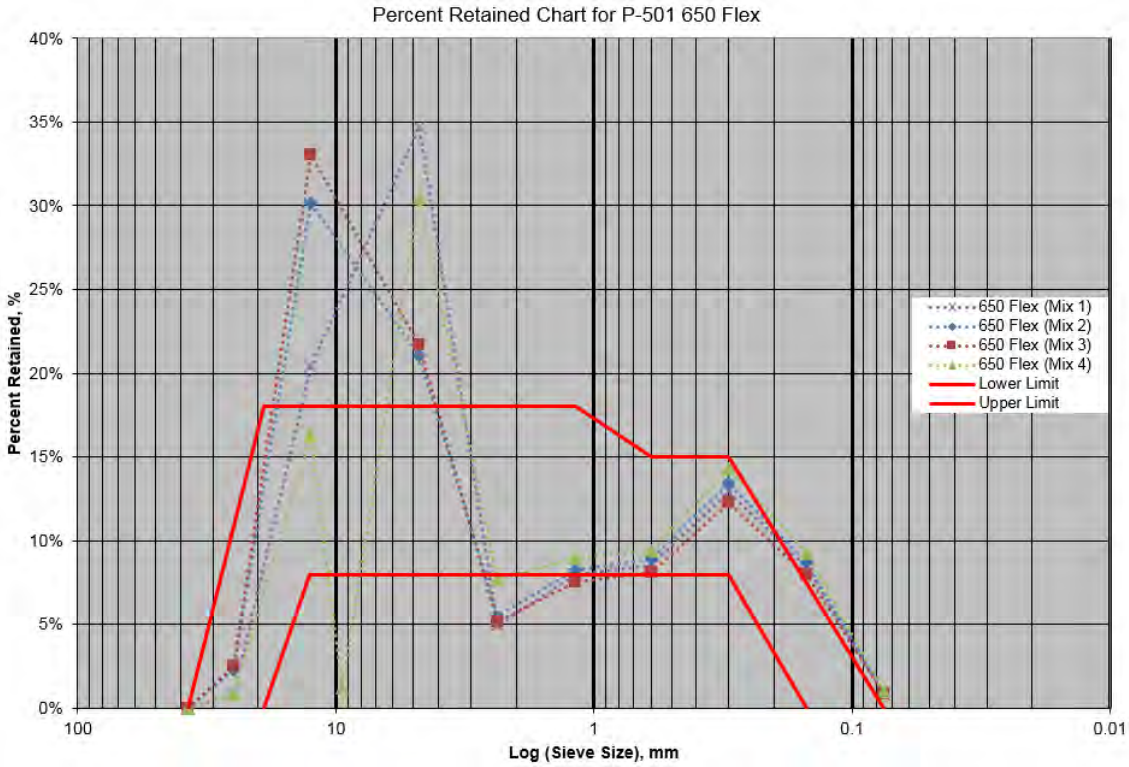

Figure 20. Percent Retained Chart for 650 Flex Mix

In order to track strength gain in the mix, the flexural and compressive strength of all four mixes were measured in accordance to ASTM C78 and C39, respectively. As shown in Figure 21, the flexural strength of all mixes started between 400-450 psi at 7 days. After 28 days, Mix 1 had the highest average break strength, 560 psi, which was 15% less than the target strength, 650 psi. Given the moderate dosage level of fly ash, the mix was expected to continue to gain strength over time. Concerning compressive strength (Figure 22), Mix 1 showed the most uniform strength development over the testing period among the mixes. Mix 1 was also more workable during the batching process and therefore was selected for use within CC8 to facilitate placement around instrumentation.

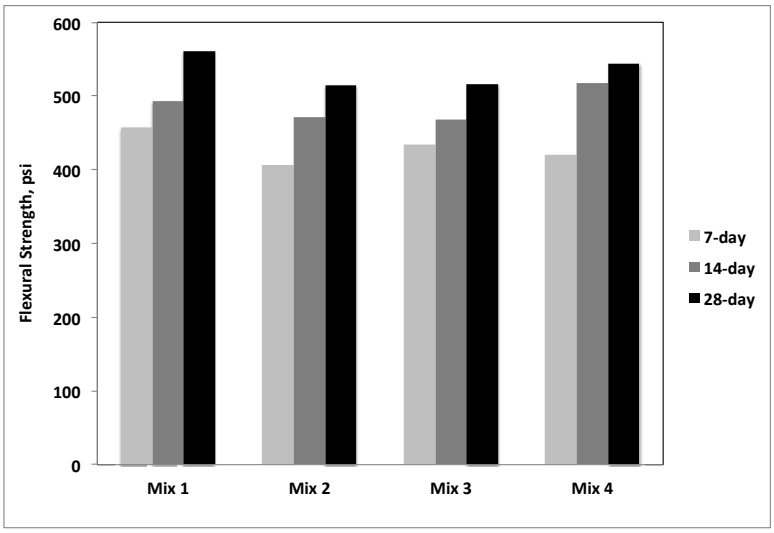

Figure 21. Flexural Strength of 650 Flex Trial Mixes

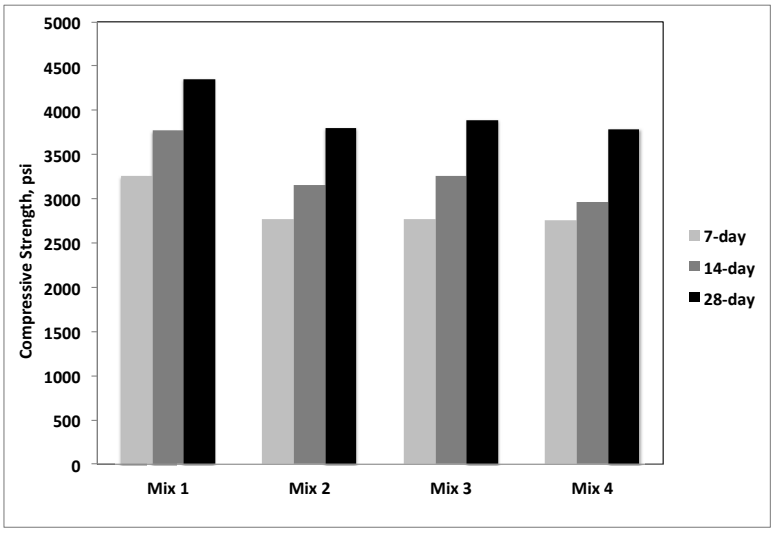

Figure 22. Compressive Strength of 650 Flex Trial Mixes

900 Flex Mix

The FAA project team utilized a recommended design from the material supplier for the 900 flexural strength mix shown in Table 15. The mix design proportions were reviewed and accepted by the FAA project team for trial batching. The mix design was trial batched and approved for construction based on the results from ASTM C78 in Table 16.

Table 15. CC8 900 Flex Mix Design

Mix Design	900 Flex
Total Cementitious	**705**
Pozzolan Replacement	**25%**

Material	Description	Quantity (lbs/cy)
Cement	Lafarge Type 1	529
Pozzolan	STI ProAsh Type F	176
Fine Aggregate	Tuckahoe Sand & Gravel Inc.	910
Coarse Aggregate	Berks Products #57	1550
Coarse Aggregate	Berks Products #8	250
Water	Potable	315
Air		6%

Table 16. Flexural Strength Results for 900 Flex Mix

Flexural Strength	Average	Standard Deviation	COV, %
7-day, psi	755	40.4	5.4
14-day, psi	926	28.0	3.0
28-day, psi	956	37.8	3.9

In summary, the mix designs, presented in Table 17, were provided by the contractor for the 650 and 900 Flex mixes.

Table 17. Mixture Designs for P-501MR

Material	650 Flex Design Qty.	900 Flex Design Qty.
Sand	1355 lb	910 lb
3/4 Stone	365 lb	1550 lb
5/8 Stone	1315 lb	-
1/2 Stone	-	250 lb
Type I Cement	329 lb	529 lb
Fly Ash	141 lb	176 lb
Water	25.5 gal	37.8 gal
Air Entrainment	5.85 oz	22.3 oz
High Range Water Reducer	18.8 oz	28.2 oz

2.2.5.2 Specifications

A material testing plan was developed for both acceptance and material characterization purposes of the P-501MR. Table 18 lists the specific tests and requirements for each of the tests, based on the material testing plan and the CC8 specifications.

Table 18. Acceptance and Material Testing for P-501MR

Purpose	Test	Requirement(s)
Acceptance	Flexural Strength	-2 replicates per sublot. The percent within limits must equal or exceed 90% of the lot.
	Thickness, Smoothness, Grade*	-The percent within limits for the lot thickness must equal or exceed 90%. -The final surface shall be measured with a 12 ft. straightedge and shall not show any deviation in excess of 1/4 in. -A 5 ft. by 5 ft. grid (maximum) shall be used and the grade shall not have a lateral deviation in excess of 0.10 ft. (pavement edge or joint) or a vertical deviation in excess of 0.04 ft. at any point.
Characterization	Compressive Strength	-2 replicates per sublot should be tested for 7-day and 28-day compressive strength breaks.
	Flexural Strength	-2 replicates per sublot should be tested for 7-day and 28-day flexural strength breaks.
	Resonant Frequencies**	-2 replicates per sublot to be tested at 7-days, 28-days, and pre-traffic.
	HWD**	-To be performed on the surface of the P-501MR at the center of each slab and Eddy-current sensor locations.
	PSPA	-To be tested at offsets ±25 ft., ±15 ft., and ±5 ft. at Stations 3+45, 3+60, 3+75 for the Overload test area. To be tested at 7-days, 28-days, and pre-traffic for the same locations as HWD testing for the Overlay, Joint Comparison, and Strength and Fatigue test areas.

**Note: NAPTF has access to a Leica Scanner so this was used to scan each layer that was placed in order to determine grade, thickness, and smoothness*

***Was not performed on Overload test area.*

2.3 CC8 Construction Practices

2.3.1 P-152M Construction Practices

Historical data from previous NAPTF CCs, as well as a subgrade study provided in APPENDIX C: CC8 SUBGRADE STUDY, were utilized to determine a target moisture content to achieve the design CBR for the P-152M material. Considering both resources, the FAA project team identified a target moisture content of ~29% to achieve the design CBR = 7-8 and ~25% to achieve the design CBR = 3-4. Since achieving the CBR value was imperative to the study, moisture content targets were determined relative to those desired ranges.

P-152M was either conditioned in place (Station 3+00 to 6+00) or processed in Building 207A and transferred to NAPTF (Station 6+00 to 6+55). Transporting P-152M into NAPTF was only used if the design called for the area to be filled or the area became contaminated, otherwise, the subgrade was conditioned to the target CBR value. To reach the target moisture content, the in-situ or stockpiled P-152M was regularly processed with the BOMAG MPH-364 soil stabilizer (Figure 23) and Seamax travel mixer (Figure 24) and tested for moisture. The stockpiled P-152M would be transferred once it reached the optimum moisture content, as it would lose 1-2% moisture during transport from Building 207A. Experience with the P-152M material has shown that it reaches the target moisture content more quickly when it is dry of optimum versus being wet of optimum. The material was transferred to NAPTF and placed in lifts not exceeding 12 in. (the initial specification was modified from 8 in. to 12 in. during construction).

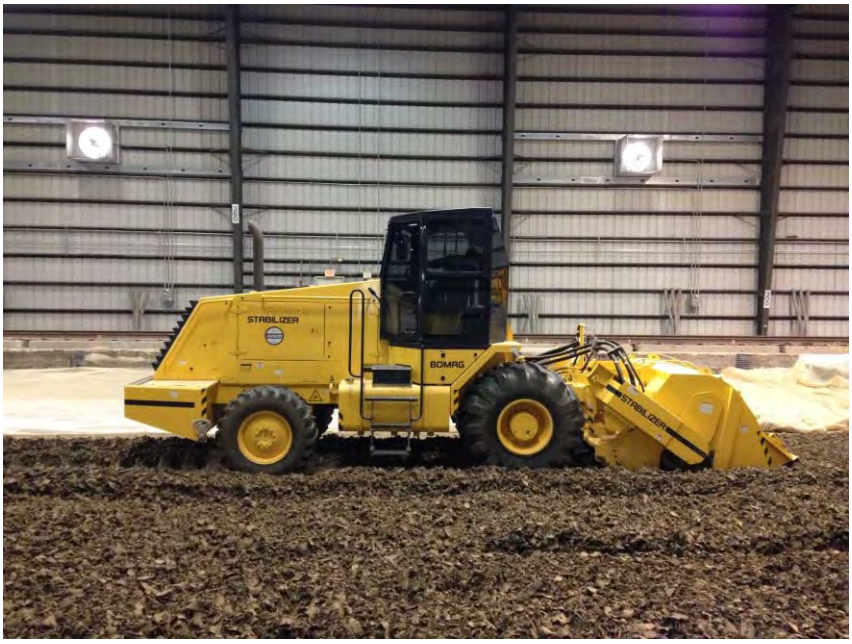

Figure 23. Bomag MPH 364-2 Soil Stabilizer

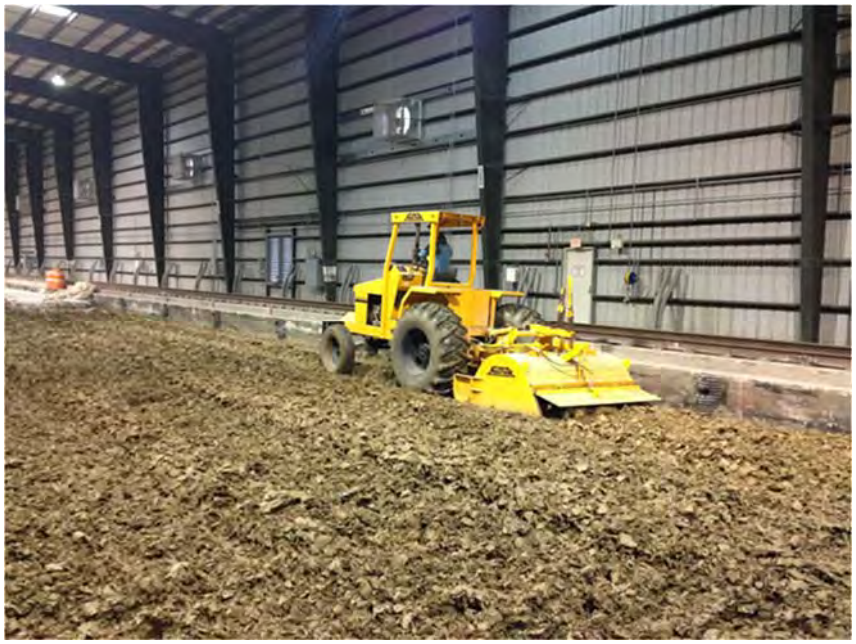

Figure 24. Seamax Travel Mixer

After the P-152M was placed in the test area, it was processed again using the Bomag and/or Seamax, and moisture content samples were collected. If the subgrade required less moisture, commercial fans were used to circulate airflow across the test area. If the subgrade required additional moisture, NAPTF's Bridge Deck Finisher (BDF), shown in Figure 25, was used to accomplish this task.

Figure 25. Bridge Deck Finisher

The water was dispersed across the section at a uniform rate and allowed to permeate the subgrade for a short period (minimum of 2 hours) before being re-processed by the contractor. After re-processing, additional moisture content samples were collected and tested, and the P-152M was compacted to minimize moisture loss. The method of processing, watering, re-processing, testing, and compacting was continued until a uniform, target moisture content was achieved. Once a

uniform moisture content was achieved, the contractor compacted the subgrade for acceptance testing using earth rollers. An Ingersoll Rand SD100D single drum vibratory roller was used to compact the processed subgrade material (Figure 26). The contractor rolled the test area from the centerline to the south edge of the test area until the surface was smooth. The compaction process was repeated with a CAT PS300C pneumatic roller (Figure 27) to densify the material and prepare the lift for acceptance testing. Prior NAPTF research showed that the pneumatic tire roller was the ideal equipment for stitching the subgrade together by squeezing the air out in addition to providing a flat surface for testing. The team monitored the compaction effort by measuring the undrained shear strength of the subgrade with a vane shear. Compaction was performed until a smooth uniform surface was achieved for testing. When testing yielded unsatisfactory results, the entire subgrade processing procedure was repeated until the acceptance specifications were met, as listed in Table 1.

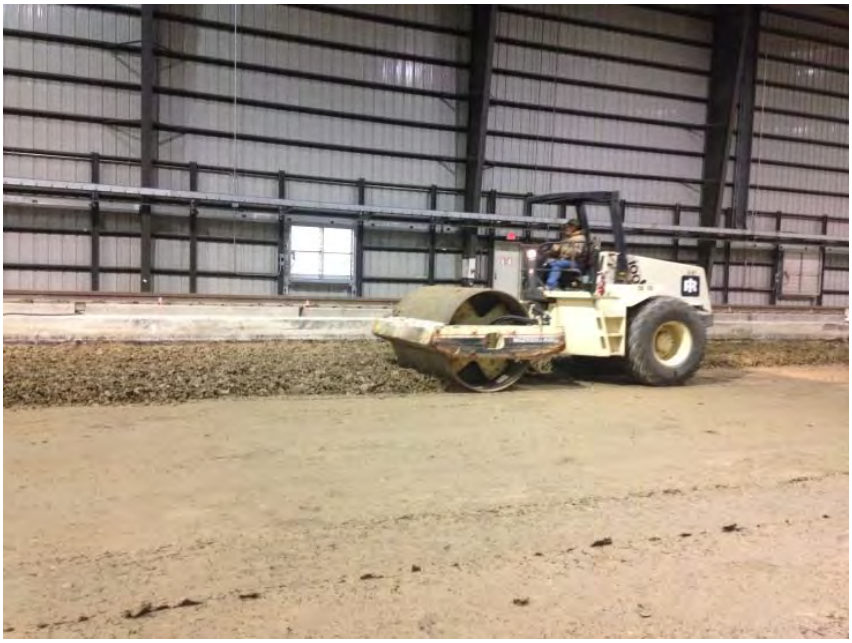

Figure 26. Compaction of P-152M Using Ingersoll Rand SD100D Roller

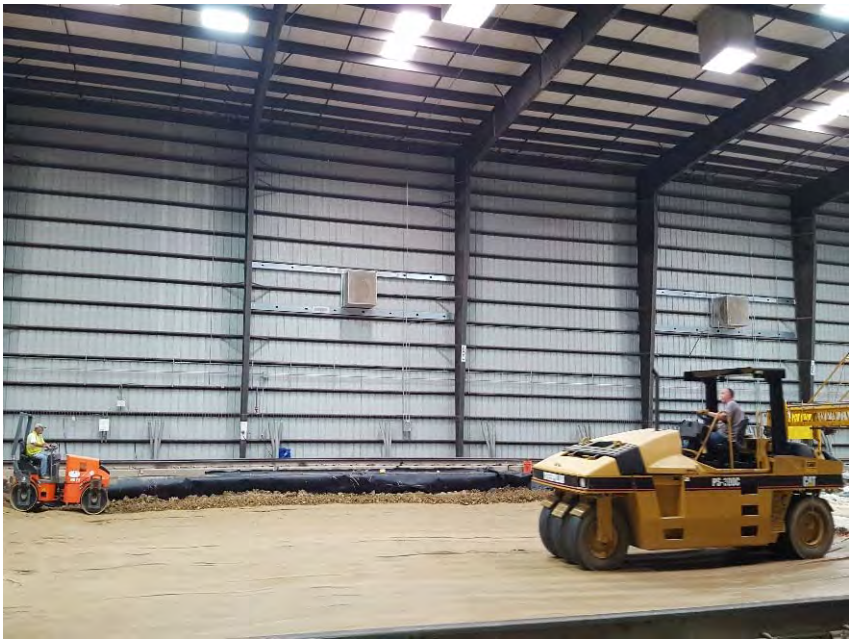

Figure 27. Compaction of P-152M Using CAT PS300C Pneumatic Roller

Once accepted, the contractor trimmed (fine-graded) the P-152M subgrade to the design elevation using a Hitachi 160LC excavator, Kobelco SK160 excavator, or a Kubota KX121-3 mini excavator equipped with flat-edged buckets (Figure 28). Specific acceptance requirements for smoothness and elevation are provided in Table 1. Actual design elevations and acceptance results are discussed in Section 2.4 for each testing section.

Figure 28. Trimming Subgrade with Excavator

2.3.2 P-154M Construction Practices

Placement of the P-154M subbase was completed in lifts not exceeding 8 in. at a target moisture content of 7%. This target moisture content was typically 1.5-2% drier than the optimum moisture content in order to prevent issues with water draining down into the subgrade due to densification under traffic loading. The P-154M was typically installed at a moisture content lower than the target content so the BDF could be utilized to closely monitor the moisture added to the material. The contractor hauled the subbase material into the NAPTF with tri-axle dump trucks and pushed the material through the test area using a CAT D3C dozer. The contractor graded the subbase within the test area using grade indicators on the dozer. Moisture analysis of the subbase was completed by lab personnel upon delivery to the NAPTF.

Figure 29. Placement of the P-154M Subbase

Similarly to the P-152M layer, when the P-154M was too wet, commercial fans were used to circulate airflow across the test area to promote drying. When the P-154M was too dry, the BDF was used to disperse water across the section at a uniform rate. The water was then given time to permeate through the layer. Once placed, the P-154M was compacted with multiple rollers. From Station 4+00 to 5+65, the Hamm 3307 Vibratory Single Drum Roller followed by the CAT PS300C Pneumatic Roller was used to achieve compaction. From Station 5+65 to 6+55, the Wirtgen HD12 Finishing Roller followed by the Dynapac single drum vibratory roller followed by the CAT PS300C Pneumatic Roller was used to achieve compaction. Compaction of the layer was monitored by the nuclear density gauge and was finished once there was little to no change in the compaction results from the nuclear density gauge.

The final surface lift for each P-154M section was slightly overbuilt and trimmed to achieve the design elevation. The P-154M was fine graded by the contractor using a Lee Grader equipped with electronic grade controls (Figure 30). The Lee Grader is smaller than typical fine graders used for construction, however, it works well at the NAPTF as it does not leave tire tracks. This allows the contractor to compact the graded surface more easily, in order to produce a smooth finish for the subbase material characterization testing (Figure 31).

Figure 30. Fine Grading the P-154M to Elevation

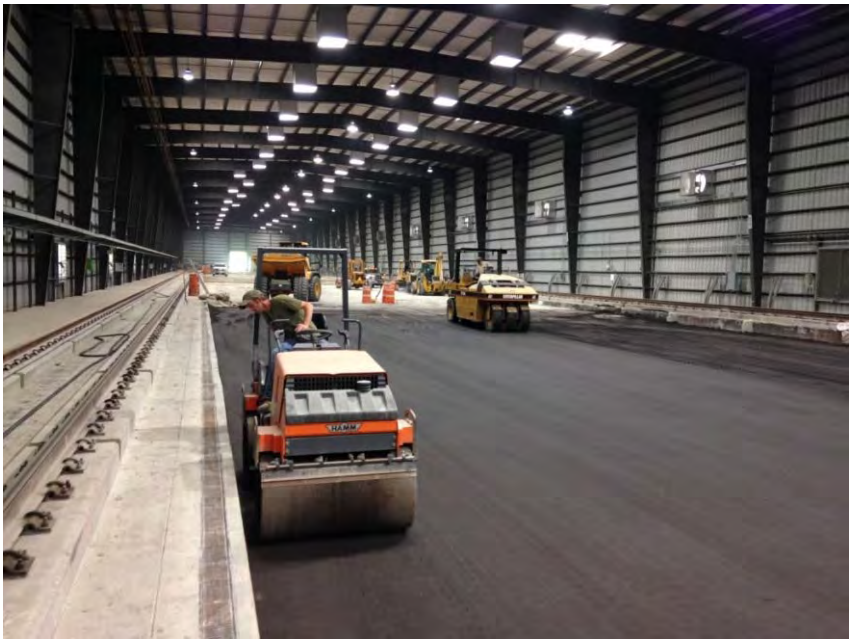

Figure 31. Final Compaction of P-154M Surface

Once compaction was complete, acceptance and material testing as presented in Table 3 was conducted. Actual design elevations and acceptance results are discussed in Section 2.4 for each testing section.

2.3.3 P-306MR Construction Practices

The contractor constructed forms on site according to the plans for each section, and the FAA project team installed required instrumentation. Both the contractor and FAA project team verified the formwork and instrumentation prior to placement. The P-306MR material was supplied by the contractor. When delivered, approximately 0.25 cubic yds. of P-306MR was poured off prior to collecting material for acceptance testing. According to ASTM C172, the portion sampled for material testing should have been in the middle 80% of the pour, however, the FAA project team decided that too much concrete would be wasted if this guideline was followed. Material acceptance testing and characterization was completed onsite by members of Craig Testing Laboratories, Inc. and the NextGen Pavement Materials Laboratory using the criteria established in Table 8 (Figure 32).

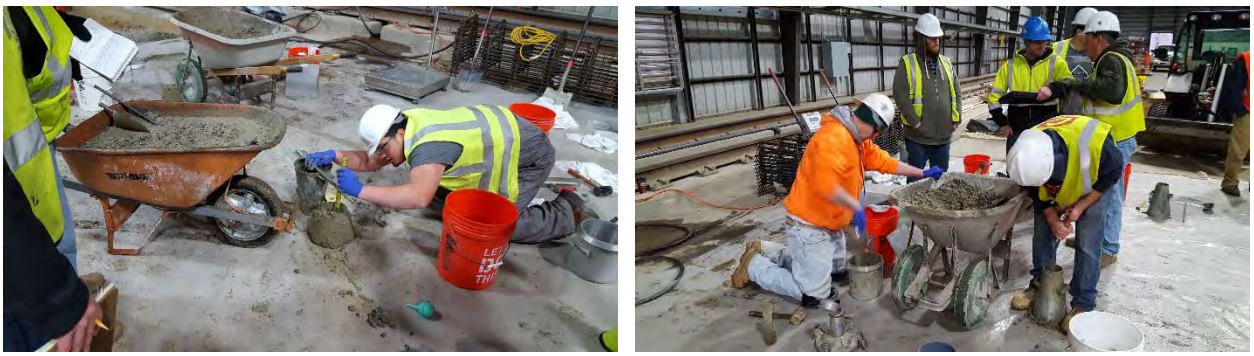

Figure 32. Material Testing and Characterization of P-306MR

When the material passed the requirements provided in Table 8, the P-306MR was loaded into the Putzmeister Telebelt, Truck-Mounted Telescopic Belt Conveyor (Figure 33) and placed in the test area. The P-306MR was placed in lanes as that is standard construction practice. If the material failed, the truck was adjusted and retested. Depending on the results, the material would be placed or rejected and sent off site. Actual design elevations and acceptance results are discussed in Section 2.4 for each testing section. The use of the conveyor truck allowed the contractor to place the material in the test area with minimal disturbance to the subbase and instrumentation.

Figure 33. Putzmeister Telebelt Conveyor Truck

The P-306MR material was loaded from the delivery trucks into the conveyor's hopper bin and moved along the conveyor belt of the boom into the placement lanes. Common masonry hand tools and a vibratory screed were used by the contractor to complete the P-306MR placement. One deviation from the specifications, however, was that the contractor was permitted to spread the P-306MR with rakes, as it was deemed that this would not be detrimental to final acceptance. The instrumentation was monitored and protected by FAA project team members during the placement. All sensors and gauges placed within CC8 are provided in Section 2.5. The contractor floated the surface material and finished it with a smooth trowel. Photos of typical placement practices can be found below in Figure 34.

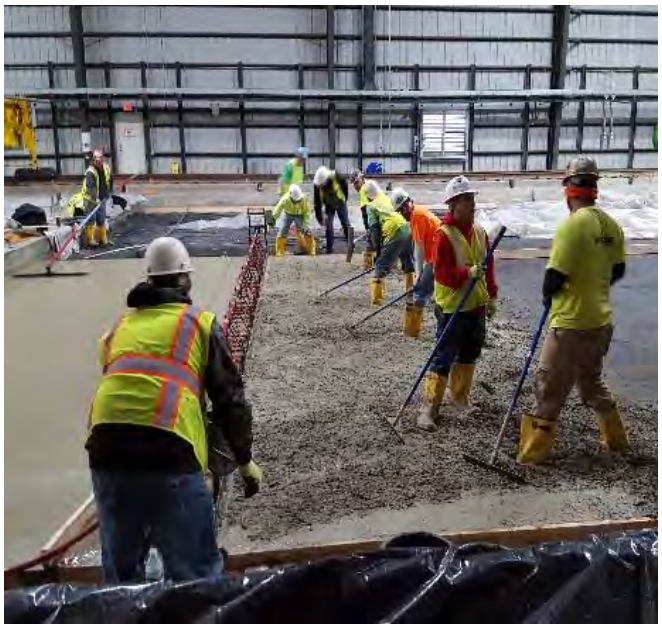

Figure 34. P-306MR Material Placement

The contractor covered the test area and samples after each placement with burlap and a poly sheet product for curing and to prevent curling. After the P-306MR was cured, the contractor made sawcuts into the finished P-306MR surface in accordance with project plans for instrumentation. The instrumentation was embedded into the pavement and backfilled with HD-50 to reduce any stress concentrations.

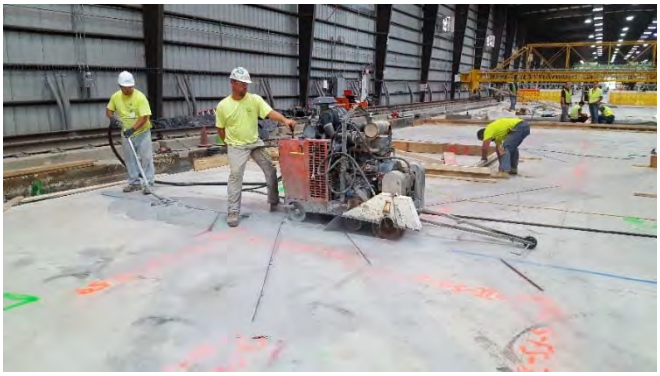

Figure 35. Sawcutting P-306MR for Instrumentation

2.3.4 P-404MR Construction Practices

Hi Calcium Lime Slurry was applied to the PCC surface by the contractor in order to dry it out and promote an unbonded structure prior to placement of the P-404MR. The contractor dispersed the lime slurry and spread the material by hand with brooms and squeegees until the test area was evenly coated. The slurry material was given 72 hours from application to dry before placement of the interlayer. Placement of the P-404MR was done in five 12 ft. wide lanes. Material was

discharged from the back of the CAT AP655F paver at the start of each lane and worked into place by hand. After the initial portion of the section was completed by hand (~5 ft.), the lane was finished using the paver. The paver placed material extending passed the test area, and excess material was removed by hand. Hot joints were used between lanes. A CAT CB54 10 ton roller was used in static mode for initial breakdown rolling, then in vibration mode for compaction. Joints were initially left uncompacted and were rolled after the adjacent lane was placed. A CAT CB-224C 3 ton finishing roller was used to eliminate roller marks. Bulk heads were used at the end of each lane for the roller to roll off of the end of the mat. A vibratory plate compactor was used at the beginning of the lanes, where the roller could not reach. The P-404MR was saw cut at the end of the test area to remove the excess material. Images of the lime slurry application and P-404MR placement are provided in Figure 36 and Figure 37.

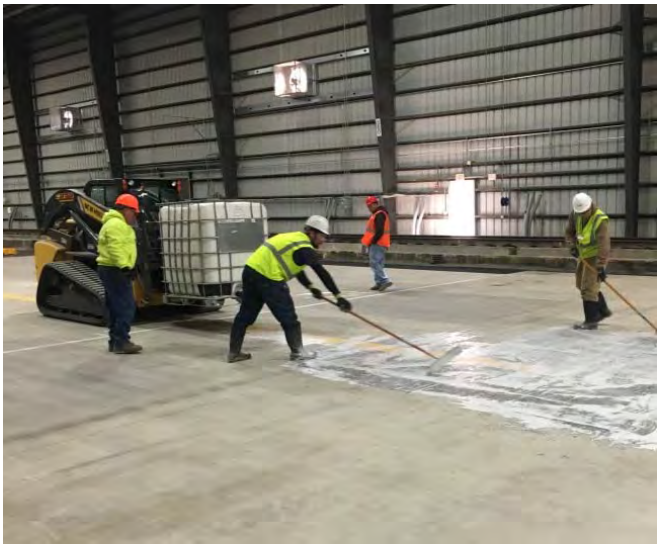

Figure 36. Lime Slurry Application to P-501MR Layer

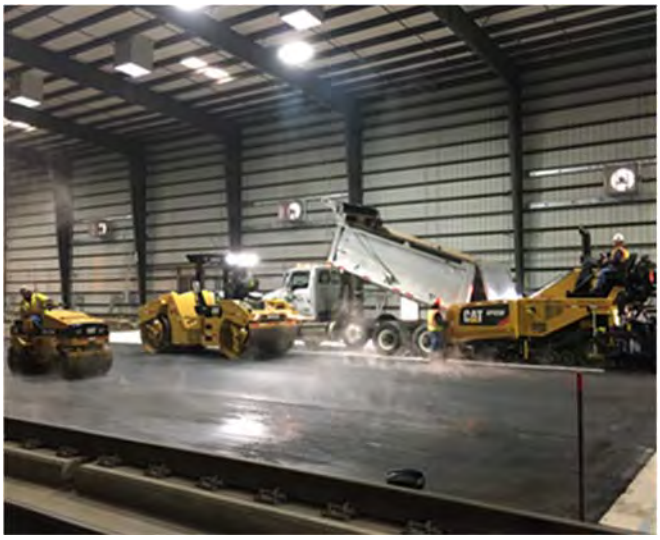

Figure 37. P-404MR Placement

2.3.5 P-501MR Construction Practices

Similarly to the practices discussed in Section 2.3.3, the contractor constructed forms on site according to the plans for each section, and the FAA project team placed required instrumentation. The P-501MR material was supplied by the contractor. When delivered, approximately 0.25 cubic yds. of P-501MR was poured off prior to collecting material for acceptance testing. Material acceptance testing and characterization were completed onsite by members of Craig Testing Laboratories, Inc. and the NextGen Pavement Materials Laboratory using the criteria established in Table 18.

When the material passed the requirements provided in Table 18, the P-501MR was loaded into the Putzmeister Telebelt, Truck-Mounted Telescopic Belt Conveyor and placed into the test area. If the material failed, the truck was adjusted and retested. Depending on the results, the material would be placed or rejected and sent off site. Actual design elevations and acceptance results are discussed in Section 2.4 for each testing section. The use of the conveyor truck allowed the contractor to place the material in the test area with minimal disturbance to the underlying materials and instrumentation.

The P-501MR material was loaded from the delivery trucks into the conveyor's hopper bin and moved along the conveyor belt of the boom into the placement locations. When construction joints were required as per the plans, the P-501MR was placed in a checkerboard pattern. If contraction joints were required, the P-501MR was placed in lanes. The contractor placed the P-501MR material with traditional placement techniques and methods permitted within the P-501MR specifications. One exception to the specifications, however, was that the contractor was permitted to not water the P-306MR layer prior to placement since rosin paper was used as a bondbeaker, and there was concern about the rosin paper deteriorating due to watering. Common masonry hand tools and a vibratory screed were used by the contractor to complete the P-501MR placement. The instrumentation was monitored and protected by team members during the placement. All sensors and gauges placed within CC8 are provided in Section 2.5. The contractor floated the surface material and finished it with a smooth trowel. Photos of typical placement practices can be found below in Figure 38, Figure 39, and Figure 40.

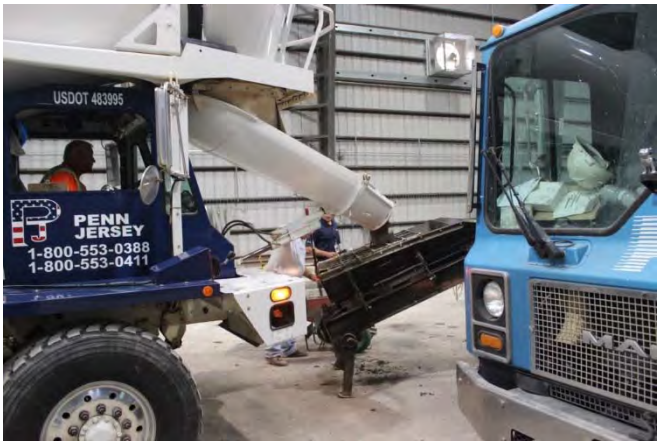

Figure 38. Transferring P-501MR Into the Conveyor Truck

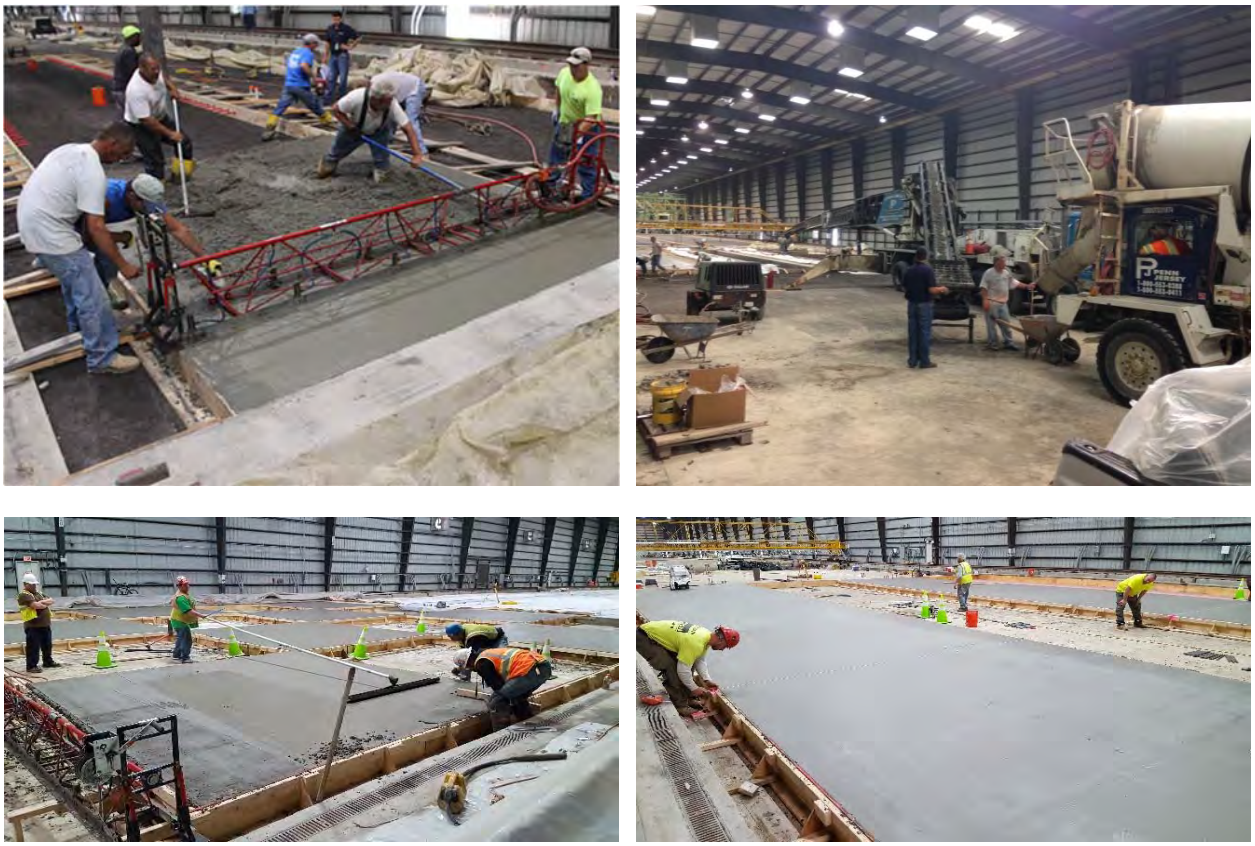

Figure 39. P-501MR Material Placement

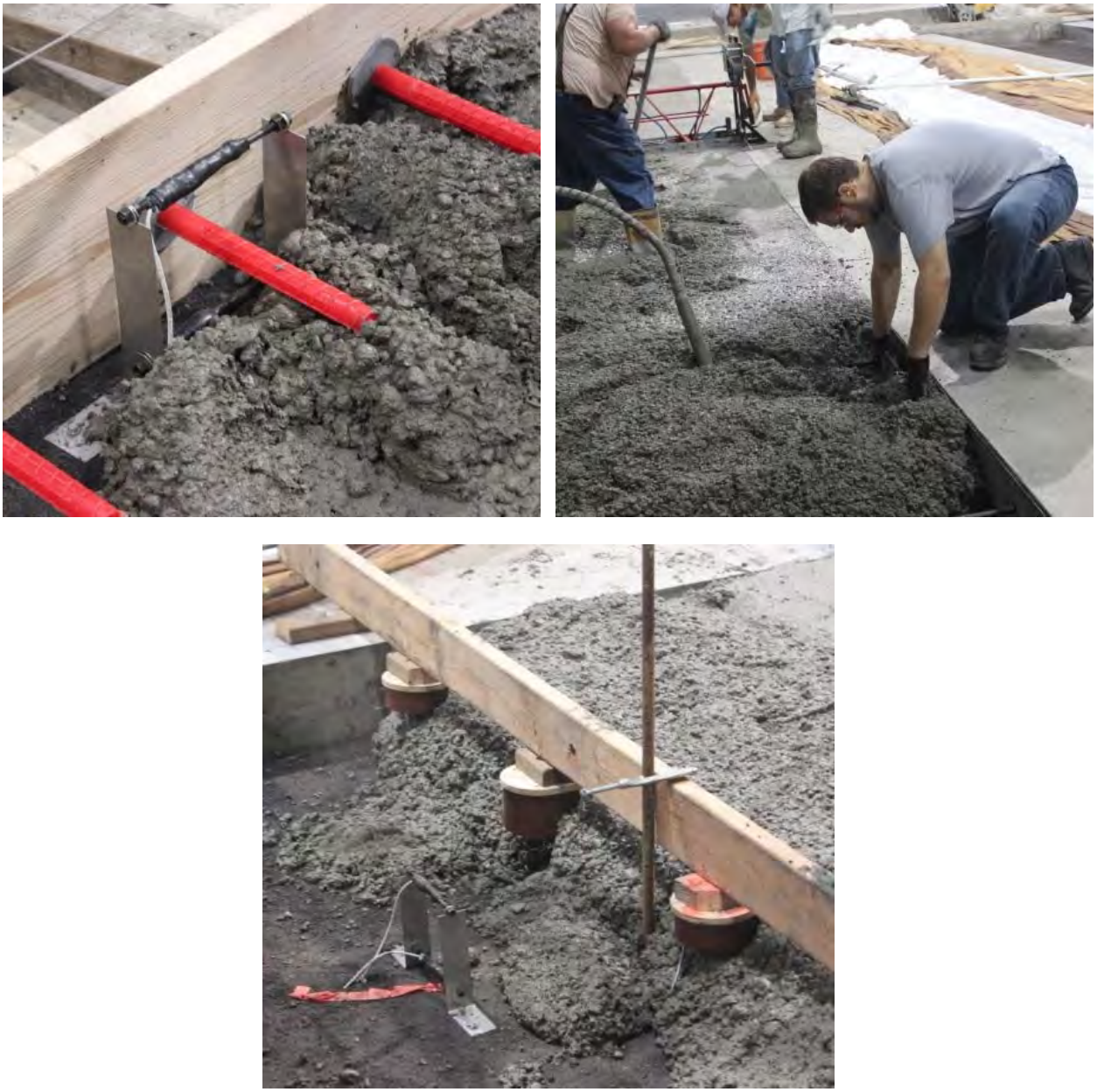

Figure 40. Instrumentation During P-501MR Placement

The contractor covered the test area and samples after each placement with burlap and a poly sheet product for curing. Within 24 hours of placement, the contractor made saw cuts in the finished PCC surface. Saw cuts were completed in accordance with project plans, which can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES. The contractor cut the P-501MR surface using a Husqvarna Soff-Cut saw. Green cuts were made into the surface at 1½ in. deep, followed by a secondary cut at 3 in. deep.

Figure 41. Sawcutting Joints in P-501MR

2.4 CC8 Material Acceptance and Characterization Results

The sections below provide the acceptance results for each of the following sections: Overload, Overlay, Joint Comparison, and Strength and Fatigue. All additional tests that were performed for characterization purposes can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES. A summary of the quantity of tests performed can be found below in Table 19. A total of 3802 tests were reported for the accepted surface throughout the CC8 testing, well beyond requirements established in the scope of the project. This number does not include additional studies or tests that were conducted when conditioning and preparing each layer.

Table 19. Quantity of Tests Performed Throughout CC8

Test (Manufacturer)	Property Measured	P-152M	P-154M	P-306MR	P-404MR	P-501MR
CBR	CBR	78				
Oven Moisture	Moisture Content	26	30			
Nuke Gauge Moisture	Moisture Content		191			
Shelby Tube	In-Situ Density	26				
Vane Shear	Shear Strength	620				
Plate Load	k-value	10	10			
LWD (Dynatest)	LWD Modulus	480	288			
D-PSPA (Geomedia)	Seismic Modulus	130	144			
Triaxial Test	Resilient Modulus	2	2			
DCP (Kessler)	In-situ Penetration Resistance	134	72			
Sand Cone	Max Dry Density, % Compaction		30			
Nuke Gauge Compaction	% Compaction		191		10	
Slump	Workability			32		117
Air Content	Air Content			32		114
Unit Weight	Density			32		113
Temperature	Temperature			32		99
Compressive Strength	Compressive Strength			56		220
Free-Free	Resonant Frequency			16		123
Flexural Strength	Modulus of Rupture					284
HWD (KUAB)	Elastic Modulus					56
Sieve Analysis	Particle Size Distribution				2	

2.4.1 Overload Test Area Acceptance Results

The contractor utilized practices outlined in Sections 2.3.1, 2.3.2, and 2.3.5 to construct the P-152M, P-154M, and P-501MR layers, respectively. The target surface elevation, target layer thickness, average as-built surface elevation, and average layer thickness for the Overload test area are provided in Table 20. The as-built drawings showing the variation of elevation and thickness throughout this section can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Table 20. Elevation and Thickness for the Overload Test Area Materials

Material	Target Elevation, ft.	Target Thickness, in.	Avg. As-Built Elevation, ft.	Avg. As-Built Thickness, in.
P-152M	55.59	N/A	55.47	N/A
P-154M	56.42	10	56.37	10.8
P-501MR	57.17	9	57.14	9.3

The material was accepted based on the criteria established in Table 1, Table 3, and Table 18 for the P-152M, P-154M, and P-501MR layers, respectively. A summary of the acceptance and characterization results for the Overload Test area are provided in Table 21. All data collected for acceptance and material characterization tests can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Table 21. Material Acceptance and Characterization Results for the Overload Test Area (Station 3+30 to 3+90)

Location	Material	Parameter	Average	Standard Deviation	COV, %
3+30 to 3+90 (North)	P-152	CBR, %	7.23	0.27	3.68
		Moisture Content, %	28.35	0.35	1.25
		In-Situ Density, pcf	94.15	0.49	0.53
		Shear Strength, psi	49.65	4.41	8.89
		k-value, psi/in	109.60	N/A	N/A
		LWD Modulus, psi	13,930.56	4,230.58	30.37
		Seismic Modulus, psi	11,782.78	958.05	8.13
		DCP, in/blow	1.06	0.09	8.57
	P-154	Moisture Content (Sand Cone), %	6.73	0.40	6.00
		Compaction (Sand Cone), %	100.30	0.95	0.95
		Moisture Content (Nuke Gauge), %	7.75	0.48	6.15
		Compaction (Nuke Gauge), %	99.23	2.17	2.18
		k-value, psi/in	216.00	N/A	N/A
		LWD Modulus, psi	22,744.44	2,134.27	9.38
		Seismic Modulus, psi	35,621.06	8,111.93	22.77
		DCP, in/blow	0.41	0.05	11.36
	P-501	7-day Flexural Strength, psi	487.00	33.80	6.94
		28-day Flexural Strength, psi	592.00	44.90	7.58
		28-day Seismic Modulus, psi	4,310.00	200.60	4.65

Table 21. Material Acceptance and Characterization Results for the Overload Test Area (Station 3+30 to 3+90)

Location	Material	Parameter	Average	Standard Deviation	COV, %
3+30 to 3+90 (South)	P-152	CBR, %	7.38	0.13	1.80
		Moisture Content, %	29.50	0.57	1.92
		In-Situ Density, pcf	91.60	1.13	1.24
		Shear Strength, psi	46.20	2.89	6.25
		k-value, psi/in	131.10	N/A	N/A
		LWD Modulus, psi	17,816.67	5,649.14	31.71
		Seismic Modulus, psi	11,221.00	1,141.98	10.18
		DCP, in/blow	1.12	0.09	8.45
	P-154	Moisture Content (Sand Cone), %	6.87	0.25	3.66
		Compaction (Sand Cone), %	100.63	3.33	3.31
		Moisture Content (Nuke Gauge), %	7.45	0.68	9.17
		Compaction (Nuke Gauge), %	98.98	3.21	3.24
		k-value, psi/in	272.00	N/A	N/A
		LWD Modulus, psi	23,580.56	2,072.77	8.79
		Seismic Modulus, psi	35,144.11	7,350.47	20.92
		DCP, in/blow	0.42	0.06	13.52
	P-501	7-day Flexural Strength, psi	487.00	33.80	6.94
		28-day Flexural Strength, psi	592.00	44.90	7.58
		28-day Seismic Modulus, psi	4,310.00	200.60	4.65

2.4.1.1 Overload Test Area Lessons Learned/Issues

Obtaining uniform, target CBR values is a typical issue in construction. For CC8, this was no exception, as consistent CBR values for the P-152M layer were difficult to achieve throughout the entire construction. Achieving a uniform moisture content and compactive effort often meant that some areas were stiffer than others when testing for acceptance. When there was not enough moisture in the subgrade, the material would be tilled and water would be added with the BDF. The water would be given time to permeate throughout the layer and the material would then be tilled again prior to compacting. When the subgrade was over the target moisture content, the material would be tilled and left uncovered while commercial fans were left on to circulate air across the surface. One issue that was discovered at the end of construction was that the BDF did not appear to water uniformly transversely along the section. It was observed that the moisture content dropped as it went from the north wall to the south wall after the BDF was utilized. The BDF utilizes two different types of sprinkler heads which have different flow rates, and it was noted that sediment would build up within the sprinkler heads causing additional variation in flow rates across the BDF system. Each of these components likely contributed to the issue. To ensure this problem does not persist in future CCs, the BDF will be inspected and tested in order to make sure the section is watered uniformly.

The FAA project team completed an elevation survey of the P-154M surface for conformance in a 5 ft. by 5 ft. grid throughout the test area using a surveyor's level and rod. The survey elevations were calculated and compared to the target design elevation of 56.42 ft. with an allowable tolerance of +/- 0.375 in. (+/- 0.03 ft.). The average surface elevation was determined to be 56.34 ft. with a standard deviation of 0.0139 ft. This elevation, however, was 1 in. below the design elevation (56.42 ft.). The results of the subbase survey were reviewed by the FAA project team, and no corrective action was required. The FAA accepted the P-154M surface elevation of 56.34 ft. as the design elevation. The FAA project team determined that the additional thickness required to meet the overall design would be added to the P-404MR interlayer thickness during the Overlay construction of the Overload test area.

2.4.2 Overlay Test Area Acceptance Results

The contractor utilized practices outlined in Sections 2.3.4 and 2.3.5 to construct the P-404MR and P-501MR layers, respectively. The P-404MR was placed on 12/12/2016 and compaction results were verified the following day. The P-501MR was placed on two separate days – 12/28/2016 and 1/4/2017. The section was accepted after the 28-day breaks on 2/1/2017. A total of 24 days were required to complete this section from start to final placement.

The target surface elevation, target layer thickness, average as-built surface elevation, and average layer thickness for the Overlay test area are provided in Table 22. The as-built drawings showing the variation of elevation and thickness throughout this section can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Table 22. Elevation and Thickness for the Overlay Test Area Materials

Material	Target Elevation, ft.	Target Thickness, in.	Avg. As-Built Elevation, ft.	Avg. As-Built Thickness, in.
P-404MR	57.25	1.2	57.26	1.4
P-501MR	58.00	9	58.00	9

The material was accepted based on the criteria established in Table 11 and Table 18 for the P-404MR and P-501MR layers respectively. A summary of the acceptance and characterization results for the Overlay test area are provided in Table 23. All data collected for acceptance and material characterization tests can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Table 23. Material Acceptance and Characterization Results for the OverlayTest Area (Station 3+30 to 3+90)

Location	Material	Parameter	Average	Standard Deviation	COV, %
3+30 to 3+90 (North)	P-404	Lane Compaction, %	92.98	0.19	0.21
		Lane Air Voids, %	7.03	0.22	3.16
		Joint Compaction, %	90.53	0.38	0.42
		Joint Air Voids, %	9.48	0.38	3.98
	P-501	QC Slump, in	4.72	0.69	14.56
		QC Air, %	5.96	1.23	20.66
		QC Unit Weight, pcf	138.76	1.31	0.94
		QC Temp, ^{o}F	68.18	2.47	3.62
		7-day Flexural Strength, psi	470.63	30.87	6.56
		28-day Flexural Strength, psi	553.96	30.96	5.59
		28-day Compressive Strength, psi	4,376.25	234.81	5.37
		28-day Resonant Freq, ksi	5,621.08	43.48	0.77
3+30 to 3+90 (South)	P-404	Lane Compaction, %	92.98	0.19	0.21
		Lane Air Voids, %	7.03	0.22	3.16
		Joint Compaction, %	90.53	0.38	0.42
		Joint Air Voids, %	9.48	0.38	3.98
	P-501	QC Slump, in	4.68	0.70	15.02
		QC Air, %	5.86	0.60	10.24
		QC Unit Weight, pcf	139.61	1.51	1.08
		QC Temp, ^{o}F	67.13	1.60	2.38
		7-day Flexural Strength, psi	472.14	24.13	5.11
		28-day Flexural Strength, psi	558.95	29.84	5.34
		28-day Compressive Strength, psi	4,528.57	295.44	6.52
		28-day Resonant Freq, ksi	5,693.17	72.37	1.27

2.4.2.1 Overlay Lessons Learned/Issues

As stipulated in Table 18, the P-501MR surface course would be accepted if the 28-day flexural strength met or exceeded the design strength (650 psi) where the percent within limit (PWL) was at least 90%. As shown in Table 23, the beams did not achieve their required flexural strength. After discussions with the FAA, it was determined that the P-501MR would not need to be removed and reconstructed as the risk was too great. Reconstruction was not a viable option due to the smaller size of the section in addition to potential setbacks caused by damage of the base course or instrumentation. It was also determined that the flexural strength being less than the design strength could be accounted for in the post-analysis of the section.

2.4.3 Joint Comparison Test Area Acceptance Results

The contractor utilized practices outlined in Sections 2.3.1, 2.3.2, 2.3.3, and 2.3.5 to construct the P-152M, P-154M, P-306MR, and P-501MR layers, respectively. Conditioning of the P-152M layer began on 12/29/2016 and was accepted on 3/7/2017. The first lift of the P-154M was placed on 3/7/2017 and accepted on 3/13/2017. The second lift of P-154M was then placed on 3/13/2017 and accepted on 3/30/2017. The P-306MR was placed on two separate days – 3/31/2017 and 4/6/2017. The layer was accepted after the 7-day breaks on 4/13/2017. The P-501MR was also placed on two separate days – 4/27/2017 and 5/2/2017. The section was accepted after the 28-day breaks on 5/30/2017. A total of 125 days were required to complete this section from start to final placement.

The target surface elevation, target layer thickness, average as-built surface elevation, and average layer thickness for the Joint Comparison test area are provided in Table 24. The as-built drawings showing the variation of elevation and thickness throughout this section can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Table 24. Elevation and Thickness for the Joint Comparison Test Area Materials

Material	Target Elevation, ft.	Target Thickness, in.	Avg. As-Built Elevation, ft.	Avg. As-Built Thickness, in.
P-152M	55.42*	N/A	55.35	N/A
P-154M	56.50	13.0*	56.49	13.7
P-306MR	57.00	6.0	56.99	6.0
P-501MR	58.00	12.0	58.00	12.1

**Note – this value was for estimating purposes and was dependent on the removal of the clay interface.*

The material was accepted based on the criteria established in Table 1, Table 3, Table 8, and Table 18 for the P-152M, P-154M, P-306MR, and P-501MR layers, respectively. A summary of the acceptance and characterization results for the Joint Comparison test area are provided in Table 25

and Table 26. All data collected for acceptance and material characterization tests can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Table 25. Material Acceptance and Characterization Results for the Joint Comparison Test Area (Station 4+00 to 4+45)

Location	Layer	Parameter	Average	Standard Deviation	COV, %
4+00 to 4+45 (North)	P-152	CBR, %	7.63	0.15	2.00
		Moisture Content, %	28.40	N/A	N/A
		In-Situ Density, pcf	96.60	N/A	N/A
		Shear Strength, psi	29.77	6.11	20.52
		LWD Modulus, ksi	13.96	5.14	36.84
		Seismic Modulus, ksi	9.22	0.99	10.71
		DCP, in/blow	1.17	0.21	18.12
	P-154	Moisture Content (Sand Cone), %	5.20	N/A	N/A
		Compaction (Sand Cone), %	98.00	N/A	N/A
		Moisture Content (Nuke Gauge), %	4.75	0.49	10.42
		Compaction (Nuke Gauge), %	98.57	1.34	1.36
		LWD Modulus, ksi	21.25	0.65	3.07
		Seismic Modulus, ksi	45.29	8.29	18.31
		DCP, in/blow	0.25	0.00	1.42
		Resilient Modulus, ksi	32.11	N/A	N/A
4+00 to 4+45 (North)	P-306	QC Slump, in	4.50	N/A	N/A
		QC Air, %	6.10	N/A	N/A
		QC Unit Weight, pcf	137.10	N/A	N/A
		QC Temp, ^{o}F	69.30	N/A	N/A
		7-day Compressive Strength, psi	395.00	7.07	1.79
		7-day Resonant Freq, ksi	2,291.00	N/A	N/A
	P-501	QC Slump, in	3.93	0.85	21.65
		QC Air, %	5.81	0.94	16.09
		QC Unit Weight, pcf	139.44	2.07	1.48
		QC Temp, ^{o}F	71.90	2.83	3.93
		7-day Flexural Strength, psi	476.43	24.95	5.24
		7-day Resonant Freq, ksi	4,765.89	246.99	5.18
		28-day Flexural Strength, psi	596.43	33.55	5.62
		28-day Compressive Strength, psi	4,441.90	304.53	6.86
		28-day Resonant Freq, ksi	5,158.29	194.10	3.76
		Elastic Modulus, ksi	5,794.69	816.22	14.09

Table 25. Material Acceptance and Characterization Results for the Joint Comparison Test Area (Station 4+00 to 4+45)

Location	Layer	Parameter	Average	Standard Deviation	COV, %
4+00 to 4+45 (South)	P-152	CBR, %	7.58	0.36	4.75
		Moisture Content, %	27.60	0.14	0.51
		In-Situ Density, pcf	96.80	0.57	0.58
		Shear Strength, psi	24.01	4.13	17.18
		LWD Modulus, ksi	10.90	0.48	4.36
		Seismic Modulus, ksi	8.48	0.57	6.69
		DCP, in/blow	1.40	0.37	26.20
	P-154	Moisture Content (Sand Cone), %	5.30	N/A	N/A
		Compaction (Sand Cone), %	96.70	N/A	N/A
		Moisture Content (Nuke Gauge), %	5.20	0.14	2.72
		Compaction (Nuke Gauge), %	97.90	1.29	1.32
		LWD Modulus, ksi	22.60	0.81	3.59
		Seismic Modulus, ksi	41.47	22.28	53.72
		DCP, in/blow	0.22	0.02	11.01
		Resilient Modulus, ksi	32.11	N/A	N/A
4+00 to 4+45 (South)	P-306	QC Slump, in	2.50	N/A	N/A
		QC Air, %	5.00	N/A	N/A
		QC Unit Weight, pcf	138.70	N/A	N/A
		QC Temp, ^{o}F	65.40	N/A	N/A
		7-day Compressive Strength, psi	400.00	14.14	3.54
		7-day Resonant Freq, ksi	2,258.00	N/A	N/A
	P-501	QC Slump, in	3.96	0.60	15.17
		QC Air, %	5.60	0.49	8.67
		QC Unit Weight, pcf	140.37	0.78	0.55
		QC Temp, ^{o}F	73.83	2.46	3.34
		7-day Flexural Strength, psi	470.83	25.96	5.51
		7-day Resonant Freq, ksi	4,666.00	309.31	6.63
		28-day Flexural Strength, psi	585.00	26.07	4.46
		28-day Compressive Strength, psi	4,310.00	160.11	3.71
		28-day Resonant Freq, ksi	5,154.17	83.96	1.63
		Elastic Modulus, ksi	5,525.98	514.23	9.31

Table 26. Material Acceptance and Characterization Results for the Joint Comparison Test Area (Station 4+45 to 4+90)

Location	Material	Parameter	Average	Standard Deviation	COV, %
4+45 to 4+90 (North)	P-152	CBR, %	7.57	0.12	1.53
		Moisture Content, %	28.80	N/A	N/A
		In-Situ Density, pcf	96.40	N/A	N/A
		Shear Strength, psi	24.75	4.99	20.17
		k-value, psi/in	154.00	N/A	N/A
		LWD Modulus, ksi	4.65	2.11	45.35
		Seismic Modulus, ksi	8.83	2.21	25.02
		DCP, in/blow	1.23	0.25	20.38
	P-154	Moisture Content (Sand Cone), %	7.00	N/A	N/A
		Compaction (Sand Cone), %	101.00	N/A	N/A
		Moisture Content (Nuke Gauge), %	4.53	1.03	22.64
		Compaction (Nuke Gauge), %	98.76	1.55	1.57
		k-value, psi/in	154.00	N/A	N/A
		LWD Modulus, ksi	19.90	0.70	3.53
		Seismic Modulus, ksi	44.70	7.79	17.44
		DCP, in/blow	0.27	0.01	4.03
		Resilient Modulus, ksi	32.11	N/A	N/A
	P-306	QC Slump, in	5.50	N/A	N/A
		QC Air, %	5.20	N/A	N/A
		QC Unit Weight, pcf	140.60	N/A	N/A
		QC Temp, ^{o}F	72.00	N/A	N/A
		7-day Compressive Strength, psi	440.00	14.14	3.21
		7-day Resonant Freq, ksi	2,600.00	N/A	N/A
	P-501	QC Slump, in	3.71	0.91	24.65
		QC Air, %	6.00	0.76	12.69
		QC Unit Weight, pcf	138.75	1.21	0.87
		QC Temp, ^{o}F	71.02	3.25	4.57
		7-day Flexural Strength, psi	472.50	61.70	13.06
		7-day Resonant Freq, ksi	4,562.00	397.50	8.71
		28-day Flexural Strength, psi	593.61	60.75	10.23
		28-day Compressive Strength, psi	4,491.67	455.20	10.13
		28-day Resonant Freq, ksi	5,168.44	179.07	3.46
		Elastic Modulus, ksi	5,792.51	399.09	6.89

Table 26. Material Acceptance and Characterization Results for the Joint Comparison Test Area (Station 4+45 to 4+90)

Location	Material	Parameter	Average	Standard Deviation	COV, %
4+45 to 4+90 (South)	P-152	CBR, %	7.37	0.32	4.36
		Moisture Content, %	28.70	N/A	N/A
		In-Situ Density, pcf	96.40	N/A	N/A
		Shear Strength, psi	26.74	2.50	9.34
		k-value, psi/in	196.90	N/A	N/A
		LWD Modulus, ksi	17.10	6.33	37.03
		Seismic Modulus, ksi	8.61	1.00	11.65
		DCP, in/blow	1.07	0.26	24.66
	P-154	Moisture Content (Sand Cone), %	6.36	0.92	14.52
		Compaction (Sand Cone), %	99.80	4.51	4.52
		Moisture Content (Nuke Gauge), %	5.07	0.23	4.56
		Compaction (Nuke Gauge), %	99.79	0.23	0.23
		k-value, psi/in	197.00	N/A	N/A
		LWD Modulus, ksi	21.61	1.80	8.34
		Seismic Modulus, ksi	49.31	11.87	24.07
		DCP, in/blow	0.26	0.03	11.91
		Resilient Modulus, ksi	32.11	N/A	N/A
	P-306	QC Slump, in	8.00	N/A	N/A
		QC Air, %	4.60	N/A	N/A
		QC Unit Weight, pcf	142.00	N/A	N/A
		QC Temp, ^{o}F	63.70	N/A	N/A
		7-day Compressive Strength, psi	660.00	28.28	4.29
		7-day Resonant Freq, ksi	3,484.00	N/A	N/A
	P-501	QC Slump, in	3.75	0.52	13.88
		QC Air, %	5.21	0.46	8.89
		QC Unit Weight, pcf	140.63	0.84	0.59
		QC Temp, ^{o}F	74.14	1.92	2.59
		7-day Flexural Strength, psi	462.14	34.74	7.52
		7-day Resonant Freq, ksi	4,784.40	172.47	3.60
		28-day Flexural Strength, psi	596.90	24.31	4.07
		28-day Compressive Strength, psi	4,485.24	214.02	4.77
		28-day Resonant Freq, ksi	5,211.90	89.94	1.73
		Elastic Modulus, ksi	5,753.85	724.13	12.59

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2.4.3.1 Joint Comparison Lessons Learned/Issues

During tilling, a puddle began collecting on the subgrade along the south wall between Stations 4+20 and 4+30. Upon further inspection, it was determined that water was running out of one of the instrumentation conduits. Water built up against the foundation of the building and entered through a gap in the foundation itself. To remedy the problem initially, an excavator was brought in to the problem area on the outside of the building to dig a trench in order to pull water away from the side of the building. The water that collected on the subgrade was removed using a vacuum. The area was then tilled to a depth of 6 in. against the south wall and extended 30 ft. towards the north wall. Once tilling was completed, an excavator separated the tilled subgrade into 3 equal piles: material from Station 4+00 to 4+20; Station 4+20 to 4+40; and Station 4+40 to 4+50 with a small amount from the center of the test bed. These piles were then tilled and placed in equal quantities throughout the tilled and excavated section.

A survey was taken after the P-306MR placement, indicating that the grade was low between Station 4+00 and 4+25. To remedy the issue, the FAA project team elected to use Mapei Novoplan 2 Plus self-leveling underlayment. Mapei Primer L bonding agent was spread across the low area and allowed to cure prior to placing two layers of Mapei Novoplan 2 Plus to achieve the desired grade. The Mapei Novoplan 2 Plus was spread by hand, and a straight edge was utilized to ensure uniformity. A hand trowel was used to remove any excess material. Cut sheets of both materials can be found in APPENDIX D: CUT SHEETS.

As stipulated in Table 8, the P-306MR would be accepted if the 7-day compressive strength was between 500 psi and 800 psi, with no more than 20% of the cylinders exceeding 800 psi. As shown in Table 25 and Table 26, the cylinders did not achieve their required compressive strength. It was determined that the P-306MR would not need to be removed and reconstructed since the risk was too great. The same reasons that were used for the P-501MR in 2.4.2.1 were cited as reasons not to reconstruct the section.

As stipulated in Table 18, the P-501MR surface course would be accepted if the 28-day flexural strength met or exceeded the design strength (650 psi) where the PWL was at least 90%. As shown in Table 25 and Table 26, the beams did not achieve their required flexural strength. Similarly to the Overlay test area, it was determined that the P-501MR would not need to be removed and reconstructed due to reasons cited in Section 2.4.2.1.

2.4.4 Strength and Fatigue Test Area Acceptance Results

The contractor utilized practices outlined in Sections 2.3.1, 2.3.2, 2.3.3, and 2.3.5 to construct the P-152M, P-154M, P-306MR, and P-501MR layers, respectively. The Strength and Fatigue test area was constructed in three different stages.

The first stage that was constructed ran from 5+00 to 5+65. Conditioning of the P-152M layer began on 12/29/2016 and was accepted on 3/7/2017. The first lift of the P-154M was placed on 3/7/2017 and accepted on 3/13/2017. The second lift of P-154M was then placed on 3/13/2017 and accepted on 3/30/2017. The P-306MR was placed on two separate days: 3/31/2017 and 4/6/2017. The layer was accepted after the 7-day breaks on 4/13/2017. The P-501MR was also placed on two separate days: 4/27/2017 and 5/2/2017. The section was accepted after the 28-day breaks on 5/30/2017. A total of 125 days were required to complete this section from start to final placement.

The second stage that was constructed ran from 6+00 to 6+55. P-152M was placed in three different lifts on 7/11/2017, 7/19/2017, and 8/3/2017. These three lifts were accepted on 7/18/2017, 7/28/2017, and 8/11/2017, respectively. The first lift of P-154M was placed on 9/8/2017 and accepted on 9/14/2017. The second lift of P-154M was placed on 9/14/2017 and accepted on 9/19/2017. The P-306MR was placed on two separate days: 9/29/2017 and 10/2/2017. The layer was accepted after the 7-day breaks on 10/9/2017. The P-501MR was also placed on three separate days: 10/12/2017, 10/24/2017, and 10/30/2017. The section was accepted after the 28-day breaks on 11/27/2017. A total of 112 days were required to complete this section from start to final placement.

The third stage that was constructed ran from 5+65 to 6+00. Work on the P-152M layer began on 8/16/2017 and the layer was accepted on 8/25/2017. The first lift of P-154M was placed on 9/8/2017 and accepted on 9/14/2017. The second lift of P-154M was placed on 9/14/2017 and accepted on 9/19/2017. The P-306MR was placed on two separate days: 9/29/2017 and 10/2/2017. The layer was accepted after the 7-day breaks on 10/9/2017. The P-501MR was also placed on three separate days: 10/12/2017, 10/24/2017, and 10/30/2017. The section was accepted after the 28-day breaks on 11/27/2017. A total of 76 days were required to complete this section from start to final placement. All three stages of the Strength and Fatigue test area took 306 days to complete from start to final placement.

The target surface elevation, target layer thickness, average as-built surface elevation, and average layer thickness for the Strength and Fatigue test area are provided in Table 27. The as-built drawings showing the variation of elevation and thickness throughout this section can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Table 27. Elevation and Thickness for the Strength and Fatigue Test Area Materials

Station	Material	Target Elevation, ft.	Target Thickness, in.	Avg. As-Built Elevation, ft.	Avg. As-Built Thickness, in.
5+00 to 6+00	P-152M	55.42*	N/A	55.35	N/A
	P-154M	56.50	13.0*	56.49	13.7
	P-306MR	57.00	6.0	56.99	6.0

	P-501MR	58.00	12.0	58.00	12.1
6+00 to 6+55	P-152M	55.42*	N/A	55.35	N/A
	P-154M	56.75	16.0*	56.74	16.7
	P-306MR	57.25	6.0	57.24	6.0
	P-501MR	58.00	9.0	58.00	9.0

**Note – this value was for estimating purposes and was dependent on the removal of the clay interface.*

The material was accepted based on the criteria established in Table 1, Table 3, Table 8, and Table 18 for the P-152M, P-154M, P-306MR, and P-501MR layers, respectively. A summary of the acceptance and characterization results for the Strength and Fatigue test area are provided in Table 28, Table 29, Table 30, and Table 31. All data collected for acceptance and material characterization tests can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Table 28. Material Acceptance and Characterization Results for the Strength and Fatigue Test Area (Station 5+00 to 5+30)

Location	Material	Parameter	Average	Standard Deviation	COV, %
5+00 to 5+30 (North)	P-152	CBR, %	7.80	0.36	4.62
		Moisture Content, %	27.90	N/A	N/A
		In-Situ Density, pcf	96.80	N/A	N/A
		Shear Strength, psi	159.66	37.66	23.59
		LWD Modulus, ksi	9.31	3.58	38.41
		Seismic Modulus, ksi	7.79	1.32	16.91
		DCP, in/blow	1.79	0.70	38.93
	P-154	Moisture Content (Sand Cone), %	6.90	N/A	N/A
		Compaction (Sand Cone), %	100.70	N/A	N/A
		Moisture Content (Nuke Gauge), %	5.05	0.07	1.40
		Compaction (Nuke Gauge), %	98.22	1.62	1.65
		LWD Modulus, ksi	18.38	1.14	6.20
		Seismic Modulus, ksi	42,047.33	9,982.59	23.74
		DCP, in/blow	0.30	0.02	7.12
		Resilient Modulus, ksi	32.11	N/A	N/A
	P-306	QC Slump, in	3.25	N/A	N/A
		QC Air, %	5.10	N/A	N/A
		QC Unit Weight, pcf	141.30	N/A	N/A
		QC Temp, ^{o}F	67.80	N/A	N/A
		7-day Compressive Strength, psi	575.00	77.78	13.53
		7-day Resonant Freq, ksi	3,388.00	N/A	N/A
	P-501	QC Slump, in	5.19	0.55	10.69
		QC Air, %	7.37	0.71	9.63
		QC Unit Weight, pcf	136.83	2.17	1.59
		QC Temp, ^{o}F	71.18	3.25	4.57
		7-day Flexural Strength, psi	416.25	17.97	4.32
		7-day Resonant Freq, ksi	4,352.75	86.73	1.99
		28-day Flexural Strength, psi	504.17	27.21	5.40
		28-day Compressive Strength, psi	3,629.17	203.49	5.61
		28-day Resonant Freq, ksi	4,651.92	102.53	2.20
		Elastic Modulus, ksi	5,288.31	320.28	6.06

Table 28. Material Acceptance and Characterization Results for the Strength and Fatigue Test Area (Station 5+00 to 5+30)

Location	Material	Parameter	Average	Standard Deviation	COV, %
5+00 to 5+30 (South)	P-152	CBR, %	7.73	0.21	2.69
		Moisture Content, %	28.70	N/A	N/A
		In-Situ Density, pcf	96.60	N/A	N/A
		Shear Strength, psi	27.66	2.32	8.38
		LWD Modulus, ksi	11.26	5.06	44.97
		Seismic Modulus, ksi	8.17	0.81	9.92
		DCP, in/blow	1.61	0.44	27.14
	P-154	Moisture Content (Sand Cone), %	5.40	1.08	20.00
		Compaction (Sand Cone), %	100.95	4.05	4.02
		Moisture Content (Nuke Gauge), %	4.50	1.56	34.57
		Compaction (Nuke Gauge), %	98.22	1.06	1.08
		LWD Modulus, ksi	24.29	2.18	8.99
		Seismic Modulus, ksi	52.97	12.83	24.22
		DCP, in/blow	0.27	0.02	6.45
		Resilient Modulus, ksi	32.11	N/A	N/A
	P-306	QC Slump, in	4.50	N/A	N/A
		QC Air, %	4.80	N/A	N/A
		QC Unit Weight, pcf	141.00	N/A	N/A
		QC Temp, ^{o}F	66.30	N/A	N/A
		7-day Compressive Strength, psi	540.00	28.28	5.24
		7-day Resonant Freq, ksi	2,938.00	N/A	N/A
	P-501	QC Slump, in	4.56	0.43	9.36
		QC Air, %	5.73	0.30	5.22
		QC Unit Weight, pcf	139.83	1.21	0.86
		QC Temp, ^{o}F	73.33	3.45	4.71
		7-day Flexural Strength, psi	417.50	60.21	14.42
		7-day Resonant Freq, ksi	4,472.00	167.85	3.75
		28-day Flexural Strength, psi	512.75	47.59	9.28
		28-day Compressive Strength, psi	3,490.91	465.91	13.35
		28-day Resonant Freq, ksi	4,807.00	188.77	3.93
		Elastic Modulus, ksi	5,620.02	709.17	12.62

Table 29. Material Acceptance and Characterization Results for the Strength and Fatigue Test Area (Station 5+30 to 5+60)

Location	Material	Parameter	Average	Standard Deviation	COV, %
5+30 to 5+60 (North)	P-152	CBR, %	7.50	0.10	1.33
		Moisture Content, %	29.30	N/A	N/A
		In-Situ Density, pcf	94.10	N/A	N/A
		Shear Strength, psi	21.79	4.86	22.30
		k-value, psi/in	117.40	N/A	N/A
		LWD Modulus, ksi	9.88	4.30	43.51
		Seismic Modulus, ksi	7.10	0.76	10.69
		DCP, in/blow	1.90	0.53	27.75
	P-154	Moisture Content (Sand Cone), %	5.80	N/A	N/A
		Compaction (Sand Cone), %	97.10	N/A	N/A
		Moisture Content (Nuke Gauge), %	3.85	0.07	1.84
		Compaction (Nuke Gauge), %	98.18	1.23	1.26
		k-value, psi/in	208.00	N/A	N/A
		LWD Modulus, ksi	17.89	0.27	1.51
		Seismic Modulus, ksi	50.46	4.15	8.23
		DCP, in/blow	0.31	0.01	1.78
		Resilient Modulus, ksi	32.11	N/A	N/A
	P-306	QC Slump, in	5.00	2.47	49.50
		QC Air, %	4.80	0.42	8.84
		QC Unit Weight, pcf	142.15	1.20	0.85
		QC Temp, ^{o}F	68.85	1.48	2.16
		7-day Compressive Strength, psi	495.00	103.44	20.90
		7-day Resonant Freq, ksi	3,024.50	0.51	17.00
	P-501	QC Slump, in	4.75	0.61	12.89
		QC Air, %	6.93	1.12	16.23
		QC Unit Weight, pcf	138.35	1.92	1.39
		QC Temp, ^{o}F	71.38	3.38	4.74
		7-day Flexural Strength, psi	423.75	45.89	10.83
		7-day Resonant Freq, ksi	4,432.25	289.11	6.52
		28-day Flexural Strength, psi	535.00	50.95	9.52
		28-day Compressive Strength, psi	3,810.00	523.09	13.73
		28-day Resonant Freq, ksi	4,773.08	243.02	5.09
		Elastic Modulus, ksi	5,359.25	341.28	6.37

Table 29. Material Acceptance and Characterization Results for the Strength and Fatigue Test Area (Station 5+30 to 5+60)

Location	Material	Parameter	Average	Standard Deviation	COV, %
5+30 to 5+60 (South)	P-152	Shear Strength, psi	27.85	1.18	4.24
		k-value, psi/in	179.90	N/A	N/A
		LWD Modulus, ksi	11.26	5.06	44.97
		Seismic Modulus, ksi	7.75	0.99	12.79
		DCP, in/blow	1.73	0.18	10.39
	P-154	Moisture Content (Sand Cone), %	5.87	1.15	19.61
		Compaction (Sand Cone), %	99.63	3.30	3.31
		Moisture Content (Nuke Gauge), %	3.90	0.71	18.13
		Compaction (Nuke Gauge), %	99.21	1.57	1.58
		k-value, psi/in	371.00	N/A	N/A
		LWD Modulus, ksi	25.48	2.25	8.85
		Seismic Modulus, ksi	38.88	15.03	38.66
		DCP, in/blow	0.23	0.02	7.77
		Resilient Modulus, ksi	32.11	N/A	N/A
	P-306	QC Slump, in	4.75	0.35	7.44
		QC Air, %	4.55	0.35	7.77
		QC Unit Weight, pcf	142.00	1.41	1.00
		QC Temp, ^{o}F	67.10	1.13	1.69
		7-day Compressive Strength, psi	542.50	20.62	3.80
		7-day Resonant Freq, ksi	2,909.25	0.04	1.40
	P-501	QC Slump, in	5.50	0.84	15.30
		QC Air, %	6.33	1.09	17.19
		QC Unit Weight, pcf	139.43	1.06	0.76
		QC Temp, ^{o}F	69.78	2.75	3.94
		7-day Flexural Strength, psi	443.75	22.87	5.15
		7-day Resonant Freq, ksi	4,571.75	272.22	5.95
		28-day Flexural Strength, psi	550.00	43.06	7.83
		28-day Compressive Strength, psi	3,901.67	460.77	11.81
		28-day Resonant Freq, ksi	4,965.08	212.57	4.28
		Elastic Modulus, ksi	5,660.32	210.86	3.73

Table 30. Material Acceptance and Characterization Results for the Strength and Fatigue Test Area (Station 5+70 to 6+00)

Location	Material	Parameter	Average	Standard Deviation	COV, %
5+70 to 6+00 (North)	P-152	CBR, %	8.58	1.49	17.37
		Moisture Content, %	28.05	0.38	1.35
		In-Situ Density, pcf	93.93	1.59	1.69
		Shear Strength, psi	31.68	10.38	32.76
		k-value, psi/in	119.10	N/A	N/A
		LWD Modulus, ksi	13.45	5.10	37.89
		Seismic Modulus, ksi	10.85	1.62	14.98
		DCP, in/blow	1.68	0.56	33.15
	P-154	Moisture Content (Sand Cone), %	6.37	0.86	13.54
		Compaction (Sand Cone), %	98.30	6.81	6.93
		Moisture Content (Nuke Gauge), %	6.33	0.79	12.53
		Compaction (Nuke Gauge), %	92.18	3.51	3.81
		k-value, psi/in	323.80	N/A	N/A
		LWD Modulus, ksi	25.94	1.44	5.53
		Seismic Modulus, ksi	31.62	8.47	26.80
		DCP, in/blow	0.21	0.01	5.82
		Resilient Modulus, ksi	37.93	N/A	N/A
	P-306	QC Slump, in	3.50	1.06	30.30
		QC Air, %	7.05	0.78	11.03
		QC Unit Weight, pcf	137.70	0.14	0.10
		QC Temp, ^{o}F	64.75	1.06	1.64
		7-day Compressive Strength, psi	622.50	72.74	11.69
		28-day Compressive Strength, psi	830.00	110.45	13.31
		28-day Resonant Freq, ksi	3,474.00	181.73	5.23
	P-501	QC Slump, in	4.33	0.85	19.54
		QC Air, %	5.65	0.65	11.46
		QC Unit Weight, pcf	145.23	1.37	0.94
		QC Temp, ^{o}F	73.17	4.79	6.55
		7-day Flexural Strength, psi	793.50	69.78	8.79
		7-day Resonant Freq, ksi	6,210.50	152.63	2.46
		28-day Flexural Strength, psi	896.72	80.31	8.96
		28-day Compressive Strength, psi	5,435.56	506.23	9.31
		28-day Resonant Freq, ksi	6,444,666.67	134,367.99	2.08
		Elastic Modulus, ksi	3,564,662.50	242,743.98	6.81

Table 30. Material Acceptance and Characterization Results for the Strength and Fatigue Test Area (Station 5+70 to 6+00)

Location	Material	Parameter	Average	Standard Deviation	COV, %
5+70 to 6+00 (South)	P-152	CBR, %	7.88	1.37	17.42
		Moisture Content, %	28.28	0.56	1.99
		In-Situ Density, pcf	92.45	2.84	3.07
		Shear Strength, psi	32.66	7.14	21.86
		k-value, psi/in	15.00	N/A	N/A
		LWD Modulus, ksi	13.54	5.56	41.05
		Seismic Modulus, ksi	10.64	2.37	22.32
		DCP, in/blow	1.49	0.32	21.16
	P-154	Moisture Content (Sand Cone), %	5.77	0.57	9.86
		Compaction (Sand Cone), %	92.83	8.31	8.95
		Moisture Content (Nuke Gauge), %	6.20	0.60	9.73
		Compaction (Nuke Gauge), %	90.86	3.67	4.03
		k-value, psi/in	357.00	N/A	N/A
		LWD Modulus, ksi	28.43	2.23	7.85
		Seismic Modulus, ksi	33.21	5.18	15.58
		DCP, in/blow	0.20	0.01	5.39
		Resilient Modulus, ksi	37.93	N/A	N/A
	P-306	QC Slump, in	3.38	0.18	5.24
		QC Air, %	6.15	0.78	12.65
		QC Unit Weight, pcf	140.00	1.84	1.31
		QC Temp, ^{o}F	68.50	0.71	1.03
		7-day Compressive Strength, psi	605.00	26.46	4.37
		28-day Compressive Strength, psi	800.00	49.67	6.21
	P-501	QC Slump, in	4.50	0.66	14.70
		QC Air, %	6.23	0.50	8.07
		QC Unit Weight, pcf	144.33	0.57	0.39
		QC Temp, ^{o}F	73.33	5.51	7.51
		7-day Flexural Strength, psi	764.33	75.63	9.90
		7-day Resonant Freq, ksi	6,017.67	157.75	2.62
		28-day Flexural Strength, psi	833.00	81.03	9.73
		28-day Compressive Strength, psi	5,145.56	367.46	7.14
		28-day Resonant Freq, ksi	6,405.44	251.62	3.93
		Elastic Modulus, ksi	3,972.26	55.32	1.39

Table 31. Material Acceptance and Characterization Results for the Strength and Fatigue Test Area (Station 6+10 to 6+40)

Location	Material	Parameter	Average	Standard Deviation	COV, %
6+10 to 6+40 (North)	P-152	CBR, %	3.70	0.33	8.86
		Moisture Content, %	24.30	0.62	2.57
		In-Situ Density, pcf	99.77	1.29	1.29
		Shear Strength, psi	15.51	2.98	19.19
		k-value, psi/in	82.70	N/A	N/A
		LWD Modulus, ksi	19.03	7.95	41.80
		Seismic Modulus, ksi	11.07	1.63	14.69
		DCP, in/blow	2.10	0.33	15.94
	P-154	Moisture Content (Sand Cone), %	5.65	0.78	13.77
		Compaction (Sand Cone), %	95.15	2.19	2.30
		Moisture Content (Nuke Gauge), %	6.82	0.77	11.33
		Compaction (Nuke Gauge), %	91.41	3.33	3.64
		k-value, psi/in	346.50	N/A	N/A
		LWD Modulus, ksi	25.23	1.05	4.14
		Seismic Modulus, ksi	29.32	4.42	15.07
		DCP, in/blow	0.22	0.01	4.51
		Resilient Modulus, ksi	37.93	N/A	N/A
	P-306	QC Slump, in	2.88	0.18	6.15
		QC Air, %	6.50	0.28	4.35
		QC Unit Weight, pcf	139.10	0.71	0.51
		QC Temp, ^{o}F	67.05	0.49	0.74
		7-day Compressive Strength, psi	802.50	66.52	8.29
		28-day Compressive Strength, psi	1,025.00	161.97	15.80
		28-day Resonant Freq, ksi	3,936.00	167.58	4.26
	P-501	QC Slump, in	4.38	0.81	18.58
		QC Air, %	5.99	0.91	15.21
		QC Unit Weight, pcf	144.58	1.95	1.35
		QC Temp, ^{o}F	71.88	5.64	7.85
		7-day Flexural Strength, psi	754.75	65.97	8.74
		7-day Resonant Freq, ksi	6,029.38	320.03	5.31
		28-day Flexural Strength, psi	853.46	103.21	12.09
		28-day Compressive Strength, psi	5,235.42	678.34	12.96
		28-day Resonant Freq, ksi	6,360.75	222.00	3.49
		Elastic Modulus, ksi	4,753.71	261.19	5.49

Table 31. Material Acceptance and Characterization Results for the Strength and Fatigue Test Area (Station 6+10 to 6+40)

Location	Material	Parameter	Average	Standard Deviation	COV, %
6+10 to 6+40 (South)	P-152	CBR, %	3.47	0.40	11.54
		Moisture Content, %	24.93	0.47	1.90
		In-Situ Density, pcf	97.43	0.90	0.93
		Shear Strength, psi	14.02	2.38	16.96
		k-value, psi/in	76.00	N/A	N/A
		LWD Modulus, ksi	12.25	4.26	34.74
		Seismic Modulus, ksi	9.53	1.95	20.43
		DCP, in/blow	1.89	0.48	25.59
	P-154	Moisture Content (Sand Cone), %	6.20	0.28	4.56
		Compaction (Sand Cone), %	99.90	2.69	2.69
		Moisture Content (Nuke Gauge), %	6.20	0.64	10.35
		Compaction (Nuke Gauge), %	93.03	2.99	3.21
		k-value, psi/in	241.90	N/A	N/A
		LWD Modulus, ksi	26.83	1.48	5.51
		Seismic Modulus, ksi	26.67	3.77	14.14
		DCP, in/blow	0.21	0.01	4.53
		Resilient Modulus, ksi	37.93	N/A	N/A
	P-306	QC Slump, in	4.00	1.41	35.36
		QC Air, %	6.90	0.14	2.05
		QC Unit Weight, pcf	138.95	0.35	0.25
		QC Temp, ^{o}F	71.00	1.41	1.99
		7-day Compressive Strength, psi	755.00	35.36	4.68
		28-day Compressive Strength, psi	970.00	67.33	6.94
		28-day Resonant Freq, ksi	3,880.00	93.34	2.41
	P-501	QC Slump, in	3.79	0.58	15.27
		QC Air, %	5.95	1.47	24.74
		QC Unit Weight, pcf	144.67	2.28	1.58
		QC Temp, ^{o}F	72.17	5.04	6.98
		7-day Flexural Strength, psi	801.83	49.65	6.19
		7-day Resonant Freq, ksi	6,076.83	129.95	2.14
		28-day Flexural Strength, psi	870.72	71.59	8.22
		28-day Compressive Strength, psi	5,273.89	342.88	6.50
		28-day Resonant Freq, ksi	6,548.39	235.69	3.60
		Elastic Modulus, ksi	4,635.59	239.56	5.17

Page Removed During Revisions

2.4.4.1 *Strength and Fatigue Test Area Lessons Learned/Issues*

Processing the P-152M that was placed between Station 6+00 and 6+55 became an issue between May 2017 and June 2017. The P-152M that was to be placed exceeded the target moisture content, and drying the material took longer than anticipated. The material was regularly tilled and commercial fans were utilized to circulate the air over top of the P-152M, but the material was unable to dry due to a historically wet May 2017 in Atlantic City (Melisurgo 2017). This issue delayed the placement of P-152M from Station 6+00 to 6+55 until mid-July 2017.

During excavation, an old tarp liner was found at Station 6+00 and was used to separate the medium strength and high strength subgrade during construction of CC1 (Figure 42). The subgrade from Station 5+98 to 6+00 was excavated down to elevation 53.00 ft. and the tarp was removed where encountered. The P-152M material that was removed was replaced with like material.

Figure 42. Existing Tarp Encountered Between Stations 5+98 and 6+00

As stipulated in Table 8, the P-306MR surface course would be accepted if the 7-day compressive strength was between 500 psi and 800 psi, with no more than 20% of the cylinders exceeding 800 psi. For the two P-306MR pours located between 5+00 and 5+60, a total of 8 cylinders were cast and tested at 7-day compressive strength. As shown in Table 28 and Table 29, the cylinders did not achieve their required compressive strength. It was determined that the P-306MR would not need to be removed and reconstructed since the risk was too great. The same reasons that were used for the P-501MR in Section 2.4.2.1 were cited as reasons not to reconstruct the section.

As stipulated in Table 18, the P-501MR surface course would be accepted if the 28-day flexural strength met or exceeded the design strength (650 or 900 psi) where the PWL was at least 90%. P-501MR was poured in three different locations: Stations 5+00 to 5+60 (650 psi); 5+70 to 6+00 (900 psi); and 6+10 to 6+40 (900 psi). As shown in Table 28, Table 29, Table 30, and Table 31, the beams did not achieve their required flexural strength. Similarly to the Overlay test area, it

was determined that the P-501MR would not need to be removed and reconstructed due to reasons cited in Section 2.4.2.1.

2.5 CC8 Instrumentation

Instrumentation was placed in the P-152M, P-154M, and P-501MR layers. Moisture sensors (P-152M and P-154M) and pressure cells (P-152M) were the only sensors placed in the subgrade and subbase layers. Instrumentation within P-501MR was selected and installed to monitor vertical movement of the test slabs and measure strain responses at the top and bottom of the slab. The gauge selection was based on reliability, accuracy, and ease of handling at the construction site. The types and quantity of each gauge in addition to the sections they were placed in are presented in Table 32 below.

Table 32. Type and Quantity of Instrumentation Placed for Each Section

Type of Gauge	Overload	Overlay*	Joint Comparison	Strength and Fatigue	Purpose
	# of Gauges	*# of Gauges*	*# of Gauges*	*# of Gauges*	
Moisture Sensor (Subgrade)	2	0	0	2	Moisture content
Pressure Cell (Subgrade)	0	0	0	4	Vertical stress
Moisture Sensor (P-154M)	0	0	4	0	Moisture content
Embedded Strain Gauge (P-501MR)	32	32	46	124	Dynamic strain response
Potentiometer (P-501MR)	8	0	0	0	Vertical displacement
Thermocouple (P-501MR)	6	6	6	6	Pavement temperature
Eddy Current Sensor (P-501MR)	2	8	8	18	Vertical displacement
Resistance Gauge (P-501MR)	0	0	0	16	Response discontinuity
RGM (P-501MR)	0	0	0	8	Dynamic strain response
ROS (P-501MR)	0	0	0	20	Dynamic strain response

**Note – the Overlay test area was built on top of the Overload test area. The number of gauges provided in the Overlay test area are in addition to those given in Overload test area.*

The instrumentation for the test area was installed and monitored by the instrumentation team during all construction activities. Each of the gauges and sensors were installed to meet the project objectives at the planned locations. The instrumentation required custom installation techniques and assemblies for each item to assure the integrity of the gauge and data output was not impacted by the construction. Examples of the gauge assemblies and installation are shown from Figure 43 to Figure 50 below. The locations of all gauges placed can be found in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES.

Figure 43. Eddy Current Sensors

Figure 44. Embedded Strain Gauges

Figure 45. Potentiometers

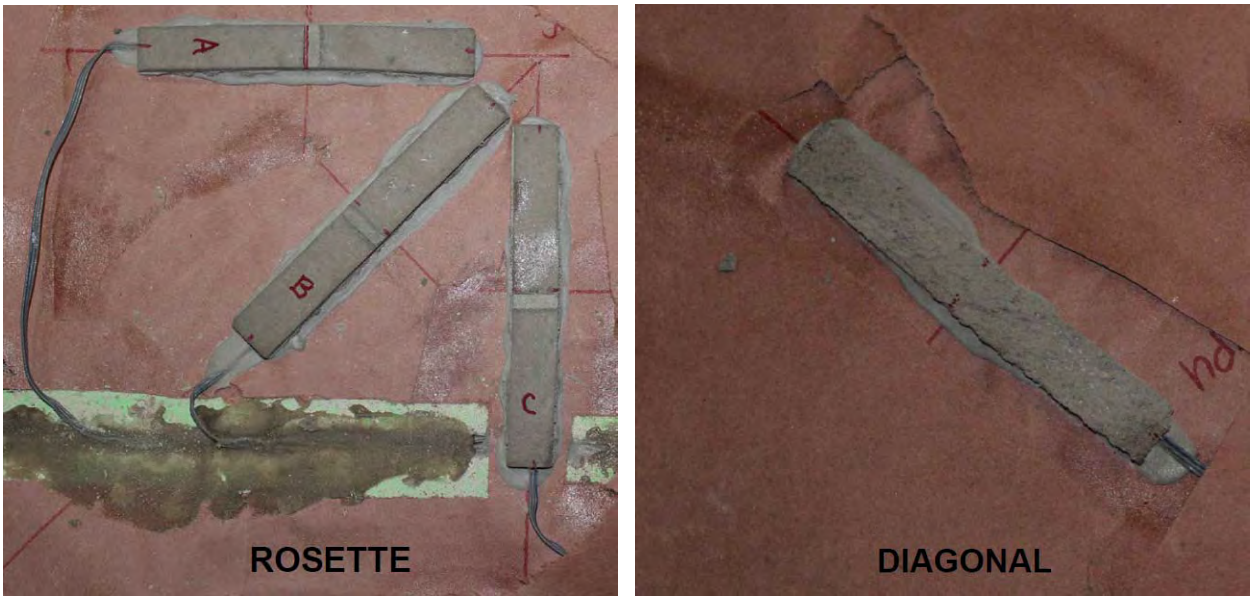


Figure 46. Modified Resistance Gauges

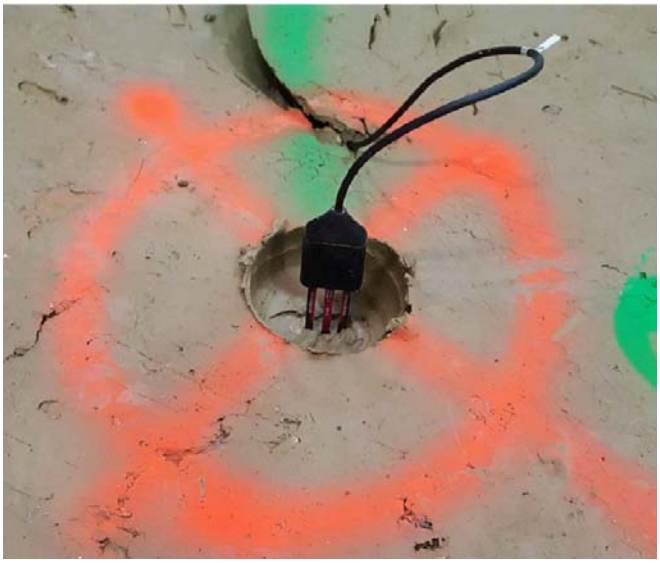


Figure 47. Moisture Sensors

Figure 48. Pressure Cells

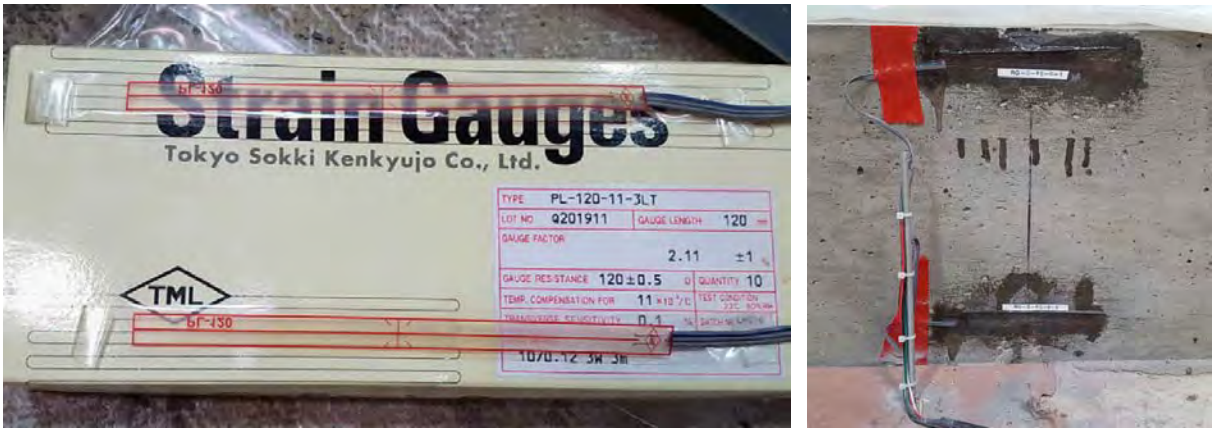


Figure 49. Resistance Gauges

Figure 50. Thermocouples

2.6 CC8 Painting

Painting of the test area was completed by the contractor using a water based paint material in accordance with the plan shown in APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES. Test slab identification and Non-Destructive Testing locations were not marked for FAA specification, but rather to aid in facilitating testing and discussion within the facility.

3. REFERENCES

ASTM (2011). ASTM D2487-11 "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)." ASTM International, West Conshohocken, PA, 2011, www.astm.org.

FAA (n.d.). Advisory Circular 150/5370-10H, "Standard Specifications for Construction of Airports." 2018 (Federal Aviation Administration, US Department of Transportation: Washington, DC).

FAA (2009). Advisory Circular 150/5320-6E, "Airport Pavement Design and Evaluation." 2009 (Federal Aviation Administration, US Department of Transportation: Washington, DC).

FAA (2014). Advisory Circular 150/5370-10G, "Standards for Specifying Construction of Airports." 2014 (Federal Aviation Administration, US Department of Transportation: Washington, DC).

FAA (2018). "NAPTF Databases." Retrieved March 12, 2018, from http://www.airporttech.tc.faa.gov/Airport-Pavement/National-Airport-Pavement-Test-Facility-/NAPTF-Databases

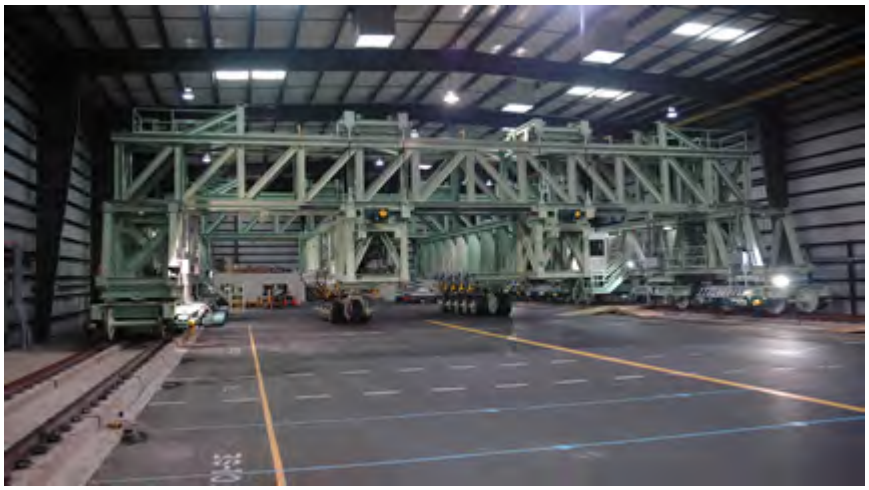
Gervais, E. L., Hayhoe, G. F., and Garg, N. (2003). "Towards a permanent ACN solution for 6-wheel landing gear aircraft." Proceedings of the 2003 ASCE Airfield Pavement Specialty Conference, Las Vegas, NV, 2003, Reston, Va., 39–56. 4

Hayhoe, G. F. (2004). "Traffic test results from the FAA's National Airport Pavement Test Facility." Proc., 2nd Int. Conf. on Accelerated Pavement Testing, University of Minnesota, Minneapolis, Minnesota (1).

Melisurgo, L. (2017). "These are the 25 towns that got the most rain in N.J. in May." Retrieved March 12, 2018, from www.nj.com/weather/index.ssf/2017/06/these_were_the_25_wettest_places_in_nj_in_may.html

APPENDIX A: SPECIFICATIONS

Federal Aviation Administration
William J. Hughes Technical Center
National Airport Pavement Test Facility
Atlantic City International Airport, New Jersey



SPECIFICATIONS

FOR

NAPTF– CONSTRUCTION CYCLE 8 (CC8)

Issued for Construction

Prepared by

APPLIED RESEARCH ASSOCIATES, INC.
EGG HARBOR, NJ

In Association with:

SRA INTERNATIONAL INCORPORATED, A CSRA COMPANY
LINWOOD, NJ

November 16, 2016

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Section 110MR	Method of Estimating Percentage of Material within Specification Limits

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Item M-102MR	Demolition and Removal

Part 3	**Paving Materials**
Item P-152M	Subgrade
Item P-154M	Subbase Course
Item P-306MR	Lean Concrete Base Course
Item P-404MR	Bituminous Bondbreaker Interlayer
Item P-501MR	Portland Cement Concrete (PCC) Pavement
Item P-604MR	Compression Joint Seals for Concrete Pavements
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Section 10MR Definition of Terms

Whenever the following terms are used in these specifications, in the contract, or in any documents or other instruments pertaining to construction where these specifications govern, the intent and meaning shall be interpreted as follows:

10MR-1.1 AASHTO. The American Association of State Highway and Transportation Officials, the successor association to AASHO.

10MR-1.2 Access road. The right-of-way, the roadway and all improvements constructed thereon connecting the airport to a public highway.

10MR-1.3 Advertisement. A public announcement, as required by local law, inviting bids for work to be performed and materials to be furnished.

10MR-1.4 Airport Improvement Program (AIP). A grant-in-aid program, administered by the Federal Aviation Administration (FAA).

10MR-1.5 Air operations area (AOA). For the purpose of these specifications, the term air operations area (AOA) shall mean any area of the facility used or intended to be used for the operation of pavement testing equipment.

10MR-1.6 ASTM International (ASTM). Formerly known as the American Society for Testing and Materials (ASTM).

10MR-1.7 Award. The Owner's notice to the successful bidder of the acceptance of the submitted bid.

10MR-1.8 Beneficial Occupancy. Completion of the work or a portion of the work such that the Owner may commence the pavement testing for which the pavement was designed. Acceptance or characterization testing do not constitute beneficial occupancy by the owner.

10MR-1.9 Bidder. Any individual, partnership, firm, or corporation, acting directly or through a duly authorized representative, who submits a proposal for the work contemplated.

10MR-1.10 Building area. An area on the airport to be used, considered, or intended to be used for airport buildings or other airport facilities or rights-of-way together with all airport buildings and facilities located thereon.

10MR-1.11 Calendar day. Every day shown on the calendar.

10MR-1.12 Change order. A written order to the Contractor covering changes in the plans, specifications, or proposal quantities and establishing the basis of payment and contract time adjustment, if any, for the work affected by such changes. The work, covered by a change order, must be within the scope of the contract.

10MR-1.13 Contract. The written agreement covering the work to be performed. The awarded contract shall include, but is not limited to: Advertisement, Contract Form, Proposal, Performance Bond, Payment Bond, any required insurance certificates, Specifications, Plans, and any addenda issued to bidders.

10MR-1.14 Contract item (pay item). A specific unit of work for which a price is provided in the contract.

10MR-1.15 Contract time. The number of calendar days or working days, stated in the proposal, allowed for completion of the contract, including authorized time extensions. If a calendar date of completion is stated in the proposal, in lieu of a number of calendar or working days, the contract shall be completed by that date.

10MR-1.16 Contractor. The individual, partnership, firm, or corporation primarily liable for the acceptable performance of the work contracted and for the payment of all legal debts pertaining to the work who acts directly or through lawful agents or employees to complete the contract work. When used to designate a person, Contractor shall mean a principal or duly authorized representative of the individual, partnership, firm, or corporation that is the contract signatory responsible for completion of work.

10MR-1.17 Contractor's laboratory. The Contractor's quality control organization in accordance with the Contractor Quality Control Program.

10MR-1.18 Construction Safety and Phasing Plan (CSPP). The overall plan for safety and phasing of a construction project developed by the airport operator, or developed by the airport operator's consultant and approved by the airport operator. It is included in the invitation for bids and becomes part of the project specifications.

10MR-1.9 Drainage system. The system of pipes, ditches, and structures by which surface or subsurface waters are collected and conducted from the airport area.

10MR-1.20 Engineer. The individual, partnership, firm, or corporation duly authorized by the Owner to be responsible for engineering inspection and observation of the contract work and acting directly or through an authorized representative.

10MR-1.21 Equipment. All machinery, together with the necessary supplies for upkeep and maintenance, and also all tools and apparatus necessary for the proper construction and acceptable completion of the work.

10MR-1.22 Extra work. An item of work not provided for in the awarded contract as previously modified by change order or supplemental agreement, but which is found by the Engineer to be necessary to complete the work within the intended scope of the contract as previously modified.

10MR-1.23 FAA. The Federal Aviation Administration of the U.S. Department of

Transportation. The FAA is the Owner and Sponsor of this project. When used to designate a person, FAA shall mean the Administrator or his or her duly authorized representative.

10MR-1.24 Federal specifications. The Federal Specifications and Standards, Commercial Item Descriptions, and supplements, amendments, and indices thereto are prepared and issued by the General Services Administration of the Federal Government.

10MR-1.25 Force account. Force account work is planning, engineering, or construction work done by the Sponsor's employees.

10MR-1.26 Inspector. An authorized representative of the Engineer assigned to make all necessary inspections, observations, and observation of tests of the work performed or being performed, or of the materials furnished or being furnished by the Contractor.

10MR-1.27 Intention of terms. Whenever, in these specifications or on the plans, the words "directed," "required," "permitted," "ordered," "designated," "prescribed," or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of the Engineer is intended; and similarly, the words "approved," "acceptable," "satisfactory," or words of like import, shall mean approved by, or acceptable to, or satisfactory to the Engineer, subject in each case to the final determination of the Owner.
Any reference to a specific requirement of a numbered paragraph of the contract specifications or a cited standard shall be interpreted to include all general requirements of the entire section, specification item, or cited standard that may be pertinent to such specific reference.

10MR-1.28 Laboratory. The official testing laboratories of the Owner or such other laboratories as may be designated by the Engineer. Also referred to as "Engineer's Laboratory" or "quality assurance laboratory."

10MR-1.29 Lighting. A system of fixtures providing or controlling the light sources used on or near the airport or within the airport buildings. The field lighting includes all luminous signals, markers, floodlights, and illuminating devices used on or near the airport or to aid in the operation of aircraft landing at, taking off from, or taxiing on the airport surface.

10MR-1.30 Major and minor contract items. A major contract item shall be any item that is listed in the proposal, the total cost of which is equal to or greater than 20% of the total amount of the award contract. All other items shall be considered minor contract items.

10MR-1.31 Materials. Any substance specified for use in the construction of the contract work.

10MR-1.32 NAPTF. The National Airport Pavement Test Facility is a state-of-the-art, full-scale pavement test facility dedicated solely to airport pavement research that is operated by the FAA. Located at the William J. Hughes Technical Center near Atlantic City, New Jersey, the National Airport Pavement Test Facility (NAPTF) provides high quality, accelerated test data from rigid and flexible pavements subjected to simulated aircraft traffic.

10MR-1.33 Notice to Proceed (NTP). A written notice to the Contractor to begin the actual contract work on a previously agreed to date. If applicable, the Notice to Proceed shall state the date on which the contract time begins.

10MR-1.34 Operations Area. See "AOA".

10MR-1.35 Owner. The term "Owner" shall mean the party of the first part or the contracting agency signatory to the contract. Where the term "Owner" is capitalized in this document, it shall mean airport Sponsor only. The FAA is the Owner and Sponsor of this project.

10MR-1.36 Passenger Facility Charge (PFC). Per 14 CFR Part 158 and 49 USC § 40117, a PFC is a charge imposed by a public agency on passengers enplaned at a commercial service airport it controls."

10MR-1.37 Pavement. The combined surface course, base course, and subbase course, if any, considered as a single unit.

10MR-1.38 Payment bond. The approved form of security furnished by the Contractor and his or her surety as a guaranty that the Contractor will pay in full all bills and accounts for materials and labor used in the construction of the work.

10MR-1.39 Performance bond. The approved form of security furnished by the Contractor and his or her surety as a guaranty that the Contractor will complete the work in accordance with the terms of the contract.

10MR-1.310 Plans. The official drawings or exact reproductions which show the location, character, dimensions and details of the airport and the work to be done and which are to be considered as a part of the contract, supplementary to the specifications.

10MR-1.40 Project. The agreed scope of work for accomplishing specific airport development with respect to a particular airport.

10MR-1.41 Proposal. The written offer of the bidder (when submitted on the approved proposal form) to perform the contemplated work and furnish the necessary materials in accordance with the provisions of the plans and specifications.

10MR-1.42 Proposal guaranty. The security furnished with a proposal to guarantee that the bidder will enter into a contract if his or her proposal is accepted by the Owner.

10MR-1.42 Quality Assurance. Testing and inspection of a product or item by or on behalf of the Owner to verify that the delivered product complies with contract requirements and should be accepted.

10MR-1.43 Quality Control. Plans, procedures, testing, and organization necessary to produce an end product that complies with the contract requirements. Quality control is performed by the

contractor in a proactive manner before and during the construction and manufacturing processes such that all delivered products are acceptable.

10MR-1.44 Specifications. A part of the contract containing the written directions and requirements for completing the contract work. Standards for specifying materials or testing which are cited in the contract specifications by reference shall have the same force and effect as if included in the contract physically.

10MR-1.45 Sponsor. A Sponsor is defined in 49 USC § 47102(24) as a public agency that submits to the FAA for an AIP grant; or a private Owner of a public-use airport that submits to the FAA an application for an AIP grant for the airport. The FAA is the Owner and Sponsor of this project.

10MR-1.46 Structures. Airport facilities such as bridges; culverts; catch basins, inlets, retaining walls, cribbing; storm and sanitary sewer lines; water lines; underdrains; electrical ducts, manholes, handholes, lighting fixtures and bases; transformers; flexible and rigid pavements; navigational aids; buildings; vaults; and, other manmade features of the airport that may be encountered in the work and not otherwise classified herein.

10MR-1.47 Subgrade. The soil that forms the pavement foundation.

10MR-1.48 Superintendent. The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the Engineer, and who shall supervise and direct the construction.

10MR-1.49 Supplemental agreement. A written agreement between the Contractor and the Owner covering (1) work that would increase or decrease the total amount of the awarded contract, or any major contract item, by more than 25%, such increased or decreased work being within the scope of the originally awarded contract; or (2) work that is not within the scope of the originally awarded contract.

10MR-1.50 Surety. The corporation, partnership, or individual, other than the Contractor, executing payment or performance bonds that are furnished to the Owner by the Contractor.

10MR-1.51 Taxiway. For the purpose of this document, the term taxiway means the portion of the air operations area of an airport that has been designated by competent airport authority for movement of aircraft to and from the airport's runways, aircraft parking areas, and terminal areas.

10MR-1.52 Work. The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans, and specifications.

10MR-1.53 Working day. A working day shall be any day other than a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work for at least six (6) hours toward completion of the contract. When work is suspended for causes

beyond the Contractor's control, it will not be counted as a working day. Saturdays, Sundays and holidays on which the Contractor's forces engage in regular work will be considered as working days.

END OF SECTION 10MR

Section 40MR Scope of Work

GENERAL REQUIREMENTS

40MR-1.1 Project description. The work consists of deconstruction of existing pavement test sections, construction of new pavement test sections, and incidental related efforts at the National Airport Pavement Test Facility (Building 296) in the William J. Hughes Technical Center, located at the Atlantic City International Airport in New Jersey. Typical tasks include:

- Careful demolition of existing pavement test sections.
- Construction of new pavement test sections.
- Use of specific construction techniques identified in the project documents for research purposes.

40MR-1.1 Intent of contract. The intent of the contract is to provide for construction and completion, in every detail, of the work described. It is further intended that the Contractor shall furnish all labor, materials, equipment, tools, transportation, and supplies required to complete the work in accordance with the plans, specifications, and terms of the contract, except as identified in the project plans and specifications.

40MR-1.2 Special research requirements. Construction work at the NAPTF is conducted to support research activities and is subject to unique requirements. Pavement items may be indicated in the project plans to be constructed indoors, with associated issues of lighting, equipment and material entry into and operation inside the building, sufficient overhead lighting, and adequate ventilation. Items are subject to intense testing and documentation. Demolish and construct items in the sequence indicated in project documents. Complete each item before commencing with subsequent items unless otherwise indicated in the project documents. Furnish items to NAPTF personnel for sampling and testing as indicated in project documents. Cease demolition and construction activities for the duration of testing at times indicated in the project documents. Expect a work stoppage of 1 to 3 days, or as indicated in project documents, after completion of each item to allow adequate time for the FAA to obtain samples and run tests. Coordinate activities with the NAPTF to avoid disturbance of research occurring outside the limits of this project. Do not allow the moisture content of the subgrade surface to change by more than two percentage points except as indicated in the project plans and specifications. Any requirement of these specifications may be waived to further the research goals of the project by written notification from the FAA to the Contractor.

40MR-1.3 Submittals. Submit the following in accordance with 61MR SUBMITTAL PROCEDURES:

a. **SD-01 Preconstruction Submittals**.
    a. **Construction Operations Plan.** Document the intended general sequence of work activities, general types of anticipated equipment, anticipated utility and service interruptions, and anticipated impact to research or other activities near the work site.
    b. **Project Schedule.** Prepare and maintain a schedule in MS Project format. Use the Critical Path Method to schedule and control project activities. Include submittals, review periods, all construction activities, inspection,

testing, and closeout activities. Saturdays, Sundays, and Federal holidays are non-work days. Indicate if extended work hours will be requested.

c. **Safety Plan.** Identify potentially hazardous construction activities and planned mitigation procedures. The plan should include excavation, heavy equipment operation, and minimum Personal Protective Equipment requirements for site access in addition to each major construction activity.

40MR-1.4 Commencement of work. Do not begin work until authorization is received from the FAA. The schedule of the availability of work areas shall be confirmed by the FAA. Complete work during standard work hours at the facility of 7:00 AM to 5:00 PM. Requests for extended work hours should be submitted in writing five work days in advance, and may be granted at the discretion of the FAA.

40MR-1.5 Maintenance of site. Do not store rubbish or debris on unstabilized base, subbase, and subgrade materials. Maintain staging and stockpile areas in a neat and organized manner, properly drained, and in a manner to prevent contamination of stockpiles and materials.

40MR-1.6 Items to remain in place. Take necessary precautions to avoid damage to existing items and instrumentation to remain in place, to be reused, or to remain the property of the FAA. Do not overload pavements to remain. Provide supports and reinforcement for existing items weakened by excavation, demolition, deconstruction, or removal work. Reinforcement and supports require approval by the FAA prior to performing such work. Prevent contamination of materials to remain with foreign or demolished pavement materials, debris, and refuse. Repair or replace damaged items as directed by and at no additional cost to the FAA.

40MR-1.7 Dust and debris control. Prevent the spread of dust and debris beyond the project limits. Use of water is permitted, however, do not use water if it results in hazardous or objectionable conditions such as, but not limited to ice, flooding, or pollution. Water trucks are not permitted inside the test facility. Prevent the accumulation of loose dust, dirt, mud, or debris on roadways and parking lots. Provide protective measures to control accumulation and migration of dust and dirt into work areas and office spaces.

40MR-1.8 Weather protection. Protect materials and equipment from damage by the weather at all times.

40MR-1.9 Utility service. Utilities must remain in service for the duration of project activities. Protect against damage during demolition and deconstruction operations. Notify the FAA immediately if utility infrastructure is damaged, or if an unmarked utility is located.

40MR-1.10 Protection of personnel. Conform to the safety requirements in accordance with the NAPTF Health and Safety Plan, Federal, state, and local laws, and rules and regulations concerning construction safety and health standards, including Corps of Engineers manual EM 385-1-1. Comply with the Environmental Protection Agency requirements. The Contractor shall not require or allow any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to health or safety.

40MR-1.11 Alteration of work and quantities. The FAA reserves and shall have the right to make such alterations in the work as may be necessary or desirable to complete the work originally intended in an acceptable manner. Unless otherwise specified herein, the Engineer shall be and is hereby authorized to make such alterations in the work as may increase or decrease the originally awarded contract quantities, provided that the aggregate of such alterations does not change the total contract cost or the total cost of any major contract item by more than 25% (total cost being based on the unit prices and estimated quantities in the awarded contract). Alterations that do not exceed the 25% limitation shall not invalidate the contract nor release the surety, and the Contractor agrees to accept payment for such alterations as if the altered work had been a part of the original contract. These alterations that are for work within the general scope of the contract shall be covered by "Change Orders" issued by the Engineer. Change orders for altered work shall include extensions of contract time where, in the Engineer's opinion, such extensions are commensurate with the amount and difficulty of added work. Should the aggregate amount of altered work exceed the 25% limitation hereinbefore specified, such excess altered work shall be covered by supplemental agreement. If the Owner and the Contractor are unable to agree on a unit adjustment for any contract item that requires a supplemental agreement, the Owner reserves the right to terminate the contract with respect to the item and make other arrangements for its completion.

Supplemental agreements shall be approved by the FAA and shall include all applicable Federal contract provisions for procurement and contracting required under AIP. Supplemental agreements shall also require consent of the Contractor's surety and separate performance and payment bonds.

40MR-1.12 Omitted items. The FAA may omit from the work any contract item, except major contract items, by written notification. Major contract items may be omitted by a supplemental agreement. Such omission of contract items shall not invalidate any other contract provision or requirement.

Should a contract item be omitted or otherwise ordered to be non-performed, the Contractor shall be paid for all work performed toward completion of such item prior to the date of the order to omit such item. Payment for work performed shall be in accordance with subsection 40R-2.1 titled PAYMENT FOR OMITTED ITEMS.

40MR-1.13 Extra work. Should acceptable completion of the contract require the Contractor to perform an item of work for which no basis of payment has been provided in the original contract or previously issued change orders or supplemental agreements, the same shall be called "Extra Work." Extra Work that is within the general scope of the contract shall be covered by written change order. Change orders for such Extra Work shall contain agreed unit prices for performing the change order work in accordance with the requirements specified in the order, and shall contain any adjustment to the contract time that, in the Engineer's opinion, is necessary for completion of such Extra Work.

When determined by the Engineer to be in the best interest of the FAA, the Engineer may order the Contractor to proceed with Extra Work as provided in the subsection 40R-2.2 titled PAYMENT FOR EXTRA WORK. Extra Work that is necessary for acceptable completion of

the project, but is not within the general scope of the work covered by the original contract shall be covered by a Supplemental Agreement as defined in the subsection 40R-3.1 titled SUPPLEMENTAL AGREEMENT.

Any claim for payment of Extra Work that is not covered by written agreement (change order or supplemental agreement) shall be rejected by the FAA.

40MR-1.14 Removal of existing structures. Demolish, salvage, or relocate all existing items and structures encountered within the project limits as indicated in the project documents and in accordance with section M-102MR titled DEMOLITION AND REMOVAL.

Should the Contractor encounter an existing structure (above or below ground) in the work for which the disposition is not indicated on the plans, the Engineer shall be notified prior to disturbing such structure. The disposition of existing structures so encountered shall be immediately determined by the Engineer in accordance with the provisions of the contract.

40MR-1.15 Rights in and use of materials found in the work.
Except for salvage items identified in the Plans, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from FAA property. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon removal of the material from the project site. The FAA will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

The Contractor shall not excavate, remove, or otherwise disturb any material, structure, or part of a structure which is located outside of the project limits as indicated in the project plans.

40MR-1.16 Final cleanup. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, and temporary structures. The Contractor shall leave the site in a neat and presentable condition. Material located within the limits of the William J. Hughes Technical Center will not be considered as having been disposed of satisfactorily, unless permitted by the project documents.

FAA FURNISHED ITEMS

40MR-2.1 Materials. Suitable material for construction of the following items will be provided by the FAA at no cost to the Contractor at the locations indicated on the plans. The quantities provided will be sufficient for construction of the test pavement to the lines and grades indicated on the plans. The contractor is responsible for all other aspects of constructing the items including hauling. Quality control and acceptance testing requirements are not waived for FAA furnished materials.

- Item P-152 Subgrade

- Potable water is available from a 2” valve located in the northwest corner of the NAPTF. A hydrant connection may be available through coordination with the FAA Facilities Engineer.

40MR-2.1 Equipment. The following equipment may be used at no cost to the contractor to construct the test pavement to the lines and grades indicated on the plans. The equipment will be delivered to the Contractor at the work location. FAA furnished equipment used by the Contractor shall be operated, fueled, and maintained by the Contractor, and will be returned to the FAA in the same condition in which it was delivered to the Contractor.

- CAT PS 300C pneumatic rubber tire roller.
- BOMAG MPH 364 S soil stabilizer.
- SEAMAN MODEL TO730-H-K travel mixer- soil stabilizer.
- GOMACO 450 bridge deck finisher

PAYMENT

40MR-3.1 Payment for omitted items. As specified in the subsection 40R1.3 titled OMITTED ITEMS, the Engineer shall have the right to omit from the work (order nonperformance) any contract item, except major contract items, in the best interest of the Owner.

Should the Engineer omit or order nonperformance of a contract item or portion of such item from the work, the Contractor shall accept payment in full at the contract prices for any work actually completed and acceptable prior to the Engineer’s order to omit or non-perform such contract item. Payment will not be made for work on omitted items after the item is omitted from the contract, whether performed or not performed.

Acceptable materials ordered by the Contractor or delivered on the work prior to the date of the Engineer’s order will be paid for at the actual cost to the Contractor and shall thereupon become the property of the Owner.

In addition to the reimbursement hereinbefore provided, the Contractor shall be reimbursed for all actual costs incurred for the purpose of performing the omitted contract item prior to the date of the Engineer’s order. Such additional costs incurred by the Contractor must be directly related to the deleted contract item and shall be supported by certified statements by the Contractor as to the nature the amount of such costs.

40MR-3.2 Payment for extra work. Extra work, performed in accordance with the subsection R40-1.4 titled EXTRA WORK, will be paid for at the contract prices or agreed prices specified in the change order or supplemental agreement authorizing the extra work.

DEFINITIONS

40MR-4.1 Supplemental agreement. A written agreement between the Contractor and the Owner covering (1) work that would increase or decrease the total amount of the awarded

contract, or any major contract item, by more than 25%, such increased or decreased work being within the scope of the originally awarded contract; or (2) work that is not within the scope of the originally awarded contract.

END OF SECTION 40

Section 50MR Control of Work

GENERAL REQUIREMENTS

50MR-1.1 Roles, responsibilities, and authorities. Responsibility and authority with regard to this project shall be divided as defined in this paragraph, except as indicated in the contract or other sections of these specifications. Reporting and communication shall be organized according to Figure 1, except as indicated in the contract or other sections of these specifications.

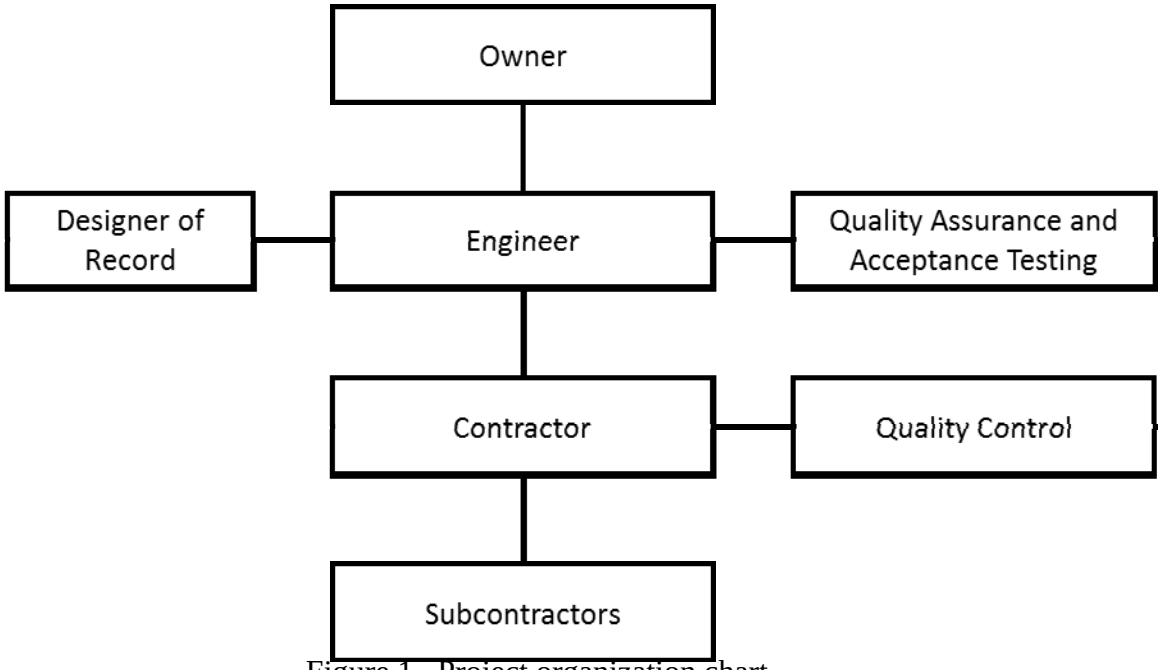

Figure 1. Project organization chart.

a. **Contractor.** The contractor is responsible for completion of all aspects of the work in conformance with the plans, specifications, and contract requirements. Subcontractors to the Contractor are not recognized as parties to the contract. All communication with the Engineer must be by the Contractor. The Contractor is solely responsible for the Contractor's schedule, means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

b. **Quality Control.** The quality control staff shall advise the Contractor concerning testing, construction inspection, and acceptability of submittals to proactively control the work in such a manner to ensure conformity with the project plans and specifications. The quality control staff shall conduct or oversee testing, inspection, and other activities necessary to proactively ensure conformance with project plans and specifications

c. **Engineer.** The Engineer shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, the manner of performance and rate of progress of the work, the interpretation of the specifications or

plans relating to the work, and the acceptability of submittals. The Engineer shall determine the amount and quality of the several kinds of work performed and materials furnished which are to be paid for under contract. The Engineer does not have authority to change contract requirements or accept pavements that do not conform to FAA specification requirements. The Engineer shall have unfettered access to the site of the work for purposes inspection of the work or other actions necessary under the contract.

d. **Quality Assurance.** The quality assurance staff shall advise the Engineer concerning acceptability of submittals, testing and construction activities. The quality assurance staff shall conduct testing, surveillance, and other activities necessary to verify conformance with project plans and specifications, including Engineer-performed acceptance testing identified in the specifications. The quality assurance staff shall have unfettered access to the site of the work for purposes inspection of the work or other actions necessary under the contract.

e. **Designer of Record.** The designer of record shall advise the Engineer concerning interpretation of plans and specifications, requests for additional information, and the acceptability of such changes as the Contractor may propose.

f. **Owner.** The Owner shall have authority to accept or reject any or all aspects of the work, interpret or otherwise answer questions concerning the plans and specifications, make changes to the plans and specifications, and make payment under the contract. The Owner shall have unfettered access to the site of the work for purposes inspection of the work or other actions necessary under the contract. The owner shall have the authority to suspend work in whole or in part for non-conformance with plans or specifications, or for such period or periods as the Owner may deem necessary for research purposes, by verbal notification to the Contractor.

50MR-1.2 Conformity with plans and specifications. All work and all materials furnished shall be in reasonably close conformity with the lines, grades, grading sections, cross-sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans or specifications.

If the Engineer finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications but that the portion of the work affected will, in his or her opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, the Engineer will advise the Owner of his or her determination that the affected work be accepted and remain in place. In this event, the Engineer will document the determination and recommend to the Owner a basis of acceptance that will provide for an adjustment in the contract price for the affected portion of the work. The Engineer's determination and recommended contract price adjustments will be based on sound engineering judgment and such tests or retests of the affected work as are, in the Engineer's opinion, needed. Changes in the contract price shall be covered by contract change order or supplemental agreement as applicable.

If the Engineer finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the Engineer's written orders.

For the purpose of this subsection, the term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the work in accordance with the contract, plans, and specifications. The term shall not be construed as waiving the Engineer's responsibility to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the work, when, in the Engineer's opinion, such compliance is essential to provide an acceptable finished portion of the work.
For the purpose of this subsection, the term "reasonably close conformity" is also intended to provide the Engineer with the authority, after consultation with the FAA, to use sound engineering judgment in his or her determinations as to acceptance of work that is not in strict conformity, but will provide a finished product equal to or better than that intended by the requirements of the contract, plans and specifications.

50MR-1.3 Coordination of contract, plans, and specifications. The contract, plans, specifications, and all referenced standards cited are essential parts of the contract requirements. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions; contract technical specifications shall govern over contract general provisions, plans, cited standards for materials or testing, and cited advisory circulars (ACs); contract general provisions shall govern over plans, cited standards for materials or testing, and cited ACs; plans shall govern over cited standards for materials or testing and cited ACs. If any paragraphs contained in the Special Provisions conflict with General Provisions or Technical Specifications, the Special Provisions shall govern.

From time to time, discrepancies within cited testing standards occur due to the timing of the change, edits, and/or replacement of the standards. If the Contractor discovers any apparent discrepancy within standard test methods, the Contractor shall immediately ask the Engineer for an interpretation and decision, and such decision shall be final. If conflicting dimensions are provided, the more stringent requirement shall govern.

LIST OF SPECIAL PROVISIONS

There are no special provisions.

50MR-1.4 Cooperation of Contractor. The Contractor will be supplied with electronic copies each of the plans and specifications in PDF format. The Contractor shall have available on the work at all times one copy each of the plans and specifications. The cost of reproduction shall be borne by the Contractor.

The Contractor shall give constant attention to the work to facilitate the progress thereof, and shall cooperate with the Engineer and his or her inspectors and with other contractors in every way possible. The Contractor shall have a competent superintendent on the work at all times who is fully authorized as his or her agent on the work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions in the English language from the Engineer or his or her authorized representative.

50MR-1.5 Cooperation between contractors. The Owner reserves the right to contract for and perform other or additional work on or near the work covered by this contract.
When separate contracts are let within the limits of any one project, each Contractor shall conduct the work so as not to interfere with or hinder the progress of completion of the work being performed by other Contractors. Contractors working on the same project shall cooperate with each other as directed.

Each Contractor involved shall assume all liability, financial or otherwise, in connection with his or her contract and shall protect and save harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced because of the presence and operations of other Contractors working within the limits of the same project.
The Contractor shall arrange his or her work and shall place and dispose of the materials being used so as not to interfere with the operations of the other Contractors within the limits of the same project. The Contractor shall join his or her work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

50MR-1.6 Construction layout and stakes. The Engineer shall establish horizontal and vertical control only. The Contractor must establish all layout required for the construction of the work. Such stakes and markings as the Engineer may set for either their own or the Contractor's guidance shall be preserved by the Contractor. In case of negligence on the part of the Contractor, or their employees, resulting in the destruction of such stakes or markings, stakes or markings shall be replaced by the Contractor to the satisfaction of the Engineer at no additional cost to the Owner.

The Contractor will be required to furnish all lines, grades and measurements from the control points necessary for the proper execution and control of the work contracted for under these specifications.

The Contractor must give copies of survey notes to the Engineer for each area of construction and for each placement of material as specified to allow the Engineer to make periodic checks for conformance with plan grades, alignments and grade tolerances required by the applicable material specifications. All surveys must be provided to the Engineer prior to commencing work items that will cover or disturb the survey staking as set by the Contractor's surveyor. Survey(s) and notes shall be provided in the following format(s): drawings and plans as AutoCAD dwg (latest version) and equivalent plots as PDF; all other items as PDF. In the case of error, on the part of the Contractor, their surveyor, employees or subcontractors, resulting in established grades, alignment or grade tolerances that do not concur with those specified or shown on the plans, the Contractor is solely responsible for correction, removal, replacement and all associated costs at no additional cost to the Owner.

No direct payment will be made, unless otherwise specified in contract documents, for this labor, materials, or other expenses. The cost shall be included in the price of the bid for the various items of the Contract.

The establishment of Survey Control and/or reestablishment of survey control shall be by a State Licensed Land Surveyor.

Controls and stakes disturbed or suspect of having been disturbed shall be checked and/or reset as directed by the Engineer without additional cost to the Owner.

50MR-1.7 Automatically controlled equipment. Whenever batching or mixing plant equipment is required to be operated automatically under the contract and a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods for a period of up to 48 consecutive hours following the breakdown or malfunction, provided this method of operations will produce results which conform to all other requirements of the contract.

50MR-1.8 Authority and duties of inspectors. Inspectors shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication, or manufacture of the materials to be used. Inspectors are not authorized to revoke, alter, or waive any provision of the contract. Inspectors are not authorized to issue instructions or to act as foreman for the Contractor.

Inspectors are authorized to notify the Contractor or his or her representatives of any apparent failure of the work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the Engineer for a decision.

50MR-1.9 Inspection of the work. All materials and each part or detail of the work shall be subject to inspection. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

If the Engineer requests it, the Contractor, at any time before acceptance of the work, shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor’s expense.

Any work done or materials used without supervision or inspection by an authorized representative of the Owner may be ordered removed and replaced at the Contractor’s expense

unless the Owner's representative failed to inspect after having been given reasonable notice in writing that the work was to be performed.
Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

50MR-1.10 Removal of unacceptable and unauthorized work. All work that does not conform to the requirements of the contract, plans, and specifications will be considered unacceptable, unless otherwise determined acceptable by the Engineer as provided in the subsection 50MR-1.2 titled CONFORMITY WITH PLANS AND SPECIFICATIONS of this section.

Unacceptable work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the work, shall be removed immediately and replaced in an acceptable manner in accordance with these specifications.

Until the Owner's final written acceptance of the entire completed work, excepting only those portions of the work accepted in accordance with the subsection 50MR 1.14 titled PARTIAL ACCEPTANCE of Section 50MR, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part due to the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God such as earthquake, tidal wave, tornado, hurricane or other cataclysmic phenomenon of nature, or acts of the public enemy or of government authorities.

If the work is suspended for any cause whatever, the Contractor shall be responsible for the work and shall take such precautions necessary to prevent damage to the work. The Contractor shall provide for normal drainage and shall erect necessary temporary structures, signs, or other facilities at his or her expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established planting, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

No removal work made under provision of this subsection shall be done without lines and grades having been established by the Engineer. Work done contrary to the specifications or instructions of the Engineer, work done beyond the lines shown on the plans or as established by the Engineer, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the Engineer made under the provisions of this subsection, the Engineer will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs incurred by the Owner from any monies due or to become due the Contractor.

50MR-1.11 Load restrictions. The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the work. A special permit will not relieve the Contractor of liability for damage that may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor shall be responsible for all damage done by his or her hauling equipment and shall correct such damage at his or her own expense.

50MR-1.12 Maintenance during construction. The Contractor shall maintain the work during construction and until the work is accepted. Maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the work is maintained in satisfactory condition at all times.

In the case of a contract for the placing of a course upon a course or subgrade previously constructed, the Contractor shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the project is accepted shall be included in the unit prices bid on the various contract items, and the Contractor will not be paid an additional amount for such work.

50MR-1.13 Failure to maintain the work. Should the Contractor at any time fail to maintain the work as provided in the subsection 50MR-1.12 titled MAINTENANCE DURING CONSTRUCTION of this section, the Engineer shall immediately notify the Contractor of such noncompliance. Such notification shall specify a reasonable time within which the Contractor shall be required to remedy such unsatisfactory maintenance condition. The time specified will give due consideration to the exigency that exists.

Should the Contractor fail to respond to the Engineer’s notification, the Owner may suspend any work necessary for the Owner to correct such unsatisfactory maintenance condition, depending on the exigency that exists. Any maintenance cost incurred by the Owner, shall be deducted from monies due or to become due the Contractor.

50MR-1.14 Partial acceptance. If at any time during the execution of the project the Contractor substantially completes a usable unit or portion of the work, the occupancy of which will benefit the Owner, the Contractor may request the Engineer to make final inspection of that unit. If the

Engineer finds upon inspection that the unit has been satisfactorily completed in compliance with the contract, the Engineer may accept it as being complete, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the contract.

50MR-1.15 Final acceptance. Upon due notice from the Contractor of presumptive completion of the entire project, the Engineer and Owner will make an inspection. If all construction provided for and contemplated by the contract is found to be complete in accordance with the contract, plans, and specifications, such inspection shall constitute the final inspection. The Engineer shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of same and the Contractor shall immediately comply with and execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the final inspection, provided the work has been satisfactorily completed. In such event, the Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

50MR-1.16 Claims for adjustment and disputes. If for any reason the Contractor deems that additional compensation is due for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized as extra work, the Contractor shall notify the Engineer in writing of his or her intention to claim such additional compensation before the Contractor begins the work on which the Contractor bases the claim. If such notification is not given or the Engineer is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the Engineer has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit a written claim to the Engineer who will present it to the Owner for consideration in accordance with local laws or ordinances.

Nothing in this subsection shall be construed as a waiver of the Contractor’s right to dispute final payment based on differences in measurements or computations.

END OF SECTION 50

Section 60MR Control of Materials

GENERAL REQUIREMENTS

60MR-1.1 Source of supply and quality requirements. The materials used in the work shall conform to the requirements of the contract, plans, and specifications. Unless otherwise specified, such materials that are manufactured or processed shall be new (as compared to used or reprocessed).

Steel products must be 100% U.S. domestic product. For non-steel items, preference shall be given to products that are 100% manufactured and assembled in the U.S. Manufactured products not meeting the 100% U.S. domestic preference may only be used on the project if the FAA has officially granted a permissible waiver to Buy American Preferences. Submittals for all manufactured products must include certification of compliance with Buy American requirements as established under 49 USC Section 50101. Submittal must include sufficient information to confirm compliance or submittal will be returned with no action.

The Contractor is solely responsible for control of quality in accordance with Section 100MR CONTRACTOR QUALITY CONTROL. The FAA reserves the right to verify material quality through independent testing and inspection of any material or item as part of the Quality Assurance Program. Provide access to materials and facilities to the Engineer for purposes of sampling and testing. Except as indicated, Quality Assurance Program activities are the responsibility of the Engineer, to be conducted at no additional cost to the Contractor.

60MR-1.2 Samples, tests, and cited specifications. Perform sampling, testing, and inspection in accordance with Section 100MR CONTRACTOR QUALITY CONTROL and the Contractor's Quality Control Plan. All materials used in the work are also subject to sampling, inspection, testing, and approval by the Engineer as part of the Quality Assurance Program. Submit materials for approval before incorporation in the work. Unauthorized materials or materials found to be unacceptable will not be paid for and, if directed by the Engineer, shall be removed at the Contractor's expense.

Unless otherwise indicated, perform sampling and testing in accordance with the cited standard methods of ASTM, American Association of State Highway and Transportation Officials (AASHTO), Federal Specifications, Commercial Item Descriptions, and all other cited methods, which are current on the date of advertisement for bids.

60MR-1.3 Submittals. Provide complete and sufficiently detailed submittals as indicated in the technical sections of these Specifications to allow the FAA to determine compliance of the indicated materials and methods with contract requirements. Prepare and submit submittals in accordance with section 61MR SUBMITTAL PROCEDURES.

60MR-1.4 Plant inspection. The Engineer, or authorized representative, may inspect, at its source, any specified material or assembly to be used in the work. Manufacturing plants may be inspected from time to time for the purpose of determining compliance with specified

manufacturing methods or materials to be used in the work and to obtain Quality Assurance samples.

Should the Engineer conduct plant inspections:

a. Cooperate with and assist the Engineer for purposes of plant inspections.

b. Allow the Engineer full entry at all reasonable times to such parts of the plant that concern the manufacture or production of the materials being furnished.

c. If required by the Engineer, arrange for adequate office or working space that may be reasonably needed for conducting plant inspections. Office or working space should be conveniently located with respect to the plant.

The FAA reserves the right to re-inspect and retest any material that has been tested and approved at the source of supply after it has been delivered to the site.

60MR-1.5 Storage of materials. Materials shall be so stored as to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located to facilitate their prompt inspection. The Contractor shall coordinate the storage of all materials with the Engineer. Unless otherwise shown on the plans, the storage of materials and the location of the Contractor's plant and parked equipment or vehicles shall be as directed by the Engineer. Private property shall not be used for storage purposes without written permission of the Owner or lessee of such property. The Contractor shall make all arrangements and bear all expenses for the storage of materials on private property. Upon request, the Contractor shall furnish the Engineer a copy of the property Owner's permission.

All storage sites on private or airport property shall be restored to their original condition by the Contractor at his or her entire expense, except as otherwise agreed to (in writing) by the Owner or lessee of the property.

60MR-1.6 Unacceptable materials. Any material or assembly that does not conform to the requirements of the contract, plans, or specifications shall be considered unacceptable and shall be rejected. The Contractor shall remove any rejected material or assembly from the site of the work, unless otherwise instructed by the Engineer. The Contractor is responsible for the cost of removal of unacceptable materials, including removal and repair of adjacent or subsequent work.

Rejected material or assembly, the defects of which have been corrected by the Contractor, shall not be returned to the site of the work until such time as the Engineer has approved its use in the work.

60MR-1.7 Owner furnished materials. The Contractor shall furnish all materials required to complete the work, except those specified, if any, to be furnished by the Owner. Owner-furnished materials shall be made available to the Contractor at the location specified.
All costs of handling, transportation from the specified location to the site of work, storage, and installing Owner-furnished materials shall be included in the unit price bid for the contract item in which such Owner-furnished material is used.

After any Owner-furnished material has been delivered to the location specified, the Contractor shall be responsible for any demurrage, damage, loss, or other deficiencies that may occur during the Contractor's handling, storage, or use of such Owner-furnished material. The Owner will deduct from any monies due or to become due the Contractor any cost incurred by the Owner in making good such loss due to the Contractor's handling, storage, or use of Owner-furnished materials.

END OF SECTION 60MR

Section 61MR Submittal Procedures

GENERAL REQUIREMENTS

61MR-1.1 Summary. Required **s**ubmittals are identified in the technical sections. The FAA may request submittals in addition to those specified when deemed necessary to adequately describe the work. Units of weights and measures used on all submittals are to be the same as those used in the contract drawings. Each submittal is to be complete and have sufficient detail to allow ready determination of compliance with contract requirements. An incomplete submittal is grounds for rejection without further review. The Contractor shall review and certify all items prior to submission.

All submittals require FAA approval and are to be approved prior to the acquisition of any material or equipment covered thereby.

61MR-1.2 Submittal Descriptions (SD). Submittal descriptions define the type of materials expected as part of a submittal. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

a. **SD-01 Preconstruction Submittals.** Submittals which are required prior to commencement of any on-site work, including demolition, site work, or establishment of staging areas.
   i. Certificates of insurance
   ii. Surety bonds
   iii. List of proposed Subcontractors
   iv. List of proposed products
   v. Construction progress schedule
   vi. Network Analysis Schedule (NAS)
   vii. Submittal register
   viii. Schedule of prices or Earned Value Report
   ix. Health and safety plan
   x. Work plan
   xi. Quality Control(QC) plan
   xii. Environmental protection plan

b. **SD-02 Shop Drawings.** Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

c. **SD-03 Product Data.** Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

d. **SD-04 Samples.** Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Field samples and mock-ups constructed on the project site establish standards by which the ensuring work

can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

e. **SD-05 Design Data.** Design calculations, mix designs, analyses or other data pertaining to a part of work.

f. **SD-06 Test Reports.** Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.
   - **i.** Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to job site.
   - **ii.** Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.
   - iii. Investigation reports.
   - iv. Daily logs and checklists.
   - v. Final acceptance test and operational test procedure.

g. **SD-07 Certificates.** Statements printed on the manufacturer's letterhead and signed by a company officer or Registered Professional employed by the manufacturer of a product, system or material attesting that product, system or material meets specification requirements. Must be dated after award of project contract and clearly name the project. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

h. **SD-08 Manufacturer's Instructions.** Preprinted material describing installation of a product, system or material, including special notices and (MSDS) concerning impedances, hazards and safety precautions.

i. **SD-10 Operation and Maintenance Data.** Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel, including manufacturer's help and product line documentation necessary to maintain and install equipment. This data is needed by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

j. **SD-11 Closeout Submittals.** Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.
   - **i.** Record Drawings.
   - **ii.** As-built drawings.
   - **iii.** Verification statements.

61MR-1.3 Submittals. FAA approval is required for all submittals. Submit the following in accordance with this section:

a. **SD-01 Preconstruction Submittals**

i. **Submittal Register.** Provide a submittal register in accordance with paragraph SUBMITTAL REGISTER of this section. No other submittal will be accepted until the Submittal Register is approved by the FAA.

FORMAT

61MR-2.1 Transmittal form. Submit items using ENG 4025 for the transmittal form. Completely fill out the form and attach it to the submittal as a cover sheet. Submit a transmittal form following normal procedures after physical delivery of SD04 submittals to the Government.

61MR-2.2 Quantity of submittals. Provide the following submittal quantities according to the Submittal Description:

a. **SD-02 Shop Drawings.** Provide one half-size (ledger-size, 11x17) hard copy of drawings and one electronic copy of each required SD-02 submittal.
b. **SD-04 Samples.**
   i. **Items.** Submit two sample items, or two sets of sample items showing range of variation, of each required item. One approved sample or set of samples will be retained by the FAA and one will be returned to Contractor.
   ii. **Installations.** Submit one sample installation in the location directed. Include components listed in technical section or as directed.
   iii. **Liquids.** Submit four 5-gallon samples of non-solid materials, or as indicated in the technical sections.
   iv. **Paving materials.** Submit 200 pounds of material samples for each paving material or constituent, or as indicated in the technical sections.
c. **All other Submittal Descriptions.** Unless otherwise indicated, provide one electronic copy of each required submittal.

61MR-2.3 Electronic file format. Provide electronic format submittals as PDF files unless otherwise indicated. Photographs shall be sized 4-megapixel in the JPEG format. Video shall be full 1080p High Definition Video in MP4 format.

61MR-2.4 Electronic signature. A scanned signature is valid and binding for non-repudiation of documents for purposes of this contract.

61MR-2.5 Contractor certification. Certify each submittal item as compliant with contract requirements prior to submission.

a. **Certification authority.** Submittals must be certified by the Contractor Quality Control System Manager, Contractor Project Superintendent, or a company officer.
b. **Contents of certification.** The certification must identify:
   - The firm name of the Contractor
   - An indication of “Approved” or “Approved with corrections as noted”
   - The signature of the certifying individual
   - The printed name of the certifying individual
   - The title of the certifying individual

- The date the review and certification by the Contractor was complete.

SUBMISSION AND APPROVAL PROCESS

61MR-3.1 Electronic submission. Upload the electronic documents to the project website provided by the Engineer. Submit the cover sheet for SD-04 Samples submittals after delivery of the samples.

61MR-3.2 Submittal register. The Engineer will provide an on-line submittal register for submission and tracking of submittals. A draft submittal register identifying the minimum required set of submittals will be provided to the Contractor by the Engineer. Provide a final Submittal Register, including all anticipated submittals, associated submittal descriptions, and anticipated submission dates. Upon approval, the Engineer will update the on-line submittal register to reflect the approved submittal register. No other submittal will be accepted until the Submittal Register is approved by the FAA.

61MR-3.3 Approval process. Submittals will be reviewed for approval within the period specified and only for conformance with project design concepts and compliance with contract documents. Claims for delays due to failure on the part of the Contractor to obtain approval of submittals, including any required resubmittals, in a timely manner will not be considered. Approval of a submittal does not relieve the Contractor of any contract requirements. The Engineer will perform the initial review of each submittal, with the FAA having final approval authority. Submittals will be returned to the Contractor within 10 business days with one of the following actions and with markings appropriate for action indicated:

A - Approved as submitted. Submittals marked "A" authorize the Contractor to proceed with the work covered.

B - Approved except as noted on drawings. Resubmission not required. Submittals marked "B" authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections.

C - Approved except as noted on the drawings. Refer to attached comments. Resubmission required. Submittals marked "C" authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections. Resubmission is required.

D – Will be returned by separate correspondence. Submittals marked "D" authorize the Contractor to proceed with the work.

E – Disapproved. Refer to attached comments. Submittals marked "E" indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.

F – Receipt acknowledged. Submittals marked "F" authorize the Contractor to proceed with the work.

G – Other action required. Submittals marked "G" indicate an action is required before the submittal can be approved. The required actions will be specified. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.

X – Receipt acknowledged, does not comply with contract requirements, as noted. Submittals marked "X" indicate noncompliance with the contract requirements. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.

61MR-3.4 Disapproved or rejected submittals. Make corrections required by the Engineer and FAA. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under section 40MR SCOPE OF WORK paragraph EXTRA WORK, is to be given to the Engineer. Approval of a submittal is not considered written agreement for extra work. The Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and submission of the submittals in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

61MR-3.5 Approved submittals. The FAA's approval or acceptance of submittals is not to be construed as a complete check, and indicates only that the materials appear to comply with contract requirements. Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

61MR-3.6 Approved samples. Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, the Contractor to assure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the contract. Samples not approved will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. Government

reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Contractor to replace such materials or equipment to meet contract requirements.

Approval of the Contractor's samples by the Contracting Officer does not relieve the Contractor of his responsibilities under the contract.

61MR-3.7Scheduling. Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. No delay damages or time extensions will be allowed for time lost in late submittals. An additional 10 business days shall be allowed and shown on the register for review and approval of submittals.

a. **Delays.** Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements. The normal submittal review period available to the Government is 10 business days.
b. **Submittals not applicable to work.** Submittals called for by the contract documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A."
c. **Procurement.** Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

61MR-3.8 Variations. Except as explicitly requested in the project documents, variations will not be considered due to the research-related nature of the work.

61MR-3.9 Request for information (RFI). Submit requests for information or clarification of project documents through the project website. Requests for information will be processed and approved through normal submittal approval processes, except that response time to an RFI may exceed the normal submittal review period depending on the complexity and potential cost or schedule impact. Requests for Information shall contain at minimum:

- A description of the required information
- A reference to the pertinent portion of the contract documents
- A description of cost impacts
- A recommended answer or solution
- A description of the impact to schedule, including the effect on the critical path

END OF SECTION 61M

Section 100MR Contractor Quality Control

GENERAL REQUIREMENTS

100MR-1.1 General. The Contractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. Designate a Contractor Quality Control System Manager (CQCSM) within the on-site organization who has sole responsibility for the Contractor's Quality Control activities.

The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements, and are to be performed by the Contractor. The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed and accepted by the FAA.

100MR-1.2 Submittals. FAA approval is required for all submittals. Submit the following in accordance with section 61 SUBMITTAL PROCEDURES:

b. SD-01 Preconstruction Submittals
   i. Contractor's Quality Control Plan. Document the Contractor's Quality Control Program in sufficient detail to demonstrate compliance with the quality control requirements of the project specifications.

c. SD-06 Test Reports
   i. Inspection Records. Provide copies of all inspection records for each item of work.
   ii. Field Tests. Provide copies of all field test records for each item of work.
   iii. Factory Tests. Provide copies of all factory test records for each item of work.

d. SD-11 Closeout Submittals
   i. Verification Statement. Provide a certified statement for each item of work that the appropriate quality control procedures were conducted and that the item of work conforms to the project plans and specifications.

QUALITY CONTROL PROGRAM

100MR-2.1 Description of program.

a. **General description.** The Contractor shall establish a Quality Control Program to perform quality control inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. This Quality Control Program shall ensure conformance to applicable specifications and plans with respect to materials, workmanship, construction, finish, and functional performance. The Quality Control Program shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to

other requirements of this section and any other activities deemed necessary by the Contractor to establish an effective level of quality control. Three phases of control are required for each item of work: Preparatory, Initial, and Follow-up. At minimum, each specification section constitutes a separate item of work.

b. Specific requirements. The Contractor is encouraged to include any elements in the Quality Control Program that are deemed necessary to adequately control all production and/or construction processes required by this contract. Contractor Quality Control program must address, at minimum, the following items:

(1) Submittal procedures in compliance with specification section 61 SUBMITTAL PROCEEDURES.

(2) Inspection requirements and plan**.**

(3) Quality Control test plan and schedule, including acceptance testing**.**

(4) Quality Control documentation procedures**.**

(5) Procedures for identifying deficient work, correcting deficient work, and documenting the correction of deficient work**.**

c. Preparatory phase. The Preparatory phase is conducted after all submittals and materials have been approved for an item of work and prior to beginning that work. Notify the FAA of the time and location of the Preparatory phase meeting a minimum of two working days in advance of the meeting. The meeting will be conducted by the CQCSM and attended by the CQC inspectors and the foremen responsible for the work. Document the results of each Preparatory Phase Meeting in the daily report. Review the following items and resolve any conflicts:

(1) Each paragraph of these specifications.

(2) Contract drawings.

(3) All submittals pertinent to the item. Un-approved submittals, except for test and inspection reports from the actual installation of the item and for SD-11 Closeout Submittals, will be considered a failure of the Preparatory phase and non-compliance with project requirements.

(4) Testing plan, including inspection, quality control testing, quality assurance testing, and research testing.

(5) The work area. Ensure that necessary preliminary work has been completed.

(6) Specific activities to be performed and the quality controls that will be used to ensure compliance with project requirements. Perform a walk-through at the site if necessary.

(7) Discuss specific controls used and construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for the work.

(8) Compliance with Federal, state, and local laws, rules, and regulations.

(9) Applicable safety requirements.

d. Initial Phase. Notify the Engineer at least two work days in advance of each initial phase meeting. When construction crews are ready to start work on an item, the CQCSM shall conduct the initial phase with the CQC inspectors and the foreman responsible for that item. Observe the initial segment of the item to ensure that the work complies with Contract

requirements. Document the results of the initial phase in the daily report. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not being met. Perform the following for each item:

(1) Establish the level of workmanship and verify that it meets the minimum acceptable workmanship standards.
(2) Resolve workmanship issues.
(3) Ensure that specified testing is performed by the approved laboratories.
(4) Coordinate scheduled work with the Engineer for research testing and sampling.
(5) Ensure that applicable safety requirements are met.

e. Follow-up phase. Perform the following for on-going work daily, or more frequently as necessary, until the completion of the project. Document compliance in the Daily Report.

(1) Ensure the work is in compliance with contract requirements.
(2) Ensure that all required testing is performed.
(3) Maintain the quality of workmanship required.
(4) Ensure that rework items are being corrected.

f. Additional preparatory and initial phases. Conduct additional preparatory and initial phases if the quality of on-going work is unacceptable, if there are changes in the quality control organization or the on-site production supervision, if work is resumed after substantial period of inactivity, or if other problems develop.

100MR-2.2 Quality control organization. The Contractor Quality Control Program shall be implemented by the establishment of a separate quality control organization. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel.

The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the Quality Control Program, including inspection and testing for each item of work. If necessary, different technicians can be used for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the Quality Control Program, the personnel assigned shall be subject to the qualification requirements of paragraph 100R-1.3a and 100R-1.3b. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization. The quality control organization shall, as a minimum, consist of the following personnel:

a. Program Administrator. The Program Administrator shall be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The Program Administrator shall have a minimum of five (5) years of experience in airport construction and shall have had prior quality control experience on a project of comparable size and scope as the contract.

Additional qualifications for the Program Administrator shall include at least one of the following requirements:

(1) Professional Engineer with one (1) year of airport paving experience.

(2) Engineer-in-training with two (2) years of airport paving experience.

(3) An individual with three (3) years of airport paving experience, with a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology or Construction.

(4) Construction materials technician certified at Level III by the National Institute for Certification in Engineering Technologies (NICET).

(5) Highway materials technician certified at Level III by NICET.

(6) Highway construction technician certified at Level III by NICET.

(7) A NICET certified engineering technician in Civil Engineering Technology with five (5) years of highway and/or airport paving experience.

The Program Administrator shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract plans and technical specifications. The Program Administrator shall report directly to a responsible officer of the construction firm. The Program Administrator may supervise the Quality Control Program on more than one project provided that person can be at the job site within two (2) hours after being notified of a problem.

b. Quality control technicians. A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall be either Engineers, engineering technicians, or experienced craftsman with qualifications in the appropriate field equivalent to NICET Level II or higher construction materials technician or highway construction technician and shall have a minimum of two (2) years of experience in their area of expertise. Personnel inspecting Portland cement concrete construction shall be appropriately certified by the American Concrete Institute.

The quality control technicians shall report directly to the CQCSM and shall perform the following functions:

(1) Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by subsection 100-06.

(2) Performance of all quality control tests as required by the technical specifications and subsection 100-07.

(3) Assistance with collecting acceptance testing or other samples for the Engineer when required by the technical specifications.

Appropriate certification at an equivalent level, by a state or nationally recognized organization will be acceptable in lieu of NICET certification. Quality control technicians are subject to approval by the Engineer.

c. Staffing levels. The Contractor shall provide sufficient qualified quality control personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The Quality Control Program shall state where different technicians will be required for different work elements.

100MR-2.3 Project progress schedule. The Contractor shall submit a coordinated construction schedule for all work activities. The schedule shall be prepared as a network diagram in Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), or other format, or as

otherwise specified in the contract. As a minimum, it shall provide information on the sequence of work activities, milestone dates, and activity duration.

The Contractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Contractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

100MR-2.4 Inspection requirements. Quality control inspection functions shall be organized to provide inspections for all definable items of work, as detailed below. All inspections shall be documented by the Contractor as specified by paragraph 100R-2.5 DOCUMENTATION.

Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular item of work. These shall include the following minimum requirements:

a. During plant operation for material production, quality control test results and periodic inspections shall be used to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment used in proportioning and mixing shall be inspected to ensure its proper operating condition. The Quality Control Program shall detail how these and other quality control functions will be accomplished and used.

b. During field operations, quality control test results and periodic inspections shall be used to ensure the quality of all materials and workmanship. All equipment used in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The Program shall detail how these and other quality control functions will be accomplished and used.

100MR-2.5 Quality control testing plan. As a part of the overall Quality Control Program, the Contractor shall implement a quality control testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional quality control tests that the Contractor deems necessary to adequately control production and/or construction processes. The testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

a. Specification item number (for example, P-401)

b. Item description (for example, Plant Mix Bituminous Pavements)

c. Test type (for example, gradation, grade, asphalt content)

d. Test standard (for example, ASTM or American Association of State Highway and Transportation Officials (AASHTO) test number, as applicable)

e. Test frequency (for example, 1 test per 500 cubic yards)

f. Responsibility by company and position (for example, ABC Asphalt plant technician)

g. Control requirements (for example, target value and permissible deviations)

The testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with ASTM D3665. The Engineer shall be provided the opportunity to witness quality control sampling and testing.

All quality control test results shall be documented by the Contractor as required by paragraph 100MR-2.5 DOCUMENTATION.

100MR-26 Documentation. The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the Engineer daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the Contractor's Program Administrator.
Specific Contractor quality control records required for the contract shall include, but are not necessarily limited to, the following records:

a. Daily inspection reports. Each Contractor quality control technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations. These technician's daily reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum, include the following:

(1) Technical specification item number and description
(2) Compliance with approved submittals
(3) Proper storage of materials and equipment
(4) Proper operation of all equipment
(5) Adherence to plans and technical specifications
(6) Review of quality control tests
(7) Safety inspection.

The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible quality control technician and the Program Administrator. The Engineer shall be provided at least one copy of each daily inspection report on the work day following the day of record.

b. Daily test reports. The Contractor shall be responsible for establishing a system that will record all quality control test results. Daily test reports shall document the following information:

(1) Technical specification item number and description
(2) Test designation
(3) Location
(4) Date of test
(5) Control requirements
(6) Test results
(7) Causes for rejection
(8) Recommended remedial actions
(9) Retests

Test results from each day's work period shall be submitted to the Engineer prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical quality control charts. The daily test reports shall be signed by the responsible quality control technician and the Program Administrator.

100MR-2.7 Corrective action requirements. The Quality Control Program shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications. The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Contractor shall establish and use statistical quality control charts for individual quality control tests. The requirements for corrective action shall be linked to the control charts.

Document deficient items that cannot be corrected the same day the deficiency was discovered on a rework items list. Document the status of each item on the rework list. Do not remove items from the list. Instead, mark a corrected deficiency as "closed" that has inspected and approved by the Engineer. Provide the rework item list to the Engineer daily.

SURVEILLANCE BY THE ENGINEER

100MR-3.1 Surveillance by the Engineer. All items of material and equipment shall be subject to surveillance, sampling, and testing by the FAA, the Engineer, and other designated representatives of the FAA at the point of production, manufacture, shipment, or installation to determine if the Contractor, producer, manufacturer or shipper maintains an adequate quality control system in conformance with the requirements detailed here and the applicable technical

specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to surveillance, sampling, and testing by the Engineer at the site for the same purpose. Surveillance by the Engineer does not relieve the Contractor of performing quality control activities for either on-site or off-site Contractor's or subcontractor's work.

NONCOMPLIANCE

100MR-4.1 Notification. The Engineer will notify the Contractor of any observed noncompliance with the project plans and specifications. The Contractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Engineer or his or her authorized representative to the Contractor or his or her authorized representative at the site of the work, shall be considered sufficient notice.

100MR-4.2 Failure to maintain control. In cases where quality control activities do not comply with either the Contractor Quality Control Program or the contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the FAA, the FAA may:

a. Order the Contractor to replace ineffective or unqualified quality control personnel or subcontractors.

b. Order the Contractor to stop operations until appropriate corrective actions are taken.

BASIS OF PAYMENT

100MR-5.1 Payment. Quality Control is considered an integral part of each item of work. Separate payment will not be made for any quality control activities.

END OF SECTION 100M

Section 110MR Method of Estimating Percentage of Material Within Specification Limits (PWL)

110MR-1.1 General. When the specifications provide for acceptance of material based on the method of estimating percentage of material within specification limits (PWL), the PWL will be determined in accordance with this section. All test results for a lot will be analyzed statistically to determine the total estimated percent of the lot that is within specification limits. The PWL is computed using the sample average (X) and sample standard deviation (S_n) of the specified number (n) of sublots for the lot and the specification tolerance limits, L for lower and U for upper, for the particular acceptance parameter. From these values, the respective Quality index, Q_L for Lower Quality Index and/or Q_U for Upper Quality Index, is computed and the PWL for the lot for the specified n is determined from Table 1. All specification limits specified in the technical sections shall be absolute values. Test results used in the calculations shall be to the significant figure given in the test procedure.

There is some degree of uncertainty (risk) in the measurement for acceptance because only a small fraction of production material (the population) is sampled and tested. This uncertainty exists because all portions of the production material have the same probability to be randomly sampled. The Contractor's risk is the probability that material produced at the acceptable quality level is rejected or subjected to a pay adjustment. The Owner's risk is the probability that material produced at the rejectable quality level is accepted.

It is the intent of this section to inform the Contractor that, in order to consistently offset the Contractor's risk for material evaluated, production quality (using population average and population standard deviation) must be maintained at the acceptable quality specified or higher. In all cases, it is the responsibility of the Contractor to produce at quality levels that will meet the specified acceptance criteria when sampled and tested at the frequencies specified.

110MR-1.2 Method for computing PWL. The computational sequence for computing PWL is as follows:

a. Divide the lot into n sublots in accordance with the acceptance requirements of the specification.

b. Locate the random sampling position within the sublot in accordance with the requirements of the specification.

c. Make a measurement at each location, or take a test portion and make the measurement on the test portion in accordance with the testing requirements of the specification.

d. Find the sample average (X) for all sublot values within the lot by using the following formula:

$$\mathbf{X = (x_1 + x_2 + x_3 + \ldots x_n) / n}$$

Where: X = Sample average of all sublot values within a lot

x_1, x_2 = Individual sublot values

n = Number of sublots

e. Find the sample standard deviation (S_n) by use of the following formula:

$$S_n = [(d_1^2 + d_2^2 + d_3^2 + \ldots d_n^2)/(n-1)]^{1/2}$$

Where: S_n = Sample standard deviation of the number of sublot values in the set

d_1, d_2 = Deviations of the individual sublot values x_1, x_2, … from the average value X

that is: $d_1 = (x_1 - X)$, $d_2 = (x_2 - X)$ … $d_n = (x_n - X)$

n = Number of sublots

f. For single sided specification limits (that is, L only), compute the Lower Quality Index Q_L by use of the following formula:

$$Q_L = (X - L) / S_n$$

Where: L = specification lower tolerance limit

Estimate the percentage of material within limits (PWL) by entering Table 1 with Q_L, using the column appropriate to the total number (n) of measurements. If the value of Q_L falls between values shown on the table, use the next higher value of PWL.

g. For double-sided specification limits (that is, L and U), compute the Quality Indexes Q_L and Q_U by use of the following formulas:

$$Q_L = (X - L) / S_n$$

and

$$Q_U = (U - X) / S_n$$

Where: L and U = specification lower and upper tolerance limits

Estimate the percentage of material between the lower (L) and upper (U) tolerance limits (PWL) by entering Table 1 separately with Q_L and Q_U, using the column appropriate to the total number (n) of measurements, and determining the percent of material above P_L and percent of material below P_U for each tolerance limit. If the values of Q_L fall between values shown on the table, use the next higher value of P_L or P_U. Determine the PWL by use of the following formula:

$$PWL = (P_U + P_L) - 100$$

Where: P_L = percent within lower specification limit

P_U = percent within upper specification limit

EXAMPLE OF PWL CALCULATION

Project: Example Project
Test Item: Item P-401, Lot A.
A. PWL Determination for Mat Density.

1. Density of four random cores taken from Lot A.

A-1 = 96.60

A-2 = 97.55

A-3 = 99.30

A-4 = 98.35

n = 4

2. Calculate average density for the lot.

$X = (x_1 + x_2 + x_3 + . . . x_n) / n$
$X = (96.60 + 97.55 + 99.30 + 98.35) / 4$
$X = 97.95\%$ density

3. Calculate the standard deviation for the lot.

$S_n = [((96.60 - 97.95)^2 + (97.55 - 97.95)^2 + (99.30 - 97.95)^2 + (98.35 - 97.95)^2)) / (4 - 1)]^{1/2}$
$S_n = [(1.82 + 0.16 + 1.82 + 0.16) / 3]^{1/2}$
$S_n = 1.15$

4. Calculate the Lower Quality Index Q_L for the lot. (L=96.3)

$Q_L = (X - L) / S_n$
$Q_L = (97.95 - 96.30) / 1.15$
$Q_L = 1.4348$

5. Determine PWL by entering Table 1 with $Q_L = 1.44$ and n= 4.

PWL = 98

B. PWL Determination for Air Voids.

1. Air Voids of four random samples taken from Lot A.

A-1 = 5.00
A-2 = 3.74
A-3 = 2.30
A-4 = 3.25

2. Calculate the average air voids for the lot.

$X = (x_1 + x_2 + x_3 . . . n) / n$
$X = (5.00 + 3.74 + 2.30 + 3.25) / 4$
$X = 3.57\%$

3. Calculate the standard deviation S_n for the lot.

$S_n = [((3.57 - 5.00)^2 + (3.57 - 3.74)^2 + (3.57 - 2.30)^2 + (3.57 - 3.25)^2) / (4 - 1)]^{1/2}$
$S_n = [(2.04 + 0.03 + 1.62 + 0.10) / 3]^{1/2}$
$S_n = 1.12$

4. Calculate the Lower Quality Index Q_L for the lot. (L= 2.0)

$Q_L = (X - L) / S_n$
$Q_L = (3.57 - 2.00) / 1.12$
$Q_L = 1.3992$

5. Determine P_L by entering Table 1 with $Q_L = 1.41$ and n = 4.

$P_L = 97$

6. Calculate the Upper Quality Index Q_U for the lot. (U= 5.0)

$Q_U = (U - X) / S_n$
$Q_U = (5.00 - 3.57) / 1.12$

$Q_U = 1.2702$

7. Determine P_U by entering Table 1 with $Q_U = 1.29$ and n = 4.

$P_U = 93$

8. Calculate Air Voids PWL

$PWL = (P_L + P_U) - 100$
$PWL = (97 + 93) - 100 = 90$

EXAMPLE OF OUTLIER CALCULATION (REFERENCE ASTM E178)

Project: Example Project
Test Item: Item P-401, Lot A.
A. Outlier Determination for Mat Density.

1. Density of four random cores taken from Lot A arranged in descending order.

A-3 = 99.30
A-4 = 98.35
A-2 = 97.55
A-1 = 96.60

2. Use n=4 and upper 5% significance level of to find the critical value for test criterion = 1.463.

3. Use average density, standard deviation, and test criterion value to evaluate density measurements.

a. For measurements greater than the average:

If (measurement - average)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier

For A-3, check if (99.30 - 97.95) / 1.15 is greater than 1.463.

Since 1.174 is less than 1.463, the value is not an outlier.

b. For measurements less than the average:

If (average - measurement)/(standard deviation) is less than test criterion, then the measurement is not considered an outlier.

For A-1, check if (97.95 - 96.60) / 1.15 is greater than 1.463.

Since 1.435 is less than 1.463, the value is not an outlier.

Note: In this example, a measurement would be considered an outlier if the density were:

Greater than (97.95 + 1.463 × 1.15) = 99.63%

OR

less than (97.95 - 1.463 × 1.15) = 96.27%.

Table 1. Table for Estimating Percent of Lot Within Limits (PWL)

Percent Within Limits (P_L and P_U)	Positive Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
99	1.1541	1.4700	1.6714	1.8008	1.8888	1.9520	1.9994	2.0362
98	1.1524	1.4400	1.6016	1.6982	1.7612	1.8053	1.8379	1.8630
97	1.1496	1.4100	1.5427	1.6181	1.6661	1.6993	1.7235	1.7420
96	1.1456	1.3800	1.4897	1.5497	1.5871	1.6127	1.6313	1.6454
95	1.1405	1.3500	1.4407	1.4887	1.5181	1.5381	1.5525	1.5635
94	1.1342	1.3200	1.3946	1.4329	1.4561	1.4717	1.4829	1.4914
93	1.1269	1.2900	1.3508	1.3810	1.3991	1.4112	1.4199	1.4265
92	1.1184	1.2600	1.3088	1.3323	1.3461	1.3554	1.3620	1.3670
91	1.1089	1.2300	1.2683	1.2860	1.2964	1.3032	1.3081	1.3118
90	1.0982	1.2000	1.2290	1.2419	1.2492	1.2541	1.2576	1.2602
89	1.0864	1.1700	1.1909	1.1995	1.2043	1.2075	1.2098	1.2115
88	1.0736	1.1400	1.1537	1.1587	1.1613	1.1630	1.1643	1.1653
87	1.0597	1.1100	1.1173	1.1192	1.1199	1.1204	1.1208	1.1212
86	1.0448	1.0800	1.0817	1.0808	1.0800	1.0794	1.0791	1.0789
85	1.0288	1.0500	1.0467	1.0435	1.0413	1.0399	1.0389	1.0382
84	1.0119	1.0200	1.0124	1.0071	1.0037	1.0015	1.0000	0.9990
83	0.9939	0.9900	0.9785	0.9715	0.9671	0.9643	0.9624	0.9610
82	0.9749	0.9600	0.9452	0.9367	0.9315	0.9281	0.9258	0.9241
81	0.9550	0.9300	0.9123	0.9025	0.8966	0.8928	0.8901	0.8882
80	0.9342	0.9000	0.8799	0.8690	0.8625	0.8583	0.8554	0.8533
79	0.9124	0.8700	0.8478	0.8360	0.8291	0.8245	0.8214	0.8192
78	0.8897	0.8400	0.8160	0.8036	0.7962	0.7915	0.7882	0.7858
77	0.8662	0.8100	0.7846	0.7716	0.7640	0.7590	0.7556	0.7531
76	0.8417	0.7800	0.7535	0.7401	0.7322	0.7271	0.7236	0.7211
75	0.8165	0.7500	0.7226	0.7089	0.7009	0.6958	0.6922	0.6896
74	0.7904	0.7200	0.6921	0.6781	0.6701	0.6649	0.6613	0.6587
73	0.7636	0.6900	0.6617	0.6477	0.6396	0.6344	0.6308	0.6282
72	0.7360	0.6600	0.6316	0.6176	0.6095	0.6044	0.6008	0.5982
71	0.7077	0.6300	0.6016	0.5878	0.5798	0.5747	0.5712	0.5686
70	0.6787	0.6000	0.5719	0.5582	0.5504	0.5454	0.5419	0.5394
69	0.6490	0.5700	0.5423	0.5290	0.5213	0.5164	0.5130	0.5105
68	0.6187	0.5400	0.5129	0.4999	0.4924	0.4877	0.4844	0.4820
67	0.5878	0.5100	0.4836	0.4710	0.4638	0.4592	0.4560	0.4537
66	0.5563	0.4800	0.4545	0.4424	0.4355	0.4310	0.4280	0.4257
65	0.5242	0.4500	0.4255	0.4139	0.4073	0.4030	0.4001	0.3980
64	0.4916	0.4200	0.3967	0.3856	0.3793	0.3753	0.3725	0.3705
63	0.4586	0.3900	0.3679	0.3575	0.3515	0.3477	0.3451	0.3432
62	0.4251	0.3600	0.3392	0.3295	0.3239	0.3203	0.3179	0.3161
61	0.3911	0.3300	0.3107	0.3016	0.2964	0.2931	0.2908	0.2892
60	0.3568	0.3000	0.2822	0.2738	0.2691	0.2660	0.2639	0.2624
59	0.3222	0.2700	0.2537	0.2461	0.2418	0.2391	0.2372	0.2358
58	0.2872	0.2400	0.2254	0.2186	0.2147	0.2122	0.2105	0.2093
57	0.2519	0.2100	0.1971	0.1911	0.1877	0.1855	0.1840	0.1829
56	0.2164	0.1800	0.1688	0.1636	0.1607	0.1588	0.1575	0.1566
55	0.1806	0.1500	0.1406	0.1363	0.1338	0.1322	0.1312	0.1304
54	0.1447	0.1200	0.1125	0.1090	0.1070	0.1057	0.1049	0.1042
53	0.1087	0.0900	0.0843	0.0817	0.0802	0.0793	0.0786	0.0781
52	0.0725	0.0600	0.0562	0.0544	0.0534	0.0528	0.0524	0.0521
51	0.0363	0.0300	0.0281	0.0272	0.0267	0.0264	0.0262	0.0260
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Percent Within Limits (P_L and P_U)	Negative Values of Q (Q_L and Q_U)							
	n=3	n=4	n=5	n=6	n=7	n=8	n=9	n=10
49	-0.0363	-0.0300	-0.0281	-0.0272	-0.0267	-0.0264	-0.0262	-0.0260
48	-0.0725	-0.0600	-0.0562	-0.0544	-0.0534	-0.0528	-0.0524	-0.0521
47	-0.1087	-0.0900	-0.0843	-0.0817	-0.0802	-0.0793	-0.0786	-0.0781
46	-0.1447	-0.1200	-0.1125	-0.1090	-0.1070	-0.1057	-0.1049	-0.1042
45	-0.1806	-0.1500	-0.1406	-0.1363	-0.1338	-0.1322	-0.1312	-0.1304
44	-0.2164	-0.1800	-0.1688	-0.1636	-0.1607	-0.1588	-0.1575	-0.1566
43	-0.2519	-0.2100	-0.1971	-0.1911	-0.1877	-0.1855	-0.1840	-0.1829
42	-0.2872	-0.2400	-0.2254	-0.2186	-0.2147	-0.2122	-0.2105	-0.2093
41	-0.3222	-0.2700	-0.2537	-0.2461	-0.2418	-0.2391	-0.2372	-0.2358
40	-0.3568	-0.3000	-0.2822	-0.2738	-0.2691	-0.2660	-0.2639	-0.2624
39	-0.3911	-0.3300	-0.3107	-0.3016	-0.2964	-0.2931	-0.2908	-0.2892
38	-0.4251	-0.3600	-0.3392	-0.3295	-0.3239	-0.3203	-0.3179	-0.3161
37	-0.4586	-0.3900	-0.3679	-0.3575	-0.3515	-0.3477	-0.3451	-0.3432
36	-0.4916	-0.4200	-0.3967	-0.3856	-0.3793	-0.3753	-0.3725	-0.3705
35	-0.5242	-0.4500	-0.4255	-0.4139	-0.4073	-0.4030	-0.4001	-0.3980
34	-0.5563	-0.4800	-0.4545	-0.4424	-0.4355	-0.4310	-0.4280	-0.4257
33	-0.5878	-0.5100	-0.4836	-0.4710	-0.4638	-0.4592	-0.4560	-0.4537
32	-0.6187	-0.5400	-0.5129	-0.4999	-0.4924	-0.4877	-0.4844	-0.4820
31	-0.6490	-0.5700	-0.5423	-0.5290	-0.5213	-0.5164	-0.5130	-0.5105
30	-0.6787	-0.6000	-0.5719	-0.5582	-0.5504	-0.5454	-0.5419	-0.5394
29	-0.7077	-0.6300	-0.6016	-0.5878	-0.5798	-0.5747	-0.5712	-0.5686
28	-0.7360	-0.6600	-0.6316	-0.6176	-0.6095	-0.6044	-0.6008	-0.5982
27	-0.7636	-0.6900	-0.6617	-0.6477	-0.6396	-0.6344	-0.6308	-0.6282
26	-0.7904	-0.7200	-0.6921	-0.6781	-0.6701	-0.6649	-0.6613	-0.6587
25	-0.8165	-0.7500	-0.7226	-0.7089	-0.7009	-0.6958	-0.6922	-0.6896
24	-0.8417	-0.7800	-0.7535	-0.7401	-0.7322	-0.7271	-0.7236	-0.7211
23	-0.8662	-0.8100	-0.7846	-0.7716	-0.7640	-0.7590	-0.7556	-0.7531
22	-0.8897	-0.8400	-0.8160	-0.8036	-0.7962	-0.7915	-0.7882	-0.7858
21	-0.9124	-0.8700	-0.8478	-0.8360	-0.8291	-0.8245	-0.8214	-0.8192
20	-0.9342	-0.9000	-0.8799	-0.8690	-0.8625	-0.8583	-0.8554	-0.8533
19	-0.9550	-0.9300	-0.9123	-0.9025	-0.8966	-0.8928	-0.8901	-0.8882
18	-0.9749	-0.9600	-0.9452	-0.9367	-0.9315	-0.9281	-0.9258	-0.9241
17	-0.9939	-0.9900	-0.9785	-0.9715	-0.9671	-0.9643	-0.9624	-0.9610
16	-1.0119	-1.0200	-1.0124	-1.0071	-1.0037	-1.0015	-1.0000	-0.9990
15	-1.0288	-1.0500	-1.0467	-1.0435	-1.0413	-1.0399	-1.0389	-1.0382
14	-1.0448	-1.0800	-1.0817	-1.0808	-1.0800	-1.0794	-1.0791	-1.0789
13	-1.0597	-1.1100	-1.1173	-1.1192	-1.1199	-1.1204	-1.1208	-1.1212
12	-1.0736	-1.1400	-1.1537	-1.1587	-1.1613	-1.1630	-1.1643	-1.1653
11	-1.0864	-1.1700	-1.1909	-1.1995	-1.2043	-1.2075	-1.2098	-1.2115
10	-1.0982	-1.2000	-1.2290	-1.2419	-1.2492	-1.2541	-1.2576	-1.2602
9	-1.1089	-1.2300	-1.2683	-1.2860	-1.2964	-1.3032	-1.3081	-1.3118
8	-1.1184	-1.2600	-1.3088	-1.3323	-1.3461	-1.3554	-1.3620	-1.3670
7	-1.1269	-1.2900	-1.3508	-1.3810	-1.3991	-1.4112	-1.4199	-1.4265
6	-1.1342	-1.3200	-1.3946	-1.4329	-1.4561	-1.4717	-1.4829	-1.4914
5	-1.1405	-1.3500	-1.4407	-1.4887	-1.5181	-1.5381	-1.5525	-1.5635
4	-1.1456	-1.3800	-1.4897	-1.5497	-1.5871	-1.6127	-1.6313	-1.6454
3	-1.1496	-1.4100	-1.5427	-1.6181	-1.6661	-1.6993	-1.7235	-1.7420
2	-1.1524	-1.4400	-1.6016	-1.6982	-1.7612	-1.8053	-1.8379	-1.8630
1	-1.1541	-1.4700	-1.6714	-1.8008	-1.8888	-1.9520	-1.9994	-2.0362

END OF SECTION 110

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Item M–102MR Demolition and Removal

DESCRIPTION

102MR-1.1 Project description. The work covered by this section consists of the demolition and removal of test pavement items at the Federal Aviation Administration's National Airport Pavement Test Facility (NAPTF) as identified on the plans and removal of resulting rubbish and debris. The test pavement items are located inside a building and in close proximity to specialized facilities and equipment. Badging and other security procedures are in place and are required to access the work location. Materials to be removed may include Portland Cement concrete pavement; bituminous pavement; pavement materials stabilized with asphalt, cement, or other binders; granular sublayers; subgrade materials; specialized or unique paving materials; and appurtenances such as embedded pavement and soil sensors. Dispose of all removed pavement materials to the area designated by the project documents, or dispose of them at a legally approved disposal site.

102MR-1.2 Special research requirements. Demolition and removal work at the NAPTF is conducted to support research activities and is subject to unique requirements. Remove items in the sequence indicated in project documents. Complete the removal of each item before commencing removal of any underlying item unless otherwise indicated in the project plans. Coordinate demolition activities with the NAPTF to avoid disturbance of research occurring outside the limits of this project.

Demolition items are subject to intense testing and sampling. Furnish demolished items to NAPTF personnel for sampling and testing as indicated in project documents. Cease demolition activities for the duration of testing at times indicated in the project documents. Expect a work stoppage as indicated in Table 1 after demolition of each item is complete to allow adequate time for the FAA to obtain samples and run tests.

Table 1. Anticipated work stoppages for testing during demolition.

Layer	Anticipated Work Stoppage after Demolition of Layer
P-403 Asphalt Base	0 Days
P-306 Lean Concrete	0 Days
P-154 Subbase	1 Day
P-152 Subgrade	1 Day

SUBMITTALS

102MR-2.1 Provide complete and sufficiently detailed submittals to allow the FAA to determine compliance of the indicated materials and methods with contract requirements. A responsible party, defined as a company officer or licensed individual, must certify that submittals are in compliance with contract requirements. Pre-construction submittals require approval by the FAA prior to commencing work. Allow 10 working days for FAA review of submittals. Provide

submittals in electronic PDF format, or as indicated by the FAA. In addition to the electronic copy, provide one hard copy of each submittal.

a. **Preconstruction submittals**
   (1) **Demolition plan.** Prepare and submit a demolition plan describing methods and equipment to be used for each operation and the sequence of operations. Identify any anticipated effects on research activities or other construction activities, including utility outages.
   (2) **Documentation of existing conditions.** Record existing conditions of items and facilities adjacent to the work area, in and around the haul route, and in and around any staging areas. Photographs sized 4 inches or 4-megapixel JPEG format digital photographs will be acceptable as a record of existing conditions. Include in the record the location and extent of existing cracks and other damage and a description of surface conditions that exist prior to starting work.

GENERAL REQUIREMENTS

102MR-3.1 Commencement of work. Notify the Engineer and the FAA 10 business days in advance of anticipated start of demolition. Do not begin demolition until authorization is received from the FAA. The schedule of the availability of work areas shall be confirmed by the FAA. Complete work during standard work hours at the facility of 7:00 AM to 5:00 PM. Requests for work outside these hours must be submitted to the Engineer a minimum of three business days in advance of the start of the proposed non-standard shift and approved by the FAA.

102MR-3.2 Tolerances. Remove items and materials in the locations indicated on project plans.

g. Remove materials to a depth or elevation of ±½ inch of the indicated elevation or as specified in the project plans.

h. Saw cuts at the extents of removal shall be within ½ inch of the locations indicated or as specified in the project plans. Saw cuts shall be straight and true, not varying more than ¼ inch in 10 feet.

102MR-3.3 Maintenance of site. Maintain the trench drain along the north edge of the project area in a clean and free-flowing condition at all times. Do not store rubbish or debris on unstabilized base, subbase, and subgrade materials. Maintain staging and stockpile areas in a neat and organized manner, properly drained, and in a manner to prevent contamination of stockpiles and materials. Provide appropriate receptacles in the staging area and at the actual work location for garbage and trash. Do not place demolition debris in these receptacles. Restore all areas disturbed by project activities to pre-project conditions, including seeding or sodding.

102MR-3.4 Items to remain in place. Take necessary precautions to avoid damage to existing items and instrumentation to remain in place, to be reused, or to remain the property of the FAA. Do not overload pavements to remain. Provide supports and reinforcement for existing items weakened by demolition, deconstruction, or removal work. Reinforcement and supports require approval by the FAA prior to performing such work. Pavements to be removed that are adjacent to structures shall be double saw cut adjacent to the structures in a manner to avoid damage to the structure. Prevent contamination of materials to remain with foreign or demolished pavement

materials, debris, and refuse. Repair or replace damaged items as directed by and at no additional cost to the FAA.

102MR-3.5 Dust and debris control. Prevent the spread of dust and debris beyond the project limits. Use of water is permitted, however, do not use water if it results in hazardous or objectionable conditions such as, but not limited to ice, flooding, or pollution. Water trucks are not permitted inside the test facility. Prevent the accumulation of loose dust, dirt, mud, or debris on roadways and parking lots. Provide protective measures to control accumulation and migration of dust and dirt into work areas and office spaces.

102MR-3.6 Weather protection. Protect materials and equipment from damage by the weather at all times.

102MR-3.7 Utility service. Utilities must remain in service for the duration of project activities. Protect against damage during demolition and deconstruction operations. Notify the FAA immediately if utility infrastructure is damaged, or if an unmarked utility is located.

102MR-3.8 Protection of personnel. Conform to the safety requirements in accordance with Federal, state, and local laws, rules and regulations concerning construction safety and health standards, including Corps of Engineers EM 385-1-1. Comply with the National Airport Pavement Test Facility Health and Safety Plan. Comply with the Environmental Protection Agency requirements. The Contractor shall not require or allow any worker to work in surroundings or under conditions that are unsanitary, hazardous, or dangerous to health or safety.

MATERIALS AND EQUIPMENT

102MR-4.1 Temporary materials. Do not contaminate or damage items to remain, test items, or items outside the project limits with temporary construction support materials. Completely remove all temporary fill, supports, guards, forms, ramps, and other appurtenances prior to completion of the project.

102MR-4.2 Equipment. Concrete saws, core drills, pneumatic hammers, pneumatic chisels, cutting torches, backhoes, loaders, cranes, milling machines, or similar tools and equipment may be used. No equipment required to perform any portion of the work shall be considered or classified as special equipment. All equipment must be approved by the FAA prior to commencement of work. Welding, cutting, or any other operation that uses or generates an open flame requires a hot-work permit from William J. Hughes Technical Center. Allow a minimum of two business days for issuance of any necessary hot-work permits.

102MR-4.3 Government Furnished Equipment. All necessary equipment is to be furnished by the Contractor.

CONSTRUCTION METHODS

102MR-5.1 Construction limits. Do not disturb items beyond the limits of demolition indicated in the project documents. Precision demolition methods such as hand work are required within 2

feet of facilities and items to remain in order to prevent damage. Pavements to be removed shall be double saw cut at the demolition limits in such a manner to avoid damage to any pavements identified on the plans as to remain. Prevent undermining of adjacent pavements at the demolition limits.

102MR-5.2 Burning and explosives. Burning at the project site is not permitted. Use of explosives at the project site is not permitted.

102MR–5.3 Surface course removal. Remove surface course materials to the depth indicated on the plans. Provide a surface free from loose material, debris, and significant defects. Do not score, mar, or otherwise damage underlying layers or sensors. Do not contaminate underlying layers with surface course materials or debris. Cracking or rubblization of PCC pavement slabs to facilitate removal is not permitted. Lifting of PCC pavement slabs or pieces of slabs is permitted. Heavy equipment and trucks are not permitted on exposed underlying layers.

102M–5.4 Stabilized material removal. Remove stabilized materials to the depth indicated on the plans. Provide a surface free from loose material, debris, and significant defects. Do not score, mar, or otherwise damage underlying layers or sensors. Cracking or rubblization of stabilized materials to facilitate removal is not permitted. Do not contaminate underlying layers with stabilized materials or debris. Heavy equipment and trucks are not permitted on exposed underlying layers. Completely expose the stabilized material within the limits of demolition prior to commencing demolition.

102MR-5.5 Granular material removal. Remove granular materials to the depth indicated on the plans. Do not score, mar, or otherwise damage underlying layers or sensors. Provide a surface free from loose material, debris, and significant defects. Do not contaminate underlying layers with granular materials or debris. Heavy equipment and trucks are not permitted on exposed underlying layers. Completely expose the granular material within the limits of demolition prior to commencing demolition.

102MR–5.6 Subgrade removal. Remove subgrade materials to the depth indicated on the plans. Do not damage existing sensors to remain. Provide a surface free from loose material, debris, and significant defects. Do not contaminate materials to remain. Completely expose the subgrade within the limits of demolition prior to commencing demolition.

102MR–5.7 Clean-up and disposal. The clean-up operation shall include vacuum sweeping as necessary and shall leave the pavement surface free of loose dust, dirt, mud, and debris. Sawing equipment for cutting of pavements shall be equipped with vacuum pickup and pumps capable of pumping to container or tanker storage. The storage tanks shall be emptied at least daily or as often as necessary to prevent overflow of the slurry. Slurry generated from this operation shall be disposed of off-site at a legally approved and recognized disposal site.

DISPOSITION OF MATERIALS

102MR–6.1 Title to materials. Except for salvage items specified in the Plans, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or

salvaged, shall become the property of the Contractor and shall be removed from FAA property. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon removal of the material from the project site. The FAA will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

102MR-6.2 Dumpsters. Demolition debris shall not be placed in dumpsters or other receptacles owned, leased, or otherwise serviced by the FAA, its vendors, or other contractors.

QUALITY CONTROL

102MR-7.1 Establish and maintain an effective quality control plan to execute work in a manner that complies with contract requirements. Two phases of control are required: Preparatory and Follow-up.

a. Preparatory phase. The Preparatory phase is conducted after all submittals and materials have been approved and prior to beginning work. Notify the FAA of the time and location of the Preparatory phase meeting a minimum of two working days in advance of the meeting. The contractor is responsible for keeping meeting minutes. Review the following items and resolve any conflicts:

(6) Each paragraph of these specifications.
(7) Contract drawings.
(8) All preconstruction submittals. Un-approved submittals will be considered a failure of the Preparatory phase and non-compliance with project requirements.
(9) Testing plan, including inspection, quality control testing, quality assurance testing, and research testing.
(10) The work area. Ensure that necessary preliminary work has been completed.
(11) Specific activities to be performed and the quality controls that will be used to ensure compliance with project requirements. Perform a walk-through at the site if necessary.
(12) The quality of workmanship required.
(13) Compliance with Federal, state, and local laws, rules, and regulations.
(14) Applicable safety requirements.

b. Follow-up phase. Perform the following for on-going work daily, or more frequently as necessary, until the completion of the project. Document compliance in the Daily Report.

(6) Ensure the work is in compliance with contract requirements.
(7) Ensure that all required testing is performed.
(8) Maintain the quality of workmanship required.
(9) Ensure that rework items are being corrected.

c. Additional preparatory phases. Conduct additional preparatory phases if the quality of on-going work is unacceptable, if there are changes in the quality control organization or the on-site production supervision, if work is resumed after substantial period of inactivity, or if other problems develop.

METHOD OF MEASUREMENT

102MR–8.1 Measurement shall consist of calculating the number of cubic yards of concrete pavement, bituminous pavement, econocrete, lean concrete, subbase, and subgrade removal at the specified depth from the neat lines shown on the plans.

BASIS OF PAYMENT

102MR–9.1 The quantity of full depth pavement removal measured as provided above, shall be at the Contract unit price for pavement layers and subgrade removed, which price and payment shall constitute full compensation for all cutting, sawing, breaking, removal, hauling, and disposal of materials, clean-up, and for labor, equipment, tools, and any incidentals necessary to complete this item of work as specified herein or as specified on the Plans.

Payment will be made under:

Item M-102M–9.1a	Bituminous Pavement Removal -- per cubic yard
Item M-102M–9.1b	Shoulder Removal -- per cubic yard
Item M-102M–9.1c	Econocrete or Lean Concrete Base Removal -- per cubic yard
Item M-102M–9.1d	Subbase Removal -- per cubic yard
Item M-102M–9.1e	Subgrade Removal -- per cubic yard

END OF ITEM M–102

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ITEM P-152M SUBGRADE
(FOR LOW AND MEDIUM STRENGTH SUBGRADE)

152M-1.1: This item shall consist of a prepared subgrade consisting of soils that provide the specified design California Bearing Ratio (CBR) values for test items comprising construction of test pavements on low and medium strength subgrades. The subgrades shall be prepared in the excavated bed of the NAPTF or building 207 A, Subgrade Processing building, in accordance with these specifications and shall conform to the dimensions and cross section(s) shown on the Plans.

MATERIALS

152M-2.1: SUBGRADE

For test pavement construction the subgrade soils for constructing the low and medium strength subgrades shall be obtained by the Contractor from existing stockpiles located in the 207 yard, as directed by the Engineer. The USCS soil classification of the test bed and stockpiled subgrade material is CH, fat clay. The soils shall be processed to uniform moisture content and placed (or replaced) in the test bed. The conditioned material will be placed within the test bed and processed, as necessary to obtain the target CBR as indicated in the construction drawings. Prior to placement, any stockpiled subgrade will be processed as necessary to remove rock particles, vegetation, organic matter, or other objectionable substances. The contractor will be responsible for the removal and disposal of any objectionable substances.

152M-2.2: TARGET MATERIAL PROPERTIES

As determined by the FAA Materials Lab.

Insert table of values derived from the test strip.

CONSTRUCTION METHODS

152M-3.1: SUBGRADE PROCESSING

New subgrade materials from the stockpile shall be hauled and processed in Bldg. 207A. The material shall be spread in layers and processed to reduce lumps and clay balls to a fine mixture and provide uniform moisture content. The quantity of subgrade material shall be enough to construct one (1) lift of material as required by the construction plans. Material that is too wet shall be dried and re-processed until the target moisture content range for transporting to the NAPTF is achieved. The Contractor will be required, as necessary, to supply fans to aid the drying process. The moisture content of the material prepared in the Bldg. 207A should be slightly wet of the design (target) moisture content before transporting the material to the NAPTF test bed to compensate for drying during transporting, spreading, and in place processing.

Subgrade processing shall be suspended by the Engineer at any time when satisfactory results cannot be obtained due to unsatisfactory conditions in the Bldg. 207A. The Contractor shall protect the processed subgrade with an appropriate cover, as necessary.

Processed subgrade material must be covered any time there is a risk of unwanted moisture loss. The Contractor will be responsible for covering and uncovering the material when necessary during construction activities and material processing. The Contractor will be responsible for furnishing and installing a minimum 6 mil poly sheet product, for protection of the subgrade material. The sheeting must be installed in a manner to minimize moisture loss in the material.

152M-3.2: PREPARATION OF EXISTING TEST BED

Pavement and subgrade removal from the existing test bed shall be in accordance with Item M-102M Demolition. The bottom of the excavation shall be checked and accepted by the Engineer before placing and spreading operations are started. If the material within the existing test bed does not meet the design CBR requirements, the Contractor will be responsible to dry or wet the material as necessary. If corrective action is required to meet the design CBR, the existing material shall be processed to a minimum depth of 8-inches The Engineer will provide the moisture content and CBR of the existing test bed for Contractor reference and planning purposes.

Material that is too dry will be watered using the FAA furnished Bridge Deck Finisher (BDF), and processed to obtain uniform moisture. Watering with hoses or the use of a water truck is unacceptable. Once the target moisture content is achieved the material will be re-compacted and tested for acceptance by the Engineer.

152M-3.3: PLACEMENT AND COMPACTION

The subgrade materials shall be placed in successive layers of 6 to 8-inches in compacted depth for the full width of the cross section, unless otherwise approved by the Engineer. At the completion of each layer, adequate time must be provided to conduct appropriate Quality Control (QC) and acceptance tests. A summary of the acceptance testing requirements can be found in 152M-3.4.

Hauling operations and other traffic will be controlled in such a manner as to prevent damage to compacted subgrade material. Traffic that is allowed on the compacted subgrade will be distributed evenly over the entire width of the compacted subgrade.

The Contractor will be responsible to supply equipment to properly compact the material lift and eliminate air voids within the material layer. The compacted material layer shall be free of ruts and suitable for material testing.

Each layer of subgrade material is subject to the acceptance criteria. All material layers must be accepted by the Engineer prior to placing and spreading subsequent layers. The Contractor shall be responsible for protecting the individual lift prior to acceptance tests.

The Contractor will be responsible for furnishing a minimum 6 mil poly sheet product, for protection of the subgrade material. The sheeting must be installed in a manner to prevent moisture loss of the entire material surface within the test bed.

152M-3.4: ACCEPTANCE TESTING FOR CBR

Acceptance measurements will be made on each layer of completed subgrade by the Engineer. The total layer will be divided into sublots. Random testing locations will be determined by the Engineer for each sublot within the material layer.

Three (3) CBR penetrations will be made within one foot of each other at each random location. The average of the three penetrations will be considered as an individual CBR test for that sublot. The lot shall be considered acceptable when:

Low Strength Subgrade (CBR 3.0 to 4.0)

- **a.** The average of the two (2) CBR tests for the low strength material is between 3.0 to 4.0
- **b**. The difference between the highest and lowest CBR values for the penetrations at a given location cannot exceed 1.0. If the value is greater than 1.0, the subgrade layer will not be acceptable.

Medium Strength Subgrade (CBR 7.0 to 8.0)

- **a.** The average of the four (4) CBR tests for the medium strength material is between 7.0 to 8.0.
- **b.** The difference between the highest and lowest CBR values for the penetrations at a given location cannot exceed 1.0. If the value is greater than 1.0, the subgrade layer will not be acceptable.

Subgrade material not meeting the CBR acceptance criteria shall be reworked in place by wetting or drying, and compacted until the material layer is accepted by the Engineer.

152M-3.5: FINISHING AND PROTECTION OF SUBGRADE.

Accepted subgrade material must be covered any time there is a risk of unwanted moisture loss. The Contractor will be responsible for protecting the material from damage and moisture loss during construction activities.

When the final lift has been placed and compacted, the top of the subgrade shall be fine-graded to meet the design grade. Meeting the final grade by placement of thin layers (less than 6”) of subgrade material is not acceptable. In order to minimize the risk of missing the design grade after compaction, the final lift shall be slightly over built. The Contractor shall over build the final layer and trim the subgrade material to meet the design elevation. NOTE: The overlying material must be approved by the Engineer for use, and scheduled for placement prior to finish grading the subgrade material.

152M-3.6: TOLERANCES

The final surface shall be within tolerance before the final survey. In those areas upon which a subbase or base course is to be placed, the top of the subgrade shall be of such smoothness that, when tested with a 12-foot straightedge applied parallel and at right angles to the centerline, it shall not show any deviation in excess of 1/2 inch or shall not be more than 0.05 feet from true grade. Any deviation in

excess of these amounts shall be corrected by loosening, adding, or removing materials; reshaping; and recompacting.

Level surveys to establish final grade shall be the responsibility of the Contractor. The Contractor shall be responsible for grade verification during the construction process. A final elevation survey for acceptance will be completed by the Engineer on the top layer of subgrade after the Contractor completes the final grade verification.

The final layer of subgrade shall be covered with plastic sheets to prevent drying of the surface. The Contractor shall be responsible for maintaining the approved surfaces during any material placement delays.

152M-3.7: HAULING OF SUBGRADE MATERIALS

All hauling will be considered a necessary and incidental part of the work. Its cost shall be considered by the Contractor and included in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

Upon acceptance of the final layer of subgrade material the Contractor shall be responsible for hauling the excess subgrade material from the NAPTF and 207A building. The material shall be properly placed in the subgrade stockpile. Any costs or equipment necessary to complete this work shall be included in the cost of the test bed.

METHOD OF MEASUREMENT

152M-4.1: SUBGRADE QUANTITY

Subgrade shall be measured in-place, completed, and accepted for:

- **a.** Existing bottom layer -- per cubic yard
- **b.** Subgrade fill from stockpile -- per cubic yard
- **c.** Reclaimed material from in-situ subgrade -- per cubic yard

For payment specified by the cubic yard measurement for all subgrade materials shall be computed by the average end area method. The end area is that bound by the original ground line established by field cross-sections and the final pay line established by cross-sections shown on the plans, subject to verification by the Engineer. After completion of all subgrade operations and prior to the placing of base or subbase material, the final subgrade shall be verified by the Engineer.

BASIS OF PAYMENT

152M-5.1: Payment for accepted subgrade shall be made at:

Item 152M-5.2a. The Contract unit price per cubic yard for existing bottom layer.
Item 152M-5.2b. The Contract unit price per cubic yard for fill from stockpile.

Item 152M-5.2c. The Contract unit price per cubic yard for in-situ subgrade.

Payment shall be full compensation for all labor, materials, tools, equipment, and incidentals required to complete the work as specified herein.

END OF ITEM P-152M

ITEM P-154M SUBBASE COURSE
DESCRIPTION

154M-1.1 This item shall consist of a subbase course composed of granular materials constructed on a prepared subgrade or underlying course in accordance with project plans and specifications, and in conformity with the required dimensions and typical cross section. This material shall be used for construction of the Construction Cycle 8 (CC-8) test items.

MATERIALS

154M-2.1 MATERIALS

The subbase material shall consist of hard durable particles or fragments of granular aggregates. This mixture must be uniform and shall comply with the requirements of these specifications as to gradation, soil constants, and shall be capable of being compacted into a dense and stable subbase. The material shall be free from vegetable matter, lumps or excessive amounts of clay, and other objectionable or foreign substances. Pit-run material may be used, provided the material meets the gradation requirements specified. Quarried crushed screenings used for the manufacture of hot mix asphalt may be used, provided the material meets the requirements specified herein. At the Contractor's request, the Engineer will provide a list of material suppliers used for previous projects within the National Airport Pavement Test Facility (NAPTF). The Engineer assumes no responsibility for the suppliers' material gradations or availability.

TABLE 1. GRADATION REQUIREMENTS

Sieve designation (square openings) as per ASTM C136 and ASTM D422	Percentage by weight passing sieves
3 inch	100
No. 10	60-90
No. 40	5-60
No. 200	0-15

The portion of the material passing the No. 40 (0.450 mm) sieve shall have a liquid limit of not more than 25 and shall be non-plastic when tested in accordance with ASTM D 4318.

154M-2.2 SAMPLING AND TESTING

Material used on the project shall be sampled per ASTM D75 and tested per ASTM C136 and ASTM C117. Results shall be furnished to the Engineer by the Contractor prior to the start of construction activities. The Contractor shall supply samples of subbase material for verification testing and other material characterization tests. The additional testing will be completed by the NAPTF Materials Testing Lab. The Contractor shall supply approximately 250 lbs. of the subbase material in five gallon buckets with protective lids for testing. The results of the ASTM D1557 performed by the NAPTF lab will determine the target moisture and material density acceptance for project use.

CONSTRUCTION METHODS

154M-3.1 GENERAL

The subbase course shall be placed where designated on the plans or as directed by the Engineer. The material shall be shaped and thoroughly compacted within the tolerances specified.

152M 3.2 HAULING OF SUBBASE MATERIALS

All hauling will be considered a necessary and incidental part of the work. Its cost shall be considered by the Contractor and included in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

154M-3.3 QUARRY OPERATIONS

The subbase material shall be obtained from pits or sources that have been approved by the Engineer. The material in the pits shall be excavated and handled in such manner that a uniform and satisfactory product can be secured.

154M-3.4 PREPARING UNDERLYING COURSE

Before any subbase material is placed, the underlying course shall be prepared and conditioned as specified in Item P-152M. The course shall be checked and accepted by the Engineer before placing and spreading operations are started.

154M-3.5 MATERIALS ACCEPTANCE IN EXISTING CONDITION

When the subbase material is secured in a uniform and satisfactory condition and contains approximately the desired moisture, such approved material may be moved directly to the site for placement. The materials shall meet the requirements for gradation, quality, and consistency as confirmed by the NAPTF Materials Testing Lab. It is the intent of this section of the specification to secure materials that will not require further mixing. The moisture content of the material shall be within +/- 2% of the target the value, as provided by the NAPTF lab testing. The Contractor shall be responsible for providing the Engineer with the moisture content of the source materials prior to hauling/placement activities. Any minor deficiency or excess of moisture may be corrected by surface sprinkling or by aeration. In such instances, some mixing or manipulation may be required, immediately preceding the rolling, to obtain the required moisture content. Blading or dragging of the material shall be performed, if necessary, to obtain a smooth uniform surface true to line and grade.

154M-3.6 GENERAL METHODS FOR PLACING

The subbase course shall be constructed in layers of neither less than 3 inches, nor more than 8 inches of compacted thickness. Thin lifts to adjust finished grade or for other reasons are not permitted. The subbase material shall be deposited and spread evenly to a uniform thickness and width. The material, as spread, shall be of uniform gradation with no pockets of fine or coarse materials. When more than one layer is required, the construction procedure described here shall apply. Each lift must be completed and accepted prior to beginning the subsequent lift. Subbase material must be covered any time there is a risk of unwanted moisture loss. The Contractor will be responsible for covering and uncovering the material when necessary during construction activities. The Contractor will be responsible for furnishing a minimum 6 mil poly sheet product, for protection of the subbase material. The sheeting must be installed in a manner to minimize moisture loss in the material.

During the placing and spreading, sufficient caution shall be exercised to prevent the incorporation of subgrade or foreign material in the subbase course mixture. Hauling operations and other traffic will be controlled in such a manner as to prevent damage to compacted subbase material. Traffic that is allowed on the compacted subbase will be distributed evenly over the entire width of the test bed.

154M-3.7 FINISHING AND COMPACTING

After spreading, the subbase material shall be watered, as necessary, and thoroughly compacted by rolling. Sufficient rollers shall be furnished by the Contractor to adequately handle the rate of placing and spreading of the subbase course. The Contractor shall provide the Engineer the rolling equipment specifications prior to placing any material within the test bed. Along places inaccessible to rollers, the Contractor shall thoroughly compact the subbase material with mechanical tampers.

Watering, to meet the target moisture content, shall be in the amount determined by the Engineer. Water shall be added using the FAA furnished Bridge Deck Finisher (BDF). Water shall not be added in such a manner or quantities that free water will reach the underlying layer and cause it to become soft. The Contractor shall be responsible for supplying any equipment or machinery required for the aeration activities. The moisture content of the material at the start of compaction shall not be more than 1-1/2 percentage points above or below the target moisture content.

The field density of the compacted material shall be at least 100 percent of the maximum density at the target (dry of optimum) moisture content as provided by the NAPTF Materials Testing Lab. The in-place field density shall be monitored by the Engineer during the compaction effort. The Engineer will utilize a nuclear densometer to monitor the density during the compaction efforts. The Contractor will suspend compaction activities when the density readings from the nuclear densometer reach the targeted values set by the Engineer. The acceptance of the in-place field density will be determined in accordance with ASTM D1556. The field density acceptance testing will be performed by the Engineer.

Compaction of the subbase shall not result in movement of the subgrade or cause penetration of the subbase into the subgrade nor cause undulation in the subbase. When the rolling develops irregularities that exceed 3/8-inch when tested with a 12-foot straightedge, the irregular surface shall be corrected by the Contractor.

154M-3.8 SURFACE TESTING

At the completion of each layer, the surface shall be tested for material acceptance by the Engineer. The Contractor shall be responsible at all times for protecting the material layer prior to acceptance tests. Adequate time must be provided to conduct the appropriate Quality Control (QC) and material acceptance tests.

Any subbase material not meeting the acceptance criteria shall be reworked by scarifying, wetting or drying, and compacted until the acceptance criteria is satisfied. Each layer of subbase material is subject to the acceptance criteria. Each material layer must be accepted by the Engineer prior to placing and spreading subsequent layers.

154M-3.9 GRADE TESTING

The designed elevation of the completed subbase course shall be indicated on the Plan. Level surveys to establish final grade shall be the responsibility of the Contractor. The Contractor shall be responsible for grade verification during the construction process. When a deficiency in elevation is more than 3/8-inch, the Contractor shall correct such areas by scarifying, adding or removing material as needed, rolling, sprinkling, reshaping, and finishing in accordance with these specifications. The subbase layer shall be constructed to within 3/8-inch of the required grade. The finished surface shall not vary more than 3/8-inch when tested with a 12 foot straightedge applied parallel with, and at right angles to, the centerline. The Engineer shall survey the finished layer on a 5 foot by 5 foot grid for final grade acceptance.

In order to minimize the risk of missing the design grade after compaction, the final lift shall be slightly over built. The Contractor shall over build the final layer and trim the subbase material to meet the design elevation indicated on the Plan.

154M-3.10 THICKNESS TESTING

Thicknesses shall be calculated using the elevations determined for grade testing. Thickness shall be calculated as the difference in the surveyed elevation of the P-154 and the underlying course. Thickness shall be determined at the same grid interval and at the same grid locations as grade testing identified in paragraph 154M-3.9.

BASIS OF PAYMENT

154-4.1 Payment shall be made at the contract unit price per cubic yard for subbase course at the thickness shown on the Plans. This price shall be full compensation for furnishing all materials; for all preparation, hauling, and placing of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment shall be made under:

Item P-154-4.1 Subbase Course -- per cubic yard

TESTING REQUIREMENTS

ASTM C117	Standard Test Method for Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D422	Standard Test Method for Particle-Size Analysis of Soils
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

END OF ITEM P-154

Item P–306MR Lean Concrete Base Course

DESCRIPTION

306MR-1.1 This item shall consist of a subbase material, herein termed Lean concrete, that is composed of aggregate and cement uniformly blended together and mixed with water. The mixture may also include approved cementitious additives, in the form of fly ash or slag, and chemical admixtures. The mixed material shall be spread, shaped, and consolidated using concrete paving equipment in accordance with these specifications and in conformity to the lines, grades, dimensions, and typical cross-sections shown on the plans.

SUBMITTALS

306MR-2.1 Submit certified test reports to the Engineer for those materials proposed for use during construction, as well as the mix design information for the lean concrete material. Tests older than six 6 months shall not be used. The certification shall show the appropriate ASTM or AASHTO specifications or tests for the material, the name of the company performing the tests, the date of the tests, the test results, and a statement that the material did or did not comply with the applicable specifications. Submit the following in accordance with Section 61MR Submittal Procedures:

a. SD-02 Shop Drawings.

- Placement plan, including proposed jointing in the event strength exceeds 800 psi at 7 days.

b. SD-03 Product Data.

- Mixer type and capacity
- Patching compound

b. SD-05 Design Data. Mix identification number

- Weight of saturated surface-dry aggregates (fine and coarse)
- Combined aggregate gradation
- Cement factor
- Water content
- Water-cementitious material ratio (by weight)
- Volume of admixtures and yield for one cubic yard (cubic meter) of lean concrete

c. SD-06 Test Reports.

- Slump
- Air content
- Compressive strength at 3, 7, and 28 days (average values)

- Freeze-thaw weight loss (when applicable)
- Aggregate. The sources of materials and certified test results indicating they meet the requirements of paragraph 306MR-3.1.

d. SD-07 Certificates.

- Ready mixed concrete plant information
- Batch ticket information. During production, the Contractor shall submit batch tickets for each delivered load.
- Cement. The sources of materials and certificates indicating it meets the requirements of paragraph 306MR-3.2 or 306MR-3.3.
- Admixtures. The sources of materials and certificates indicating it meets the requirements of paragraph 306MR-3.4.
- Curing materials. The sources of materials and certificates indicating it meets the requirements of paragraph 306MR-3.5.

MATERIALS

306MR-3.1 Aggregate. The coarse aggregate fraction shall be crushed stone, crushed or uncrushed gravel, or a combination thereof. The fine aggregate fraction may be part of the natural aggregate blend as obtained from the borrow source or it may be sand that is added at the time of mixing.

The aggregate shall consist of hard, durable particles, free from an excess of flat, elongated, soft, or disintegrated pieces, or objectionable matter such as roots, sod, weeds, organic impurities, etc. A flat particle is one having a ratio of width to thickness greater than five; an elongated particle is one having a ratio of length to width greater than five.

The design aggregate blend shall conform to the gradation shown in the table below, when tested in accordance with ASTM C136. The aggregates shall be within the limits for deleterious material contained in ASTM C33 Table 3 type 4S. Aggregates shall not contain any substance which may be deleteriously reactive with the alkalis in the cement, except as permitted in ASTM C33.

Aggregate Gradation for Lean concrete Base Course

Sieve Size (square openings)	Percentage by Weight Passing Sieves
2 inch	100
1 inch	55-85
3/4 inch	50-80
No. 4	30-60
No. 40	10-30
No. 200	0-15

306MR-3.2 Cement. Cement shall conform to the requirements of ASTM C 150, Type II.

306MR-3.3 Cementitious additives. Pozzolanic and slag cement may be added to the econcrete mix. If used, each material must meet the following requirements:

a. Pozzolan. Pozzolanic materials must meet the requirements of ASTM C618, Class N, F, or C Fly Ash, except the loss on ignition shall be 6% for Class N and F.

b. Ground granulated blast furnace slag (slag cement). Slag shall conform to ASTM C989, Grade 120.

306MR-3.4 Chemical admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all the requirements listed below. In addition, the Engineer may require the Contractor to submit complete test data showing that the material to be furnished meets all the requirements of the cited specification.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260.

b. Water-reducing admixtures. Water-reducing, set-controlling admixtures shall meet the requirements of ASTM C494, Type A, D, E, F, or G. Water-reducing admixtures shall be added at the mixer separately from air-entraining admixtures in accordance with the manufacturer's printed instructions. The air entrainment agent and the water-reducing admixture shall be compatible.

c. Retarding admixtures. Retarding admixtures shall meet the requirements of ASTM C494, Type B or D.

d. Accelerating admixtures. Accelerating admixtures shall meet the requirements of ASTM C494, Type C.

306MR-3.5 Water. Water used in mixing or curing shall be potable, clean and free of oil, salt, acid, alkali, sugar, vegetable, or other deleterious substances injurious to the finished product.

306MR-3.6 Curing materials. For curing lean concrete, use white-pigmented, liquid membrane-forming compound conforming to ASTM C309, Type 2, Class B, or clear or translucent Type 1-D, Class B with white fugitive dye.

COMPOSITION OF MIXTURE

306MR-4.1 Mix design. The lean concrete mix design shall be based on trial batch results conducted in the laboratory. The lean concrete shall be designed to meet the criteria in this section.

a. Compressive strength. Compressive strength shall not be less than 500 psi nor greater than 800 psi at 7 days. Three-day and seven-day strengths shall be taken as the average of two compressive strength test results. All compressive strength specimens shall be prepared and tested in accordance with ASTM C 192 and ASTM C 39, respectively.

The freeze-thaw weight loss shall not exceed 14% when tested in accordance with American Association of State Highway and Transportation Officials (AASHTO) T136.

If there is a change in aggregate sources, type of cement used, or pozzolanic materials, a new mix design must be submitted.

b. Air content. The percentage of air entrainment shall be 6%, ±2%. Air content shall be determined by testing in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag and other highly porous coarse aggregate.

EQUIPMENT

306MR-5.1 All equipment necessary to mix, transport, place, compact, and finish the lean concrete base material shall be furnished by the Contractor. The equipment shall be subject to inspection and approval by the Engineer.

306MR-5.2 Mixing. Lean concrete may be mixed in a stationary mixer (central batch plant or at the site), or in a truck mixer. The Contractor must submit the mixer type and capacity information prior to the start of work. Each mixer shall have attached in a prominent place a manufacturer's nameplate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades.

a. Stationary plant mixer. The batch plant and equipment shall conform to the requirements of ASTM C94. The Engineer shall have unrestricted access to the plant at all times for inspection of the plant's equipment and operation and for sampling the lean concrete mixture and its components.

The mixers shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or wear of blades.

b. Truck mixers. Truck mixers used for mixing lean concrete shall conform to the requirements of ASTM C94. Lean concrete may be entirely mixed in a truck mixer or partially mixed in a stationary mixer with mixing completed in a truck mixer. Truck mixers shall be equipped with an accurate continuous registering electronically or mechanically activated revolution counter, to verify the number of drum revolutions.

306MR-5.3 Hauling. Mixed lean concrete shall be hauled from the stationary plant to the job site in a truck agitator, a truck mixer operating at agitating speed, or a non-agitating truck. All equipment shall conform to the requirements of ASTM C94. When truck mixers are used to mix lean concrete, they may be transported to the job site in the same truck operating at agitating speeds, truck agitators, or a non-agitating truck. The bodies of non-agitating trucks shall be smooth, metal containers and shall be capable of discharging the concrete at a controlled rate without segregation.

306MR-5.4 Placing and finishing.

a. Forms. Straight side forms shall be made of steel and shall be furnished in sections not less than 10 feet in length. Forms shall have a depth equal to the pavement thickness at the edge. Flexible or curved forms of proper radius shall be used for curves of 100 feet radius or less. Forms shall be provided with adequate devices to secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and

finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the Engineer.

The top face of the form shall not vary from a true plane more than 1/8 inch in 10 feet, and the upstanding leg shall not vary more than 1/4 inch. The forms shall contain provisions for locking the ends of abutting sections together tightly for secure setting. Wood forms may be used under special conditions, when accepted by the Engineer.

b. Fixed form pavers. Lean concrete can be placed using fixed form pavers. The paver shall be fully energized, self-propelled and capable of spreading, consolidating, and finishing the lean concrete material, true to grade, tolerances, and cross-sections. The paver shall be capable of finishing the surface so that hand finishing is not required. The paver shall be of sufficient weight and power to construct the maximum specified concrete paving lane width, at adequate forward speed, without transverse, longitudinal or vertical instability or without displacement.

1. Concrete pavers. Concrete pavers are approved as paver-finishing machines for lean concrete, providing they are capable of handling the amount of lean concrete required for the full-lane width specified, and consolidating the lean concrete full depth. A concrete paver is a power-driven machine with augers, strike-off and tamper bars ahead of a pan screed, with at least one trailing oscillating screed or belt finisher.

2. Bridge deck pavers. Bridge deck pavers are approved as paver-finishing machines for lean concrete, providing they are capable of handling the amount of lean concrete required for the full-lane width specified, and consolidating the lean concrete full depth. A bridge deck paver is an automatic truss paving machine, with paving carriage that strikes off, vibrates, paves, and textures the lean concrete with augers, internal vibration, paving rollers, and drag pan.

306MR-5.5 Consolidation. For side-form construction, vibrators may be either the surface pan type for pavements less than 8 inches thick or the internal type with either immersed tube or multiple spuds for the full width of the slab. They may be attached to the spreader or the finishing machine, or they may be mounted on a separate carriage. They shall not come in contact with existing material, the subgrade, or side forms.

The vibrators and tamping elements shall be automatically controlled so that they stop operation as forward motion ceases. Any override switch shall be of the spring-loaded, momentary-contact type.

Hand held vibrators may be used in irregular areas.

306MR-5.6 Jointing. The Contractor shall provide sawing equipment adequate in number of units and power to produce contraction or construction joints of the required dimensions as shown on the plans. The Contractor shall provide at least one standby saw in good working order and a supply of saw blades at the site of the work at all times during sawing operations.

CONSTRUCTION METHODS

306MR-6.1 Weather limitations.

a. Cold weather. Unless authorized by the Engineer, the temperature of the mixed lean concrete shall not be less than 50°F at the time of placement. In addition, the lean concrete shall not be placed when the ambient temperature is below 40°F or when conditions indicate that the temperature may fall below 35°F within 24 hours. Under no circumstances shall the lean concrete be placed on frozen underlying courses or mixed when the aggregate is frozen.

When mixing and placing is authorized during cold weather, the Engineer may require the water and/or the aggregates to be heated to not less than 70°F nor more than 150°F. The aggregates may be heated by either steam or dry heat prior to being placed in the mixer. The apparatus used shall heat the mass uniformly and shall be arranged to preclude the possible occurrence of overheated areas which might be detrimental to the materials. The Contractor shall adhere to the practices recommended in American Concrete Institute (ACI) 306R, Guide to Cold Weather Concreting.

b. Hot weather. To prevent rapid drying of newly constructed lean concrete, the lean concrete temperature from initial mixing through final cure shall not exceed 90°F. The aggregates and/or mixing water shall be cooled as necessary to maintain the lean concrete temperature at or not more than the specified maximum. Ice or ice water may be substituted for the mixing water for this purpose. The Contractor shall adhere to the practices recommended in ACI 305R.

In addition, during periods of warm weather when the maximum daily air temperature at the point of placement exceeds 85°F, the forms and/or the underlying material shall be lightly sprinkled with water immediately before placing the econcrete.

c. Rain. If exposed to the elements, all mixing and batching operations should be halted during rain.

306MR-6.2 Form setting. Forms shall be set sufficiently in advance of the lean concrete placement to ensure continuous paving operation. After the forms have been set to correct grade, the grade shall be thoroughly tamped, either mechanically or by hand, at both the inside and outside edges of the base of the forms. Forms shall be staked into place with not less than three pins for each 10 feet section. A pin shall be placed at each side of every joint.
Form sections shall be tightly locked and shall be free from play or movement in any direction. The forms shall not deviate from true line by more than 1/4 inch at any joint. Forms shall be so set that they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and oiled prior to the placing of lean concrete. The alignment and grade elevations of the forms shall be checked and corrections made by the Contractor immediately before placing the lean concrete. When any form has been disturbed or any grade has become unstable, the form shall be reset and rechecked. The forms shall be approved by the Engineer prior to Lean concrete placement.

306MR-6.3 Preparation of underlying course. The underlying course shall be checked by the Contractor before placing and spreading operations are started. Document it is free of any ruts, depressions, or bumps and is finished to the correct grade. The underlying course may be inspected by the Engineer at the discretion of the engineer. Any ruts or soft yielding places in the

underlying course shall be corrected at the Contractor's expense before the lean concrete mixture is placed. The underlying course should be lightly wetted down in advance of placing the lean concrete to ensure a firm, moist condition at the time of lean concrete placement. The underlying course shall be protected from frost. Usage of chemicals to eliminate frost is not permissible.

306MR-6.4 Grade control. Grade control between the edges of the pavement shall be accomplished at intervals of 25 feet or less on the longitudinal grade and at 25 feet or less on the transverse grade. To protect the underlying course and ensure proper drainage, the lean concrete paving shall begin along the centerline of the pavement on a crowned section or on the greatest contour elevation of a pavement with variable cross slope.

306MR -6.5 Handling, measuring, and batching material. The batch plant site, layout, equipment, and provisions for transporting material shall assure a continuous supply of material to the work. Stockpiles shall be constructed in a manner that prevents segregation and intermixing of deleterious materials.

Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched. Rail shipments requiring more than 12 hours transit will be accepted as adequate binning if the car bodies permit free drainage.

Batching plants shall be equipped to proportion aggregates and bulk cement, by weight, automatically using approved interlocked proportioning devises. When bulk cement is used, the Contractor shall use a suitable method such as a chute, boot or other device approved by the Engineer to handle the cement between the weighing hopper and the transporting container or into the batch itself for transportation to the mixer, to prevent loss of cement. The device shall provide positive assurance that each batch has the specified cement content.

306MR-6.6 Mixing. All lean concrete shall be mixed and delivered to the site per the requirements of ASTM C94. The mixing time should be adequate to produce lean concrete that is uniform in appearance, with all ingredients evenly distributed. Mixing time shall be measured from the time all materials are emptied into the drum (provided all the water is added before one-fourth the preset mixing time has elapsed) and continues until the time the discharge chute is opened to deliver the lean concrete.

If mixing in a plant, the mixing time shall not be less than 50 or greater than 90 seconds. If mixing in a truck, the mixing time shall not be less than 70 or more than 125 truck-drum revolutions at a mixing speed of not less than 6 or more than 18 truck-drum revolutions per minute.

Re-tempering lean concrete by adding water or by other means will not be permitted, except when lean concrete is delivered in truck mixers. With truck mixers, additional water may be added to the batch materials and additional mixing performed to allow proper placement of the material, provided (a) the addition of water is performed within 45 minutes after the initial

mixing operations and (b) the slump and water/cementitious ratio specified in the mix design is not exceeded.

306MR-6.7 Hauling. The elapsed time from the addition of cementitious material to the mix until the lean concrete is deposited in place at the work site shall not exceed 45 minutes when the concrete is hauled in nonagitating trucks, or 90 minutes when it is hauled in truck mixers or truck agitators.

306MR-6.8 Placing, consolidating, and finishing. Prior to placement of the lean concrete layer, the prepared underlying course shall be moistened with water, without saturating, to prevent rapid loss of moisture from the lean concrete. In cold weather, the underlying course shall be protected so that it will be entirely free of frost when lean concrete is placed.
The hauled lean concrete material shall be discharged onto the prepared underlying course such that segregation of the mix is minimized and minimum handling of the mix is needed. The lean concrete shall be placed continuously at a uniform rate without unscheduled stops except for equipment failure or other emergencies. Avoid contamination of plastic lean concrete with foreign material on construction equipment, workman's footwear, or any other sources. Lean concrete shall not be mixed, placed, or finished when the natural light is insufficient, unless an adequate artificial lighting system is provided.

a. Side-form construction. For side-form placement, the Contractor shall verify the elevations of the fixed forms so the thickness and finished grade of the lean concrete layer will be in accordance with the requirements of the project plans and specifications. The lean concrete shall be spread uniformly between the forms immediately after it is placed using a spreading machine. Necessary hand spreading shall be done with shovels. Rakes shall not be allowed for spreading lean concrete.

The spreading shall be followed immediately by thorough consolidation using vibrating screeds or spud vibrators. Vibrators may be external or internal type, depending on the thickness of the lean concrete layer. The surface vibrators may be attached to the spreader or they may be mounted on a separate carriage. They shall not come in contact with existing material, the subgrade, or side forms. When spud vibrators are used, the lean concrete shall be thoroughly consolidated against and along the faces of all forms and previously placed lean concrete. Vibrators shall not be permitted to come in contact with existing material, the subgrade, or a side form. In no case shall the vibrator be operated longer than 20 seconds in any one location, nor shall the vibrators be used to move the lean concrete.

Hand finishing will not be permitted except in areas where the mechanical finisher cannot operate.

306MR-6.9 Final finishing. Final finishing shall be accomplished while the lean concrete is still in the plastic state. Limited surface refinishing by hand is acceptable to meet the grade and surface tolerance established in paragraphs 306MR-6.2.3 and 306MR-6.2.4, after strike off and consolidation. The surface of the lean concrete shall not be textured.

306MR-6.10 Joints. Joints shall be constructed as shown on the plans.

a. Construction joints. Locate all longitudinal and transverse construction joints as shown on the plans. If longitudinal joints are not shown, locate longitudinal joints within 6 inches from planned joints in the PCC to be placed over the lean concrete. Place against vertical clean edge free of loose material and debris.

b. Contraction joints. If shown on the plans, transverse contraction joints shall be constructed by sawing the hardened lean concrete to a depth of at least one-third the thickness of the lean concrete base. These joints shall match within 3 inches the planned joints of the overlying concrete surface.

c. Concrete saws. When sawing of joints are specified, the Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing to the required dimensions and at the required rate. The Contractor shall provide at least one standby saw in good working order. An ample supply of saw blades shall be maintained at the site of the work at all times during sawing operations. All equipment shall be on the job at all times during lean concrete placement.

306MR-6.11 Curing. Immediately after the finishing operations are complete and within two hours of placement of the lean concrete, the entire surface and edges of the newly placed lean concrete shall be sprayed uniformly with white pigmented, liquid membrane forming curing compound. The layer should be kept moist using a moisture-retaining cover or a light application of water until the curing material is applied.

The curing material shall be applied at a maximum rate of 200 square feet per gallon using pressurized mechanical sprayers. The spraying equipment shall be a fully atomizing type equipped with a tank agitator. At the time of use, the curing compound in the tank shall be thoroughly and uniformly mixed with the pigment. During application the curing compound shall be continuously stirred by mechanical means.

Hand spraying of odd widths or shapes and lean concrete surfaces exposed by the removal of forms is permitted.

If the film of curing material becomes damaged from any cause, including sawing operations, within the required 7-day curing period or until the overlying course is constructed, the damaged portions shall be repaired immediately with additional compound or other approved means as quickly as practical.

Edges of the lean concrete layer shall be sprayed with curing when side-forms are removed.

a. Curing in cold weather. The lean concrete shall be maintained at a temperature of at least 50°F during curing. Cover lean concrete and provide with a source of heat sufficient to maintain 50°F minimum while curing. The Contractor shall adhere to the practices recommended in ACI 306R. The Contractor shall be responsible for the quality and strength of the lean concrete placed during cold weather, and any lean concrete injured by frost action shall be removed and replaced at the Contractor’s expense.

b. Curing in hot weather. Lean concrete temperature from initial mixing through final cure shall not exceed 90°F. Shade the fresh lean concrete and start curing as soon as the surface is sufficiently hard to permit curing without damage. The Contractor shall adhere to the practices recommended in ACI 305R.

306MR-6.12 Protection. The Contractor shall protect the lean concrete from injurious action by sun, rain, flowing water, frost, or mechanical injury. Protect lean concrete surfaces from foot and vehicular traffic and other sources of abrasion for a minimum of 72 hours. The Engineer shall decide when the pavement shall be opened to traffic. Traffic shall not be allowed on the pavement until test specimens made per ASTM C31 have attained a compressive strength of 350 psi when tested per ASTM C39. The Contractor shall maintain continuity of applied curing method for the entire curing period.

306MR-6.13 Instrumentation Channel. Instrumentation channels or grooves shall be constructed as shown on the plans All slurry, laitance and debris from construction of instrumentation channels shall be removed by vacuuming and washing. Proper curing procedures shall be reapplied in the initial sawcut and maintained for the remaining cure period. Do not erode or otherwise damage the surface by cleanup operations.

306MR-6.14 Construction and Repair Joints. Joint faces shall be a clean vertical face free of loose or shattered material. Construction joints shall be formed or sawcut. Joints for removal and repair shall be sawcut at the limits of repair.

MATERIAL ACCEPTANCE

306MR-7.1 Acceptance sampling and testing. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Contractor. The Contractor shall provide the required lean concrete samples during construction for verification testing purposes. The samples shall be taken in the presence of the Engineer.

The lean concrete layer shall be tested for air content, strength, thickness, grade, and surface tolerance. Sampling and testing for air shall be as specified in paragraph 306MR-7.1.1. Sampling and testing for strength, thickness, grade, and surface tolerance shall be on a lot basis, with a lot consisting of either: (1) one day's production not to exceed 2,000 square yards, or (2) a half day's production, where a day's production is expected to consist of between 2,000 and 4,000 square yards.

The Contractor shall notify the Engineer of the quantity anticipated to be produced on the next day of production at least 12 hours in advance in order to determine lot and sublot sizes for material testing and acceptance purposes.

Each lot will be divided into four equal sublots. In the event that only three sublots are produced, the three sublots shall constitute a complete lot. If only one or two sublots are produced, they

shall be incorporated into the next lot, and the total number of sublots shall be used in the acceptance plan calculation.

End-of-production sublots (sublots associated with the final placement of lean concrete for the project which are less than a complete lot) shall be handled as (1) three sublots shall constitute a lot, or (2) one or sublots shall be incorporated into the previous lot.

a. Air content testing. Air content tests shall be performed on the first three truckloads of lean concrete produced at the start of operations each day and the first three truckloads produced after any scheduled or non-scheduled shutdown. Additional tests shall be performed each time a sample is taken for a strength test and when requested by the Engineer.
Air content tests shall be made in accordance with ASTM C231. Air content test results shall be between 4% and 8%.

If the first test on a truckload of lean concrete is not within the specification limits, a second test on the same truckload shall be made. If the second test is within the specification limits, the lean concrete will be accepted with respect to entrained air content. If the second test is not within the specification limits, the truckload shall be rejected.

b. Compressive strength testing. One sample of freshly delivered lean concrete shall be taken from each sublot for compressive strength testing. The lean concrete shall be sampled in accordance with ASTM C172. Sampling locations shall be determined per ASTM D3665. At least two test cylinders shall be made from each sample per ASTM C31. The 7-day compressive strength of each cylinder shall be determined per ASTM C39.

The compressive strength for each sublot at shall be computed by averaging the compressive strengths of two test cylinders representing that sublot. The compressive strength of the lot shall be the average compressive strength of the individual sublots comprising the lot.

Since the strength level of lean concrete at an early age is considerably lower than PCC, special care is required in handling test specimens.

The Contractor shall provide adequate facilities for the initial curing of cylinders. During the 24 hours after molding, the temperature immediately adjacent to the specimens must be maintained in the range of 60 to 80°F, and loss of moisture from the specimens must be prevented. The specimens may be stored in tightly constructed wooden boxes, damp sand pits, temporary buildings at construction sites, under wet burlap in favorable weather or in heavyweight closed plastic bags, or use other suitable methods, provided the temperature and moisture loss requirements are met.

Specimens that are noticeably defective shall not be considered in the determination of the strength. If the test specimens fail to conform to the requirements for strength, the Contractor shall change in the lean concrete mixture to meet the requirements.

If the maximum 7-day compressive strength values exceed the maximum strength requirements when evaluated in accordance with paragraph 306MR-7-2.1, the Contractor shall propose a jointing plan for approval by the Engineer.

c. Thickness testing. Thicknesses shall be calculated using the elevations determined for grade testing. Thickness shall be calculated as the difference in the surveyed elevation of the lean concrete and the underlying course. Thickness shall be determined at the same grid interval and at the same grid locations as grade testing identified in paragraph 306MR-7.1.d.

d. Grade testing. The elevations of the finished lean concrete surface shall be surveyed on a grid spacing of not more than 5-foot by 5-foot. For P-306 provided as a sublayer for Item P-501, the size and location of the grid shall be selected to coincide with the proposed joint intersection locations.

e. Surface tolerance testing. After the lean concrete has hardened sufficiently, it shall be tested for surface tolerance with a 12 feet straightedge provided by the Contractor.

306MR-7.2 Acceptance criteria. Acceptance of lean concrete will be based on compressive strength, thickness, grade, and surface tolerance, as described in the paragraphs below.

a. Compressive strength requirements. The lean concrete shall meet all of the following compressive strength requirements on a lot basis:

The compressive strength of the lot, tested at seven days, shall be greater than 500 pounds per square inch. When a given lot of lean concrete fails to meet the minimum compressive strength requirements, the entire lot shall be replaced at the Contractor's expense.

Not more than 20% of the individual cylinders in a given lot, tested at seven days, shall have a compressive strength greater than 800 pounds per square inch. When greater than 20% of the individual cylinders in a given lot have 7-day compressive strengths in excess of 800 pounds per square inch, and transverse joints have not been constructed, a bond-breaker shall be used.

b. Thickness requirements. The completed thickness shall be as shown on the plans. When the average lot thickness is not deficient by more than 1/2 inch from the plan thickness, full payment shall be made. If the lot average thickness is deficient by more than one inch, it shall be removed and replaced at the Contractor's expense. When such measurement is deficient more than 1/2 inch and not more than one inch from the plan thickness, one additional core shall be taken at random from each sublot within the lot. The thickness of these additional cores shall be determined as indicated in paragraph 304MR-7.1.2. A new lot average thickness shall be recomputed based on these additional cores and the original cores taken from each sublot. When the recomputed average lot thickness is not deficient by more than 1/2 inch from the plan thickness, full payment shall be made. If the average lot thickness is deficient by more than 1/2 inch from the plan thickness, the entire lot shall be removed and replaced at the Contractor's expense or shall be permitted to remain in place at an adjusted payment of 75% of the contract unit price.

When the measured thickness is more than that indicated on the plans, it will be considered as conforming to the requirements, provided the surface of the completed lean concrete layer is within the established grade and surface tolerance requirements.

c. Grade requirements. When the completed surface is more than 1/2 inch above the grade shown in the plans, the surface shall be trimmed at the Contractor's expense using an approved grinding machine to an elevation that falls within a tolerance of 1/4 inch.

When the completed surface more than 1/2 inch below the grade shown in the plans, the surface shall be patched with an approved patching compound and feathered out to match the correct grade. The corrected surface shall fall within a tolerance of 1/4 inch.

d. Surface tolerance requirements. Surface deviations shall not exceed 3/8 inch from a 12-foot straightedge laid at any location in any direction (includes along all edges of the paving lane). Any high spots of more than 3/8 inch in 12-foot shall be marked and immediately trimmed with an approved grinding machine. If the overlying layer is PCC pavement, the ground surface shall be sprayed with a double application of the curing compound at the specified rate prior to paving.

METHOD OF MEASUREMENT

306MR-8.1 The quantity of lean concrete will be determined by the number of square yards of lean concrete actually constructed and accepted by the Engineer as complying with the plans and specifications.

BASIS OF PAYMENT

306MR-9.1 The accepted quantities of lean concrete will be paid for at the contract unit price per square yard for lean concrete base. The price and payment shall be full compensation for furnishing and placing all materials.

Item P-306-8.1	Payment will be made for lean concrete base course – per square yard.

TESTING REQUIREMENTS

ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C192	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1567	Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregates (Accelerated Mortar-Bar Method)
AASHTO T136	Standard Method of Test for Freezing-and-Thawing Tests of Compacted Soil-Cement Mixtures
ASTM D3665	Standard Practice for Random Sampling of Construction Materials

MATERIAL REQUIREMENTS

ACI 305R	Guide to Hot Weather Concreting
ACI 306R	Guide to Cold Weather Concreting
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Specification for Coal Fly Ash and Raw and Calcined Natural Pozzolans for Use in Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars

END OF ITEM P-306MR

Item P–404MR Bituminous Bondbreaker Interlayer

DESCRIPTION

404MR-1.1 This item shall consist of pavement courses composed of mineral aggregate and asphalt cement binder (asphalt binder) mixed in a central mixing plant and placed on a prepared course in accordance with these specifications and shall conform to the lines, grades, thicknesses, and typical cross-sections shown on the plans. Each course shall be constructed to the depth, typical section, and elevation required by the plans and shall be rolled, finished, and approved before the placement of the next course.

SUBMITTALS

404MR-2.1 Submit the following in accordance with Section 61MR Submittal Procedures:

a. SD-03 Shop Drawings.

- **Laydown plan.** Laydown plan meeting the requirements of paragraph 404MR-7.3

b. SD-03 Product Data.

- **Job Mix Formula (JMF).** JMF meeting the requirements of per paragraph 404MR-4.1

c. SD-04 Samples.

- **Aggregates.** Samples of each aggregate proposed for use.
- **Asphalt Cement Binder.** Samples of each bituminous material proposed for use.

d. SD-06 Test Reports. The test reports shall show the appropriate ASTM tests for each material, the test results, and a statement that the material meets the specification requirement. Prior to delivery of materials to the job site, the Contractor shall submit certified test reports to the Engineer for the following materials:

- **QC monitoring.** Submit all QC records in accordance with section 100 CONTRACTOR QUALITY CONTROL of the project specifications.

e. SD-07 Certificates.

- **Certification of compliance of bituminous material.** Provide certification from the manufacturer that the material proposed for use on this project complies with the requirements of paragraph 404MR-3.1.

MATERIALS

404MR-3.1 Hot Mix Asphalt. Provide material meeting New Jersey Department of Transportation (NJDOT) specifications for item 902.02 HOT MIX ASPHALT 9.5M64, item 902.02HOT MIX ASPHALT 9.5L64, 902.02 HOT MIX ASPHALT 12.5M64, or item 902.02 HOT MIX ASPHALT 12.5L64 that has been previously submitted to the New Jersey Department of Transportation and approved for use on a project funded in whole or in part by the State of New Jersey, except as modified by this specification.

COMPOSITION

404MR-4.1 Mix design. Submit the mix design for the proposed material:

a. Percent passing each sieve size for total combined gradation, individual gradation of all aggregate stockpiles and percent by weight of each stockpile used in the job mix formula.
b. Percent of asphalt cement.
c. Asphalt performance grade and type of modifier if used.
d. Compaction method (Marshall or Gyratory) and number of blows or gyrations.
e. Laboratory mixing temperature.
f. Laboratory compaction temperature.
g. Temperature-viscosity relationship of the PG asphalt cement binder showing acceptable range of mixing and compaction temperatures; and for modified binders include supplier recommended mixing and compaction temperatures.
h. Plot of the combined gradation on a 0.45 power gradation curve.
i. Design properties:
(1) For Marshall Method: Graphical plots of stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content.
(2) For Gyratory Method: Graphical plots of air voids, voids in the mineral aggregate, and unit weight versus asphalt content.
j. Specific Gravity and absorption of each aggregate.
k. Percent natural sand.
l. Percent fractured faces.
m. Percent by weight of flat particles**,** elongated particles, and flat and elongated particles (and criteria).
n. Tensile Strength Ratio (TSR).
o. Anti-strip agent (if required).
p. Date the JMF was developed.

SAMPLING AND TESTING

404MR-5.1 General acceptance requirements. The Engineer may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the Engineer is considered sufficient grounds for such rejection.

For PG 64-22, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 290 °F when the ambient temperature is less than 50 °F or is at least 275 °F when the ambient temperature is greater than or equal to 50 °F.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195.

404MR-5.2 Sampling. Obtain one random sample from each 700 tons of production, or portion thereof, for volumetric acceptance testing and to verify composition. Perform sampling according to AASHTO T 168, NJDOT B-2, or ASTM D 3665.

404MR-5.3 Quality Control Testing. The HMA producer shall provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP).

Perform ignition oven testing according to AASHTO T 308 and aggregate gradation according to AASHTO T 30 once on a portion of each random sample. Perform maximum specific gravity testing according to AASHTO T 209 once on a portion of each random sample.

404MR-5.4 Thickness and grade.
a. The elevations of the finished surface of the interlayer shall be surveyed by the Engineer on a grid spacing of not more than 5-foot by 5-foot. For P-404MR provided as a sublayer for Item P-501, the size and location of the grid shall be selected to coincide with the proposed joint intersection locations.

b. Thicknesses shall be calculated using the elevations determined for grade testing. Thickness shall be calculated as the difference in the surveyed elevation determined according to 404MR-5.4a and the elevation of the underlying course. Thickness shall be determined at the same grid interval and at the same grid locations as grade testing identified in paragraph 404MR-5.4a.

404MR-5.5 Smoothness. The surface of the interlayer shall be tested for surface tolerance with a 16 feet straightedge provided by the Contractor. Smoothness testing frequency and location shall be at the discretion of the Engineer.

404MR-5.6 Density. Determine the density of the in-place mat for at least one random location within each paving lane and one random location on each joint using a density device provided in accordance with paragraph 404MR-6.5.

EQUIPMENT

404MR-6.1 HMA plant. Plants used for the preparation of HMA shall conform to the requirements of American Association of State Highway and Transportation Officials (AASHTO) M156 with the following changes:

Requirements for all plants include:
a. Truck scales. The HMA shall be weighed on approved scales furnished by the Contractor, or on certified public scales at the Contractor's expense. Scales shall be inspected and sealed as often as the Engineer deems necessary to assure their accuracy. In lieu of scales, and as approved by the Engineer, HMA weight may be determined by the use of an electronic weighing system equipped with an automatic printer that weighs the total HMA production and as often thereafter as requested by the Engineer.

404MR-6.2 Hauling equipment. Trucks used for hauling HMA shall have tight, clean, and smooth metal beds. To prevent the HMA from sticking to the truck beds, the truck beds shall be lightly coated with a minimum amount of paraffin oil, lime solution, or other material approved by the Engineer. Petroleum products shall not be used for coating truck beds. Each truck shall have a suitable cover to protect the mixture from adverse weather. When necessary, to ensure that the mixture will be delivered to the site at the specified temperature, truck beds shall be insulated or heated and covers shall be securely fastened.

404MR-6.3 HMA pavers. HMA pavers shall be self-propelled with an activated heated screed, capable of spreading and finishing courses of HMA that will meet the specified thickness, smoothness, and grade. The paver shall have sufficient power to propel itself and the hauling equipment without adversely affecting the finished surface.
The paver shall have a receiving hopper of sufficient capacity to permit a uniform spreading operation. The hopper shall be equipped with a distribution system to place the HMA uniformly in front of the screed without segregation. The screed shall effectively produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.
If, during construction, it is found that the spreading and finishing equipment in use leaves tracks or indented areas, or produces other blemishes in the pavement that are not satisfactorily corrected by the scheduled operations, the use of such equipment shall be discontinued and satisfactory equipment shall be provided by the Contractor.

a. Automatic grade controls. The HMA paver shall be equipped with a control system capable of automatically maintaining the specified screed elevation. The control system shall be automatically actuated from either a reference line and/or through a system of mechanical sensors or sensor-directed mechanisms or devices that will maintain the paver screed at a predetermined transverse slope and at the proper elevation to obtain the required surface. The transverse slope controller shall be capable of maintaining the screed at the desired slope within ±0.1%.
The controls shall be capable of working in conjunction with any of the following attachments:
(1) Ski-type device of not less than 30 feet (9 m) in length.
(2) Taut string-line (wire) set to grade.
(3) Short ski or shoe.
(4) Laser control.

404MR-6.4 Rollers. Rollers of the vibratory, steel wheel, and pneumatic-tired type shall be used. They shall be in good condition, capable of operating at slow speeds to avoid displacement of the HMA. The number, type, and weight of rollers shall be sufficient to compact the HMA to the required density while it is still in a workable condition.

All rollers shall be specifically designed and suitable for compacting HMA concrete and shall be properly used. Rollers that impair the stability of any layer of a pavement structure or underlying soils shall not be used. Depressions in pavement surfaces caused by rollers shall be repaired by the Contractor at their own expense.

The use of equipment that causes crushing of the aggregate will not be permitted.

404MR-6.5 Density device. The Contractor shall have on site a density gauge during all paving operations in order to assist in the determination of the optimum rolling pattern, type of roller and frequencies, as well as to monitor the effect of the rolling operations during production paving. The Contractor shall also supply a qualified technician during all paving operations to calibrate the gauge and obtain accurate density readings for all new HMA. These densities shall be supplied to the Engineer upon request at any time during construction. No separate payment will be made for supplying the density gauge and technician.

404MR-6.6 Straightedge. Provide a 16-foot straightedge for smoothness testing. The straightedge shall be at the work site at all times during Bituminous Bondbreaker Interlayer paving operations and for at least 24 hours after completion of compaction of each lot of material.

CONSTRUCTION METHODS

404MR-7.1 Weather limitations. The HMA shall not be placed upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 4. The temperature requirements may be waived by the Engineer, if requested; however, all other requirements including compaction shall be met.

Table 4. Surface Temperature Limitations of Underlying Course

Mat Thickness	Base Temperature (Minimum)	
	°F	°C
3 inches or greater	40	4
Greater than 2 inches but less than 3 inches	45	7

404MR-7.2 Preparation of the underlying surface. Immediately before placing the HMA, the underlying course shall be cleaned of all dust and debris. A lime slurry bond breaker shall be placed underneath the asphalt interlayer as shown on the plans.

404MR-7.3 Laydown plan, transporting, placing, and finishing. Prior to the placement of the HMA, the Contractor shall prepare a laydown plan for approval by the Engineer. This is to minimize the number of cold joints in the pavement. The laydown plan shall include the sequence of paving laydown by stations, width of lanes, temporary ramp locations, and laydown temperature. The laydown plan shall also include estimated time of completion for each portion of the work (that is, milling, paving, rolling, cooling, etc.). Modifications to the laydown plan shall be approved by the Engineer.

The HMA shall be transported from the mixing plant to the site in vehicles conforming to the requirements of paragraph 401-6.2. Deliveries shall be scheduled so that placing and compacting of HMA is uniform with minimum stopping and starting of the paver. Hauling over freshly placed material shall not be permitted until the material has been compacted, as specified, and allowed to cool to atmospheric temperature.
The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose for the first lift of all runway and taxiway pavements.

The initial placement and compaction of the HMA shall occur at a temperature suitable for obtaining density, surface smoothness, and other specified requirements but not less than 250°F.

Upon arrival, the HMA shall be placed to the full width by a HMA paver. It shall be struck off in a uniform layer of such depth that, when the work is completed, it shall have the required thickness and conform to the grade and contour indicated. The speed of the paver shall be regulated to eliminate pulling and tearing of the HMA mat. Unless otherwise permitted, placement of the HMA shall begin along the centerline of a crowned section or on the high side of areas with a one-way slope. The HMA shall be placed in consecutive adjacent strips having a minimum width of **12** feet except where edge lanes require less width to complete the area. Additional screed sections shall not be attached to widen paver to meet the minimum lane width requirements specified above unless additional auger sections are added to match. The longitudinal joint in one course shall offset the longitudinal joint in the course immediately below by at least 1 foot; however, the joint in the surface top course shall be at the centerline of crowned pavements.

Transverse joints in adjacent lanes shall be offset a minimum of 10 feet. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the HMA may be spread and luted by hand tools. Areas of segregation in the surface course, as determined by the Engineer, shall be removed and replaced at the Contractor’s expense. The boundaries of the removal area shall be saw cut.

404MR-7.4 Compaction of HMA. After placing, the HMA shall be thoroughly and uniformly compacted by power rollers. The surface shall be compacted as soon as possible when the HMA

has attained sufficient stability so that the rolling does not cause undue displacement, cracking or shoving. The sequence of rolling operations and the type of rollers used shall be at the discretion of the Contractor. The speed of the roller shall, at all times, be sufficiently slow to avoid displacement of the hot mixture and be effective in compaction. Any displacement occurring as a result of reversing the direction of the roller, or from any other cause, shall be corrected at once. Sufficient rollers shall be furnished to handle the output of the plant. Rolling shall continue until the surface is of uniform texture, true to grade and cross-section, and the required field density is obtained. To prevent adhesion of the HMA to the roller, the wheels shall be equipped with a scraper and kept properly moistened but excessive water will not be permitted.

In areas not accessible to the roller, the mixture shall be thoroughly compacted with approved power driven tampers. Tampers shall weigh not less than 275 pounds (125 kg), have a tamping plate width not less than 15 inches (38 cm), be rated at not less than 4,200 vibrations per minute, and be suitably equipped with a standard tamping plate wetting device.

Any HMA that becomes loose and broken, mixed with dirt, contains check-cracking, or in any way defective shall be removed and replaced with fresh hot mixture and immediately compacted to conform to the surrounding area. This work shall be done at the Contractor's expense. Skin patching shall not be allowed.

404MR-7.5 Joints. The formation of all joints shall be made in such a manner as to ensure a continuous bond between the courses and obtain the required density. All joints shall have the same texture as other sections of the course and meet the requirements for smoothness and grade. The roller shall not pass over the unprotected end of the freshly laid HMA except when necessary to form a transverse joint. When necessary to form a transverse joint, it shall be made by means of placing a bulkhead or by tapering the course. The tapered edge shall be cut back to its full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. In both methods, all contact surfaces shall be coated with an asphalt tack coat before placing any fresh HMA against the joint.

Longitudinal joints which have been left exposed for more than four (4) hours; the surface temperature has cooled to less than 175°F; or are irregular, damaged, uncompacted or otherwise defective shall be cut back 3 inches to 6 inches to expose a clean, sound, uniform vertical surface for the full depth of the course. All cutback material shall be removed from the project. Asphalt tack coat or other product approved by the Engineer shall be applied to the clean, dry joint, prior to placing any additional fresh HMA against the joint. Any laitance produced from cutting joints shall be removed. The cost of this work shall be considered incidental to the cost of the HMA.

404MR-7.6 Diamond grinding. When required, diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive. The saw blades shall be assembled in a cutting head mounted on a machine designed specifically for diamond grinding that will produce the required texture and smoothness level without damage to the pavement. The saw blades shall be 1/8-inch wide and there shall be a minimum of 55 to 60 blades per 12 inches of cutting head width; the actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Each machine shall be capable of cutting a path at least 3 feet wide. Equipment that causes ravels, aggregate fractures, spalls or disturbance to the

pavement will not be permitted. The depth of grinding shall not exceed 1/2 inch and all areas in which diamond grinding has been performed will be subject to the final pavement thickness tolerances specified. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. Areas that have been ground will be sealed with a P-608 surface treatment as directed by the Engineer. It may be necessary to seal a larger area to avoid surface treatment creating any conflict with runway or taxiway markings.

MATERIAL ACCEPTANCE

404MR-8.1 Material acceptance shall be on the basis of mix design conformity, grade, smoothness, and density. Acceptance shall be based on Contractor Quality Control testing except as indicated in this specification.

a. **Mix design conformance.** The material composition shall be within limits of Table 5. Lots not conforming to the limits of Table 5 shall have a pay reduction factor of 50%.

Table 5. Material composition acceptance criterial

Sieve	Acceptance Criteria
3/4 inch	JMF±9%
1/2 inch	JMF±9%
3/8 inch	JMF±9%
No. 4	JMF±9%
No. 16	JMF±7.5%
No. 50	JMF±4.5%
No. 200	JMF±3%
Asphalt Content	JMF±0.70%
VMA	>(JMF-1.50)%

b. Grade. When the completed surface is more than 1/2 inch above the grade shown in the plans, the surface shall be trimmed at the Contractor's expense using an approved grinding machine to an elevation that falls within a tolerance of 1/4 inch. When the completed surface more than 1/2 inch below the grade shown in the plans, the surface shall be patched with an approved patching compound and feathered out to match the correct grade. The corrected surface shall fall within a tolerance of 1/4 inch.

c. Smoothness. Surface deviations shall not exceed 3/8 inch from a 16-foot straightedge laid at any location in any direction (includes along all edges of the paving lane). Any high spots of more than 3/8 inch in 16-foot shall be marked and immediately trimmed with an approved grinding machine.

d. Density. All density readings on the completed mat shall have a density of at least 92% of the theoretical maximum density determined from the maximum specific gravity of that lot. All density readings on completed joints shall have a density of at least 90% of the theoretical maximum density determined from the maximum specific gravity of that lot.

MEASUREMENT AND PAYMENT

404MR-9.1 Measurement. HMA shall be measured by the number of tons of HMA used in the accepted work. Recorded batch weights or truck scale weights will be used to determine the basis for the tonnage.

404MR-9.1 Payment. Payment for a lot of HMA meeting all acceptance criteria as specified in paragraph 404MR-8.1 shall be made based on results of tests. Payment shall be adjusted according to paragraph 404MR-8.1 for each lot not meeting the acceptance criteria. The price shall be compensation for furnishing all materials, for all preparation, mixing, and placing of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

TESTING REQUIREMENTS

AASHTO M 320	Standard Specification for Performance-Graded Asphalt Binder
AASHTO M 323	Standard Specification for Superpave Volumetric Mix Design
AASHTO R 26	Standard Practice for Certifying Suppliers of Performance-Graded Asphalt Binders
AASHTO R 35	Standard Practice for Superpave Volumetric Design for Asphalt Mixtures
AASHTO T 11	Standard Method of Test for Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
AASHTO T 27	Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
AASHTO T 30	Standard Method of Test for Mechanical Analysis of Extracted Aggregate
AASHTO T 37	Standard Method of Test for Sieve Analysis of Mineral Filler for Hot Mix Asphalt (HMA)
AASHTO T 40	Standard Method of Test for Sampling Bituminous Materials
AASHTO T 84	Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate
AASHTO T 85	Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate
AASHTO T 88	Standard Method of Test for Particle Size Analysis of Soils
AASHTO T 96	Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T 104	Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
AASHTO T 165	Standard Method of Test for Effect of Water on Compressive Strength of Compacted Bituminous Mixtures
AASHTO T 166	Standard Method of Test for Bulk Specific Gravity (Gmb) of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface-Dry Specimens
AASHTO T 167	Standard Method of Test for Compressive Strength of Hot Mix Asphalt

AASHTO T 168	Standard Method of Test for Sampling Bituminous Paving Mixtures
AASHTO T 195	Standard Method of Test for Determining Degree of Particle Coating of Asphalt Mixtures
AASHTO T 209	Standard Method of Test for Theoretical Maximum Specific Gravity (Gmm) and Density of Hot Mix Asphalt (HMA)
AASHTO T 245	Standard Method of Test for Resistance to Plastic Flow of Asphalt Mixtures Using Marshall Apparatus
AASHTO T 283	Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage
AASHTO T 308	Standard Method of Test for Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
AASHTO T 312	Standard Method of Test for Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C29	Standard Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C183	Standard Practice for Sampling and the Amount of Testing of Hydraulic Cement
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75	Standard Practice for Sampling Aggregates
ASTM D979	Standard Practice for Sampling Bituminous Paving Mixtures
ASTM D1073	Standard Specification for Fine Aggregate for Bituminous Paving Mixtures
ASTM D2172	Standard Test Method for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D1461	Standard Test Method for Moisture or Volatile Distillates in Bituminous Paving Mixtures
ASTM D2041	Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2419	Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate

ASTM D2489	Standard Practice for Estimating Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM D2726	Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2950	Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods
ASTM D3203	Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D3666	Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse AggregateASTM D4867 Standard Test Method for Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ASTM D6084	Standard Test Method for Elastic Recovery of Bituminous Materials by Ductilometer
ASTM D6307	Standard Test Method for Asphalt Content of Hot Mix Asphalt by Ignition Method
ASTM D6752	Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
ASTM D6926	Standard Practice for Preparation of Bituminous Specimens Using Marshall Apparatus
ASTM D6927	Standard Test Method for Marshall Stability and Flow of Bituminous mixtures
ASTM D6925	Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the SuperPave Gyratory Compactor.
ASTM E11	Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves
ASTM E178	Standard Practice for Dealing with Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph
AASHTO T030	Standard Method of Test for Mechanical Analysis of Extracted Aggregate
AASHTO T110	Standard Method of Test for Moisture or Volatile Distillates in Hot Mix Asphalt (HMA)
AASHTO T275	Standard Method of Test for Bulk Specific Gravity (Gmb) of Compacted Hot Mix Asphalt (HMA) Using Paraffin-Coated Specimens
AASHTO M156	Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

AASHTO T329	Standard Method of Test for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method

Asphalt Institute Handbook MS-26, Asphalt Binder
Asphalt Institute MS-2 Mix Design Manual, 7th Edition

NJDOT A-3	Standard Specification for Petrographic Analysis to Determine Lithological Composition of Coarse Aggregate
NJDOT A-4	Standard Specification for Determining Percent of Adherent Fines Present in Coarse Aggregate
NJDOT B-2	Standard Specification for Sampling HMA Mixtures
NJDOT B-3	Standard Specification for Selecting Cores for Maximum Specific Gravity Tesing in Air Voids Determination
NJDOT B-4	Standard Specification for Measuring Thickness of HMA Cores
NJDOT B-5	Standard Specification for Determining Composition of HMA Mixture Using Hot Bin Sample Analysis
NJDOT ST	Standard Specification- Statistical Tables

ASTM D242	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D946	Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D3381	Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D4552	Standard Practice for Classifying Hot-Mix Recycling Agents
ASTM D6373	Standard Specification for Performance Graded Asphalt Binder

END OF ITEM P-404MR

Item P–501MR Portland Cement Concrete (PCC) Pavement

DESCRIPTION

501MR-1.1 This work shall consist of pavement composed of Portland cement concrete (PCC), without reinforcement constructed on a prepared underlying surface in accordance with these specifications and shall conform to the lines, grades, thickness, and typical cross-sections shown on the plans.

SUBMITTALS

501MR-2.1 Submit the following in accordance with Section 61MR Submittal Procedures:

a. **SD-02 Shop Drawings**
   - **Proposed techniques.** A placement plan including the sequence of paving, forming and placing methods, consolidation methods, finishing methods, and curing methods.

b. **SD-03 Product Data**
   - **Dowels**
   - **Rosin paper**
   - **Non-shrink grout**
   - **Construction equipment list.** The list of proposed equipment to be used in the performance of construction work, including descriptive data, shall be approved by the Engineer prior to use on the project.

c. **SD-05 Design Data.**
   - **Mix Design/ Mix Proportioning Study.** Mix Design/ Mix Proportioning Study.

d. **SD-06 Test Reports.**
   - **Materials Acceptance.** Certified test reports for materials proposed for use during construction.
   - **Uniformity Test Report.** Most recent uniformity test results for all mixing equipment proposed for use on the project.
   - **Pre-pour agreements.** Pre-pour agreements documenting conformity with project plans and specifications and signed by both the Contractor and the Engineer.

e. **SD-07 Certificates.**
   - **Admixtures Certificates.** Certificates indicating that the material to furnished meets all of the requirements of paragraph 501MR-3.9.
   - **Laboratory Accreditation Certificate**. Certificates indicating laboratory accreditation as per paragraph 501MR-4.5.
   - **NRMCA Certificate of Conformance.**

MATERIALS

501MR-3.1 Aggregates.

a. Reactivity. Fine and Coarse aggregates to be used in all concrete shall be evaluated and tested by the Contractor for alkali-aggregate reactivity in accordance with both ASTM C1260 and ASTM C1567. Aggregate and mix proportion reactivity tests shall be performed for each project.

(1) Coarse and fine aggregate shall be tested separately in accordance with ASTM C1260. The aggregate shall be considered innocuous if the expansion of test specimens, tested in accordance with ASTM C1260, does not exceed 0.10% at 28 days (30 days from casting).

(2) Combined coarse and fine aggregate shall be tested in accordance with ASTM C1567, modified for combined aggregates, using the proposed mixture design proportions of aggregates, cementitious materials, and/or specific reactivity reducing chemicals. If lithium nitrate is proposed for use with or without supplementary cementitious materials, the aggregates shall be tested in accordance with Corps of Engineers (COE) Concrete Research Division (CRD) C662. If lithium nitrate admixture is used, it shall be nominal 30% ±0.5% weight lithium nitrate in water.

(3) If the expansion of the proposed combined materials test specimens, tested in accordance with ASTM C1567, modified for combined aggregates, or COE CRD C662, does not exceed 0.10% at 28 days, the proposed combined materials will be accepted. If the expansion of the proposed combined materials test specimens is greater than 0.10% at 28 days, the aggregates will not be accepted unless adjustments to the combined materials mixture can reduce the expansion to less than 0.10% at 28 days, or new aggregates shall be evaluated and tested.

b. Fine aggregate. Fine aggregate shall conform to the requirements of ASTM C33. Fineness modulus shall not be less than 2.50 nor more than 3.40. The soundness loss shall not exceed 10% when sodium sulfate is used or 15% when magnesium sulfate is used, after five cycles, when tested per ASTM C88.

The amount of deleterious material in the fine aggregate shall not exceed the following limits:

Limits for Deleterious Substances in Fine Aggregate for Concrete

Deleterious material	ASTM	Percentage by Mass
Clay Lumps and friable particles	ASTM C142	1.0
Material finer than 0.075mm (No. 200 sieve)	ASTM C117	3.0
Lightweight particles	ASTM C123 using a medium with a density of Sp. Gr. of 2.0	0.5
Total of all deleterious Material		3.0

c. Coarse aggregate. Aggregates delivered to the mixer shall consist of crushed stone, crushed or uncrushed gravel, or a combination. The aggregates should be free of ferrous sulfides, such as pyrite, that would cause "rust" staining that can bleed through pavement markings. Steel blast furnace slag shall not be permitted. The aggregate shall be composed of clean, hard, uncoated particles. Dust and other coating shall be removed from the aggregates by washing.

The percentage of wear shall be no more than 40 when tested in accordance with ASTM C131.

The quantity of flat, elongated, and flat and elongated particles in any size group coarser than 3/8 sieve (9 mm) shall not exceed 8% by weight when tested in accordance with ASTM D4791. A flat particle is defined as one having a ratio of width to thickness greater than 5. An elongated particle is one having a ratio of length to width greater than 5.

The soundness loss shall not exceed 12% when sodium sulfate is used or 18% when magnesium sulfate is used, after five cycles, when tested per ASTM C88.

The amount of deleterious material in the coarse aggregate shall not exceed the following limits:

Limits for Deleterious Substances in Coarse Aggregate for Concrete

Deleterious material	ASTM	Percentage by Mass
Clay Lumps and friable particles	ASTM C142	1.0
Material finer than No. 200 sieve (0.075mm)	ASTM C117	1.0
Lightweight particles	ASTM C123 using a medium with a density of Sp. Gr. of 2.0	0.5
Chert (less than 2.40 Sp Gr.)	ASTM C123 using a medium with a density of Sp. Gr. of 2.40)	1.0
Total of all deleterious Material		3.0

(1) Aggregate susceptibility to durability (D) cracking. Aggregates that have a history of D-cracking shall not be used.

Coarse aggregate may be accepted from sources that have a 20 year service history for the same gradation to be supplied with no durability issues. Aggregates that do not have a record of 20 years of service without major repairs (less than 5% of slabs replaced) in similar conditions without D-cracking shall not be used unless it meets the following:

(a) Material currently being produced shall have a durability factor ≥ 95 using ASTM C666 procedure B. Coarse aggregates that are crushed granite, calcite cemented sandstone,

quartzite, basalt, diabase, rhyolite or trap rock are considered to meet the D-cracking test but must meet all other quality tests. Aggregates meeting State Highway Department material specifications may be acceptable.

(b) The Contractor shall submit a current certification that the aggregate does not have a history of D-cracking and that the aggregate meets the state specifications for use in PCC pavement for use on interstate highways. Certifications, tests and any history reports must be for the same gradation as being proposed for use on the project. Certifications which are not dated or which are over one (1) year old or which are for different gradations will not be accepted. Test results will only be accepted when tests were performed by a State Department of Transportation (DOT) materials laboratory or an accredited laboratory.

c. Combined aggregate gradation. The combined aggregate grading shall meet the following requirements:

(a) The materials selected and the proportions used shall be such that when the Coarseness Factor (CF) and the Workability Factor (WF) are plotted on a diagram as described in d. below, the point thus determined shall fall within the parallelogram described therein.

(b) The CF shall be determined from the following equation:

CF = (cumulative percent retained on the 3/8 in. sieve)(100) / (cumulative percent retained on the No. 8 sieve)

(c) The Workability Factor WF is defined as the percent passing the No. 8 sieve based on the combined gradation. However, WF shall be adjusted, upwards only, by 2.5 percentage points for each 94 pounds of cementitious material per cubic meter yard greater than 564 pounds per cubic yard.

(d) A diagram shall be plotted using a rectangular scale with WF on the Y-axis with units from 20 (bottom) to 45 (top), and with CF on the X-axis with units from 80 (left side) to 30 (right side). On this diagram a parallelogram shall be plotted with corners at the following coordinates (CF-75, WF-28), (CF-75, WF-40), (CF-45, WF-32.5), and (CF-45, WF-44.5). If the point determined by the intersection of the computed CF and WF does not fall within the above parallelogram, the grading of each size of aggregate used and the proportions selected shall be changed as necessary.

Reference United States Air Force Engineering Technical Letter (ETL) 97-5:
Proportioning Concrete Mixtures with Graded Aggregates for Rigid Airfield Pavements.
The ETL is available at the following website:

http://www.wbdg.org/ccb/AF/AFETL/etl_97_5.pdf

501MR-3.2 Cement. Cement shall conform to the requirements of ASTM C150 Type I or Type II.
If cement becomes partially set or contains lumps of caked cement, it shall be rejected. Cement salvaged from discarded or used bags shall not be used.

501MR-3.3 Cementitious materials.

a. Fly ash. Fly ash shall meet the requirements of ASTM C618, with the exception of loss of ignition, where the maximum shall be less than 6%. Fly ash for use in mitigating alkali-silica reactivity shall have a Calcium Oxide (CaO) content of less than 13% and a total available alkali

content less than 3% per ASTM C311. Fly ash produced in furnace operations using liming materials or soda ash (sodium carbonate) as an additive shall not be acceptable. The Contractor shall furnish the previous three most recent, consecutive ASTM C618 reports for each source of fly ash proposed in the mix design, and shall furnish each additional report as they become available during the project. The reports can be used for acceptance or the material may be tested independently by the Engineer.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement shall conform to ASTM C989, Grade 100 or Grade 120.

c. Raw or calcined natural pozzolan. Natural pozzolan shall be raw or calcined and conform to ASTM C618, Class N, including the optional requirements for uniformity and effectiveness in controlling Alkali-Silica reaction and shall have a loss on ignition not exceeding 6%. Class N pozzolan for use in mitigating Alkali-Silica Reactivity shall have a total available alkali content less than 3%.

d. Ultrafine fly ash and ultrafine pozzolan. UltraFine Fly Ash (UFFA) and UltraFine Pozzolan (UFP) shall conform to ASTM C618, Class F or N, and the following additional requirements:

(1) The strength activity index at 28 days of age shall be at least 95% of the control specimens.

(2) The average particle size shall not exceed 6 microns.

501MR-3.4 Joint seal. The joint seal for the joints in the concrete pavement shall be preformed polychloroprene compression seals that meet the requirements of Item P-604MR and shall be as specified in the plans.

501MR-3.5 Isolation joint filler. Premolded joint filler for isolation joints shall conform to the requirements of ASTM D1751 and shall be where shown on the plans. The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint, unless otherwise approved by the Engineer. When the use of more than one piece is required for a joint, the abutting ends shall be fastened securely and held accurately to shape by taping or other positive fastening means satisfactory to the Engineer.

501MR-3.6 Dowel and tie bars. Dowel bars shall be plain steel bars conforming to ASTM A615 and shall be free from burring or other deformation restricting slippage in the concrete. Before delivery to the construction site each dowel bar shall be epoxy coated per ASTM A1078. The dowels shall be coated with a bond-breaker recommended by the manufacturer. Dowel sleeves or inserts are not permitted. Grout retention rings shall be fully circular metal or plastic devices capable of supporting the dowel until the grout hardens.

Tie bars shall be deformed steel bars and conform to the requirements of ASTM A615. Tie bars designated as Grade 60 in ASTM A615 or ASTM A706 shall be used for construction requiring bent bars.

501MR-3.7 Water. Water used in mixing or curing shall be potable, clean, free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product, except that non-

potable water, or water from concrete production operations, may be used if it meets the requirements of ASTM C1602.

501MR-3.8 Material for curing concrete. Curing materials shall conform to one of the following specifications. Prevent water used for curing operations from infiltrating through the pavement or shoulders.

a. Liquid membrane-forming compounds for curing concrete shall conform to the requirements of ASTM C309, Type 2, Class A wax base only.

b. Polyethylene film for curing concrete shall conform to the requirements of ASTM C171.

c. Burlap-polyethylene sheeting shall be used for curing concrete. The curing materials shall be shall conform to the requirements of ASTM C171.

501MR-3.9 Admixtures. The Contractor shall submit certificates indicating that the material to be furnished meets all of the requirements indicated below. In addition, the Engineer may require the Contractor to submit complete test data from an approved laboratory showing that the material to be furnished meets all of the requirements of the cited specifications. Subsequent tests may be made of samples taken by the Engineer from the supply of the material being furnished or proposed for use on the work to determine whether the admixture is uniform in quality with that approved.

a. Air-entraining admixtures. Air-entraining admixtures shall meet the requirements of ASTM C260 and shall consistently entrain the air content in the specified ranges under field conditions. The air-entrainment agent and any water reducer admixture shall be compatible.

b. Water-reducing admixtures. Water-reducing admixture shall meet the requirements of ASTM C494, Type A, B, or D. ASTM C494, Type F and G high range water reducing admixtures and ASTM C1017 flowable admixtures shall not be used.

c. Other admixtures. The use of set retarding, and set-accelerating admixtures shall be approved by the Engineer. Retarding shall meet the requirements of ASTM C494, Type A, B, or D and set-accelerating shall meet the requirements of ASTM C494, Type C. Calcium chloride and admixtures containing calcium chloride shall not be used.

d. Lithium Nitrate. The lithium admixture shall be a nominal 30% aqueous solution of Lithium Nitrate, with a density of 10 pounds/gallon, and shall have the approximate chemical form as shown below:

Constituent	Limit (Percent by Mass)
LiNO3 (Lithium Nitrate)	30 ±0.5
SO4 (Sulfate Ion)	0.1 (max)
Cl (Chloride Ion)	0.2 (max)
Na (Sodium Ion)	0.1 (max)
K (Potassium Ion)	0.1 (max)

Provide a trained manufacturer's representative to supervise the lithium nitrate admixture dispensing and mixing operations.

501MR-3.10 Epoxy-resin. All epoxy-resin materials shall be two-component materials conforming to the requirements of ASTM C881, Class as appropriate for each application

temperature to be encountered, except that in addition, the materials shall meet the following requirements:

a. Material for use for embedding dowels and anchor bolts shall be Type IV, Grade 3.

b. Material for use as patching materials for complete filling of spalls and other voids and for use in preparing epoxy resin mortar shall be Type III, Grade as approved.

c. Material for use for injecting cracks shall be Type IV, Grade 1.

d. Material for bonding freshly mixed Portland cement concrete or mortar or freshly mixed epoxy resin concrete or mortar to hardened concrete shall be Type V, Grade as approved.

501MR-3.11 Bond-breaker. A Rosin Paper bond-breaker shall be used between layers as indicated on the plans.

501MR-3.12 Bag mix. An approved non-shrink grout prepared according to the manufacturer's instructions shall be used for repairs.

501MR-3.13 Material acceptance. Prior to use of materials, the Contractor shall submit certified test reports to the Engineer for those materials proposed for use during construction. The certification shall show the appropriate ASTM test for each material, the test results, and a statement that the material passed or failed.

The Engineer may request samples for testing, prior to and during production, to verify the quality of the materials and to ensure conformance with the applicable specifications.

MIX DESIGN

501MR-4.1. General. No concrete shall be placed until the mix design has been approved by the FAA. The FAA's review shall not relieve the Contractor of the responsibility to select and proportion the materials to comply with this section.

501MR-4.2 Proportions. The laboratory preparing the mix designs shall be accredited in accordance with ASTM C1077. The mix designs for all Portland cement concrete placed under P-501MR shall be stamped or sealed by the responsible professional Engineer. Concrete shall be proportioned to achieve a 28-day flexural strength as that meets the acceptance criteria contained in paragraph 501MR-6.2 for the target flexural strengths indicated on the plans. All flexural strengths are to be determined by ASTM C78. The mix shall be developed using the procedures contained in the Portland Cement Association's (PCA) publication, "Design and Control of Concrete Mixtures".

The minimum cementitious material shall be adequate to ensure a workable, durable mix. The minimum cementitious material (cement plus fly ash, or slag cement) shall be 470 pounds per cubic yard. The ratio of water to cementitious material, including free surface moisture on the aggregates but not including moisture absorbed by the aggregates shall not be more than 0.45 by weight.

Flexural strength test specimens shall be prepared in accordance with ASTM C192 and tested in accordance with ASTM C78. The mix determined shall be workable concrete having a maximum allowable slump between one and two inches as determined by ASTM C143. For pumped concrete, the slump shall be between four inches and six inches.

Before the start of paving operations and after approval of all material to be used in the concrete, the Contractor shall submit a mix design showing the proportions and flexural strength obtained from the concrete at 28 days. The mix design shall include copies of test reports, including test dates, and a complete list of materials including type, brand, source, and amount of cement, fly ash, ground slag, coarse aggregate, fine aggregate, water, and admixtures. The mix design shall be approved by the Engineer prior to the start of operations. The submitted mix design shall not be more than 90 days old at the time of submission, or shall have been previously developed for a construction cycle at the NAPTF. Production shall not begin until the mix design is approved in writing by the Engineer.

If a change in sources is made, or admixtures added or deleted from the mix, a new mix design must be submitted to the Engineer for approval.

The results of the mix design shall include a statement giving the maximum nominal coarse aggregate size and the weights and volumes of each ingredient proportioned on a one cubic yard (meter) basis. Aggregate quantities shall be based on the mass in a saturated surface dry condition. The recommended mixture proportions shall be accompanied by test results demonstrating that the proportions selected will produce concrete of the qualities indicated. Trial mixtures having proportions, slumps, and air content suitable for the work shall be based on methodology described in PCA's publication, Design and Control of Concrete Mixtures, modified as necessary to accommodate flexural strength.

The submitted mix design shall be stamped or sealed by the responsible professional Engineer of the laboratory and shall include the following items as a minimum:

a. Coarse, fine, and combined aggregate gradations and plots including fineness modulus of the fine aggregate, coarseness and workability factor plot, and 0.45 power chart.

b. Reactivity Test Results.

c. Coarse aggregate quality test results, including deleterious materials.

d. Fine aggregate quality test results, including deleterious materials.

e. Mill certificates for cement and supplemental cementitious materials.

f. Certified test results for all admixtures, including Lithium Nitrate if applicable.

g. Specified flexural strength, slump, and air content.

h. Documentation of required average CQC flexural strength, R_a.

i. Recommended proportions/volumes for proposed mixture and trial water-cementitious materials ratio, including actual slump and air content.

j. Flexural and compressive strength summaries and plots, including all individual beam and cylinder breaks.

k. Correlation ratios for acceptance testing and Contractor Quality Control testing, when applicable.

l. Historical record of test results documenting production standard deviation, when applicable.

m. Narrative discussing methodology on how the mix design was developed.

n. Alternative aggregate blending to be used during the test section if necessary to meet the required surface and consolidation requirements.

501MR-4.3 Cementitious materials.

a. Fly ash. When fly ash is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 20 and 30% by weight of the total cementitious material. If fly ash is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

b. Slag cement (ground granulated blast furnace (GGBF)). Slag cement may be used. The slag cement, or slag cement plus fly ash if both are used, may constitute between 25 to 55% of the total cementitious material by weight.

c. Raw or calcined natural pozzolan. Natural pozzolan may be used in the mix design. When pozzolan is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between 20 and 30% by weight of the total cementitious material. If pozzolan is used in conjunction with slag cement the maximum replacement rate shall not exceed 10% by weight of total cementitious material.

d. Ultrafine fly ash (UFFA) and ultrafine pozzolan (UFP). UFFA and UFP may be used in the mix design with the Engineer's approval. When UFFA and UFP is used as a partial replacement for cement, the replacement rate shall be determined from laboratory trial mixes, and shall be between seven (7) and 16% by weight of the total cementitious material

501MR-4.4 Admixtures.

a. Air-entraining admixtures. Air-entraining admixture are to be added in such a manner that will ensure uniform distribution of the agent throughout the batch. The air content of freshly mixed air-entrained concrete shall be based upon trial mixes with the materials to be used in the work adjusted to produce concrete of the required plasticity and workability. The percentage of air in the mix shall be 6.0%. Air content shall be determined by testing in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag and other highly porous coarse aggregate.

b. Water-reducing admixtures. Water-reducing admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements. Tests shall be conducted on trial mixes, with the materials to be used in the work, in accordance with ASTM C494.

c. Other admixtures. Set controlling, and other approved admixtures shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply

with the specification requirements. Tests shall be conducted on trial mixes, with the materials to be used in the work, in accordance with ASTM C 494.

d. Lithium nitrate. Lithium nitrate shall be added to the mix in the manner recommended by the manufacturer and in the amount necessary to comply with the specification requirements in accordance with paragraph 501MR-3.9d.

501MR-4.5 Concrete mix design laboratory. The Contractor's laboratory used to develop the concrete mix design shall be accredited in accordance with ASTM C1077. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for developing the concrete mix design must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction

CONSTRUCTION METHODS

501MR-5.1 Equipment. Equipment necessary for handling materials and performing all parts of the work shall be approved by the Engineer, but does not relieve the Contractor of the responsibility for the selection of the proper equipment, proper operation of equipment, and maintaining the equipment in good working condition. The contractor shall submit construction equipment list for approval by the Engineer. The equipment shall be at the jobsite sufficiently ahead of the start of paving operations to be examined thoroughly and approved.

Prior to placement of concrete, the Contractor and the Engineer shall inspect the work site and any previously placed concrete for conformance to the plans and specifications. Items to be inspected shall include, but not be limited to:

- Subgrade, subbase, or base
- Forms
- Stringlines or other guides
- Paving equipment
- QC testing and inspection preparations
- Dowels, joint filler materials, and other preparations for joints
- Reinforcement
- Appurtenances
- Previously placed concrete

Each item shall be recorded on a pre-pour agreement form as conforming or not conforming with plans and specifications. The pre-pour agreement shall also indicate the date and specific location of the concrete placement. Both the Contractor and Engineer shall agree concerning the conformance of all items to the plans and specifications before signing the pre-pour agreement. Do not proceed with placement of concrete until all items conform to the plans and specifications and the pre-pour agreement is signed by both the Contractor and Engineer.

a. Batch plant and equipment. The batch plant and equipment shall conform to the requirements of ASTM C94.

b. Mixers and transportation equipment.

(1) General. Concrete may be mixed at a central plant, or wholly or in part in truck mixers. Each mixer shall have attached in a prominent place a manufacturer's nameplate

showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades.

(2) Central plant mixer. Central plant mixers shall conform to the requirements of ASTM C94. The mixer shall be examined daily for changes in condition due to accumulation of hard concrete or mortar or wear of blades. The pickup and throwover blades shall be replaced when they have worn down 3/4 inch or more. The Contractor shall have a copy of the manufacturer's design on hand showing dimensions and arrangement of blades in reference to original height and depth.

(3) Truck mixers and truck agitators. Truck mixers used for mixing and hauling concrete and truck agitators used for hauling central-mixed concrete shall conform to the requirements of ASTM C94.

(4) Nonagitator trucks. Nonagitating hauling equipment shall conform to the requirements of ASTM C94.

(5) Pumping and other conveying equipment. Pumping and any other necessary concrete conveying equipment shall comply with the requirements for conveying and depositing concrete in ACI 318. Pumping operations shall comply with ACI 304R and ACI 304.2R. Pumping must not result in separation or loss of materials nor cause interruptions sufficient to permit loss of plasticity between successive increments. Loss of slump in pumping equipment must not exceed inches at discharge/placement. Do not convey concrete through pipe made of aluminum or aluminum alloy. Avoid rapid changes in pipe sizes. Limit maximum size of coarse aggregate to 33 percent of the diameter of the pipe. Take samples for testing at both the point of delivery to the pump and at the discharge end.

c. Finishing equipment. Concrete pavement shall be placed with approved placement and finishing equipment using stationary side forms. Hand screeding and float finishing shall be used. Use of roller screeds or other equipment or methods that generate excessive paste at the surface shall not be permitted.

d. Vibrators. Hand held vibrators shall be used and shall meet the recommendations of ACI 309R, Guide for Consolidation of Concrete.

e. Concrete saws. The Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing to the required dimensions. The Contractor shall provide at least one standby saw in good working order and a supply of saw blades at the site of the work at all times during sawing operations. Early-entry saws may be used, subject to demonstration and approval of the Engineer.

f. Side forms. Straight side forms shall be made of either wood or steel. If steel forms are used they shall be furnished in sections not less than 10 feet in length. Forms shall have a depth equal to the pavement thickness at the edge, and a base width equal to or greater than the depth. Forms shall be provided with adequate devices for secure settings so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms with battered top surfaces and bent, twisted or broken forms shall not be used. Built-up forms shall not be used, except as approved by the Engineer. The top face of the form shall not vary from a true plane more than 1/8 inch in 10 feet, and the upstanding leg shall not vary more than 1/4 inch. The forms shall contain provisions for locking the ends of abutting sections together tightly for secure setting.

501-5.2 Form setting. Forms shall be set sufficiently in advance of the concrete placement to ensure continuous paving operation. Wooden forms must be set with kickers. Forms must be secured to the underlying layer. Forms must be set in such a manner to avoid damage to sublayers. Pins cannot be used to set the forms on stabilized materials. Nails size 10d (penny) or smaller must be used to secure forms to stabilized materials. After the forms have been set to correct grade, the underlying surface shall be thoroughly tamped, either mechanically or by hand, at both the inside and outside edges of the base of the forms. Forms shall be staked into place sufficiently to maintain the form in position for the method of placement.

Form sections shall be tightly locked and shall be free from play or movement in any direction. The forms shall not deviate from true line by more than 1/8 inch (3 mm) at any joint. Forms shall be so set that they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and oiled prior to the placing of concrete.

The alignment and grade elevations of the forms shall be checked and corrections made by the Contractor immediately before placing the concrete.

501MR-5.3 Conditioning of underlying surface, side-form and fill-in lane construction. The prepared underlying surface shall be moistened with water, without saturating, immediately ahead of concrete placement to prevent rapid loss of moisture from the concrete. Damage caused by hauling or usage of other equipment shall be corrected and retested to the satisfaction of the Engineer. If damage occurs to a stabilized subbase, it shall be corrected full depth by the Contractor. The underlying surface shall be protected so that it will be entirely free from frost when the concrete is placed. The use of chemicals to eliminate frost in the underlying surface shall not be permitted.

501MR-5.4 Handling, measuring, and batching material. The batch plant site, layout, equipment, and provisions for transporting material shall assure a continuous supply of material to the work. Stockpiles shall be constructed in such a manner that prevents segregation and intermixing of deleterious materials. Aggregates from different sources shall be stockpiled, weighed and batched separately at the concrete batch plant.

Aggregates that have become segregated or mixed with earth or foreign material shall not be used. All aggregates produced or handled by hydraulic methods, and washed aggregates, shall be stockpiled or binned for draining at least 12 hours before being batched. Rail shipments requiring more than 12 hours will be accepted as adequate binning only if the car bodies permit free drainage.

Batching plants shall be equipped to proportion aggregates and bulk cement, by weight, automatically using interlocked proportioning devices of an approved type. When bulk cement is used, the Contractor shall use a suitable method of handling the cement from weighing hopper to transporting container or into the batch itself for transportation to the mixer, such as a chute, boot, or other approved device, to prevent loss of cement. The device shall be arranged to provide positive assurance that the cement content specified is present in each batch.

501MR-5.5 Mixing concrete. The concrete may be mixed in a central mix plant or in truck mixers. The mixer shall be of an approved type and capacity. Mixing time shall be measured from the time the first cementitious material is added into the mixer. All concrete shall be mixed and delivered to the site in accordance with the requirements of ASTM C94.

Mixed concrete from the central mixing plant shall be transported in truck mixers, truck agitators, or non-agitating trucks. The elapsed time from the addition of cementitious material to the mix until the concrete is deposited in place at the work site shall not exceed 30 minutes when the concrete is hauled in non-agitating trucks, nor 90 minutes when the concrete is hauled in truck mixers or truck agitators. Retempering concrete by adding water or by other means will not be permitted. With transit mixers additional water may be added to the batch materials and additional mixing performed to increase the slump to meet the specified requirements provided the addition of water is performed within 45 minutes after the initial mixing operations and provided the water/cementitious ratio specified in the approved mix design is not exceeded, and approved by the Engineer.

501MR-5.6 Limitations on mixing and placing. No concrete shall be mixed, placed, or finished if the lighting is insufficient.

a. Cold weather. Unless authorized in writing by the Engineer, mixing and concreting operations shall be discontinued when a descending air temperature in the shade and away from artificial heat reaches 40°F and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35°F.

The aggregate shall be free of ice, snow, and frozen lumps before entering the mixer. The temperature of the mixed concrete shall not be less than 50°F at the time of placement. Concrete shall not be placed on frozen material nor shall frozen aggregates be used in the concrete.

When concreting is authorized during cold weather, water and/or the aggregates may be heated to not more than 150°F. The apparatus used shall heat the mass uniformly and shall be arranged to preclude the possible occurrence of overheated areas which might be detrimental to the materials.

b. Hot weather. During periods of hot weather when the maximum daily air temperature exceeds 85°F, the following precautions shall be taken.

The forms and/or the underlying surface shall be sprinkled with water immediately before placing the concrete. The concrete shall be placed at the coolest temperature practicable, and in no case shall the temperature of the concrete when placed exceed 90°F. The aggregates and/or mixing water shall be cooled as necessary to maintain the concrete temperature at or not more than the specified maximum.

The finished surfaces of the newly laid pavement shall be kept damp by applying a water-fog or mist with approved spraying equipment until the pavement is covered by the curing medium. Protect the concrete from plastic shrinkage cracking when an evaporation rate in excess of 0.2 psf per hour. If plastic cracking can be expected, or if any plastic cracking begins to occur, the Contractor shall take such additional measures as necessary to protect the concrete surface. Such measures shall consist of fog sprays or similar measures commencing immediately behind the

paver. If these measures are not effective in preventing plastic cracking, paving operations shall be immediately stopped.

c. Temperature management program. Prior to the start of paving operation for each day of paving, the Contractor shall provide the Engineer with a Temperature Management Program for the concrete to be placed to assure that uncontrolled cracking is avoided. As a minimum the program shall address the following items:

(1) Anticipated tensile strains in the fresh concrete as related to heating and cooling of the concrete material.

(2) Anticipated weather conditions such as ambient temperatures, wind velocity, and relative humidity; and anticipated evaporation rate using Figure 11-8, PCA, Design and Control of Concrete Mixtures.

(3) Anticipated timing of initial sawing of joint.

(4) Anticipated number and type of saws to be used.

501MR-5.7 Placing concrete. At any point in concrete conveyance, the free vertical drop of the concrete from one point to another or to the underlying surface shall not exceed 3 feet. The finished concrete product must be dense and homogeneous, without segregation and conforming to the standards in this specification. Backhoes and grading equipment shall not be used to distribute the concrete in front of the paver. Front end loaders will not be used. All concrete shall be consolidated without voids or segregation, including under and around all load-transfer devices, joint assembly units, and other features embedded in the pavement. No equipment is permitted on adjoining previously constructed pavement.

a. Side-form construction. Side form sections shall be straight, free from warps, bends, indentations, or other defects. Defective forms shall be removed from the work. Metal or wooden side forms shall be used.

Width of the base of all forms shall be equal to or greater than the specified pavement thickness.

Side forms shall be of sufficient rigidity, both in the form and in the interlocking connection with adjoining forms, that springing will not occur under the weight of equipment or from the pressure of the concrete. The Contractor shall provide sufficient forms so that there will be no delay in placing concrete due to lack of forms.

Before placing side forms, the underlying material shall be at the proper grade. Side forms shall have full bearing upon the foundation throughout their length and width of base and shall be placed to the required grade and alignment of the finished pavement. They shall be firmly supported during the entire operation of placing, compacting, and finishing the pavement.

Forms shall be drilled in advance of being placed to line and grade to accommodate tie bars where these are specified.

Immediately in advance of placing concrete and after all subbase operations are completed, side forms shall be trued and maintained to the required line and grade for a distance sufficient to prevent delay in placing.

Side forms shall remain in place at least 12 hours after the concrete has been placed, and in all cases until the edge of the pavement no longer requires the protection of the forms. After stripping of forms, the sides of the slab shall be cured in the same manner as the top surface of the slab.

Side forms shall be thoroughly cleaned and oiled each time they are used and before concrete is placed against them.

Concrete shall be spread, screeded, shaped and consolidated by hand so that the concrete is uniformly distributed and consolidated without segregation. The completed pavement shall conform to the required cross-section.

Concrete for the paving shall be effectively consolidated by hand held vibrators without causing segregation.

c. Consolidation. Concrete shall be consolidated by approved hand-operated immersion vibrators. The vibrators shall be inserted into the concrete to a depth that will provide the best full-depth consolidation but not closer to the underlying material than two inches. Excessive vibration shall not be permitted. Vibrators shall not be used to transport or spread the concrete. Hand-operated vibrators shall not be operated in the concrete at one location for more than 20 seconds. Insertion locations for hand-operated vibrators shall be between 6 to 15 inches on centers. For each paving train, at least one additional vibrator spud, or sufficient parts for rapid replacement and repair of vibrators shall be maintained at the paving site at all times. Any evidence of inadequate consolidation (honeycomb along the edges, large air pockets, or any other evidence) shall require the immediate stopping of the paving operation and adjustment of the equipment or procedures as approved by the Engineer.

Thickness cores will be evaluated for surface paste, uniformity of aggregate distribution, segregation, voids, and thickness. Density determinations will be made at the discretion of and by the Engineer based on the water content of the core as taken. ASTM C642 shall be used for the determination of core density in the saturated-surface dry condition.

The average density of the cores shall be at least 97% of the original mix design density as determined by unit weight (ASTM C138), with no cores having a density of less than 96% of the original mix design density. Failure to meet the referee tests will be considered evidence that the minimum requirements for vibration are inadequate for the job conditions. Additional vibrating units or other means of increasing the effect of vibration shall be employed so that the density of the hardened concrete conforms to the above requirements.

501MR-5.8 Strike-off of concrete. Following the placing of the concrete, it shall be struck off to conform to the cross-section shown on the plans and to an elevation that when the concrete is properly consolidated and finished, the surface of the pavement shall be at the elevation shown on the plans.

501MR-5.9 Joints. Joints shall be constructed as shown on the plans and in accordance with the following requirements:

a. Construction. Construction joints shall be constructed with their faces perpendicular to the surface of the pavement and finished or edged as shown on the plans. Construction joints shall not vary more than 1/2 inch from their designated position and shall be true to line with not more than 1/4 inch variation in 10 feet. Joint lines shall be continuous and true across successive

lanes. The surface across the joints shall be tested with a 12 feet straightedge as the joints are finished and any irregularities in excess of 1/4 inch shall be corrected before the concrete has hardened. All joints shall be so prepared, finished, or cut to provide a groove of uniform width and depth as shown on the plans.

Longitudinal construction joints shall be formed against side forms as shown in the plans.

Transverse construction joints shall be installed at the end of each day's placing operations and at any other points within a paving lane when concrete placement is interrupted for more than 30 minutes or it appears that the concrete will obtain its initial set before fresh concrete arrives. The installation of the joint shall be located at a planned contraction or expansion joint. If placing of the concrete is stopped, the Contractor shall remove the excess concrete back to the previous planned joint.

b. Contraction. Contraction joints shall be constructed with their faces perpendicular to the surface of the pavement and finished or edged as shown on the plans. Contraction joints shall not vary more than 1/2 inch from their designated position and shall be true to line with not more than 1/4 inch variation in 10 feet. The surface across the joints shall be tested with a 12 feet straightedge as the joints are finished and any irregularities in excess of 1/4 inch shall be corrected before the concrete has hardened. Contraction joints shall be so prepared, finished, or cut to provide a groove of uniform width and depth as shown on the plans.

Contraction joints shall be installed at the locations and spacing as shown on the plans. Contraction joints shall be installed to the dimensions required by sawing a groove into the concrete surface after the concrete has hardened. The groove shall be finished or cut clean so that spalling will be avoided at intersections with other joints. Grooving or sawing shall produce a slot at least 1/8 inch wide and to the depth shown on the plans.

c. Isolation (expansion). Isolation joints shall be constructed with their faces perpendicular to the surface of the pavement and finished or edged as shown on the plans. Isolation joints shall not vary more than 1/2 inch from their designated position and shall be true to line with not more than 1/4 inch variation in 10 feet. The surface across the joints shall be tested with a 12 feet straightedge as the joints are finished and any irregularities in excess of 1/4 inch shall be corrected before the concrete has hardened. Isolation joints shall be so prepared, finished, or cut to provide a groove of uniform width and depth as shown on the plans.

Isolation joints shall be installed as shown on the plans. The premolded filler of the thickness as shown on the plans, shall extend for the full depth and width of the slab at the joint, except for space for sealant at the top of the slab. The filler shall be securely staked or fastened into position perpendicular to the proposed finished surface. A cap shall be provided to protect the top edge of the filler and to permit the concrete to be placed and finished. After the concrete has been placed and struck off, the cap shall be carefully withdrawn leaving the space over the premolded filler. The edges of the joint shall be finished and tooled while the concrete is still plastic. Any concrete bridging the joint space shall be removed for the full width and depth of the joint.

d. Sinusoidal keyway. Sinusoidal keyway joints shall be installed as shown on the plans. The keyway shall consist of competent concrete free of honeycomb, excess paste, or other defects, and shall be continuous along the joint face.

e. Tie bars. Tie bars shall consist of deformed bars installed in joints as shown on the plans. Tie bars shall be placed at right angles to the centerline of the concrete slab and shall be spaced

at intervals shown on the plans. They shall be held in position parallel to the pavement surface and in the middle of the slab depth. When tie bars extend into an unpaved lane, they may be bent against the form at longitudinal construction joints, unless threaded bolt or other assembled tie bars are specified. Tie bars shall not be painted, greased, or enclosed in sleeves.

f. Dowel bars. Dowel bars shall be placed across joints as shown on the plans. They shall be of the dimensions and spacings as shown and held rigidly in the middle of the slab depth in the proper horizontal and vertical alignment by an approved assembly device to be left permanently in place. The dowel or load-transfer and joint devices shall be rigid enough to permit complete assembly as a unit ready to be lifted and placed into position. The dowels shall be coated on one end with a bond-breaker or other lubricant recommended by the manufacturer and approved by the Engineer.

g. Placing dowels and tie bars. The method used in installing and holding dowels in position shall ensure that the error in alignment of any dowel from its required horizontal and vertical alignment after the pavement has been completed will not be greater than 1/8 inch per feet. Except as otherwise specified below, horizontal spacing of dowels shall be within a tolerance of ±5/8 inch. The vertical location on the face of the slab shall be within a tolerance of ±1/2 inch. The vertical alignment of the dowels shall be measured parallel to the designated top surface of the pavement, except for those across the crown or other grade change joints. Dowels across crowns and other joints at grade changes shall be measured to a level surface. Horizontal alignment shall be checked perpendicular to the joint edge. The horizontal alignment shall be checked with a framing square. Dowels and tie bars shall not be placed closer than 0.6 times the dowel bar or tie bar length to the planned joint line. If the last regularly spaced longitudinal dowel or tie bar is closer than that dimension, it shall be moved away from the joint to a location 0.6 times the dowel bar or tie bar length, but not closer than 6 inches to its nearest neighbor. The portion of each dowel intended to move within the concrete or expansion cap shall be wiped clean and coated with a thin, even film of lubricating oil or light grease before the concrete is placed. Dowels shall be spaced as indicated in the project plans and installed as specified in the following subparagraphs.

(1) Contraction joints. Dowels and tie bars in longitudinal and transverse contraction joints within the paving lane shall be held securely in place, as indicated, by means of rigid metal frames or basket assemblies of an approved type. The basket assemblies shall be held securely in the proper location by means of suitable pins or anchors. Do not cut or crimp the dowel basket tie wires.

(2) Construction joints. Install dowels and tie bars by the cast-in- place or the drill-and-dowel method. Installation by removing and replacing in preformed holes will not be permitted. Dowels and tie bars shall be prepared and placed across joints where indicated, correctly aligned, and securely held in the proper horizontal and vertical position during placing and finishing operations, by means of devices fastened to the forms. The spacing of dowels and tie bars in construction joints shall be as indicated.

(3) Dowels installed in hardened concrete. Install dowels for isolation joints and in other hardened concrete by bonding the dowels into holes drilled into the hardened concrete. The concrete shall have cured for seven days or reached a minimum and reached a minimum compressive strength of 2500 psi before drilling commences. Holes 1/8 inch greater in diameter than the dowels shall be drilled into the hardened concrete using rotary-core drills. Rotary-percussion drills may be used, provided that excessive spalling does not occur to the concrete

joint face. Modification of the equipment and operation shall be required if, in the Engineer's opinion, the equipment and/or operation is causing excessive damage. Depth of dowel hole shall be within a tolerance of ±1/2 inch of the dimension shown on the drawings. On completion of the drilling operation, the dowel hole shall be blown out with oil-free, compressed air. Dowels shall be bonded in the drilled holes using epoxy resin. Epoxy resin shall be injected at the back of the hole before installing the dowel and extruded to the collar during insertion of the dowel so as to completely fill the void around the dowel. Application by buttering the dowel will not be permitted. The dowels shall be held in alignment at the collar of the hole, after insertion and before the grout hardens, by means of a suitable metal or plastic grout retention ring fitted around the dowel. Dowels required to be installed in any joints between new and existing concrete shall be grouted in holes drilled in the existing concrete, all as specified above.

h. Sawing of joints. Joints shall be cut as shown on the plans. Equipment shall be as described in paragraph 501MR-5.1. The circular cutter shall be capable of cutting a groove in a straight line and shall produce a slot at least 1/8 inch wide and to the depth shown on the plans. The top of the slot shall be widened by sawing to provide adequate space for joint sealers as shown on the plans. Sawing shall commence, without regard to day or night, as soon as the concrete has hardened sufficiently to permit cutting without chipping, spalling, or tearing and before uncontrolled shrinkage cracking of the pavement occurs and shall continue without interruption until all joints have been sawn. The joints shall be sawn at the required spacing. All slurry and debris produced in the sawing of joints shall be removed by vacuuming and washing. Curing compound or system shall be reapplied in the initial sawcut and maintained for the remaining cure period. If access to the project site is required outside of normal working hours for sawing joints, site access must be pre-coordinated as per section 40MR.

501MR-5.10 Finishing. Finishing operations shall be a continuing part of placing operations starting immediately behind the strike-off of the concrete. Initial finishing shall be provided by the transverse screed or extrusion plate. The sequence of operations shall be transverse finishing, straightedge finishing, texturing, and then edging of joints. Finishing shall be by the hand method. Any operations which produce more than 1/8 inch of mortar-rich surface (defined as deficient in plus U.S. No. 4 sieve size aggregate) shall be halted immediately and the equipment, mixture, or procedures modified as necessary. Compensation shall be made for surging behind the screeds or extrusion plate and settlement during hardening and care shall be taken to ensure that the finished surface of the concrete (not just the cutting edges of the screeds) will be at the required line and grade. Finishing equipment and tools shall be maintained clean and in an approved condition. At no time shall water be added to the surface of the slab with the finishing equipment or tools.

a. Machine finishing with fixed forms. The machine shall be designed to straddle the forms and shall be operated to screed and consolidate the concrete. Machines that cause displacement of the forms shall be replaced. The machine shall make only one pass over each area of pavement. If the equipment and procedures do not produce a surface of uniform texture, true to grade, in one pass, the operation shall be immediately stopped and the equipment, mixture, and procedures adjusted as necessary.

b. Other types of finishing equipment. Clary screeds, other rotating tube floats shall not be used for concrete paving. Bridge deck finishers shall have a minimum operating weight of 7500 pounds and shall have a transversely operating carriage containing a knock-down auger and a

minimum of two immersion vibrators. The acceptance of all finishing equipment is subject to the Engineer's approval.

c. Hand finishing. Hand finishing methods shall be as specified below.

(1) Equipment and screed. Provide a strike-off and tamping screed and a longitudinal float for hand finishing. The screed shall be at least one foot longer than the width of pavement being finished, of an approved design, and sufficiently rigid to retain its shape, and shall be constructed of metal or other suitable material shod with metal. The longitudinal float shall be at least 10 feet long, of approved design, and rigid and substantially braced, and shall maintain a plane surface on the bottom. Grate tampers (jitterbugs) shall not be used.

(2) Finishing and floating. As soon as placed and vibrated, the concrete shall be struck off and screeded to the such elevation above grade that when consolidated and finished, the surface of the pavement will be at the required elevation. In addition to previously specified complete coverage with handheld immersion vibrators, the entire surface shall be tamped with the strike-off and tamping template, and the tamping operation continued until the required compaction and reduction of internal and surface voids are accomplished. Immediately following the final tamping of the surface, the pavement shall be floated longitudinally from bridges resting on the side forms and spanning but not touching the concrete. If necessary, additional concrete shall be placed, consolidated and screeded, and the float operated until a satisfactory surface has been produced. The floating operation shall be advanced not more than half the length of the float and then continued over the new and previously floated surfaces.

d. Straightedge testing and surface correction. After the pavement has been struck off and while the concrete is still plastic, it shall be tested for trueness with a Contractor furnished 12-foot straightedge swung from handles 3 feet longer than one-half the width of the slab. The straightedge shall be held in contact with the surface in successive positions parallel to the centerline and the whole area gone over from one side of the slab to the other, as necessary. Advancing shall be in successive stages of not more than one-half the length of the straightedge. Any excess water and laitance in excess of 1/8 inch thick shall be removed from the surface of the pavement and wasted. Any depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the smoothness requirements of paragraph 501-6.2e(3). Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straightedge and until the slab conforms to the required grade and cross-section. The use of long-handled wood floats shall be confined to a minimum; they may be used only in emergencies and in areas not accessible to finishing equipment. This straight-edging is not a replacement for the straightedge testing of paragraph 501-6.2e(3), Smoothness.

501MR-5.11 Surface texture. The surface of the pavement shall be finished with a broom finish for all newly constructed concrete pavements. It is important that the texturing equipment not tear or unduly roughen the pavement surface during the operation. Any imperfections resulting from the texturing operation shall be corrected to the satisfaction of the Engineer.

a. Broom finish. The broom finishshall be applied when the water sheen has practically disappeared. The equipment shall operate transversely across the pavement surface, providing corrugations that are uniform in appearance and approximately 1/16 inch in depth.

501MR-5.12 Curing. Immediately after finishing operations are completed and marring of the concrete will not occur, the entire surface of the newly placed concrete shall be cured for a 7-day cure period in accordance with one of the methods below. Failure to provide sufficient cover material of whatever kind the Contractor may elect to use, or lack of water to adequately take care of both curing and other requirements, shall be cause for immediate suspension of concreting operations. The concrete shall not be left exposed for more than 1/2 hour during the curing period.

When a two-sawcut method is used to construct the contraction joint, immediately resume curing of the joint area upon completion and cleaning of the saw cut. The sealant reservoir shall not be sawed until after the curing period has been completed. When the one cut method is used to construct the contraction joint, the joint shall be cured with wet rope, wet rags, or wet blankets. The rags, ropes, or blankets shall be kept moist for the duration of the curing period.

a. Burlap-polyethylene sheets. The surface of the pavement shall be entirely covered with the sheeting. The sheeting used shall be such length (or width) that it will extend at least twice the thickness of the pavement beyond the edges of the slab. The sheeting shall be placed so that the entire surface and both edges of the slab are completely covered. The sheeting shall be placed and weighted to remain in contact with the surface covered, and the covering shall be maintained fully saturated and in position for seven (7) days after the concrete has been placed. Over saturation of the surface and shoulder area is prohibited. Standing water shall be minimized by applying only the amount of water necessary to saturate the burlap.

b. Water method. The entire area shall be covered with burlap or other water absorbing material. The material shall be of sufficient thickness to retain water for adequate curing without excessive runoff. The material shall be kept wet at all times and maintained for seven (7) days. When the forms are stripped, the vertical walls shall also be kept moist. Over saturation of the surface and shoulder area is prohibited. Standing water shall be minimized by applying only the amount of water necessary to saturate the burlap.

c. Concrete protection for cold weather. The concrete shall be maintained at an ambient temperature of at least 50°F for a period of 72 hours after placing and at a temperature above freezing for the remainder of the curing time. The Contractor shall be responsible for the quality and strength of the concrete placed during cold weather; and any concrete damaged shall be removed and replaced at the Contractor's expense.

e. Concrete protection for hot weather. Concrete should be continuous moisture cured for the entire curing period and shall commence as soon as the surfaces are finished and continue for at least 24 hours. Other curing methods may be approved by the Engineer.

501MR-5.13 Removing forms. Unless otherwise specified, forms shall not be removed from freshly placed concrete until it has hardened sufficiently to permit removal without chipping, spalling, or tearing. After the forms have been removed, the sides of the slab shall be cured as per the methods indicated in paragraph 501MR-5.12. Major honeycombed areas shall be considered as defective work and shall be removed and replaced in accordance with paragraph 501MR-6.2(f).

501MR-5.14 Sealing joints. The joints in the pavement shall be sealed in accordance with Item P-604MR.

501MR-5.15 Protection of pavement. The Contractor shall protect the pavement and its appurtenances against all traffic. No traffic will be permitted on the surface until after the pavement is accepted by the Engineer and pavement marking commences. Any damage to the pavement occurring prior to final acceptance shall be repaired or the pavement replaced at the Contractor's expense.

Aggregates, rubble, or other similar construction materials shall not be placed on the pavements. Traffic shall be excluded from the new pavement by erecting and maintaining barricades and signs until the concrete is accepted, or for a longer period if directed by the Engineer.

New and existing pavements damaged by the contractor shall be removed and replaced at the Contractor's expense. Slabs shall be removed to the full depth, width, and length of the slab.

501MR-5.16 Opening to construction traffic. Only light traffic shall be permitted on the pavement after opening. The pavement shall not be opened to traffic until test specimens molded and cured in accordance with ASTM C31 have attained their design strength when tested in accordance with ASTM C78. If such tests are not conducted, the pavement shall not be opened to traffic until 28 days after the concrete was. Prior to opening the pavement to traffic, all joints shall be sealed.

501MR-5.17 Repair, removal, or replacement of slabs.

a. General. New pavement slabs that are broken or contain cracks or are otherwise defective or unacceptable shall be removed and replaced as specified hereinafter at no additional cost to the Owner. Slabs containing spalls joints shall be repaired or removed and replaced, as determined by the Engineer, at no additional cost to the Owner. Removal of partial slabs is not permitted. Removal and replacement shall be full depth, shall be full length and width of the slab, and the limit of removal shall be normal to the paving lane and to each original transverse joint. The Engineer will determine whether cracks extend full depth of the pavement and may require cores to be drilled on the crack to determine depth of cracking. Such cores shall be 4 inch diameter, shall be drilled by the Contractor and shall be filled by the Contractor with a well consolidated concrete mixture bonded to the walls of the hole with epoxy resin, using approved procedures. Drilling of cores and refilling holes shall be at no expense to the Owner. All epoxy resin used in this work shall conform to ASTM C881, Type V. Repair of cracks as described in this section shall not be allowed if in the opinion of the Engineer the overall condition of the pavement indicates that such repair is unlikely to achieve an acceptable and durable finished pavement. No repair of cracks shall be allowed in any panel that demonstrates segregated aggregate with an absence of coarse aggregate in the upper 1/8 inch of the pavement surface.

b. Shrinkage cracks. Shrinkage cracks, which do not exceed 4 inches in depth, shall be cleaned and then pressure injected with epoxy resin, Type IV, Grade 1, using procedures as approved by the Engineer. Care shall be taken to assure that the crack is not widened during epoxy resin injection. All epoxy resin injection shall take place in the presence of the Engineer. Shrinkage cracks, which exceed 4 inches in depth, shall be treated as full depth cracks in accordance with paragraphs 5.17b and 5.17c.

c. Slabs with cracks through interior areas. Interior area is defined as that area more than 6 inches from either adjacent original transverse joint. The full slab shall be removed and replaced at no cost to the Owner, when there are any full depth cracks, or cracks greater than 4 inches in depth, that extend into the interior area.

d. Cracks close to and parallel to joints. All cracks essentially parallel to original joints, extending full depth of the slab, and lying wholly within 6 inches either side of the joint shall be treated as specified here. Any crack extending more than 6 inches from the joint shall be treated as specified above in subparagraph c.

(1) Full depth cracks present, original joint not opened. When the original un-cracked joint has not opened, the crack shall be sawed and sealed, and the original joint filled with epoxy resin as specified below. The crack shall be sawed with equipment specially designed to follow random cracks. The reservoir for joint sealant in the crack shall be formed by sawing to a depth of 3/4 inches, ±1/16 inch, and to a width of 5/8 inch, ±1/8 inch. Any equipment or procedure which causes raveling or spalling along the crack shall be modified or replaced to prevent such raveling or spalling. The joint sealant shall be a liquid sealant as specified. Installation of joint seal shall be as specified for sealing joints or as directed. If the joint sealant reservoir has been sawed out, the reservoir and as much of the lower saw cut as possible shall be filled with epoxy resin, Type IV, Grade 2, thoroughly tooled into the void using approved procedures.

If only the original narrow saw cut has been made, it shall be cleaned and pressure injected with epoxy resin, Type IV, Grade 1, using approved procedures. If filler type material has been used to form a weakened plane in the transverse joint, it shall be completely sawed out and the saw cut pressure injected with epoxy resin, Type IV, Grade 1, using approved procedures. Where a parallel crack goes part way across paving lane and then intersects and follows the original joint which is cracked only for the remained of the width, it shall be treated as specified above for a parallel crack, and the cracked original joint shall be prepared and sealed as originally designed.

(2) Full depth cracks present, original joint also cracked. At a joint, if there is any place in the lane width where a parallel crack and a cracked portion of the original joint overlap, the entire slab containing the crack shall be removed and replaced for the full lane width and length.

e. Removal and replacement of full slabs. Where it is necessary to remove full slabs, unless there are dowels present, all edges of the slab shall be cut full depth with a concrete saw. All saw cuts shall be perpendicular to the slab surface. If dowels, or tie bars are present along any edges, these edges shall be sawed full depth just beyond the end of the dowels or tie bars. These joints shall then be carefully sawed on the joint line to within one inch of the depth of the dowel or tie bar.

The main slab shall be further divided by sawing full depth, at appropriate locations, and each piece lifted out and removed. Suitable equipment shall be used to provide a truly vertical lift, and approved safe lifting devices used for attachment to the slabs. The narrow strips along doweled edges shall be carefully broken up and removed using light, hand-held jackhammers, 30 lb or less, or other approved similar equipment.

Care shall be taken to prevent damage to the dowels, tie bars, or to concrete to remain in place. The joint face below dowels shall be suitably trimmed so that there is not abrupt offset in

any direction greater than 1/2 inch and no gradual offset greater than one inch when tested in a horizontal direction with a 12-foot straightedge.

No mechanical impact breakers, other than the above hand-held equipment shall be used for any removal of slabs. Care shall be taken to prevent undermining of adjacent pavements.

If underbreak over 4 inches deep occurs, the entire slab containing the underbreak shall be removed and replaced. Where there are no dowels or tie bars, or where they have been damaged, dowels or tie bars of the size and spacing as specified for other joints in similar pavement shall be installed by epoxy grouting them into holes drilled into the existing concrete using procedures as specified. Original damaged dowels or tie bars shall be cut off flush with the joint face. Protruding portions of dowels shall be painted and lightly oiled. All four (4) edges of the new slab shall contain dowels or original tie bars.

Placement of concrete shall be as specified for original construction. Prior to placement of new concrete, the underlying material (unless it is stabilized) shall be re-compacted and shaped as specified in the appropriate section of these specifications. The underlying material shall be cleaned of all loose material and contaminants and lined with rosin paper as a bond breaker. The resulting joints around the new slab shall be prepared and sealed as specified for original construction.

f. Repairing spalls along joints. Where directed, spalls along joints of new slabs, and along parallel cracks used as replacement joints, shall be repaired by first making a vertical saw cut at least 3 inches outside the spalled area and to a depth of at least 3 inches. Saw cuts shall be straight lines forming rectangular areas. The concrete between the saw cut and the joint, or crack, shall be chipped out to remove all unsound concrete and at least 1/2 inch of visually sound concrete. The cavity thus formed shall be thoroughly cleaned with high-pressure water jets supplemented with compressed air to remove all loose material. Immediately before filling the cavity, a prime coat of epoxy resin, Type III, Grade I, shall be applied to the dry cleaned surface of all sides and bottom of the cavity, except any joint face. The prime coat shall be applied in a thin coating and scrubbed into the surface with a stiff-bristle brush. Pooling of epoxy resin shall be avoided. The cavity shall be filled with low slump Portland cement concrete or mortar or with epoxy resin concrete or mortar. Concrete shall be used for larger spalls, generally those more than 1/2 cu. ft. in size, and mortar shall be used for the smaller ones. Any spall less than 0.1 cu. ft. shall be repaired only with epoxy resin mortar or a Grade III epoxy resin. Portland cement concrete and mortar mixtures shall be proportioned as directed and shall be mixed, placed, consolidated, and cured as directed. Epoxy resin mortars shall be made with Type III, Grade 1, epoxy resin, using proportions and mixing and placing procedures as recommended by the manufacturer and approved by the Engineer. The epoxy resin materials shall be placed in the cavity in layers not over 2 inches thick. The time interval between placement of additional layers shall be such that the temperature of the epoxy resin material does not exceed 140°F at any time during hardening. Mechanical vibrators and hand tampers shall be used to consolidate the concrete or mortar. Any repair material on the surrounding surfaces of the existing concrete shall be removed before it hardens. Where the spalled area abuts a joint, an insert or other bond-breaking medium shall be used to prevent bond at the joint face. A reservoir for the joint sealant shall be sawed to the dimensions required for other joints, or as required to be routed for cracks. The reservoir shall be thoroughly cleaned and sealed with the sealer specified for the joints. If any spall penetrates half the depth of the slab or more, the entire slab shall be removed and replaced as previously specified If any spall would require over 25% of the length of any single

joint to be repaired, the entire slab shall be removed and replaced. Repair of spalls as described in this section shall not be allowed if in the opinion of the Engineer the overall condition of the pavement indicates that such repair is unlikely to achieve an acceptable and durable finished pavement. No repair of spalls shall be allowed in any panel that demonstrates segregated aggregate with a significant absence of coarse aggregate in the upper one-eight (1/8th) inch of the pavement surface.

g. Minor Patching. An approved pre-packaged patching material prepared as per manufacturer's recommendation shall be used for filling minor voids, holes and cracks as directed by the Engineer.

h. Diamond grinding of PCC surfaces. Diamond grinding of the hardened concrete with an approved diamond grinding machine should not be performed until the concrete is 14 days or more old and concrete has reached full minimum strength. When required, diamond grinding shall be accomplished by sawing with saw blades impregnated with industrial diamond abrasive. The saw blades shall be assembled in a cutting head mounted on a machine designed specifically for diamond grinding that will produce the required texture and smoothness level without damage to the pavement. The saw blades shall be 1/8-inch (3-mm) wide and there shall be a minimum of 55 to 60 blades per 12 inches (300 mm) of cutting head width; the actual number of blades will be determined by the Contractor and depend on the hardness of the aggregate. Each machine shall be capable of cutting a path at least 3 feet (0.9 m) wide. Equipment that causes ravels, aggregate fractures, spalls or disturbance to the joints will not be permitted. The area corrected by diamond grinding the surface of the hardened concrete should not exceed 10% of the total area of any sublot. The depth of diamond grinding shall not exceed 1/2 inch (13 mm) and all areas in which diamond grinding has been performed will be subject to the final pavement thickness tolerances specified. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. All pavement areas requiring plan grade or surface smoothness corrections in excess of the limits specified above, may require removing and replacing in conformance with paragraph 501-4.19.

501MR-5.18 Existing concrete pavement removal and repair. All operations shall be in accordance with specification section M-102MR and carefully controlled to prevent damage to the concrete pavement and to the underlying material to remain in place. All saw cuts shall be made perpendicular to the slab surface.

a. Removal of existing pavement slab. Remove existing pavement in accordance with paragraph 501MR-5.17e.

b. Edge repair. The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. Areas that are damaged during construction shall be repaired at no cost to the FAA.

(1) Spall repair. Spalls shall be repaired where indicated and where directed by the Engineer. Repair materials and procedures shall be as previously specified in subparagraph 501MR-5.17f.

(2) Underbreak repair. Remove and replace all slabs with underbreak at no expense to the FAA.

(3) Underlying material. The underlying material adjacent to the edge and under the existing pavement which is to remain in place shall be protected from damage or disturbance

during removal operations and until placement of new concrete, and shall be shaped as shown on the drawings or as directed. Sufficient material shall be kept in place outside the joint line to prevent disturbance (or sloughing) of material under the pavement that is to remain in place. Any material under the portion of the concrete pavement to remain in place, which is disturbed or loses its compaction shall be carefully removed and replaced with concrete as specified in paragraph 501MR-5.18b(2). The underlying material outside the joint line shall be thoroughly compacted and moist when new concrete is placed.

MATERIAL ACCEPTANCE

501MR-6.1 Acceptance sampling and testing. All acceptance sampling and testing necessary to determine conformance with the requirements specified in this section will be performed by the Contractor, except as noted. Testing organizations performing these tests shall be accredited in accordance with ASTM C1077. The laboratory accreditation must be current and listed on the accrediting authority's website. All test methods required for acceptance sampling and testing must be listed on the lab accreditation. A copy of the laboratory's current accreditation and accredited test methods shall be submitted to the Engineer prior to start of construction. Acceptance testing shall be performed by the Contractor regardless of any other testing or sampling performed by the Engineer or Owner.

Concrete shall be accepted for strength, grade, and thickness on a lot basis. A lot shall consist of a day's production**.**

a. Flexural strength.

(1) Sampling. Each lot shall be divided into four equal sublots. One sample shall be taken for each sublot from the plastic concrete delivered to the job site. Sampling locations shall be determined by the Contractor in accordance with random sampling procedures contained in ASTM D3665. The concrete shall be sampled in accordance with ASTM C172.

(2) Testing. Two (2) specimens shall be made from each sample. Specimens shall be made in accordance with ASTM C31 and the flexural strength of each specimen shall be determined in accordance with ASTM C78. The flexural strength for each sublot shall be computed by averaging the results of the two test specimens representing that sublot.

Immediately prior to testing for flexural strength, the beam shall be weighed and measured for determination of a sample unit weight. Measurements shall be made for each dimension; height, depth, and length, at the mid-point of the specimen and reported to the nearest 1/10 inch. The weight of the specimen shall be reported to the nearest 0.1 pound. The sample unit weight shall be calculated by dividing the sample weight by the calculated volume of the sample. This information shall be reported as companion information to the measured flexural strength for each specimen.

The samples will be transported while in the molds. The curing, except for the initial cure period, will be accomplished using the immersion in saturated lime water method.

Slump, air content, and temperature tests will also be conducted by the quality control laboratory for each set of strength test samples, per ASTM C31.

(3) Curing. The Contractor shall provide adequate facilities for the initial curing of beams. During the 24 hours after molding, the temperature immediately adjacent to the

specimens must be maintained in the range of 60° to 80°F, and loss of moisture from the specimens must be prevented. The specimens may be stored in tightly constructed wooden boxes, damp sand pits, temporary buildings at construction sites, under wet burlap in favorable weather, or in heavyweight closed plastic bags, or using other suitable methods, provided the temperature and moisture loss requirements are met.

(4) Acceptance. Acceptance of pavement for flexural strength will be approved by the Engineer in accordance with paragraph 501MR-6.2b.

b. Pavement thickness and grade.

(1) Sampling. The thickness and grade of each lot shall be calculated using surveyed elevations. The Engineer shall determine the elevation of the concrete surface at an equal grid spacing of not more than 5-foot by 5-foot, with the size and location selected to coincide with joint intersections.

(2) Testing. Thickness shall be calculated as the difference in the surveyed elevation of the concrete surface and the surface of the underlying course.

(3) Acceptance. Acceptance of pavement for thickness shall be approved by the Engineer in accordance with paragraph 501MR-6.2c.

c. Partial lots. When operational conditions cause a lot to be terminated before the specified number of tests have been made for the lot, or when the Contractor and Engineer agree in writing to allow overages or minor placements to be considered as partial lots, the following procedure will be used to adjust the lot size and the number of tests for the lot.

Where three sublots have been produced, they shall constitute a lot. Where one or two sublots have been produced, they shall be incorporated into the next lot or the previous lot and the total number of sublots shall be used in the acceptance criteria calculation, that is, n=5 or n=6.

d. Outliers. All individual flexural strength tests within a lot shall be checked for an outlier (test criterion) in accordance with ASTM E178, at a significance level of 5%. Outliers shall be discarded, and the percentage of material within specification limits (PWL) shall be determined using the remaining test values.

501MR-6.2 Acceptance criteria.

a. General. Acceptance will be based on the following characteristics of the completed pavement discussed in paragraph 501MR-6.2e:

(1) Flexural strength

(2) Thickness

(3) Smoothness

(4) Grade

(5) Edge slump

Flexural strength and thickness shall be evaluated for acceptance on a lot basis using the method of estimating PWL. Acceptance using PWL considers the variability (standard deviation) of the material and the testing procedures, as well as the average (mean) value of the test results to calculate the percentage of material that is above the lower specification tolerance limit (L).

Acceptance for flexural strength will be based on the criteria contained in accordance with paragraph 501MR-6.2e(1). Acceptance for thickness will be based on the criteria contained in paragraph 501MR-6.2e(2). Acceptance for smoothness will be based on the criteria contained in paragraph 501MR-6.2e(3). Acceptance for grade will be based on the criteria contained in paragraph 501MR-6.2e(4).

The Engineer may at any time, notwithstanding previous plant acceptance, reject and require the Contractor to dispose of any batch of concrete mixture which is rendered unfit for use due to contamination, segregation, or improper slump. Such rejection may be based on only visual inspection. In the event of such rejection, the Contractor may take a representative sample of the rejected material in the presence of the Engineer, and if it can be demonstrated in the laboratory, in the presence of the Engineer, that such material was erroneously rejected, payment will be made for the material at the contract unit price.

b. Flexural strength. Acceptance of each lot of in-place pavement for flexural strength shall be based on PWL. The Contractor shall target production quality to achieve 90 PWL or higher.

c. Pavement thickness. Acceptance of each lot of in-place pavement shall be based on PWL. The Contractor shall target production quality to achieve 90 PWL or higher.

d. Percentage of material within limits (PWL). The PWL shall be determined in accordance with procedures specified in Section 110MR of the General Provisions.

The specification tolerance limit (L) for flexural strength and thickness shall be:

Specification Tolerance Limit (L)

Property	Basis	Lower	Upper
Flexural Strength	S = strength specified in paragraph 501MR-3.1	0.92 × S	1.08 × S
Thickness	T = Lot Plan Thickness in inches	T – 0.25 in	T + 1 in

e. Acceptance criteria.

(1) Flexural Strength. If the PWL of the lot equals or exceeds 90%, the lot shall be acceptable. Acceptance and payment for the lot shall be determined in accordance with paragraph 501MR-9.1.

(2) Thickness. If the PWL of the lot equals or exceeds 90%, the lot shall be acceptable. Acceptance and payment for the lot shall be determined in accordance with paragraph 501MR-9.1.

(3) Smoothness. As soon as the concrete has hardened sufficiently, but not later than 48 hours after placement, the surface of each lot shall be tested in both longitudinal and transverse directions for smoothness to reveal all surface irregularities exceeding the tolerances specified. The Contractor shall furnish paving equipment and employ methods that produce a smooth surface for each section of pavement having an average profile index meeting the requirements of paragraph 501MR-9.1b when evaluated with a profilograph; and the finished surface of the pavement shall not vary more than 1/4 inch when evaluated with a 12-foot straightedge. The Contractor shall supply the straightedge and make it available for the use of the Engineer upon request. When the surface smoothness exceeds specification tolerances which cannot be corrected by diamond grinding of the pavement, full depth removal and replacement of pavement

shall be to the limit of the longitudinal placement. Corrections involving diamond grinding will be subject to the final pavement thickness tolerances specified.

(a) Transverse measurements. Transverse measurements will be taken for each lot placed. Transverse measurements will be taken perpendicular to the pavement centerline at the one-third points of each row of slabs.

(i) Testing shall be continuous across all joints, starting with one-half the length of the straight edge at the edge of pavement section being tested and then moved ahead one-half the length of the straight edge for each successive measurement. Smoothness readings will not be made across grade changes or cross slope transitions; at these transition areas, the straightedge position shall be adjusted to measure surface smoothness and not design grade or cross slope transitions. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points. Deviations on final pavement > 1/4 inch (6mm) in transverse direction shall be corrected with diamond grinding per paragraph 501MR-5.17h or by removing and replacing full depth of pavement. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The area corrected by grinding should not exceed 10% of the total area and these areas shall be retested after grinding.

(ii) The joint between lots shall be tested separately to facilitate smoothness between lots. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface, with half the straightedge on one side of the joint and the other half of the straightedge on the other side of the joint. Measure the maximum gap between the straightedge and the pavement surface in the area between these two high points. One measurement shall be taken at the joint at the one-third points of each row of slabs. If 10% or more of the maximum gap measurements on final pavement surface are > 1/4 inch in transverse direction, the pavement shall be corrected by removing and replacing full depth of surface. Each measurement shall be recorded and a copy of the data shall be furnished to the Engineer at the end of each days testing.

(b) Longitudinal measurements. Longitudinal measurements will be taken for each lot placed. Longitudinal tests will be parallel to the centerline of paving; at the center of paving lanes when widths of paving lanes are less than 20 feet; and at the one third points of paving lanes when widths of paving lanes are 20 ft or greater.

(i) Longitudinal Short Sections. Longitudinal Short Sections are when the longitudinal lot length is less than 200 feet and areas not requiring a profilograph. When approved by the Engineer, the first and last 15 feet of the lot can also be considered as short sections for smoothness. The finished surface shall not vary more than 1/4 inch when evaluated with a 12-foot straightedge. Smoothness readings will not be made across grade changes or cross slope transitions, at these transition areas, the straightedge position shall be adjusted to measure surface smoothness and not design grade or cross slope transitions. Testing shall be continuous across all joints, starting with one-half the length of the straight edge at the edge of pavement section being tested and then moved ahead one-half the length of the straight edge for each successive measurement. The amount of surface irregularity shall be determined by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points. Deviations on

final pavement surface > 1/4 inch (6mm) in longitudinal direction will be corrected with diamond grinding per paragraph 501MR-5.17h or by removing and replacing full depth of surface. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The area corrected by grinding should not exceed 10% of the total area and these areas shall be retested after grinding.

(ii) Profilograph Testing. Profilograph testing shall be performed by the contractor using approved equipment and procedures as described as ASTM E1274. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must grind" bumps and the Profile Index for the pavement using a 0.2 inch blanking band. The bump template must span one inch with an offset of 0.4 inches. The profilograph must be calibrated prior to use and operated by a factory or State DOT approved operator. Profilograms shall be recorded on a longitudinal scale of one inch equals 25 feet and a vertical scale of one inch equals one inch. A copy of the reduced tapes shall be furnished to the Engineer at the end of each days testing.

The pavement must have an average profile index meeting the requirements of paragraph 501-8.1c. Deviations on final surface in longitudinal direction shall be corrected with diamond grinding per paragraph 501MR-5.17h. Grinding will be tapered in all directions to provide smooth transitions to areas not requiring grinding. The area corrected by grinding should not exceed 10% of the total area and these areas shall be retested after grinding.

Where corrections are necessary, second profilograph runs shall be performed to verify that the corrections produced an average profile index of 15 inches per mile or less. If the initial average profile index was less than 15 inches, only those areas representing greater than 0.4 inch deviation will be re-profiled for correction verification.

(iii) Final profilograph of test section. Final profilograph, full length of the test section, shall be performed to facilitate testing of smoothness between lots. Profilograph testing shall be performed by the contractor using approved equipment and procedures as described as ASTM E1274. The pavement must have an average profile index meeting the requirements of paragraph 501-8.1c. The equipment shall utilize electronic recording and automatic computerized reduction of data to indicate "must grind" bumps and the Profile Index for the pavement using a 0.2 inch blanking band. The bump template must span one inch with an offset of 0.4 inches. The profilograph must be calibrated prior to use and operated by a factory or State DOT approved, trained operator. Profilograms shall be recorded on a longitudinal scale of one inch equals 25 feet and a vertical scale of one inch equals one inch. A copy of the reduced tapes shall be furnished to the Engineer at the end of each days testing. Profilograph of final runway shall be performed one foot right and left of runway centerline and 15 feet right and left of centerline. Any areas that indicate "must grind" will be corrected as directed by the Engineer.

Smoothness testing indicated in the above paragraphs shall be performed within 48 hours of placement of material. If the contractor's machines and/or methods are producing significant areas that need corrective actions then production should be stopped until corrective measures can be implemented. If corrective measures are not implemented and when directed by the Engineer, production shall be stopped until corrective measures can be implemented.

(c) Additional Testing. The Engineer may test at any point on the pavement with straightedge oriented in any direction.

(4) Grade. An evaluation of the surface grade shall be made by the Engineer for compliance to the tolerances contained below. The finish grade will be determined by running levels on a maximum 5-foot by 5-foot grid, to include each joint intersection.

(a) Lateral deviation. Lateral deviation from established alignment of the pavement edge or joint shall not exceed ±0.10 feet in any lane.

(b) Vertical deviation. Vertical deviation from established grade shall not exceed ±0.04 feet at any point.

f. Removal and replacement of concrete. Any area or section of concrete that is removed and replaced shall be removed and replaced back to planned joints. The Contractor shall replace damaged dowels and the requirements for doweled longitudinal construction joints in paragraph 501MR-5.9 shall apply to all contraction joints exposed by concrete removal. Removal and replacement shall be in accordance with paragraph 501MR-5.18.

CONTRACTOR QUALITY CONTROL

501MR-7.1 Quality control program. The Contractor shall develop a Quality Control Program in accordance with Section 100 of the General Provisions. The program shall address all elements that affect the quality of the pavement including but not limited to:

a. Mix Design

b. Aggregate Gradation

c. Quality of Materials

d. Stockpile Management, including aggregate gradation

e. Proportioning, including w/c ratio

f. Mixing and Transportation

g. Placing and Consolidation

h. Joints

i. Dowel Placement and Alignment

j. Flexural or Compressive Strength

k. Finishing and Curing

l. Surface Smoothness

501MR-7.2 Quality control testing. The Contractor shall perform all quality control tests necessary to control the production and construction processes applicable to this specification and as set forth in the Quality Control Program. The testing program shall include, but not necessarily be limited to, tests for aggregate gradation, aggregate moisture content, slump, and air content.
A Quality Control Testing Plan shall be developed as part of the Quality Control Program.

a. Fine aggregate.

(1) Gradation. A sieve analysis shall be made at least twice daily in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

(2) Moisture content. If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C70 or ASTM C566.

b. Coarse Aggregate.

(1) Gradation. A sieve analysis shall be made at least twice daily for each size of aggregate. Tests shall be made in accordance with ASTM C136 from randomly sampled material taken from the discharge gate of storage bins or from the conveyor belt.

(2) Moisture content. If an electric moisture meter is used, at least two direct measurements of moisture content shall be made per week to check the calibration. If direct measurements are made in lieu of using an electric meter, two tests shall be made per day. Tests shall be made in accordance with ASTM C566.

c. Slump. Four slump tests shall be performed for each lot of material produced in accordance with the lot size defined in paragraph 501MR-6.1. One test shall be made for each sublot. Slump tests shall be performed in accordance with ASTM C143 from material randomly sampled from material discharged from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.

d. Air content. Four air content tests, shall be performed for each lot of material produced in accordance with the lot size defined in paragraph 501MR-6.1. One test shall be made for each sublot. Air content tests shall be performed in accordance with ASTM C231 for gravel and stone coarse aggregate and ASTM C173 for slag or other porous coarse aggregate, from material randomly sampled from trucks at the paving site. Material samples shall be taken in accordance with ASTM C172.

e. Four unit-weight and yield tests shall be made in accordance with ASTM C138. The samples shall be taken in accordance with ASTM C172 and at the same time as the air content tests.

501-7.3 Control charts. The Contractor shall maintain linear control charts for fine and coarse aggregate gradation, slump, moisture content and air content.
Control charts shall be posted in a location satisfactory to the Engineer and shall be kept up to date at all times. As a minimum, the control charts shall identify the project number, the contract item number, the test number, each test parameter, the Action and suspension Limits, or Specification limits, applicable to each test parameter, and the Contractor's test results. The Contractor shall use the control charts as part of a process control system for identifying potential problems and assignable causes before they occur. If the Contractor's projected data during production indicates a potential problem and the Contractor is not taking satisfactory corrective action, the Engineer may halt production or acceptance of the material.

a. Fine and coarse aggregate gradation. The Contractor shall record the running average of the last five gradation tests for each control sieve on linear control charts. Specification limits

contained in the Lower Specification Tolerance Limit (L) table above and the Control Chart Limits table below shall be superimposed on the Control Chart for job control.

b. Slump and air content. The Contractor shall maintain linear control charts both for individual measurements and range (that is, difference between highest and lowest measurements) for slump and air content in accordance with the following Action and Suspension Limits.

Control Chart Limits

Control Parameter	Individual Measurements		Range Suspension Limit
	Action Limit	Suspension Limit	
Side Form:			
Slump	+0.5 to -1 inch	+1 to -1.5 inch	±1.5 inch
Air Content	±1.2%	±1.8%	±2.5%

The individual measurement control charts shall use the mix design target values as indicators of central tendency.

501-7.4 Corrective action. The Contractor Quality Control Program shall indicate that appropriate action shall be taken when the process is believed to be out of control. The Contractor Quality Control Program shall detail what action will be taken to bring the process into control and shall contain sets of rules to gauge when a process is out of control. As a minimum, a process shall be deemed out of control and corrective action taken if any one of the following conditions exists.

a. Fine and coarse aggregate gradation. When two consecutive averages of five tests are outside of the specification limits in paragraph 501MR-3.1, immediate steps, including a halt to production, shall be taken to correct the grading.

b. Fine and coarse aggregate moisture content. Whenever the moisture content of the fine or coarse aggregate changes by more than 0.5%, the scale settings for the aggregate batcher and water batcher shall be adjusted.

c. Slump. The Contractor shall halt production and make appropriate adjustments whenever:

(1) one point falls outside the Suspension Limit line for individual measurements or range

OR

(2) two points in a row fall outside the Action Limit line for individual measurements.

d. Air content. The Contractor shall halt production and adjust the amount of air-entraining admixture whenever:

(1) one point falls outside the Suspension Limit line for individual measurements or range

OR

(2) two points in a row fall outside the Action Limit line for individual measurements.

Whenever a point falls outside the Action Limits line, the air-entraining admixture dispenser shall be calibrated to ensure that it is operating correctly and with good reproducibility.

METHOD OF MEASUREMENT

501MR-8.1 Portland cement concrete pavement shall be measured by the number of cubic yards of either plain or reinforced pavement as specified in-place, completed and accepted.

BASIS OF PAYMENT

501MR-9.1 Payment. Payment for concrete pavement meeting all acceptance criteria as specified in paragraph 501MR-6.2 Acceptance Criteria shall be based on results of smoothness, grade, strength, and thickness tests. Payment for acceptable lots of concrete pavement shall be adjusted in accordance with paragraph 501MR-9.1a for strength and thickness and 501MR-9.1c for smoothness.

Payment shall be full compensation for all labor, materials, tools, equipment, and incidentals required to complete the work as specified herein and on the drawings.

a. Basis of adjusted payment. For each lot accepted, the adjusted contract unit price shall be the product of the lot pay factor for the lot and the contract unit price. The pay factor for each individual lot shall be calculated in accordance with the Price Adjustment Schedule table below. A pay factor shall be calculated for both flexural strength and thickness. The lot pay factor shall be the lower of the two values. The total project payment for concrete pavement shall not exceed 100 percent of the product of the contract unit price and the total number of cubic yards of concrete pavement used in the accepted work (See Note 1 under the Price Adjustment Schedule table below).

Price Adjustment Schedule

Percentage of Materials Within Specification Limits (PWL)	Lot Pay Factor (Percent of Contract Unit Price)
96 – 100	100
90 – 95	PWL + 10
75 – 90	0.5 PWL + 55
55 – 74	1.4 PWL – 12
Below 55	Reject[2]

[1] Although it is theoretically possible to achieve a pay factor of 106% for each lot, actual payment in excess of 100% shall be subject to the total project payment limitation specified in paragraph 501MR-9.1.

[2] The lot shall be removed and replaced. However, if the Engineer and the FAA have decided to allow the rejected lot to remain and the Engineer documents in writing that the lot shall not be removed, it shall be paid for at 50% of the contract unit price and the total project payment limitation shall be reduced by the amount withheld for the rejected lot.

b. Payment. Payment shall be made under:

Item P-501-8.1a Portland Cement Concrete Pavement – per cubic yard

Basis of adjusted payment for smoothness. Price adjustment for pavement smoothness will apply to the total area of concrete within a section of pavement and shall be applied in accordance the following equation and schedule:

(Square yard in section) × (original unit price per square yard) × PFm = reduction in payment for area within section

Average Profile Index (Inches Per Mile) Pavement Strength Rating			Contract Unit Price Adjustment (PFm)
Over 30,000 lb	30,000 lb or Less	Short Sections	
0 - 7	0 - 10	0 - 15	0.00
7.1 - 9	10.1 - 11	15.1 - 16	0.02
9.1 - 11	11.1 - 12	16.1 - 17	0.04
11.1 - 13	12.1 - 13	17.1 - 18	0.06
13.1 - 14	13.1 - 14	18.1 - 20	0.08
14.1 - 15	14.1 - 15	20.1 - 22	0.10
15.1 and up	15.1 and up	22.1 and up	Corrective work required

TESTING REQUIREMENTS

ASTM C31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C70	Standard Test Method for Surface Moisture in Fine Aggregate
ASTM C78	Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	Standard Test Method for Materials Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136	Standard Test Method for Sieve or Screen Analysis of Fine and Coarse Aggregates
ASTM C138	Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C142	Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C143	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
ASTM C227	Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method)
ASTM C231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C289	Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method)
ASTM C295	Standard Guide for Petrographic Examination of Aggregates for Concrete
ASTM C114	Standard Test Methods for Chemical Analysis of Hydraulic Cement
ASTM C311	Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland Cement Concrete
ASTM C566	Standard Test Method for Total Evaporable Moisture Content of Aggregates by Drying

ASTM C642	Standard Test Method for Density, Absorption, and Voids in Hardened Concrete
ASTM C666	Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
ASTM C1077	Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1567	Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D3665	Standard Practice for Random Sampling of Construction Materials
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM E178	Standard Practice for Dealing With Outlying Observations
ASTM E1274	Standard Test Method for Measuring Pavement Roughness Using a Profilograph

U.S. Army Corps of Engineers (USACE) Concrete Research Division (CRD) C662
Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials, Lithium Nitrate Admixture and Aggregate (Accelerated Mortar-Bar Method)

MATERIAL REQUIREMENTS

ASTM A184	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A704	Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement
ASTM A706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A714	Standard Specification for High-Strength Low-Alloy Welded and Seamless Steel Pipe
ASTM A775	Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A934	Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars

ASTM A996	Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A1078	Standard Specification for Epoxy-Coated Steel Dowels for Concrete Pavement
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C94	Standard Specification for Ready-Mixed Concrete
ASTM C150	Standard Specification for Portland Cement
ASTM C171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C260	Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C881	Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
ASTM C989	Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	Standard Specification for Preformed Sponge Rubber and Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving And Structural Construction
ACI 211.1	Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
ACI 305R	Guide to Hot Weather Concreting
ACI 306R	Guide to Cold Weather Concreting
ACI 309R	Guide for Consolidation of Concrete
AC 150/5320-6	Airport Pavement Design and Evaluation
PCA	Design and Control of Concrete Mixtures

END ITEM P-501MR

Item P-604MR Compression Joint Seals for Concrete Pavements

DESCRIPTION

604MR-1.1 This item shall consist of preformed polychloroprene compression seals used for sealing joints of rigid pavements. This material shall be used for construction of the Construction Cycle 8 (CC-8) test items.

SUBMITTALS

620MR-2.1 Certified copies of test results shall be provided 60 days prior to use of material on the project. Submit the following in accordance with Section 61MR Submittal Procedures:

f. SD-03 Product Data

- **Construction equipment list.** List of proposed equipment to be used in the performance of construction work, including descriptive data shall be provided to the Engineer 60 days prior to use on the project.
- **Manufacturer's instructions.** Where installation procedures are required in accordance with the manufacturer's recommendations, printed copies of these recommendations shall be submitted to the Engineer 60 days prior to use on the project. Installation of the material shall not be allowed until the recommendations are received.

g. SD-04 Samples. The Contractor shall submit physical samples from eah lot of material to be retained by the Engineer for possible future testing as per paragraph 604MR-3.4.

h. SD-06 Test Reports. The Contractor shall submit certified copies of test reports for the material lots proposed for use to the Engineer for written approval prior to use on the project, plus the manufacturer's certification that the selected seal is recommend for the installation on this project. No material will be used until it has been approved by the Engineer.

MATERIALS

604MR-3.1 Compression seals. Compression joint seal materials shall be a vulcanized elastomeric compound using polychloroprene as the only base polymer. The material and the manufactured seal shall conform to ASTM D2628. The joint seal shall be a labyrinth type seal. The uncompressed depth of the face of the compression seal (that is to be bonded to the joint wall) shall be greater than the uncompressed width of the seal, except that for seals one inch (25 mm) or greater in width, the depth need be only one inch (25 mm) or greater. The actual width of the uncompressed seal for construction and contraction joints shall be 13/16 inches (19mm) and for expansion joints shall be 1.25 inches (32 mm), or as indicated in the project plans. The tolerance on the uncompressed width of the seal shall be plus 1/8 inch or minus 1/16 inch.

604MR-3.2 Lubricant/adhesive. Lubricant/adhesive used for the compression elastomeric joint seal shall be a one-component compound conforming to ASTM D2835.

604MR-3.3 Delivery and storage. Materials delivered to the job site shall be inspected for defects, unloaded, and stored with a minimum of handling to avoid damage. Protect the materials from weather and maintain materials at temperatures recommended by the manufacturer.

604MR-3.4 Test requirements. Each lot of compression joint seal and lubricant/adhesive shall be sampled, identified, and tested for conformance with the applicable material specification. For purposes of certification and testing, a lot of preformed seal shall consist of one day's production, or the manufacturer's standard production lot size, whichever is smaller. For purposes of certification and testing, a lot of lubricant/adhesive shall consist of a maximum one day's production by the manufacturer, or the manufacturer's standard production lot size, whichever is smaller. No material shall be used at the project prior to receipt of written notice that the materials meet the laboratory requirements.

Testing of the preformed joint and lubricant/adhesive material shall be the responsibility of the Contractor and shall be performed in an approved independent laboratory and certified copies of the test reports shall be submitted for approval prior to the use of the materials at the job site. Samples of each lot of material shall also be submitted and will be retained by the Engineer for possible future testing should the materials appear defective during or after application. The Contractor shall furnish additional samples of materials, in sufficient quantity to be tested, upon request. Final acceptance will be based on **c**onformance to the specified test requirements and the performance of the in-place materials.

CONSTRUCTION METHODS

604MR-4.1 Equipment. Machines, tools, and equipment used in the performance of the work required by this section shall be approved by the Engineer before the work starts and shall be maintained by the Contractor in satisfactory condition at all times.

a. Joint cleaning equipment.

(**1) Concrete saw.** A self-propelled power saw with water-cooled diamond saw blades shall be provided for cutting joints to the depths and widths specified and for removing filler, existing old joint seal or other material embedded in the joints or adhered to the joint faces.

(**2) Sandblasting equipment.** Sandblasting equipment shall include an air compressor, hose, and a long-wearing venturi-type nozzle of proper size, shape, and opening. The maximum nozzle opening should not exceed 1/4 inch (6 mm). The air compressor shall be portable and shall be capable of furnishing not less than 150 cubic feet (4200 liters) per minute and maintaining a line pressure of not less than 90 psi (620 kPa) at the nozzle while in use. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water. The nozzle shall have an adjustable guide that will hold the nozzle aligned with the joint about one inch (25 mm) above the pavement surface and will direct the blast to clean the joint walls. The height, angle of inclination, and the size of the nozzle shall be adjusted as necessary to ensure satisfactory results.

(**3) Waterblasting equipment.** Waterblasting equipment shall include a trailer-mounted water tank, pumps, high-pressure hose, a wand with safety release cutoff controls, nozzle, and auxiliary water

resupply equipment. The water tank and auxiliary water resupply equipment shall be of sufficient capacity to permit continuous operations. The pumps, hoses, wand, and nozzle shall be of sufficient capacity to permit the cleaning of both walls of the joint and the pavement surface for a width of at least 1/2 inch (12 mm) on either side of the joint. The pump shall be capable of supplying a pressure of at least 3,000 psi (20.7 MPa). A pressure gauge mounted at the pump shall show at all times the pressure in pounds per square inch (psi) (kPa) at which the equipment is operating.

b. Sealing equipment. Equipment used to install the compression seal shall place the compression seal to the prescribed depths within the specified tolerances without cutting, nicking, twisting, or otherwise damaging the seal. The equipment shall not stretch or compress the seal more than 2.0% longitudinally during installation. The joint seal application equipment shall be either automatic self-propelled engine powered equipment or hand operated equipment.

(**1) Automatic sealing equipment.** The machine shall be an automatic self-propelled joint seal application equipment and shall be engine powered. The machine shall include a reservoir for the lubricant/adhesive, a device for conveying the lubricant/adhesive in the proper quantities to the sides the preformed seal or the sidewalls of the joint, a reel capable of holding one full spool of compression seal, and a power-driven apparatus for feeding the joint seal through a compression device and inserting the seal into the joint. The equipment shall also include a guide to maintain the proper course along the joint being sealed. The machine shall at all times be operated by an experienced operator.

(2) Hand operated sealing equipment. The hand operated joint seal application equipment shall be a two-axle, four-wheel machine that shall include means for compressing and inserting the compression seal into the joint and a reel capable of holding one full spool of compression seal. Auxiliary equipment shall be provided to coat both sides the seal or the joint with lubricant/adhesive just prior to the installation of the compression seal.

CONSTRUCTION METHODS

604MR-5.1 Environmental conditions. The ambient temperature and the pavement temperature within the joint wall shall be at least 35°F (2°C) or as indicated by the manufacturer's instructions at the time of installation of the materials. Sealant application will not be permitted if moisture or any foreign material is observed in the joint.

604MR-5.2 Protection of pavement. The Contractor shall protect the pavement and its appurtenances against all traffic. No traffic will be permitted on the surface until after the initial sawcut has been made and the joint has been sealed. Any damage to the pavement occurring prior to final acceptance shall be repaired or the pavement replaced at the Contractor's expense.

604MR-5.3 Preparation of joints. Immediately before installation of the compression joint seal, the joints shall be thoroughly cleaned to remove all laitance, filler, existing sealer, foreign material and protrusions of hardened concrete from the sides and upper edges of the joint space to be sealed. Cleaning shall be performed using either sandblasting or waterblasting equipment in accordance with paragraph 604MR-4.1a and shall extend along pavement surfaces at least 1/2 inch (12 mm) on either side of the joint. After final cleaning and immediately prior to sealing, the joints shall be blown out with compressed air and left completely free of debris and water. Demonstrate and document that the selected cleaning operation meets the cleanliness requirements. Any irregularity in the joint face that would prevent uniform contact between the joint seal and the joint face shall be corrected prior to the installation of the joint seal.

a. Sawing. Joints shall be sawed to clean and to open them to the full specified width and depth. Immediately following the sawing operation, the joint faces and opening shall be thoroughly cleaned

using a water jet to remove all saw cuttings or debris remaining on the faces or in the joint opening. Immediately remove water, slurry, laitance, and debris from flushing or other operations from the pavement joints and surface. Depth and width of the joint cavity shall be in accordance with manufacturer's instructions. The saw cut for the joint seal cavity shall at all locations be centered over the joint line. The nominal width of the sawed joint seal cavity shall be as follows; the actual width shall be within a tolerance of ±1/16 inch . Adjust the nominal width of the joint cavity for temperature at time of sawing according to Table 1, or in accordance with manufacturer's instructions. The pavement temperature shall be measured and recorded. Measurement shall be made each day before commencing sawing and at any other time during the day when the temperature appears to be moving out of the allowable sawing range.

Table 1. Joint seal cavity adjustments for temperature.

Uncompressed Sealant Width (inch)	Increase joint cavity width 1/16 inch if temperature at time of sawing is below:	Decrease joint cavity width 1/16 inch if temperature at time of sawing is above:
13/16	25°F	80°F
20/16	25°F	140°F

b. Cleaning. Clean joints using either sandblasting or waterblasting methods

(1) Sandblast cleaning. The concrete joint faces and pavement surfaces extending at least 1/2 inch (12 mm) from the joint edges shall be sandblasted clean. A multiple pass technique shall be used until the surfaces are free of dust, dirt, curing compound, or any residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete. Remove all residue from the cleaning process. After final cleaning and immediately prior to sealing, the joints shall be blown out with compressed air and left completely free of debris and water.

(2) Waterblast cleaning. The concrete joint faces and pavement surfaces extending at least 1/2 inch (12 mm) from the joint edges shall be waterblasted clean. A multiple pass technique shall be used until the surfaces are free of dust, dirt, curing compound, or any residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete. Water and slurry from the cleaning process shall be immediately removed from the pavement. Water from the cleaning process shall not be permitted to infiltrate through the joints or shoulders. After final cleaning and immediately prior to sealing, the joints shall be blown out with compressed air and left completely free of debris and water.

c. Rate of progress. Sandblasting or waterblasting of the joint faces and air pressure cleaning of the joints shall be limited to the joints that can be sealed during the same workday.

604MR-5.4 Installation of the compression seal.

a. Time of installation. Joints shall be sealed within three (3) calendar days of sawing the joint seal cavity and immediately following concrete cure and the final cleaning of the joint walls. Open joints ready for sealing that cannot be sealed under the conditions specified shall be provided with an approved temporary seal to prevent infiltration of foreign material. When rain interrupts the sealing operations, the joints shall be washed, air pressure cleaned and allowed to dry prior to installing the lubricant/adhesive and compression seal.

b. Sequence of installation. Longitudinal joints shall be sealed first, followed by transverse joints. Seals in longitudinal joints shall be installed so that all transverse joint seals will be intact from edge to

edge of the pavement. Intersections shall be made monolithic by use of joint seal adhesive and care in fitting the intersection parts together. Extender pieces of seal shall not be used at intersections. Any seal falling short of the intersection shall be removed and replaced with new seal at no additional cost to the FAA.

c. Sealing of joints. The sides of the joint seal or the sides of the joint shall be covered with a coating of lubricant/adhesive and the seal installed as specified. Butt joints and seal intersections shall be coated with liberal applications of lubricant/adhesive. Lubricant/adhesive spilled on the pavement shall be removed immediately to prevent setting on the pavement. An in-place joint seal shall be in an upright position and free from twisting, distortion, and cuts. Adjustments shall be made to the installation equipment and procedure, if the stretch exceeds 1%. Any seal exceeding 2% stretch shall be removed and replaced. The joint seal shall be placed at a uniform depth within the tolerances specified. In-place joint seal that fails to meet the specified requirements shall be removed and replaced with new joint seal in a satisfactory manner at no additional cost to the Owner. The compression joint seal shall be placed to a depth of 3/16 inch ±1/8 inch below the pavement surface or as indicated on the project plans. No part of the seal shall be allowed to project above the surface of the pavement. The seal shall be installed in the longest practicable lengths in longitudinal joints and shall be cut at the joint intersections so as to provide continuous installation of the seal in the transverse joints. The lubricant/adhesive in the longitudinal shall be allowed to set for one (1) hour prior to cutting at the joint intersections to reduce the possibility of shrinkage. For all transverse joints, the minimum length of the preformed joint seal shall be the pavement width from edge to edge.

604MR-5.5 Clean-up. Upon completion of the project, all unused materials shall be removed from the site, all lubricant/adhesive on the pavement surface shall be removed, all slurry and laitance from the sealing operation shall be removed, and the pavement shall be left in clean condition.

604MR-5.6 Quality control provisions.

a. Equipment. The application equipment shall be inspected to assure uniform application of lubricant/adhesive to the sides of the compression joint seal or the walls of the joint. If any equipment causes cutting, twisting, nicking, excessive stretching or compressing of the compression seal, or improper application of the lubricant/adhesive, the operation shall be suspended until causes of the deficiencies are determined and corrected by the Contractor.

b. Procedures.

(1) Quality control provisions shall be provided during the joint cleaning process to prevent or correct improper equipment and cleaning techniques that damage the concrete in any manner. Cleaned joints shall be approved and documented by the CQCSM prior to installation of the lubricant/adhesive and compression joint seal.

(2) Conformance to stretching and compression limitations shall be documented by the Contractor. Mark the top surface of the compression seal at one foot intervals in a manner clear and durable to enable length determinations of the seal. After installation, the distance between the marks on the seal shall be measured by the Contractor. If the stretching or compression exceeds the specified limit, the seal shall be removed and replaced with new joint seal at no additional cost to the Owner. The seal shall be removed up to the last correct measurement. Each joint of seal shall be inspected by the Contractor a minimum of once per 400 feet (120 m) of seal, or portion thereof, for compliance to the shrinkage or compression requirements. Measurements shall also be made at the same interval to determine conformance with depth and width installation requirements. All compression seal that is not in

conformance with specification requirements shall be removed and replaced with new joint seal at no additional cost to the Owner.

c. Inspection. The joint sealing system (compression seal and lubricant/adhesive) shall be inspected by the Engineer at his discretion for proper rate of cure and bonding to the concrete, cuts, twists, nicks, and other deficiencies. Seals exhibiting any defects, at any time prior to final acceptance of the project, shall be removed from the joint, wasted, and replaced in a satisfactory manner, as determined by the Engineer.

METHOD OF MEASUREMENT

604MR-6.1 Measurement. The quantity of each sealing item will be determined by actual measurement of the number of linear feet (meter) of in-place material that has been approved.

BASIS OF PAYMENT

604MR-7.1 Payment. Payment will be made at the contract unit bid prices per linear foot (meter) for the sealing items scheduled, including approved trial joint installation. The unit bid prices shall include the cost of all labor, materials, the use of all equipment, and tools required to complete the work.

Item 604MR-6.1	Compression Joint Seals for Concrete Pavements

TESTING REQUIREMENTS

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in this text by basic designation only.

ASTM D2628	Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements
ASTM D2835	Standard Specification for Lubricant for Installation of Preformed Compression Seals in Concrete Pavements
Corps of Engineers CRD C548	Standard Specification for Jet-Fuel and Heat Resistant Preformed Polychloroprene Elastomeric Joint Seals for Rigid Pavements
UFC 3-250-08FA	Standard Practice for Sealing Joints and Cracks in Rigid and Flexible Pavements

END ITEM P-604MR

Item P-620MR Pavement Marking

DESCRIPTION

620MR-1.1 This item shall consist of the preparation and painting of numbers, markings, and stripes on the final pavement surface of Construction Cycle 8 (CC-8). All work shall be performed in accordance with these specifications at the locations shown on the plans, or as directed by the Engineer. The terms "paint" and "marking material" as well as "painting" and "application of markings" are interchangeable throughout this specification.

SUBMITTALS

620MR-2.1 Submit the following in accordance with Section 61MR Submittal Procedures:

i. SD-03 Product Data

- Construction equipment list of proposed equipment as per paragraph 620MR-3.2.
- Manufacturer's product information as per paragraph 602MR-2.1.

MATERIALS

620MR-3.1 Materials acceptance. The Contractor shall furnish manufacturer's product information or catalog cut sheets indicating that the proposed materials comply with project plans and specifications. The product information shall include a statement that the materials meet the specification requirements. The information shall not be interpreted as a basis for payment. The Contractor shall notify the Engineer upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers for inspection by the Engineer. Material shall not be loaded into the equipment until inspected by the Engineer.

620MR-3.2 Marking materials. Paint shall be waterborne in accordance with the requirements of paragraph 620-2.2.a. Paint shall be furnished in White - 37925, Yellow - 33538 or 33655, and Blue – 35466 in accordance with Federal Standard No. 595.

a. Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952E Type II. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis.

CONSTRUCTION METHODS

620MR-4.1 Weather limitations. The painting shall be performed only when the surface is dry and when the surface temperature is at least 50°F (10°C) or meets the manufacturer's recommendations. Markings shall not be applied when the pavement temperature is greater than 130°F (55°C).

620MR-4.2 Equipment. Equipment used in the performance of the work shall be approved by the Engineer and maintained in satisfactory operating condition. The contractor shall submit construction equipment list for approval by the Engineer.

Equipment shall include a mechanical marking machine and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.

The mechanical marker shall be an atomizing spray-type or airless-type marking machine suitable for application of traffic paint. It shall produce an even and uniform film thickness at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray.

620MR-4.3 Preparation of surface. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other foreign material that would reduce the bond between the paint and the pavement.

Prior to the application of any markings, the Contractor shall confirm that the surface has been prepared in accordance with the paint manufacturer's requirements, that the application equipment is appropriate for the type of marking paint and that environmental conditions are appropriate for the material being applied.

620MR-4.4 Layout of markings. The proposed markings shall be laid out according to the project plans in advance of the paint application.

620MR-4.5 Application. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the Engineer. The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions, locations, and spacings shall be within the following tolerances:

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at a rate of 115 ft^2/gal max (2.8 m^2/l) for an equivalent wet film thickness of 0.55 inches (13.95mm). The addition of thinner will not be permitted.

620MR-4.6 Protection and cleanup. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, and by-products generated by the surface preparation and application operations to the satisfaction of the Engineer. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and Federal environmental statutes and regulations.

METHOD OF MEASUREMENT

620MR-5.1 Pavement markings shall be paid for as one complete item in place.

BASIS OF PAYMENT

620-6.1 Payment shall be made at the respective contract lump sum price for pavement marking painting. This price shall be full compensation for furnishing all materials and for all labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-620MR-5.1-1 Pavement Marking lump sum.

REFERENCED STANDARDS

ASTM C371	Standard Test Method for Wire-Cloth Sieve Analysis of Nonplastic Ceramic Powders
ASTM D92	Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
ASTM D711	Standard Test Method for No-Pick-Up Time of Traffic Paint
ASTM D968	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D1652	Standard Test Method for Epoxy Content of Epoxy Resins
ASTM D2074	Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM G154	Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
ASTM D476	Standard Classification for Dry Pigmentary Titanium Dioxide Products
40 CFR Part 60, Appendix A-7, Method 24	Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
29 CFR Part 1910.1200	Hazard Communication
FED SPEC TT-P-1952E	Paint, Traffic and Airfield Marking, Waterborne
Commercial Item Description A-A-2886B	Paint, Traffic, Solvent Based
FED STD 595	Colors used in Government Procurement
AC 150/5340-1	Standards for Airport Markings

END OF ITEM P-620MR

REVISION LOG
FEDERAL AVIATION ADMINISTRATION
WILLIAM J. HUGHES TECHNICAL CENTER NATIONAL AIRPORT PAVEMENT TEST FACILITY
NAPTF– CONSTRUCTION CYCLE 8 (CC8)

Revision	Date	Section	Paragraph	Summary of Change
01	12/20/2016	P-154	154M-2.1	Range of allowable percent passing #200 sieve adjusted to 0% to 15% to reflect the properties of the material preferred by FAA. This material consists of #10 crusher screenings and has been used successfully for multiple construction cycles. Material preference stated during project meeting on 12/19/2016.

APPENDIX B: AS-BUILT DRAWINGS AND MATERIAL PROPERTIES

CONSTRUCTION CYCLE 8

AS-BUILT DRAWINGS

NATIONAL AIRPORT PAVEMENT TESTING FACILITY
WILLIAM J. HUGHES TECHNICAL CENTER, BUILDING 296
ATLANTIC CITY INTERNATIONAL AIRPORT, NEW JERSEY

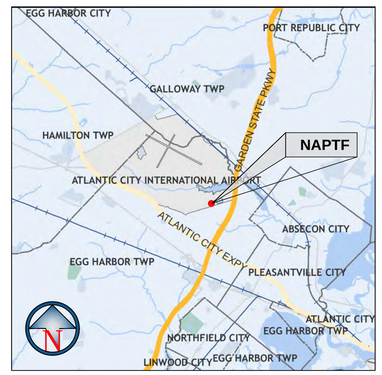
03/19/2018

PREPARED BY:

SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

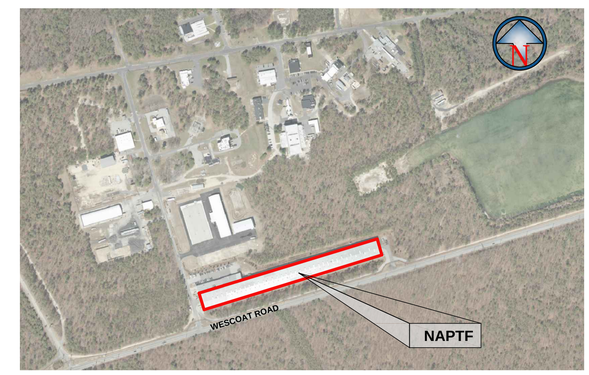
NEW JERSEY STATE MAP N.T.S.

VICINITY MAP N.T.S.

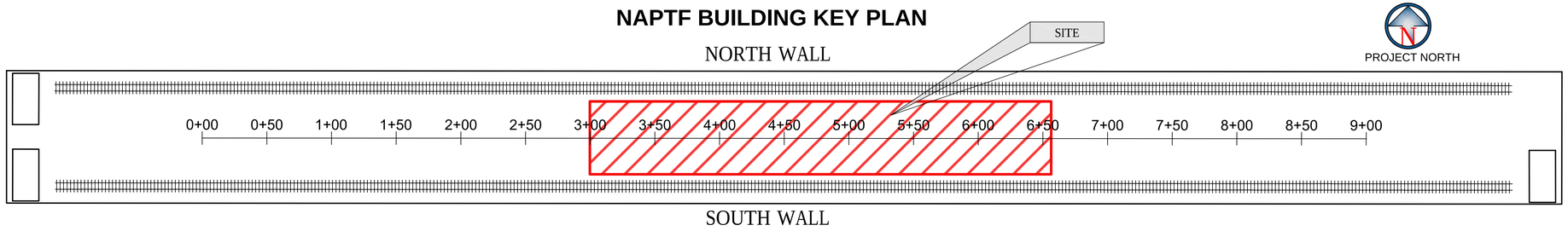


PROJECT LOCATION MAP N.T.S.

AERIAL VIEW OF THE NAPTF BUILDING N.T.S.



NAPTF BUILDING KEY PLAN



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2 OF 34	SITE ACCESS, HAULING AND STAGING AREA PLAN
3 OF 34	SURVEY CONTROL NETWORK PLAN
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5 OF 34	PHASE 2 CONSTRUCTION PLAN VIEW AND PROFILE VIEW
6 OF 34	PHASE 2 PAVEMENT JOINTING PLAN
7 OF 34	PHASE 1 OVERLAY TEST STA. 2+95 TO 4+00
8 OF 34	PHASE 2 OVERLAY TEST STA. 2+95 TO 4+00
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27 OF 34	PRE-TRAFFIC P-501 AND P-306 ELEVATION MAP
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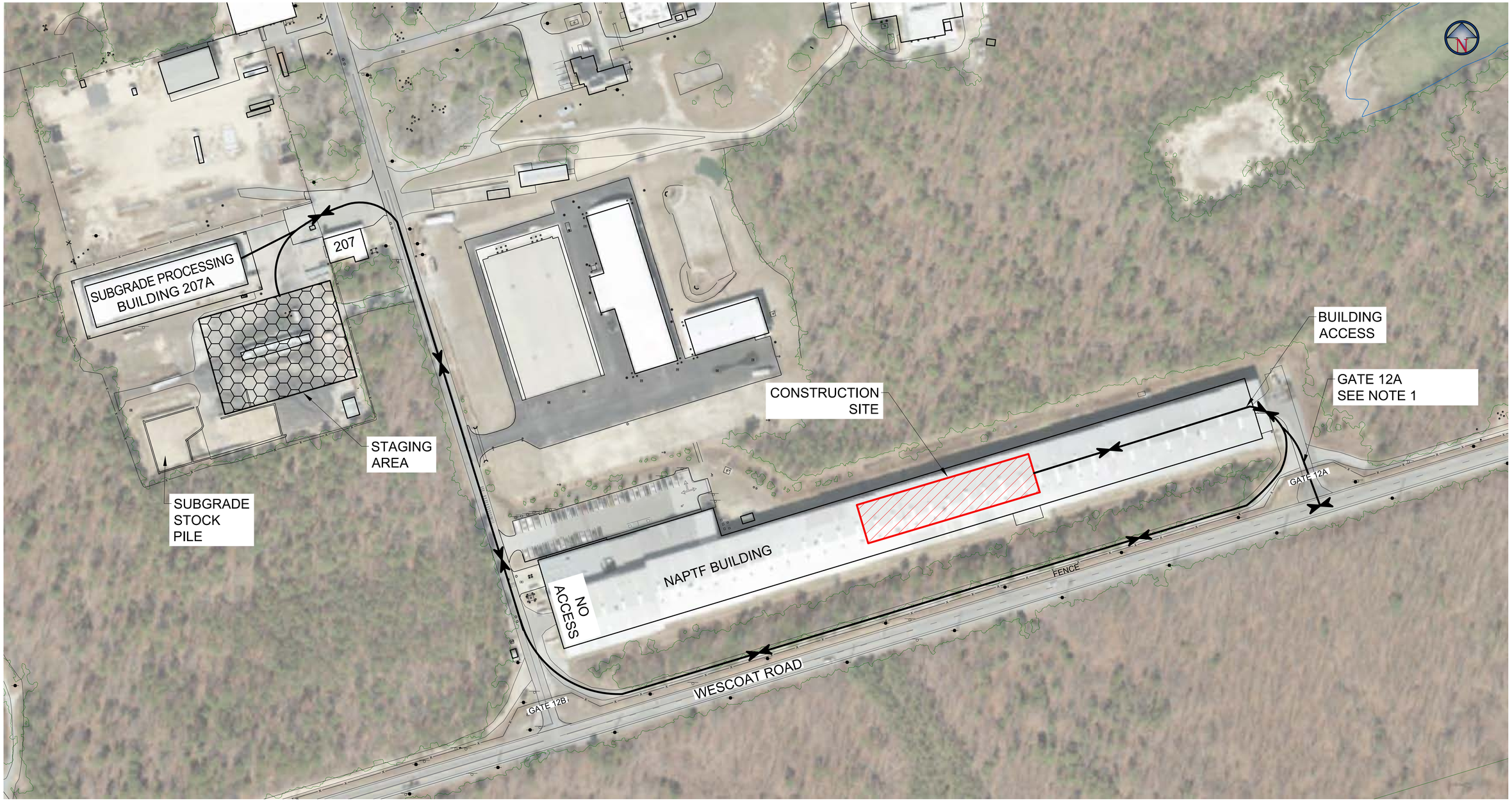
32 OF 34	P-501 THICKNESS MAP
33 OF 34	P-501 ACCEPTANCE AND CHARACTERIZATION RESULTS
34 OF 34	P-501 ACCEPTANCE AND CHARACTERIZATION RESULTS



80' 0 80' 160' 240'

GRAPHIC SCALE

1" = 80'

NOTES:

1. CONTRACTORS ACCESS THROUGH THE GATE AVAILABLE BY ADVANCED REQUEST.
2. LOCATION OF THE STAGING AREA SHOWN IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED IN THE FIELD BY THE RESIDENT ENGINEER.
3. SEE SHEET NUMBER 3 FOR INSIDE THE BUILDING STAGING AREA LOCATION AND RESTRICTIONS.

LEGEND:

- X — FENCE
- HAUL ROUTE
- CONSTRUCTION SITE
- STAGING AREA

NO.	REVISIONS	DATE	BY	CHK	APR

CSRA, INC.
1201 NEW ROAD, SUITE 242
LINWOOD, NEW JERSEY 08221
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ

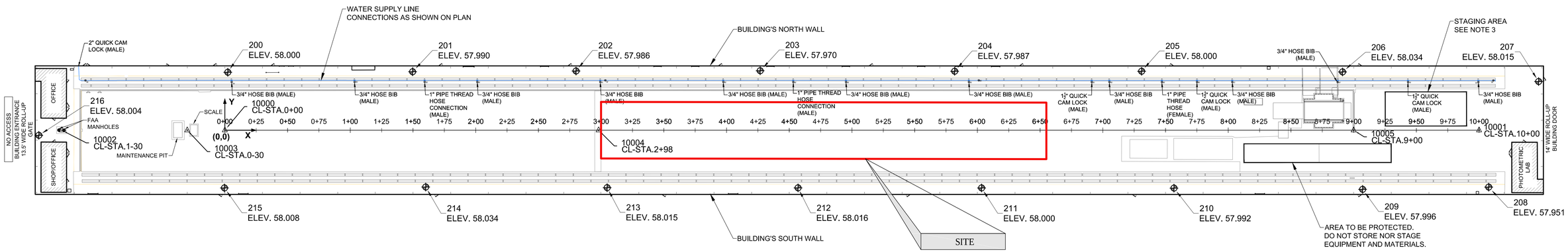
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED		
FAA APPROVAL DATE:		
PROJECT NO:		

NAPTF CONSTRUCTION CYCLE 8

SITE ACCESS, HAULING AND STAGING AREA PLAN

SIZE: ANSI D | SCALE: AS NOTED | SHEET 2 OF 34

CAD FILE: CC8-CONS-ACCS.DWG



NAPTF BUILDING PLAN VIEW

SCALE: 1"=40'

CENTER LINE MARKER POINTS

NUMBER	X COORDINATE [FEET]	Y COORDINATE [FEET]	LOCATION DESCRIPTION	MARKER DESCRIPTION
10000	0.000	0.0000	ON CENTER LINE STA. 0+00	MAG AND WASHER
10001	1,000.000	0.000	ON CENTER LINE STA. 10+00	MAG AND WASHER
10002	-130.000	0.000	ON CENTER LINE STA. -1-30	MAG AND WASHER
10003	-30.000	0.000	ON CENTER LINE STA. 0-30	MAG AND WASHER
10004	298.000	0.000	ON CENTER LINE STA. 2+98	MAG AND WASHER
10005	900.000	0.000	ON CENTER LINE STA. 9+00	MAG AND WASHER

CENTER LINE MARKER DETAIL

CONTROL POINTS

NUMBER	X COORDINATE [FEET]	Y COORDINATE [FEET]	Z ELEVATION [FEET]	DESCRIPTION
200	2.352	46.209	58.000	MAG AND WASHER
201	149.673	46.634	57.990	MAG AND WASHER
202	280.029	47.236	57.986	MAG AND WASHER
203	426.822	47.441	57.970	MAG AND WASHER
204	581.880	47.034	57.987	MAG AND WASHER
205	730.901	47.054	58.000	MAG AND WASHER
206	891.088	46.481	58.034	MAG AND WASHER
207	1047.423	38.858	58.015	MAG AND WASHER
208	1007.640	-45.426	57.951	MAG AND WASHER
209	907.144	-47.198	57.996	MAG AND WASHER
210	756.728	-46.194	57.992	MAG AND WASHER
211	603.298	-46.091	58.000	MAG AND WASHER
212	456.998	-45.992	58.016	MAG AND WASHER
213	304.791	-45.889	58.015	MAG AND WASHER
214	160.140	-45.350	58.034	MAG AND WASHER
215	-0.315	-46.085	58.008	MAG AND WASHER
216	-148.287	-4.082	58.004	MAG AND WASHER

NOTES

1. THE PROJECT AREA IS LOCATED INSIDE OF THE NATIONAL AIRPORT PAVEMENT TESTING FACILITY, BUILDING NUMBER 296, WILLIAM J. HUGHES TECHNICAL CENTER, LOCATED AT THE ATLANTIC CITY INTERNATIONAL AIRPORT, EGG HARBOR TOWNSHIP, NEW JERSEY 08405.
2. THE HORIZONTAL CONTROL NETWORK IS REFERENCED TO A LOCAL COORDINATE SYSTEM ALIGNED WITH THE NAPTF TESTING AREA CENTER LINE. THE VERTICAL CONTROL NETWORK IS ALSO REFERENCED TO A LOCAL ASSUMED DATUM.
3. LOCATION OF THE STAGING AREA SHOWN IS APPROXIMATE. THE EXACT LOCATION WILL BE DETERMINED IN THE FIELD BY THE RESIDENT ENGINEER.

CONTROL POINT MARKER DETAIL

EACH CONTROL POINT LOCATION S MARKED WITH A MAGNETIC NAIL WITH WASHER. THE CONTROL POINT NUMBER IS ENGRAVED ON EACH WASHER.

LEGEND

- CENTER LINE MARKER - MAG NAIL
- CONTROL POINT - MAG NAIL
- MANHOLE
- WATER LINE CONNECTION
- WATER SHUT-OFF VALVE
- WATER SUPPLY LINE

40' 0 40' 80' 120'

GRAPHIC SCALE

1" = 40'

NO.	REVISIONS	DATE	BY	CHK	APR

CSRA, INC.
1201 NEW ROAD, SUITE 242
LINWOOD, NEW JERSEY 08221
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ

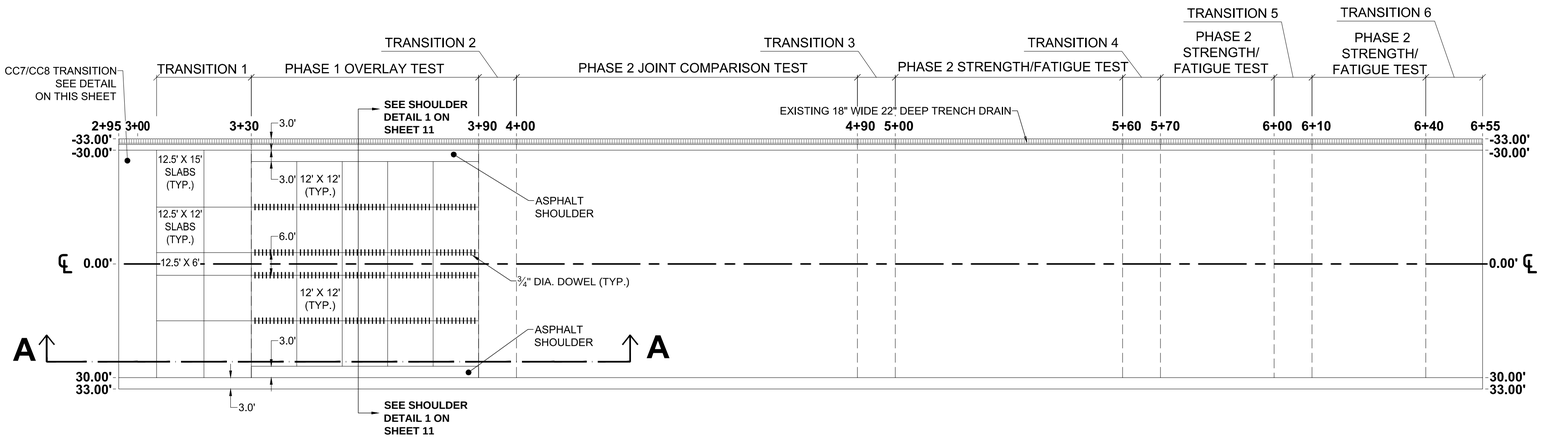
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED		
FAA APPROVAL DATE:		

SURVEY CONTROL NETWORK PLAN

NAPTF BUILDING

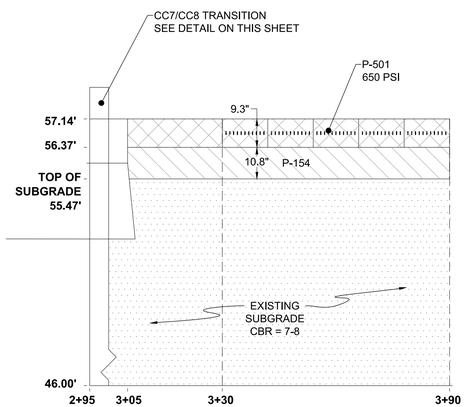
PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 3 OF 34

CAD FILE: CC8-CONS-ACCS.DWG



PLAN VIEW

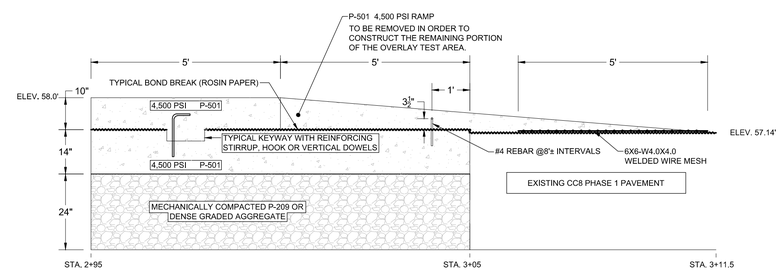
SCALE: 1"=20'



PROFILE VIEW A-A

HORIZONTAL SCALE: 1"=20'

VERTICAL SCALE: 1"=2'



NAPTF CONSTRUCTION TRANSITION: CC-7 / CC-8

N.T.S.

LEGEND:

- P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)
- P-401 PLANT MIX BITUMINOUS PAVEMENT
- P-306 LEAN CONCRETE BASE COURSE
- P-154 - GRANULAR AGGREGATE SUBBASE COURSE
- SUBGRADE - SAND WITH SILT & CLAY SP AND SM/SC

20 0 20 40 60

GRAPHIC SCALE

1" = 20'

NO.	REVISIONS	DATE	BY	CHK	APR

CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

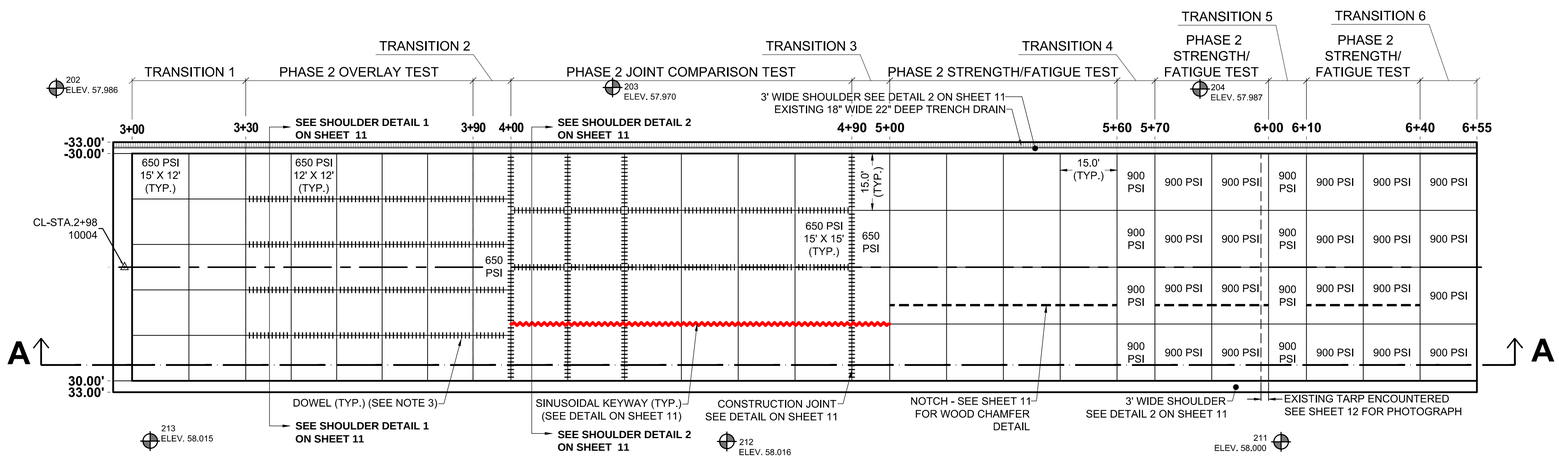
NAPTF CONSTRUCTION CYCLE 8

PHASE 1 AS-BUILT

CONSTRUCTION PLAN VIEW AND PROFILE VIEW

PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 4 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG

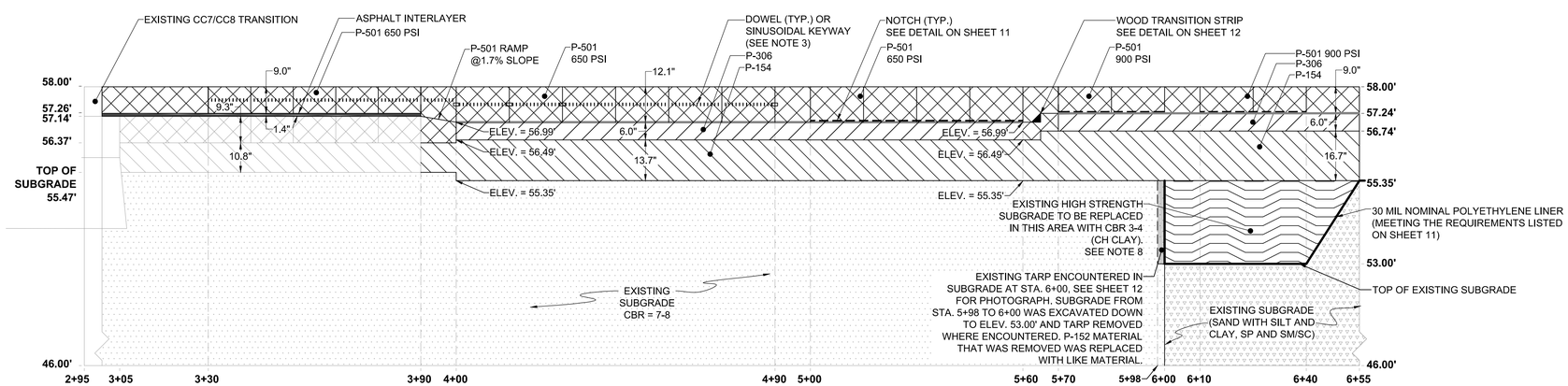


PLAN VIEW

SCALE: 1"=20'

NOTES:

1. ALL IS 650 PSI, UNLESS OTHERWISE INDICATED ON THE PLANS.
2. LIME SLURRY FROM STA. 3+00 TO 3+90 WAS USED UNDERNEATH THE ASPHALT INTERLAYER TO MINIMIZE BONDING.
3. SEE JOINTING PLAN (SHEET 6) FOR JOINTING TYPES AND DOWEL DETAILS.
4. CBR = CALIFORNIA BEARING RATIO.
5. PAPER BOND BREAKER SHALL BE PLACED BETWEEN P-306 AND P-501, FOR ALL CONCRETE BETWEEN STA. 3+90 AND STA. 6+55.
6. SEE SHEET 11 FOR JOINT & DOWEL DETAILS.
7. SEE SHEET 12 FOR SPEED DOWEL DETAILS.
8. CONTRACTOR REMOVED 28" OF EXISTING HIGH STRENGTH SUBGRADE AND REPLACED IT WITH 28" DEEP LOW STRENGTH SUBGRADE MATERIAL BETWEEN STA. 6+00 AND 6+55. SUBGRADE INSTALLED IN 3 LIFTS OF 10" AVERAGE THICKNESS AND TRIMMED TO FINAL ELEVATION/THICKNESS.
9. CONTRACTOR CUT WIRE CHANNELS FOR INSTRUMENTATION INTO THE LEAN CONCRETE BASE COURSE AND THE ASPHALT INTERLAYER. SEE SHEET 11 FOR CUT DETAILS.



PROFILE VIEW A-A

HORIZONTAL SCALE: 1"=20'

VERTICAL SCALE: 1"=2'

LEGEND:

- CENTER LINE MARKER - MAG NAIL
- CONTROL POINT - MAG NAIL
- TRIANGULAR NOTCHES FORMED BY WOOD CHAMFER STRIP
- CONSTRUCTED IN PHASE 1
- CONSTRUCTED IN PHASE 2
- PAPER BOND BREAKER
- SINUSOIDAL KEYWAY JOINT
- ASPHALT INTERLAYER
- P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)
- P-306 - LEAN CONCRETE BASE COURSE
- P-154 - GRANULAR AGGREGATE SUBBASE COURSE
- NEW SUBGRADE CBR 3-4
- EXISTING SUBGRADE - CH CLAY
- EXISTING SUBGRADE - SAND WITH SILT & CLAY SP AND SM/SC

20 0 20 40 60

GRAPHIC SCALE

1" = 20'

NO.	REVISIONS	DATE	BY	CHK	APR

CSRA — SRA INTERNATIONAL, INC., A CSRA COMPANY, 200 DECADON DRIVE, EGG HARBOR, NJ 08234, PHONE: (609) 601-6800

FOR

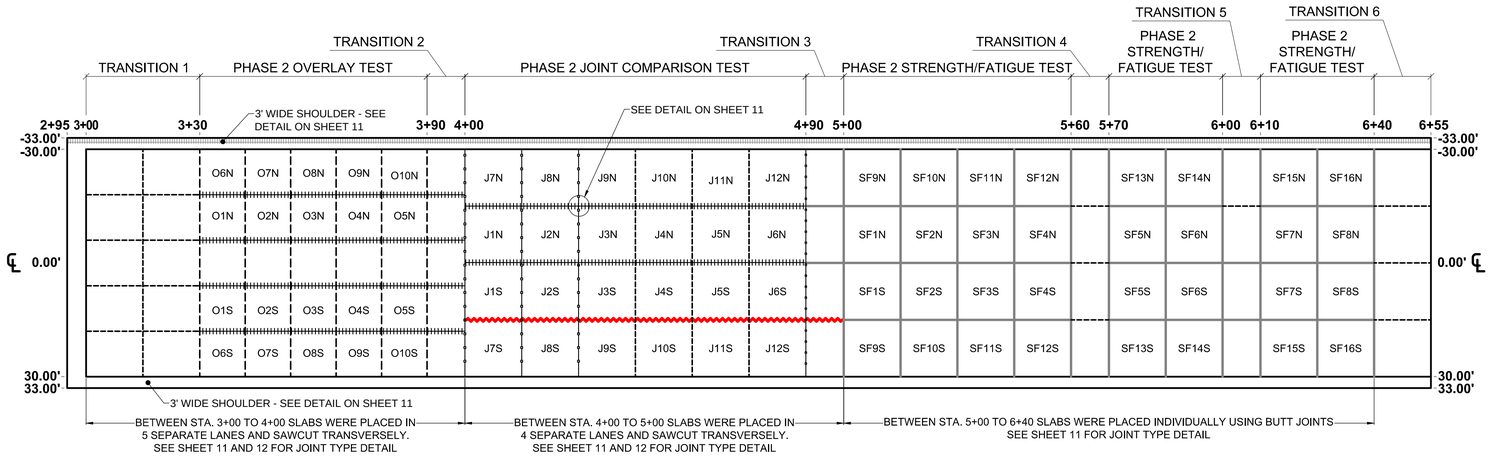
NATIONAL AIRPORT PAVEMENT TEST FACILITY, ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8
PHASE 2 AS-BUILT
CONSTRUCTION PLAN VIEW AND PROFILE VIEW

PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 5 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG



PLAN VIEW

SCALE: 1"=20'

DOWEL, JOINT, AND SEALANT SUMMARY TABLE	
OVERLAY TEST AREA	
SLAB SIZE	12' X 12' X 9"
DOWEL SIZE & INSTALLATION (WHERE INDICATED ON PLANS)	¾" Ø, 18" LONG, SPEED DOWEL PLASTIC SLEEVES. (SEE SHEET 9 AND 10 FOR INSTALLATION DETAILS).
DOWEL SPACING	12" ON CENTERS ALONG LONGITUDINAL JOINTS
LONGITUDINAL JOINT	CONSTRUCTION JOINT TYPE E DOWELED
TRANSVERSE JOINT	CONTRACTION JOINT TYPE D DUMMY (NOT DOWELED)
JOINT SEALANT	DS BROWN E-686 COMPRESSION SEAL
JOINT COMPARISON TEST AREA	
SLAB SIZE	15' X 15' X 12"
DOWEL SIZE & INSTALLATION (WHERE INDICATED ON PLANS)	1" Ø, 18" LONG, SPEED DOWEL PLASTIC SLEEVES ALONG LONGITUDINAL JOINTS. TRANSVERSE DOWELS TO BE INSTALLED WITH A DOWEL BASKET. (SEE SHEET 9 AND 10 FOR INSTALLATION DETAILS).
DOWEL SPACING (IF APPLICABLE)	SEE LAYOUT PATTERN DETAIL ON SHEET 9
LONGITUDINAL JOINT	CONSTRUCTION JOINT TYPE E DOWELED
TRANSVERSE JOINT	CONTRACTION JOINT TYPE C DOWELED AND TYPE D DUMMY
JOINT SEALANT	DS BROWN E-686 COMPRESSION SEAL
STRENGTH AND FATIGUE TEST AREA	
SLAB SIZE	15' X 15' X 12" AND 15' X 15' X 9"
DOWEL SIZE & INSTALLATION	NO DOWELS
DOWEL SPACING	N/A
LONGITUDINAL JOINT (12" SLABS)	CONSTRUCTION - TYPE F BUTT JOINT
TRANSVERSE JOINT (12" SLABS)	CONSTRUCTION - TYPE F BUTT JOINT
LONGITUDINAL JOINT (9" SLABS)	CONSTRUCTION - TYPE F BUTT JOINT
TRANSVERSE JOINT (9" SLABS)	CONSTRUCTION - TYPE F BUTT JOINT
JOINT SEALANT	DS BROWN E-686 COMPRESSION SEAL

LEGEND:

- EDGE OF PAVEMENT
- SINUSOIDAL KEYWAY LONGITUDINAL JOINT
- DOWELED CONSTRUCTION JOINT (TYPE E)
- DOWELED CONTRACTION JOINT (TYPE C)
- CONSTRUCTION BUTT JOINT (TYPE F)
- CONTRACTION JOINT (TYPE D DUMMY)

NOTES:

1. SEE SHEET 11 FOR JOINT & DOWEL DETAILS.
2. SEE SHEET 12 FOR SPEED DOWEL DETAILS.
3. ALL TRANSVERSE JOINTS IN OVERLAY AND JOINT COMPARISON SECTIONS ARE SAW CUT JOINTS.

20 0 20 40 60

GRAPHIC SCALE

1" = 20'

NO.	REVISIONS	DATE	BY	CHK	APR

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ATLANTIC CITY AIRPORT, NJ 08234

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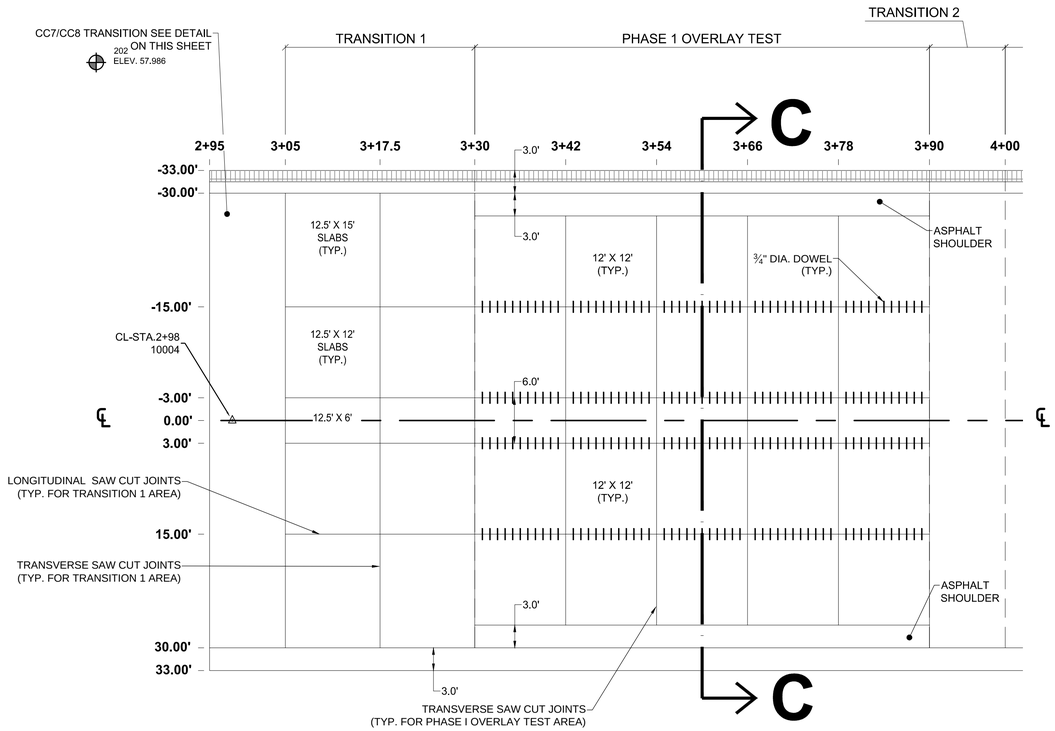
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8

PHASE 2 AS-BUILT PAVEMENT JOINTING PLAN

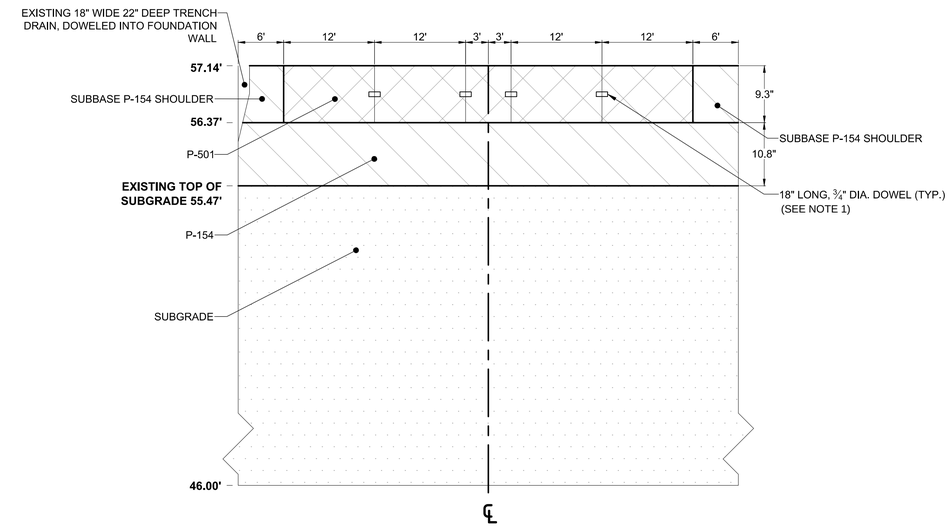
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 6 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG



PHASE 1 PLAN VIEW STA. 2+95 TO 4+00

SCALE: 1"=10'



SECTION C-C

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=1'

LEGEND:

- P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)
- P-306 - LEAN CONCRETE BASE COURSE
- P-154 - GRANULAR AGGREGATE SUBBASE COURSE
- EXISTING SUBGRADE - CH CLAY

NOTES:

1. SEE SHEET 11 FOR JOINT & DOWEL DETAILS.
2. SEE SHEET 12 FOR SPEED DOWEL DETAILS.

10 0 10 20 30
GRAPHIC SCALE
1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY: OVERLAY TEST | JOINT COMPARISON | STRENGTH/FATIGUE

CSRA
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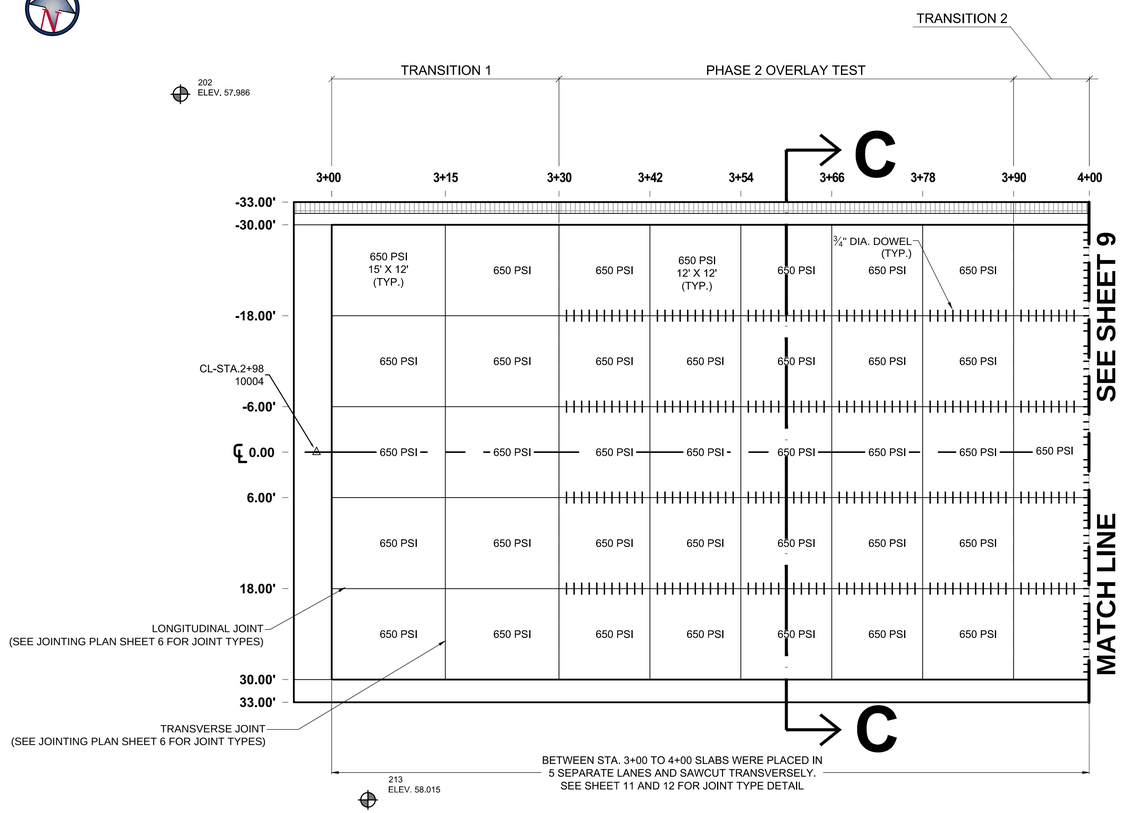
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8
PHASE 1 AS-BUILT
OVERLAY TEST STA. 2+95 TO 4+00

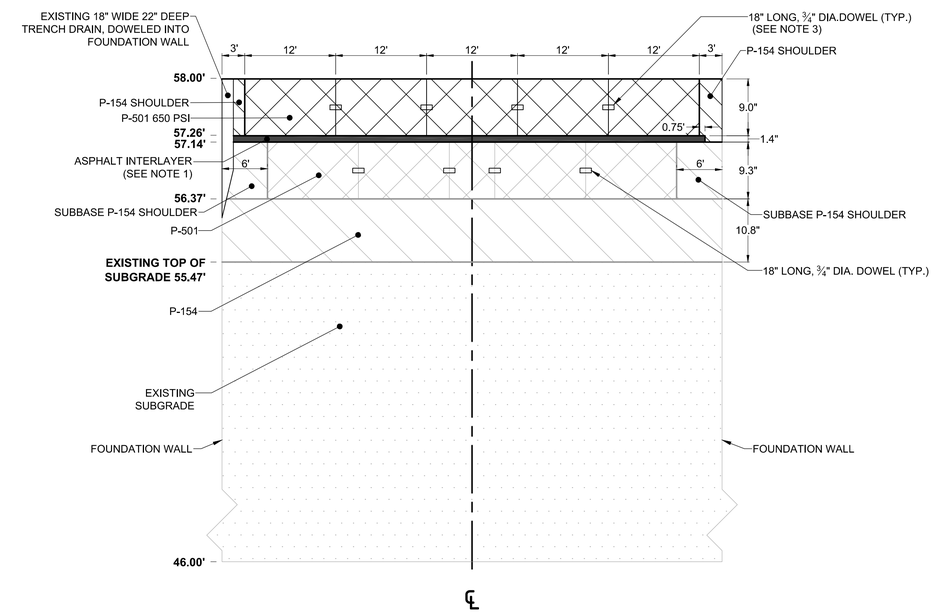
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 7 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG



PHASE 2 PLAN VIEW STA. 2+95 TO 4+00

SCALE: 1"=10'



SECTION C-C

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=1'

LEGEND:

- CENTER LINE MARKER - MAG NAIL
- CONTROL POINT - MAG NAIL
- CONSTRUCTED IN PHASE 1
- TO BE CONSTRUCTED IN PHASE 2
- ASPHALT INTERLAYER
- P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)
- P-306 - LEAN CONCRETE BASE COURSE
- P-154 - GRANULAR AGGREGATE SUBBASE COURSE
- EXISTING SUBGRADE - CH CLAY

NOTES:

1. LIME SLURRY WAS USED UNDERNEATH THE ASPHALT INTERLAYER TO MINIMIZE BONDING TO CONCRETE UNDERLAYER.
2. SEE JOINTING PLAN (SHEET 6) FOR JOINT TYPES.
3. SEE SHEET 11 FOR JOINT & DOWEL DETAILS.
4. SEE SHEET 12 FOR SPEED DOWEL DETAILS.

10 0 10 20 30
GRAPHIC SCALE
1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY: OVERLAY TEST | JOINT COMPARISON | STRENGTH/FATIGUE

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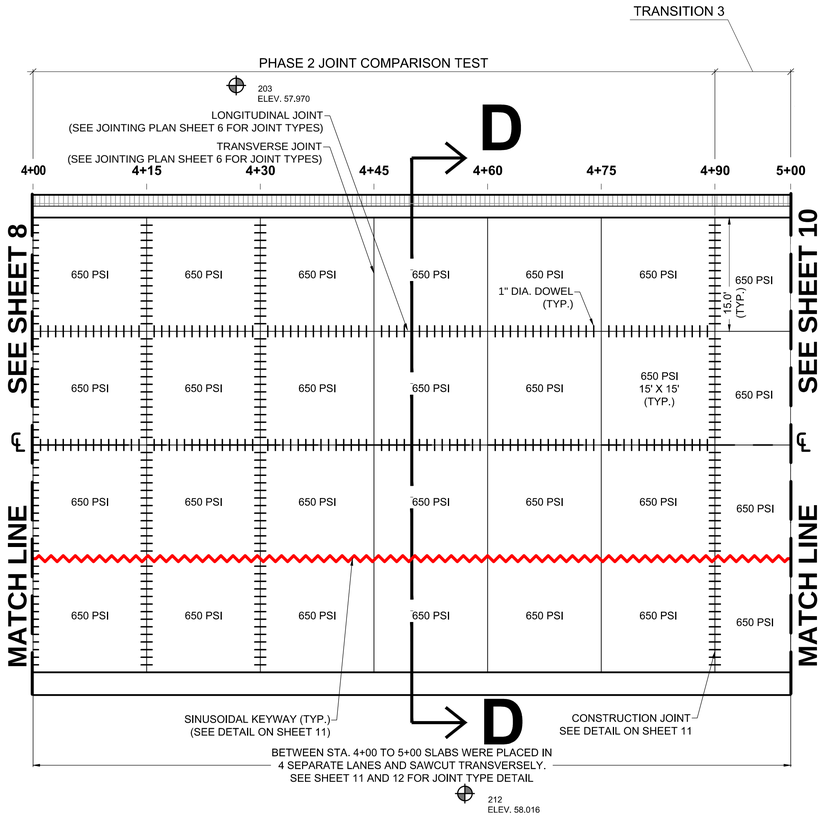
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8
PHASE 2 AS-BUILT
OVERLAY TEST STA. 2+95 TO 4+00

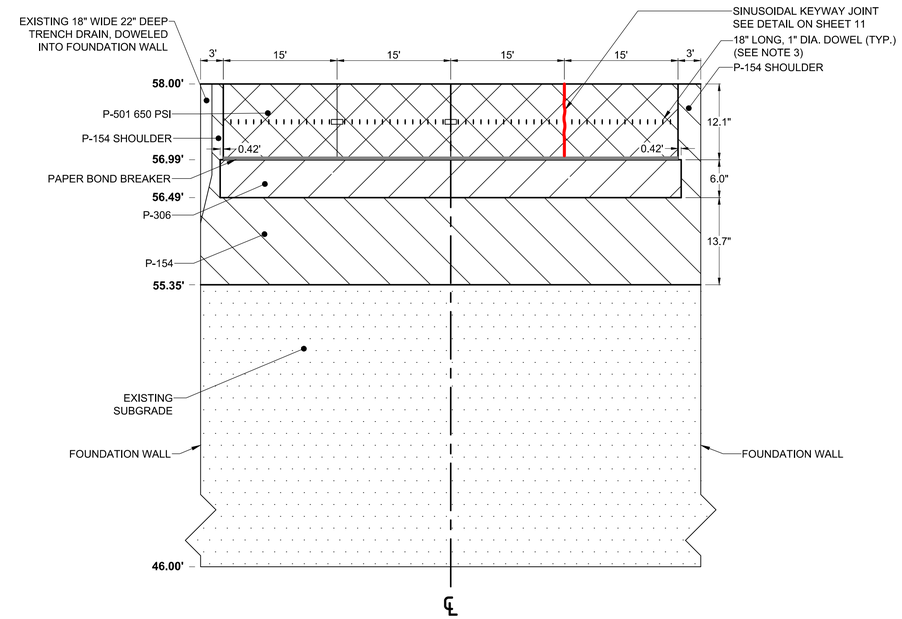
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 8 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG



PLAN VIEW STA. 4+00 TO 5+00

SCALE: 1"=10'



SECTION D-D

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=1'

LEGEND:

- CONTROL POINT - MAG NAIL
- DOWEL
- PAPER BOND BREAKER
- SINUSOIDAL KEYWAY JOINT
- P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)
- P-306 - LEAN CONCRETE BASE COURSE
- P-154 - GRANULAR AGGREGATE SUBBASE COURSE
- EXISTING SUBGRADE - CH CLAY

NOTES:

1. SEE JOINTING PLAN (SHEET 6) FOR JOINT TYPES.
2. SEE SHEET 11 FOR JOINT & DOWEL DETAILS.
3. SEE SHEET 12 FOR SPEED DOWEL DETAILS.

10 0 10 20 30
GRAPHIC SCALE
1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY: OVERLAY TEST | JOINT COMPARISON | STRENGTH/FATIGUE

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NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

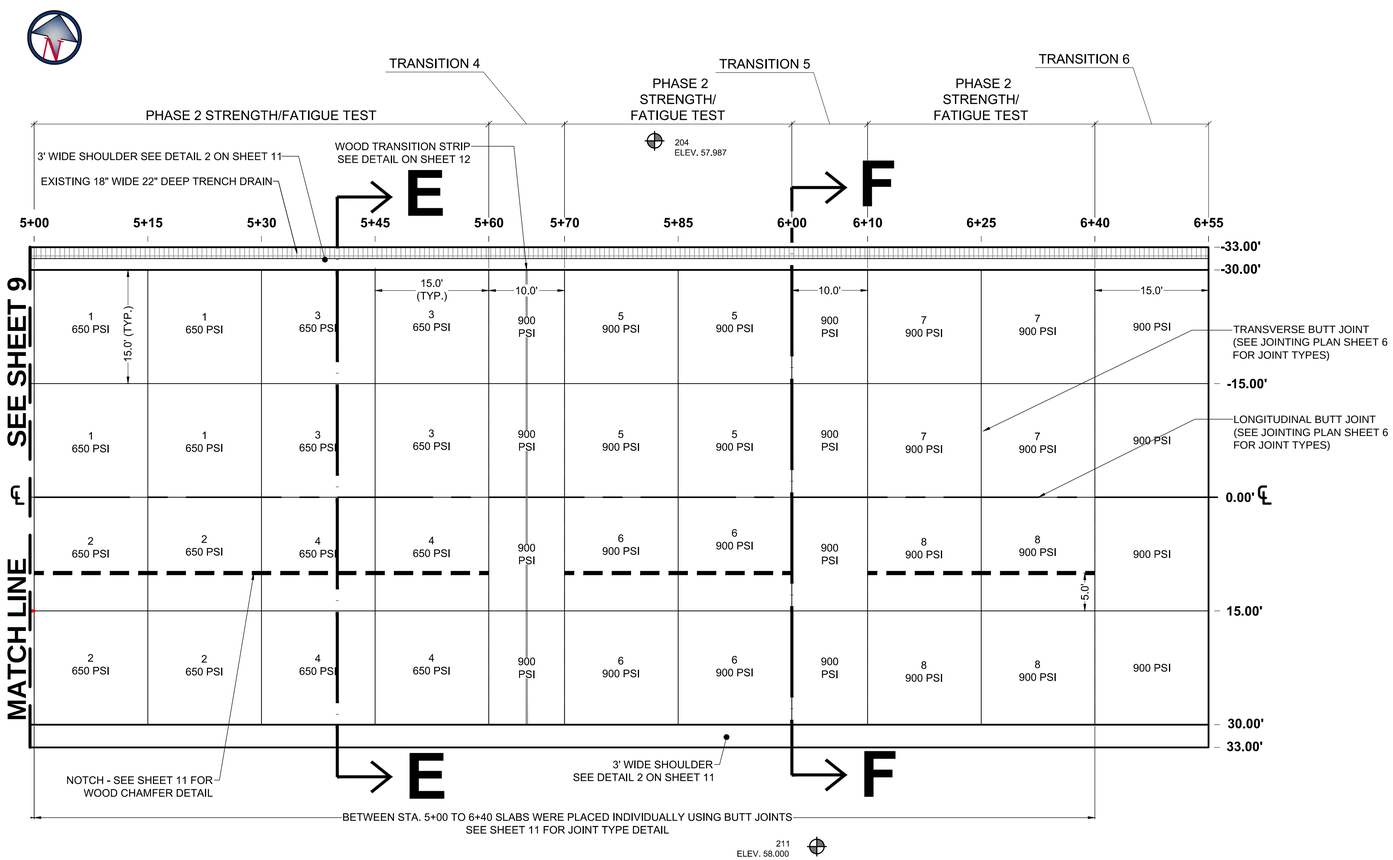
	NAME	DATE
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

PROJECT NO: CC8

NAPTF CONSTRUCTION CYCLE 8
PHASE 2 AS-BUILT
JOINT COMPARISON TEST STA. 4+00 TO 5+00

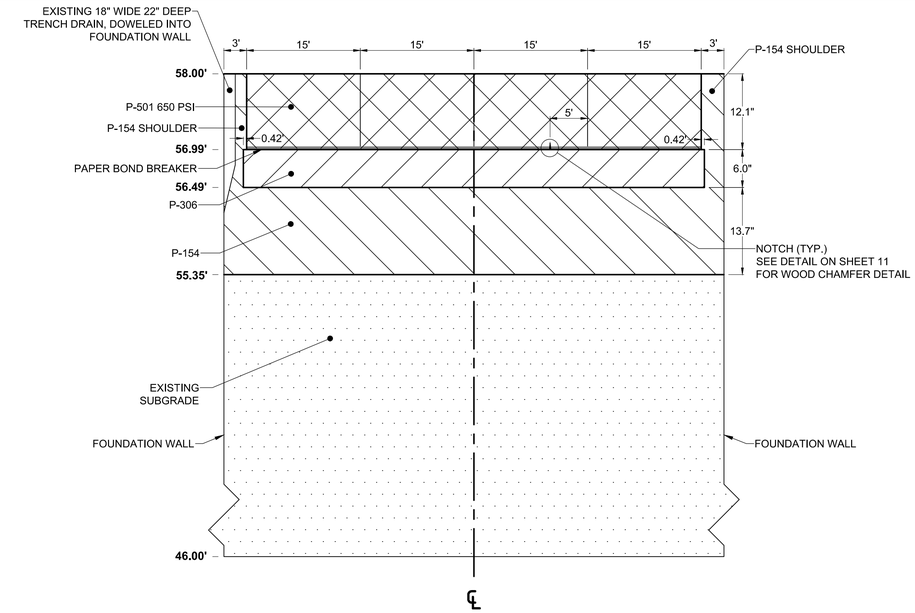
SIZE: ANSI D | SCALE: AS NOTED | SHEET 9 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG



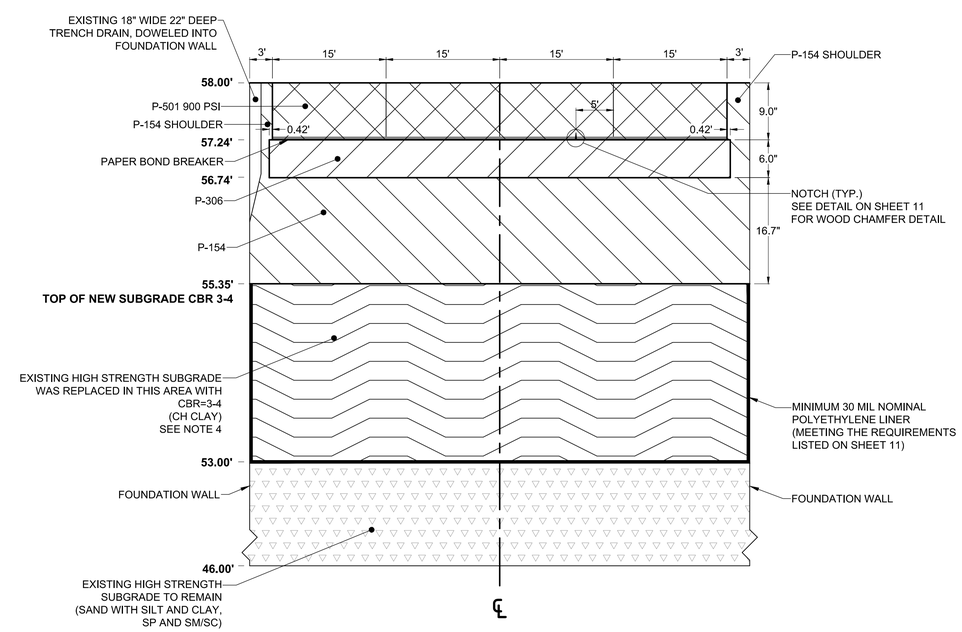
PLAN VIEW STA. 5+00 TO 6+55

SCALE: 1"=10'



SECTION E-E

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=1'



SECTION F-F

HORIZONTAL SCALE: 1"=10'
VERTICAL SCALE: 1"=1'

LEGEND:

- CONTROL POINT - MAG NAIL
- TRIANGULAR NOTCHES FORMED BY WOOD CHAMFER STRIP
- PAPER BOND BREAKER
- P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)
- P-306 - LEAN CONCRETE BASE COURSE
- P-154 - GRANULAR AGGREGATE SUBBASE COURSE
- SUBGRADE CBR 3-4
- EXISTING SUBGRADE - CH CLAY
- EXISTING SUBGRADE - SAND WITH SILT AND CLAY SP AND SM/SC

NOTES:

1. CBR = CALIFORNIA BEARING RATIO.
2. SEE JOINTING PLAN (SHEET 6) FOR JOINT TYPES.
3. SEE SHEET 11 FOR JOINT DETAILS.
4. CONTRACTOR REMOVED 28" OF EXISTING HIGH STRENGTH SUBGRADE AND REPLACED IT WITH 28" DEEP LOW STRENGTH SUBGRADE MATERIAL BETWEEN STA. 6+00 AND 6+55. SUBGRADE INSTALLED IN 3 LIFTS OF 10" AVERAGE THICKNESS AND TRIMMED TO FINAL ELEVATION/THICKNESS.

10 0 10 20 30
GRAPHIC SCALE
1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY: OVERLAY TEST | JOINT COMPARISON | STRENGTH/FATIGUE

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FOR

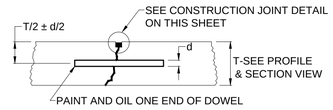
NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8
PHASE 2 AS-BUILT
STRENGTH/FATIGUE TEST STA. 5+00 TO 6+55

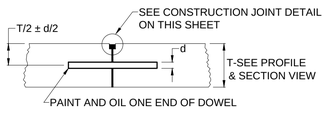
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 10 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG

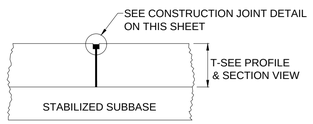


TYPE C DOWELED - CONTRACTION

TYPE D DUMMY - CONTRACTION



TYPE E DOWELED - CONSTRUCTION



TYPE F BUTT JOINT - CONSTRUCTION

d = 3/4" Ø FOR 9" THICK SLABS IN OVERLAY TEST AREA.
d = 1" Ø FOR 12" THICK SLABS IN JOINT COMPARISON TEST AREA.

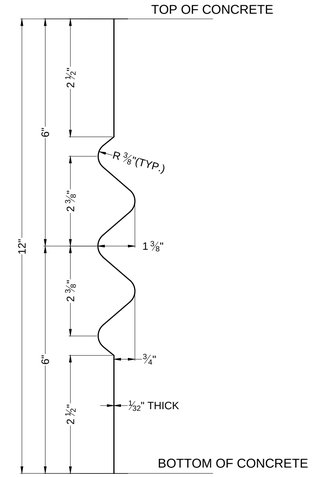
NOTES:

1. BLACK SHADED AREA IS JOINT SEALER.
2. GROOVE MAY BE FORMED OR SAWED.
3. EARLY ENTRY SAW CUTS TO BE CUT MINIMUM OF 7/64" X 1/8" WIDE.
4. FINAL SAW CUT TO BE 7/64" X 1/8" WIDE.

JOINTING FOR RIGID PAVEMENT

N.T.S.

PHOTO OF SAMPLE FORMWORK FOR KEYWAY



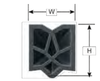
SINUSOIDAL KEYWAY LONGITUDINAL JOINT

N.T.S.

Delastic® Seal Catalog No.	Delastic® Seal Characteristics: Nominal Width (W)	Nominal Height (H)	Maximum Movement	Joint Design Criteria: Narrowest Opening[A]	Widest Opening[A]	Minimum Depth[B]	Typical Installed Width (A)**
E-437	**0.437** (11.11)	**0.937** (23.81)	**0.184** (4.67)	**0.187** (4.75)	**0.371** (9.42)	**1.250** (31.75)	**.250** (6.35)
E-562	**0.562** (14.29)	**0.625** (15.88)	**0.178** (4.52)	**0.250** (6.35)	**0.478** (12.14)	**1.125** (28.58)	**.3125** (7.9375)
E-686	**0.687** (17.46)	**0.687** (17.46)	**0.259** (6.58)	**0.325** (8.26)	**0.584** (14.83)	**1.250** (31.75)	**.375** (9.525)
E-816	**0.812** (20.64)	**0.830** (21.08)	**0.348** (8.84)	**0.350** (8.89)	**0.698** (17.73)	**1.500** (38.10)	**.500** (12.7)
E-1006	**1** (25.40)	**1** (25.40)	**0.450** (11.43)	**0.400** (10.16)	**0.850** (21.59)	**1.750** (44.45)	**.500-.5625** (12.7-14.2875)
E-1256	**1.250** (31.75)	**1** (25.40)	**0.612** (15.54)	**0.450** (11.43)	**1.062** (26.97)	**2** (50.80)	**.75** (19.05)
V-1625	**1.625** (41.28)	**1.125** (28.58)	**0.781** (19.84)	**0.600** (15.24)	**1.381** (35.08)	**2.375** (60.33)	**.875** (22.275)
E-2000	**2** (50.80)	**1.500** (38.10)	**0.950** (24.13)	**0.750** (19.05)	**1.700** (43.18)	**2.625** (66.68)	**1.125** (28.575)
E-2500	**2.500** (63.50)	**2.500** (63.50)	**1.350** (34.29)	**0.775** (19.69)	**2.125** (53.98)	**4** (101.60)	**1.375** (34.925)
E-3000	**3** (76.20)	**2.500** (63.50)	**1.350** (34.29)	**1.200** (30.48)	**2.500** (64.77)	**4.250** (107.95)	**1.750** (44.45)

First number shown in bold represents inches, metric dimensions (mm) are shown in parentheses. Notes: *Thickness of the seal wall and internal web are not drawn to scale. 1) Maximum movement which seal will accommodate in joint with correct design. 2) A narrower opening will place excessive stress on the seal and may cause premature failure. 3) A wider opening may not provide sufficient compressive force to hold the seal in place. **To be used as reference only. Installed width may vary by project.

ASTM D2628 Delastic® Preformed Pavement Seals Physical Requirements: Properties	Requirements	ASTM Test Method
Tensile Strength, min., psi (mPa)	2000 (13.8)	D412
Elongation at Break, min. %	250	D412
Hardness, Type A durometer, points	55±5	D2240 (modified)[A]
Oven Aging, 70 h at 212ºF (100ºC)		D573
Tensile Strength, loss, max., %	20 max	
Elongation, loss, max., %	20 max	
Hardness, Type A durometer, points change	0 to +10	
Oil Swell, ASTM Oil No. 3, 70 h at 212ºF (100ºC) Weight change, max., %	45 max	D471
Ozone Resistance: 20% strain, 300 pphm in air, 70 hr at 104ºF(40ºC)	no cracks	D1149 (modified[B])
Low-Temperature Stiffening, 7 days at 14ºF (-10ºC), Hardness, Type A durometer, points change	0 to +15	D2240
Low-Temperature Recovery[C], 72 h at 14ºF (-10ºC), 50% Deflection, min., %	88	9.2[D]
Low-Temperature Recovery[C], 22 h at -20ºF (-29ºC), 50% Deflection, min., %	83	9.2[D]
High-Temperature Recovery[C], 72 h at 212ºF (100ºC), 50% Deflection, min., %	85	9.2[D]
Compression-Deflection, at 80% of Nominal Width, min., lbf/in.(N/m)	3.5 (613)	9.3[D]



Typical joint design for the "E" and "V" series pavement seals

A The term "modified" in the table relates to the specimen preparation. The use of joint seal as the specimen source requires that more piles than specified in either of the modified test procedures be used. Such specimen modification shall be agreed upon by the purchaser and seller prior to testing. The hardness test shall be made with the durometer in a durometer stand as recommended in Method D2240.

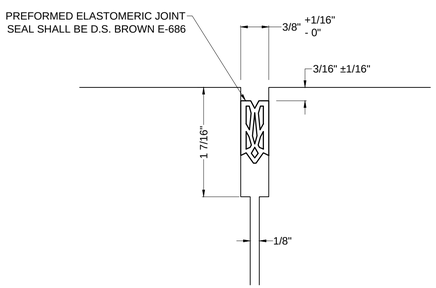
B Test in accordance with Procedure A of D518.

C Cracking, splitting or sticking of a specimen during a recovery test shall mean that the specimen has failed the test.

D The reference sections are those of this specification.

DS BROWN DELASTICÈ PREFORMED PAVEMENT SEALS SPECIFICATIONS

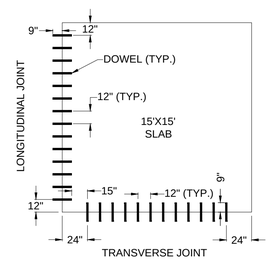
N.T.S.



PREFORMED JOINT SEAL TO BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS.

JOINT SEAL DETAIL

N.T.S.



JOINT LAYOUT PATTERN IN JOINT COMPARISON TEST AREA

N.T.S.

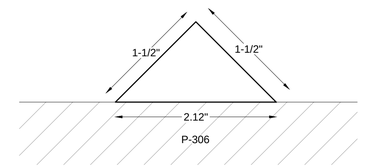
PROPERTY	TEST METHOD	FREQUENCY (1)	UNIT (Imperial)	Solmax 430-1000
SPECIFICATIONS				
Thickness (min. avg.)	ASTM D-5199	Every roll	mils	30.0
Thickness (min.)	ASTM D-5199	Every roll	mils	27
Resin Density	ASTM D-1505	1/Batch	g/cc	> 0.932
Melt Index - 190/2.16 (max.)	ASTM D-1238	1/Batch	g/10 min.	1.0
Sheet Density	ASTM D-1505	Every 2 rolls	g/cc	> 0.94
Carbon Black Content	ASTM D-4218	Every 2 rolls	%	> 2.0 / < 3.0
Carbon Black Dispersion	ASTM D-5596	Every 6 rolls	Category	Cat. 1 & Cat. 2
Oxidation Induction Time (min. ave)	ASTM D-3895	1/Batch	min.	100
Tensile Properties (min. avg) (2)	ASTM D-6693	Every 2 rolls		
Strength at Yield			ppi	66
Elongation at Yield			%	13
Strength at Break			ppi	122
Elongation at Break			%	700
Tear Resistance (min. avg.)	ASTM D-1004	Every 6 rolls	lbs	21
Puncture Resistance (min. avg.)	ASTM D-4833	Every 6 rolls	lbs	60
Dimensional Stability	ASTM D-1204	Every 6 rolls	%	± 2
Stress Crack Resistance (SP-NCTL)	ASTM D-5397	1/Batch	hr.	300
Oven Aging - % retained after 90 days	ASTM D-5721	Per formulation		
HP OIT (min. avg.)	ASTM D-5885		%	80
UV Resistance - % retained after 1600 hr	GRI-GM-11	Per formulation	%	
HP-OIT (min. avg.)	ASTM D-5885			50

NOTES
1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.

* All values are nominal test results, except when specified as minimum or maximum.
* The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. SOLMAX assumes no liability in connection with the use of this information.

POLYETHYLENE LINER SPECIFICATIONS

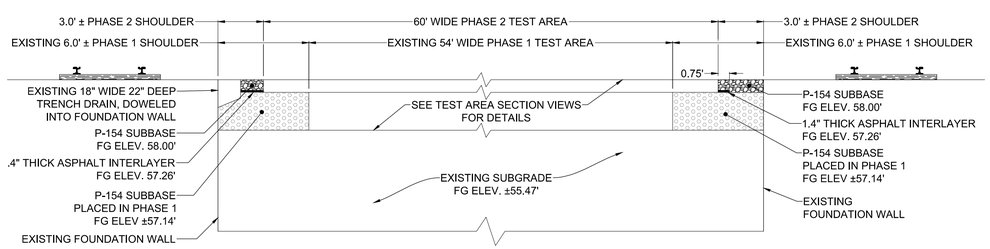
N.T.S.



THE NOTCH MUST BE BONDED TO THE P-306 AT THE LOCATIONS SHOWN ON THE PLANS.

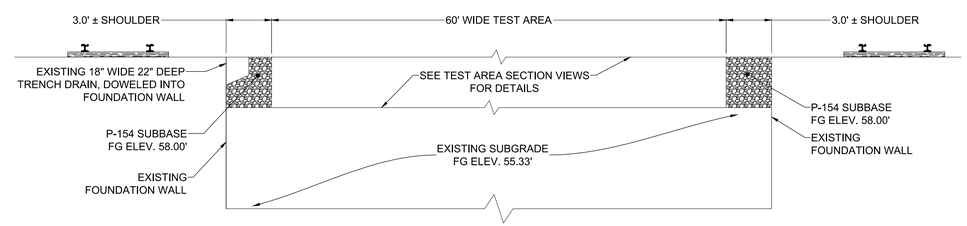
SYLVAN INDUSTRIES, LLC WOOD CHAMFER DETAIL*

N.T.S.



SHOULDER DETAIL 1
STA. 3+00 TO STA. 3+90

1"=5'



SHOULDER DETAIL 2
STA. 3+90 TO STA. 6+55

1"=5'

NO.	REVISIONS	DATE	BY	CHK	APR

SRA INTERNATIONAL, INC.,
A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

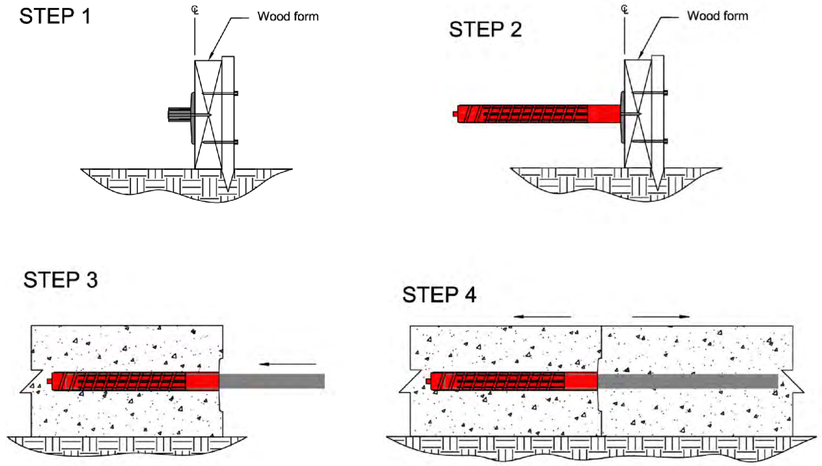
NATIONAL
AIRPORT PAVEMENT
TEST FACILITY
ATLANTIC CITY
AIRPORT, NJ 08234

	NAME	DATE
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8
PHASE 2 AS-BUILT DETAILS

PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 11 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG



INSTALLATION GUIDE

SPEED DOWEL BASE IS CENTERED IN FUTURE CONCRETE SECTION AND NAILED TO THE WOOD FORM. AT MINIMUM ENSURE DESIGN CONCRETE COVER REQUIREMENTS ARE MAINTAINED.

SPEED DOWEL SLEEVE IS PLACED OVER THE SPEED DOWEL BASE PRIOR TO THE FIRST CONCRETE PLACEMENT ENSURING PROPER DOWEL ALIGNMENT. USE CARE WHEN PLACING CONCRETE AROUND THE SPEED DOWEL SLEEVES.

THE FORM IS STRIPPED ALONG WITH THE ATTACHED REUSABLE SPEED DOWEL BASE AND THE LOAD TRANSFER DOWEL IS THEN INSERTED INTO THE SPEED DOWEL SLEEVE PRIOR TO THE SECOND CONCRETE PLACEMENT. NO DOWEL GREASE IS REQUIRED.

THE UNIQUE DESIGN OF THE SPEED DOWEL SYSTEM ALLOWS FOR AXIAL MOVEMENT BETWEEN PLACEMENTS AS THE CONCRETE SHRINKS.

NOTES:

1. ALLOWS THE CONCRETE TO SHRINK AXIALLY WITHOUT RESTRAINT.
2. TYPICALLY USED IN SLAB OR WALL CONSTRUCTION JOINTS.
3. ROUND DOWELS USED IN NEW CONSTRUCTION AND SQUARE DOWELS ARE RECOMMENDED FOR RETROFIT CONSTRUCTION.
4. ELIMINATES DOWEL MISALIGNMENT AND REDUCES INTERNAL STRESSES.
5. NO NEED TO DRILL FORMS (REUSE OF FORMS INCREASED).
6. GREATLY SIMPLIFIES FORM REMOVAL

SIKA® GREENSTREEK SPEED DOWEL® DETAILS

N.T.S.

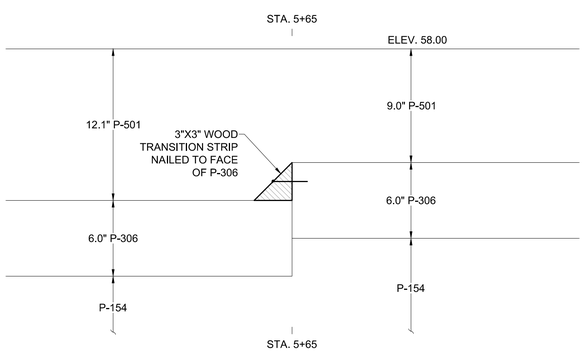
SLEEVE PRODUCT CODE	ROUND DOWEL SIZE	SLEEVE LENGTH	BASE PRODUCT CODE
PSD09/#4TX	5/8" Smooth or #4 Rebar X 18"	9"	PSD/#4BX
PSD12/#4TX	5/8" Smooth or #4 Rebar X 24"	12"	
PSD09/#5TX	3/4" Smooth or #5 Rebar X 18"	9"	PSD/#5BX
PSD12/#5TX	3/4" Smooth or #5 Rebar X 24"	12"	
PSD09/#6TX	7/8" Smooth or #6 Rebar X 18"	9"	PSD/#6BX
PSD12/#6TX	7/8" Smooth or #6 Rebar X 24"	12"	
PSD09/#7TX	1" Smooth or #7 Rebar X 18"	9"	PSD/#7BX
PSD12/#7TX	1" Smooth or #7 Rebar X 24"	12"	
PSD09/#9TX	1 1/4" Smooth or #9 Rebar X 18"	9"	PSD/#9BX
PSD12/#9TX	1 1/4" Smooth or #9 Rebar X 24"	12"	

Material Composition	100% polypropylene
Compressibility ASTM D 695	5,500-8,000 PSI
Thickness (Nominal)	
Speed Dowel Sleeve	0.125"
Speed Load Sleeve†	0.075"
Density	0.88-0.92 g/cc
Fatigue Resistance	Excellent
Impact/Stiffness Balance	Excellent

SIKA® GREENSTREEK SPEED DOWEL® SPECIFICATIONS

N.T.S.

*NOTE: WOOD TRANSITION STRIP ADDED TO PREVENT CRACKING



WOOD TRANSITION STRIP DETAIL STA. 5+65 SIDE VIEW

SCALE: 1"=½'

WOOD TRANSITION STRIP PHOTOGRAPH STA. 5+65 SIDE VIEW LOOKING NORTH

SCALE: N.T.S.

EXISTING TARP ENCOUNTERED BETWEEN STA. 5+98 AND 6+00 VIEW LOOKING SOUTH

SCALE: N.T.S.

NO.	REVISIONS	DATE	BY	CHK	APR

CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

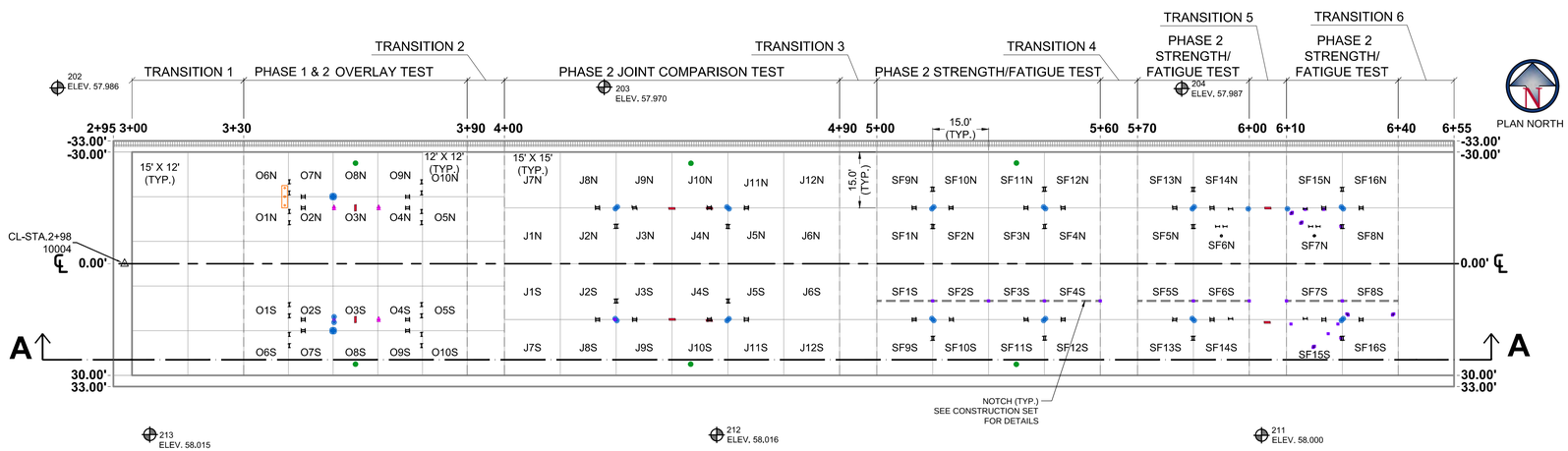
	NAME	DATE
DRAWN	E.G./M.M.	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8

PHASE 2 AS-BUILT DETAILS

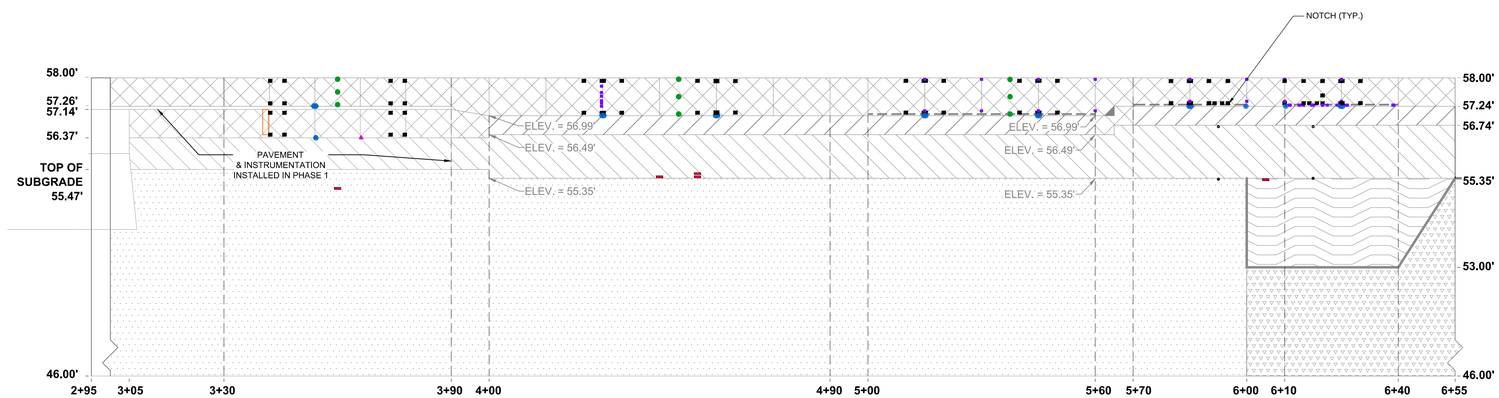
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 12 OF 34

CAD FILE: CC8-CONSTR-AS-BUILT.DWG



PLAN VIEW

SCALE: 1"=20'



PROFILE VIEW A-A

HORIZONTAL SCALE: 1"=20'

VERTICAL SCALE: 1"=2'

INSTRUMENT KEY		
	EG	EMBEDDED STRAIN GAUGE
	T	THERMOCOUPLE
	MS	MOISTURE SENSOR
	ECS	EDDY CURRENT SENSOR
	RG	RESISTANCE GAGE
	PC	PRESSURE CELL
	POT	POTENTIOMETER

LEGEND:

- CENTER LINE MARKER - MAG NAIL
- CONTROL POINT - MAG NAIL
- NOTCH
- P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)
- P-306 - LEAN CONCRETE BASE COURSE
- P-154 - GRANULAR AGGREGATE SUBBASE COURSE
- SUBGRADE CBR 3-4
- EXISTING SUBGRADE - CH CLAY
- EXISTING SUBGRADE - SAND WITH SILT & CLAY SP AND SM/SC

20 0 20 40 60

GRAPHIC SCALE

1" = 20'

NO.	REVISIONS	DATE	BY	CHK	APR

CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY

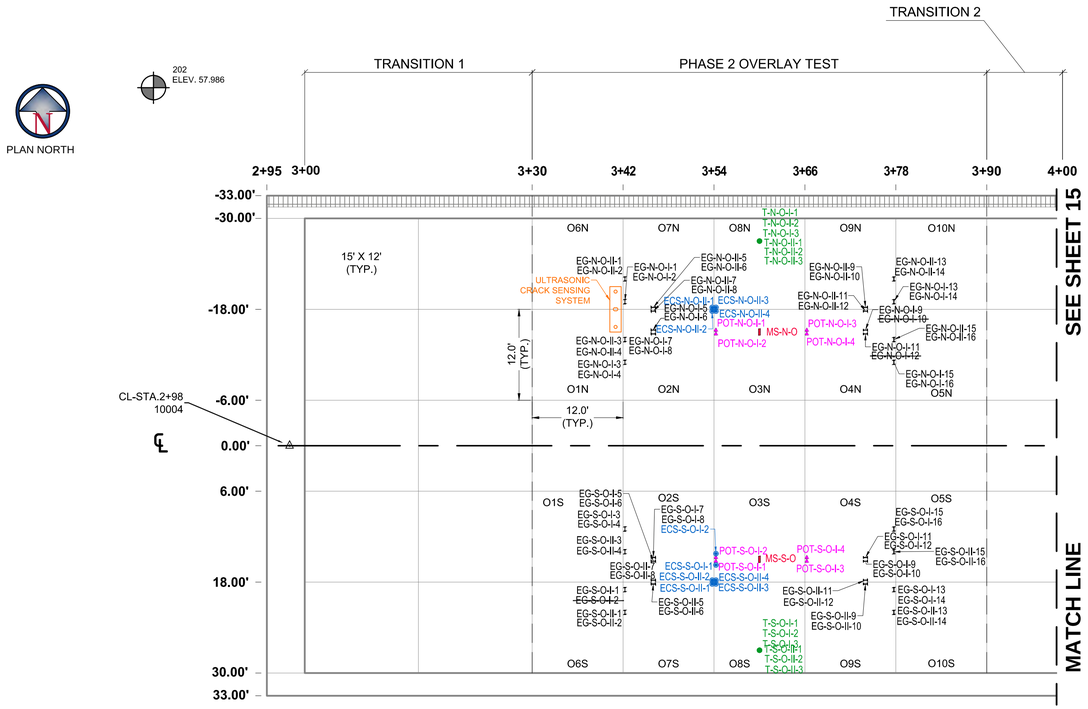
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED		
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8

INSTRUMENTATION AS-BUILT PLAN OVERVIEW

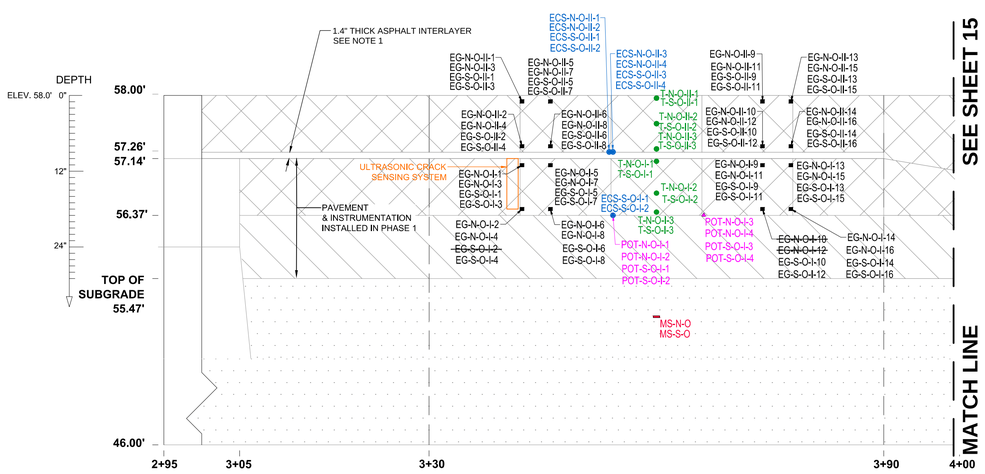
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 13 OF 34

CAD FILE: CC8-INSTR-AS-BUILT.DWG



PLAN VIEW STA. 2+95 TO 4+00

SCALE: 1"=10'



PROFILE VIEW STA. 2+95 TO 4+00

HORIZONTAL SCALE: 1"=10'

VERTICAL SCALE: 1"=1'

PHASE 1 OVERLAY INSTRUMENTATION

NORTH

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
30301	EG-N-O-I-1	342.25	-19.00	57.08	11.00
30302	EG-N-O-I-2	342.25	-19.00	56.50	18.00
30303	EG-N-O-I-3	342.25	-11.00	57.08	11.00
30304	EG-N-O-I-4	342.25	-11.00	56.50	18.00
30305	EG-N-O-I-5	346.00	-15.25	57.08	11.00
30306	EG-N-O-I-6	346.00	-15.25	56.50	18.00
30307	EG-N-O-I-7	346.00	-14.75	57.08	11.00
30308	EG-N-O-I-8	346.00	-14.75	56.50	18.00
30309	EG-N-O-I-9	374.00	-15.25	57.08	11.00
30310	~~EG-N-O-I-10~~	374.00	-15.25	56.50	18.00
30311	EG-N-O-I-11	374.00	-14.75	57.08	11.00
30312	~~EG-N-O-I-12~~	374.00	-14.75	56.50	18.00
30313	EG-N-O-I-13	377.75	-19.00	57.08	11.00
30314	EG-N-O-I-14	377.75	-19.00	56.50	18.00
30315	EG-N-O-I-15	377.75	-11.00	57.08	11.00
30316	EG-N-O-I-16	377.75	-11.00	56.50	18.00
30317	MS-N-O	360.00	-15.00	55.08	35.00
30318	POT-N-O-I-1	354.25	-15.25	56.42	19.00
30319	POT-N-O-I-2	354.25	-14.75	56.42	19.00
30320	POT-N-O-I-3	366.25	-15.25	56.42	19.00
30321	POT-N-O-I-4	366.25	-14.75	56.42	19.00
30322	T-N-O-I-1	360.00	-27.00	57.13	10.44
30323	T-N-O-I-2	360.00	-27.00	56.71	15.48
30324	T-N-O-I-3	360.00	-27.00	56.46	18.48
30349	ULTRASONIC CRACK SENSING SYSTEM	341.00	-18.00	57.17	9.96

SOUTH

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
30350	ECS-S-O-I-1	354.25	15.75	56.42	19.00
30351	ECS-S-O-I-2	354.25	14.25	56.42	19.00
30325	EG-S-O-I-1	342.25	19.00	57.08	11.00
30326	~~EG-S-O-I-2~~	342.25	19.00	56.50	18.00
30327	EG-S-O-I-3	342.25	11.00	57.08	11.00
30328	EG-S-O-I-4	342.25	11.00	56.50	18.00
30329	EG-S-O-I-5	346.00	15.25	57.08	11.00
30330	EG-S-O-I-6	346.00	15.25	56.50	18.00
30331	EG-S-O-I-7	346.00	14.75	57.08	11.00
30332	EG-S-O-I-8	346.00	14.75	56.50	18.00
30333	EG-S-O-I-9	374.00	15.25	57.08	11.00
30334	EG-S-O-I-10	374.00	15.25	56.50	18.00
30335	EG-S-O-I-11	374.00	14.75	57.08	11.00
30336	EG-S-O-I-12	374.00	14.75	56.50	18.00
30337	EG-S-O-I-13	377.75	19.00	57.08	11.00
30338	EG-S-O-I-14	377.75	19.00	56.50	18.00
30339	EG-S-O-I-15	377.75	11.00	57.08	11.00
30340	EG-S-O-I-16	377.75	11.00	56.50	18.00
30341	MS-S-O	360.00	15.00	55.08	35.00
30342	POT-S-O-I-1	354.25	15.25	56.42	19.00
30343	POT-S-O-I-2	354.25	14.75	56.42	19.00
30344	POT-S-O-I-3	366.25	15.25	56.42	19.00
30345	POT-S-O-I-4	366.25	14.75	56.42	19.00
30346	T-S-O-I-1	360.00	27.00	57.13	10.44
30347	T-S-O-I-2	360.00	27.00	56.71	15.48
30348	T-S-O-I-3	360.00	27.00	56.46	18.48

~~EG-S-O-I-2~~ - CROSSED NAME DESIGNATES SENSORS FAILED DURING CONSTRUCTION

PHASE 2 OVERLAY INSTRUMENTATION

NORTH

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
65	ECS-N-O-II-1	353.75	-18.25	57.25	9.00
66	ECS-N-O-II-2	353.75	-17.75	57.25	9.00
67	ECS-N-O-II-3	354.25	-18.25	57.25	9.00
68	ECS-N-O-II-4	354.25	-17.75	57.25	9.00
49	EG-N-O-II-1	342.25	-22.00	57.92	1.00
50	EG-N-O-II-2	342.25	-22.00	57.33	8.00
51	EG-N-O-II-3	342.25	-14.00	57.92	1.00
52	EG-N-O-II-4	342.25	-14.00	57.33	8.00
53	EG-N-O-II-5	346.00	-18.25	57.92	1.00
54	EG-N-O-II-6	346.00	-18.25	57.33	8.00
55	EG-N-O-II-7	346.00	-17.75	57.92	1.00
56	EG-N-O-II-8	346.00	-17.75	57.33	8.00
57	EG-N-O-II-9	374.00	-18.25	57.92	1.00
58	EG-N-O-II-10	374.00	-18.25	57.33	8.00
59	EG-N-O-II-11	374.00	-17.75	57.92	1.00
60	EG-N-O-II-12	374.00	-17.75	57.33	8.00
61	EG-N-O-II-13	377.75	-22.00	57.92	1.00
62	EG-N-O-II-14	377.75	-22.00	57.33	8.00
63	EG-N-O-II-15	377.75	-14.00	57.92	1.00
64	EG-N-O-II-16	377.75	-14.00	57.33	8.00
69	T-N-O-II-1	360.00	-27.00	57.96	0.50
70	T-N-O-II-2	360.00	-27.00	57.62	4.50
71	T-N-O-II-3	360.00	-27.00	57.29	8.50

SOUTH

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
88	ECS-S-O-II-1	353.75	18.25	57.25	9.00
89	ECS-S-O-II-2	353.75	17.75	57.25	9.00
90	ECS-S-O-II-3	354.25	18.25	57.25	9.00
91	ECS-S-O-II-4	354.25	17.75	57.25	9.00
72	EG-S-O-II-1	342.25	22.00	57.92	1.00
73	EG-S-O-II-2	342.25	22.00	57.33	8.00
74	EG-S-O-II-3	342.25	14.00	57.92	1.00
75	EG-S-O-II-4	342.25	14.00	57.33	8.00
76	EG-S-O-II-5	346.00	18.25	57.92	1.00
77	EG-S-O-II-6	346.00	18.25	57.33	8.00
78	EG-S-O-II-7	346.00	17.75	57.92	1.00
79	EG-S-O-II-8	346.00	17.75	57.33	8.00
80	EG-S-O-II-9	374.00	18.25	57.92	1.00
81	EG-S-O-II-10	374.00	18.25	57.33	8.00
82	EG-S-O-II-11	374.00	17.75	57.92	1.00
83	EG-S-O-II-12	374.00	17.75	57.33	8.00
84	EG-S-O-II-13	377.75	22.00	57.92	1.00
85	EG-S-O-II-14	377.75	22.00	57.33	8.00
86	EG-S-O-II-15	377.75	14.00	57.92	1.00
87	EG-S-O-II-16	377.75	14.00	57.33	8.00
92	T-S-O-II-1	360.00	27.00	57.96	0.50
93	T-S-O-II-2	360.00	27.00	57.62	4.50
94	T-S-O-II-3	360.00	27.00	57.29	8.50

INSTRUMENT KEY		
	EG	EMBEDDED STRAIN GAUGE
	T	THERMOCOUPLE
	MS	MOISTURE SENSOR
	ECS	EDDY CURRENT SENSOR
	POT	POTENTIOMETER

NOTES:

1. WIRE CONDUIT CHANNELS WERE EMBEDDED IN THE ASPHALT INTERLAYER.
2. A RED FONT INDICATES AS-BUILT VALUES DIFFERENT FROM PROPOSED.

LEGEND:

- CENTER LINE MARKER - MAG NAIL
- CONTROL POINT - MAG NAIL

N - NORTH
S - SOUTH
J - JOINT COMPARISON TEST
I - PHASE 1
II - PHASE 2
FT - FEET
IN - INCHES

P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)

P-154 - GRANULAR AGGREGATE SUBBASE COURSE

EXISTING SUBGRADE - CH CLAY

10 0 10 20 30

GRAPHIC SCALE

1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY

OVERLAY TEST | JOINT COMPARISON | STRENGTH/FATIGUE

CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR NATIONAL AIRPORT PAVEMENT TEST FACILITY

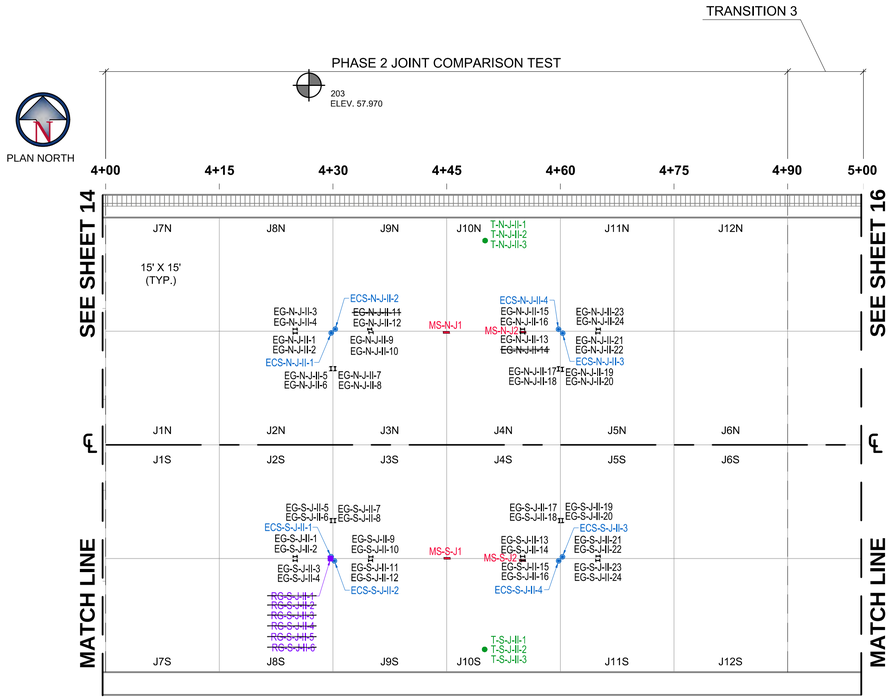
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED		
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8

OVERLAY INSTRUMENTATION AS-BUILT PLAN STA. 2+95 TO 4+00

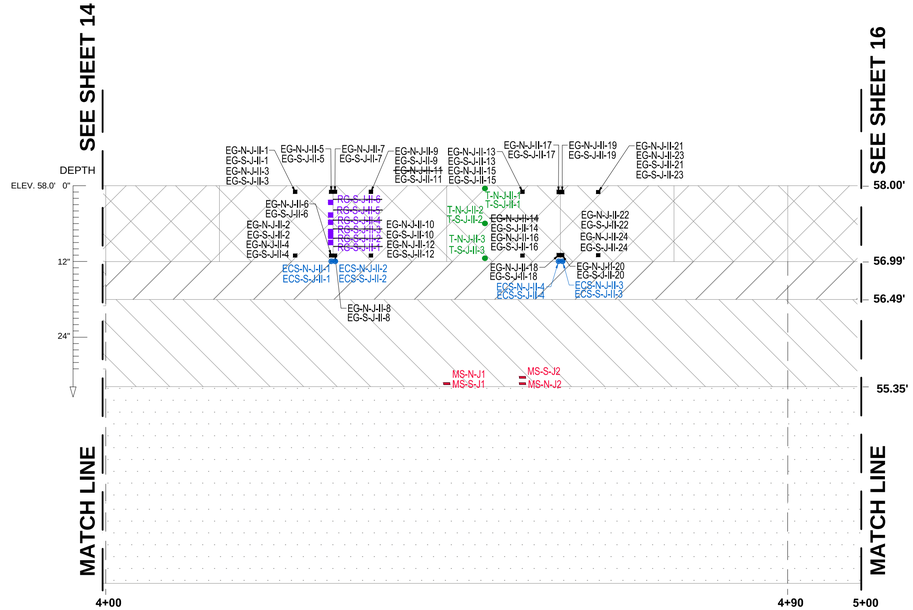
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 14 OF 34

CAD FILE: CC8-INSTR-AS-BUILT.DWG



PLAN VIEW STA. 4+00 TO 5+00

SCALE: 1"=10'



PROFILE VIEW STA. 4+00 TO 5+00

HORIZONTAL SCALE: 1"=10'

VERTICAL SCALE: 1"=1'

PHASE 2 JOINT COMPARISON INSTRUMENTATION

NORTH

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
112	ECS-N-J-II-1	429.76	-14.76	57.00	12.00
113	ECS-N-J-II-2	430.29	-15.26	57.00	12.00
114	ECS-N-J-II-3	460.30	-14.73	57.00	12.00
115	ECS-N-J-II-4	459.75	-15.24	57.00	12.00
95	EG-N-J-II-1	425.00	-14.75	57.92	1.00
96	EG-N-J-II-2	425.00	-14.75	57.09	10.88
97	EG-N-J-II-3	424.99	-15.27	57.92	1.00
98	EG-N-J-II-4	424.99	-15.27	57.09	10.88
99	EG-N-J-II-5	429.72	-10.05	57.92	1.00
100	EG-N-J-II-6	429.72	-10.05	57.09	10.88
101	EG-N-J-II-7	430.27	-10.05	57.92	1.00
102	EG-N-J-II-8	430.27	-10.05	57.08	11.00
103	EG-N-J-II-9	435.02	-14.82	57.93	0.87
104	EG-N-J-II-10	435.02	-14.82	57.09	10.88
105	~~EG-N-J-II-11~~	434.86	-15.26	57.92	1.00
106	EG-N-J-II-12	434.86	-15.26	57.09	10.88
107	EG-N-J-II-13	455.04	-14.75	57.92	1.00
108	~~EG-N-J-II-14~~	455.04	-14.75	57.08	11.00
109	EG-N-J-II-15	455.02	-15.27	57.92	1.00
110	EG-N-J-II-16	455.02	-15.27	57.08	11.00
231	EG-N-J-II-17	459.75	-10.02	57.92	1.00
232	EG-N-J-II-18	459.75	-10.02	57.09	10.88
233	EG-N-J-II-19	460.27	-9.96	57.92	1.00
234	EG-N-J-II-20	460.27	-9.96	57.09	10.88
235	EG-N-J-II-21	464.96	-14.76	57.93	0.87
236	EG-N-J-II-22	464.96	-14.76	57.09	10.88
237	EG-N-J-II-23	465.01	-15.26	57.92	1.00
238	EG-N-J-II-24	465.01	-15.26	57.09	10.88
313	MS-N-J1	444.95	-14.84	55.39	31.3
314	MS-N-J2	455.06	-14.88	55.39	31.3
116	T-N-J-II-1	450.07	-26.94	57.96	0.50
117	T-N-J-II-2	450.07	-26.94	57.50	6.00
118	T-N-J-II-3	450.07	-26.94	57.04	11.50

SOUTH

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
136	ECS-S-J-II-1	429.74	14.76	57.00	12.00
137	ECS-S-J-II-2	430.18	15.31	57.00	12.00
138	ECS-S-J-II-3	460.26	14.78	57.00	12.00
139	ECS-S-J-II-4	459.77	15.31	57.00	12.00
119	EG-S-J-II-1	425.01	14.74	57.92	1.00
120	EG-S-J-II-2	425.01	14.74	57.09	10.88
121	EG-S-J-II-3	425.01	15.28	57.92	1.00
122	EG-S-J-II-4	425.01	15.28	57.09	10.88
123	EG-S-J-II-5	429.75	10.00	57.92	1.00
124	EG-S-J-II-6	429.75	10.00	57.09	10.88
125	EG-S-J-II-7	430.25	10.00	57.92	1.00
126	EG-S-J-II-8	430.25	10.00	57.09	10.88
127	EG-S-J-II-9	435.00	14.76	57.92	1.00
128	EG-S-J-II-10	435.00	14.76	57.08	11.00
129	EG-S-J-II-11	434.95	15.26	57.93	0.87
130	EG-S-J-II-12	434.95	15.26	57.09	10.88
131	EG-S-J-II-13	455.03	14.72	57.92	1.00
132	EG-S-J-II-14	455.03	14.72	57.09	10.88
133	EG-S-J-II-15	455.08	15.26	57.92	1.00
134	EG-S-J-II-16	455.08	15.26	57.09	10.88
239	EG-S-J-II-17	459.87	10.00	57.92	1.00
240	EG-S-J-II-18	459.87	10.00	57.09	10.88
241	EG-S-J-II-19	460.28	10.00	57.92	1.00
242	EG-S-J-II-20	460.28	10.00	57.09	10.88
243	EG-S-J-II-21	464.98	14.68	57.93	0.87
244	EG-S-J-II-22	464.98	14.68	57.09	10.88
245	EG-S-J-II-23	464.95	15.26	57.92	1.00
246	EG-S-J-II-24	464.95	15.26	57.09	10.88
312	MS-S-J1	445.05	14.97	55.39	31.3
311	MS-S-J2	455.00	15.26	55.48	30.3
323	~~RG-S-J-II-1~~	429.68	15.00	57.25	9.00
324	~~RG-S-J-II-2~~	429.68	15.00	57.33	8.00
325	~~RG-S-J-II-3~~	429.68	15.00	57.43	6.88
326	~~RG-S-J-II-4~~	429.68	15.00	57.54	5.50
327	~~RG-S-J-II-5~~	429.68	15.00	57.64	4.38
328	~~RG-S-J-II-6~~	429.68	15.00	57.79	2.50
140	T-S-J-II-1	450.01	26.99	57.96	0.50
141	T-S-J-II-2	450.01	26.99	57.50	6.00
142	T-S-J-II-3	450.01	26.99	57.04	11.50

ADDITIONAL SENSORS INSTALLED DURING CONSTRUCTION

~~EG-S-O-I-2~~ - CROSSED NAME DESIGNATES SENSORS FAILED DURING CONSTRUCTION

INSTRUMENT KEY

	EG	EMBEDDED STRAIN GAUGE
	T	THERMOCOUPLE
	MS	MOISTURE SENSOR
	ECS	EDDY CURRENT SENSOR
	RG	RESISTANCE GAGE

LEGEND:

- CENTER LINE MARKER - MAG NAIL
- CONTROL POINT - MAG NAIL

N - NORTH
S - SOUTH
J - JOINT COMPARISON TEST
II - PHASE 2
FT - FEET
IN - INCHES

P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)

P-306 - LEAN CONCRETE BASE COURSE

P-154 - GRANULAR AGGREGATE SUBBASE COURSE

EXISTING SUBGRADE - CH CLAY

NOTES:

A RED FONT INDICATES AS-BUILT VALUES DIFFERENT FROM PROPOSED.

10 0 10 20 30

GRAPHIC SCALE

1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY

OVERLAY TEST | JOINT COMPARISON | STRENGTH/FATIGUE

CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY

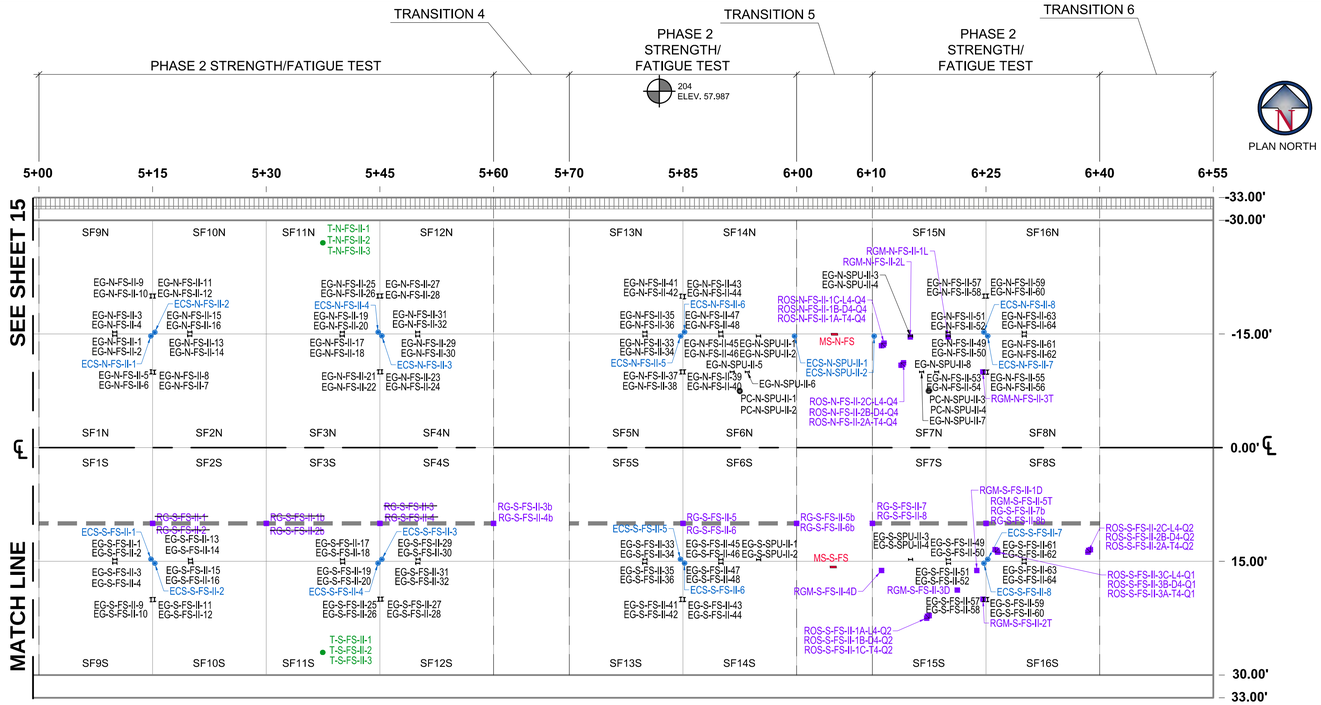
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED		
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8

JOINT COMPARISON INSTRUMENTATION AS-BUILT PLAN STA. 4+00 TO 5+00

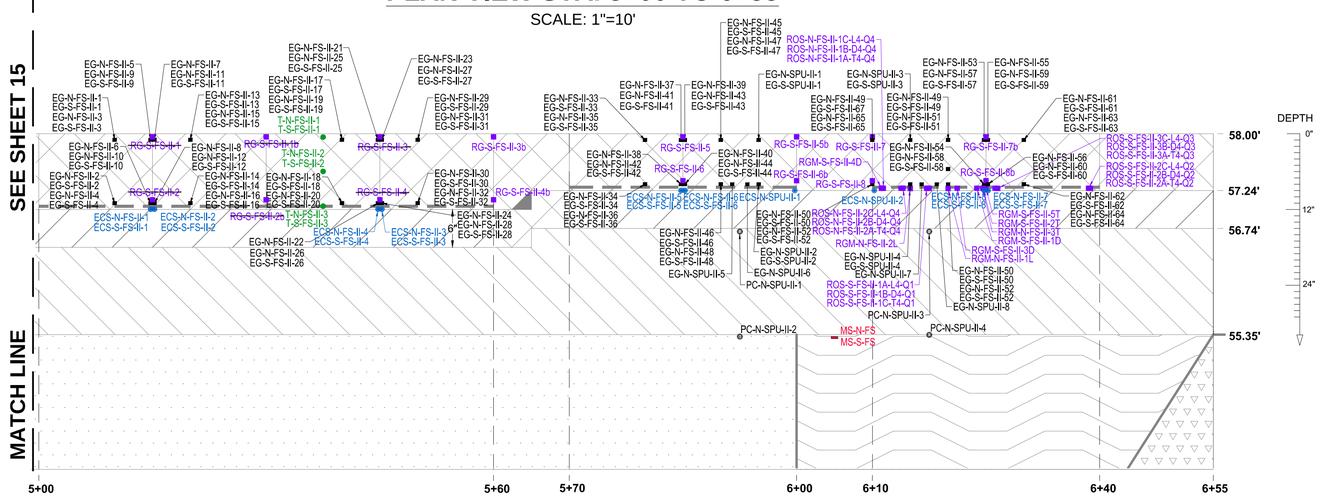
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 15 OF 34

CAD FILE: CC8-INSTR-AS-BUILT.DWG



PLAN VIEW STA. 5+00 TO 6+55

SCALE: 1"=10'



PROFILE VIEW STA. 5+00 TO 6+55

HORIZONTAL SCALE: 1"=10'

VERTICAL SCALE: 1"=1'

LEGEND:

- △ - CENTER LINE MARKER MAG NAIL
- ⊕ - CONTROL POINT - MAG NAIL
- — — - NOTCH

N - NORTH
S - SOUTH
J - JOINT COMPARISON TEST
II - PHASE 2
FT - FEET
IN - INCHES

- P-501 - CONCRETE PAVEMENT (PORTLAND CEMENT CONCRETE)
- P-306 - LEAN CONCRETE BASE COURSE
- P-154 - GRANULAR AGGREGATE SUBBASE COURSE
- SUBGRADE CBR 3-4
- EXISTING SUBGRADE - SAND WITH SILT & CLAY SP AND SM/SC
- EXISTING SUBGRADE - CH CLAY

10 0 10 20 30

GRAPHIC SCALE

1" = 10'

RG #	SLAB
RG-S-FS-II-1	SF2S
RG-S-FS-II-2	SF2S
RG-S-FS-II-1b	SF2S
RG-S-FS-II-2b	SF2S
RG-S-FS-II-3	SF4S
RG-S-FS-II-4	SF4S
RG-S-FS-II-3b	SF4S
RG-S-FS-II-4b	SF4S

RG-S-FS-II-5	SF6S
RG-S-FS-II-6	SF6S
RG-S-FS-II-5b	SF6S
RG-S-FS-II-6b	SF6S
RG-S-FS-II-7	SF7S
RG-S-FS-II-8	SF7S
RG-S-FS-II-7b	SF7S
RG-S-FS-II-8b	SF7S

NORTH

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
176	ECS-N-FS-II-1	514.77	-14.73	57.00	12.00
177	ECS-N-FS-II-2	515.28	-15.23	57.00	12.00
178	ECS-N-FS-II-3	545.25	-14.75	57.00	12.00
179	ECS-N-FS-II-4	544.76	-15.24	57.00	12.00
223	ECS-N-FS-II-5	584.68	-14.71	57.25	9.00
224	ECS-N-FS-II-6	585.19	-15.25	57.25	9.00
225	ECS-N-FS-II-7	625.21	-14.74	57.25	9.00
226	ECS-N-FS-II-8	624.72	-15.24	57.25	9.00
354	ECS-N-SPU-II-1	599.71	-14.71	57.25	9.00
355	ECS-N-SPU-II-2	610.23	-14.73	57.25	9.00
143	EG-N-FS-II-1	510.01	-14.78	57.89	1.38
144	EG-N-FS-II-2	510.01	-14.78	57.10	10.75
145	EG-N-FS-II-3	510.01	-15.26	57.90	1.25
146	EG-N-FS-II-4	510.01	-15.26	57.08	11.00
147	EG-N-FS-II-5	514.80	-10.01	57.89	1.38
148	EG-N-FS-II-6	514.80	-10.01	57.10	10.75
149	EG-N-FS-II-7	515.26	-9.95	57.90	1.25
150	EG-N-FS-II-8	515.26	-9.95	57.10	10.75
151	EG-N-FS-II-9	514.76	-20.02	57.90	1.25
152	EG-N-FS-II-10	514.76	-20.02	57.10	10.75
153	EG-N-FS-II-11	515.25	-20.00	57.89	1.38
154	EG-N-FS-II-12	515.25	-20.00	57.10	10.75
155	EG-N-FS-II-13	519.90	-14.76	57.89	1.38
156	EG-N-FS-II-14	519.90	-14.76	57.10	10.75
157	EG-N-FS-II-15	519.92	-15.26	57.90	1.25
158	EG-N-FS-II-16	519.92	-15.26	57.09	10.88
159	EG-N-FS-II-17	540.03	-14.74	57.90	1.25
160	EG-N-FS-II-18	540.03	-14.74	57.10	10.75
161	EG-N-FS-II-19	540.05	-15.25	57.88	1.50
162	EG-N-FS-II-20	540.05	-15.25	57.10	10.75
163	EG-N-FS-II-21	544.80	-10.00	57.90	1.25
164	EG-N-FS-II-22	544.80	-10.00	57.10	10.75
165	EG-N-FS-II-23	545.27	-10.01	57.89	1.38
166	EG-N-FS-II-24	545.27	-10.01	57.09	10.88

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
167	EG-N-FS-II-25	544.74	-20.01	57.89	1.38
168	EG-N-FS-II-26	544.74	-20.01	57.10	10.75
169	EG-N-FS-II-27	545.24	-20.01	57.92	1.00
170	EG-N-FS-II-28	545.24	-20.01	57.09	10.88
171	EG-N-FS-II-29	550.00	-14.72	57.88	1.50
172	EG-N-FS-II-30	550.00	-14.72	57.09	10.88
173	EG-N-FS-II-31	549.99	-15.26	57.90	1.25
174	EG-N-FS-II-32	549.99	-15.26	57.10	10.75
247	EG-N-FS-II-33	580.00	-14.73	57.89	1.38
248	EG-N-FS-II-34	580.00	-14.73	57.35	7.75
249	EG-N-FS-II-35	579.98	-15.26	57.90	1.25
250	EG-N-FS-II-36	579.98	-15.26	57.35	7.75
251	EG-N-FS-II-37	584.72	-9.99	57.90	1.25
252	EG-N-FS-II-38	584.72	-9.99	57.35	7.75
253	EG-N-FS-II-39	585.20	-9.99	57.90	1.25
254	EG-N-FS-II-40	585.20	-9.99	57.35	7.75
255	EG-N-FS-II-41	584.70	-19.99	57.90	1.25
256	EG-N-FS-II-42	584.70	-19.99	57.35	7.75
257	EG-N-FS-II-43	585.20	-19.93	57.90	1.25
258	EG-N-FS-II-44	585.20	-19.93	57.35	7.75
259	EG-N-FS-II-45	590.02	-14.73	57.90	1.25
260	EG-N-FS-II-46	590.02	-14.73	57.35	7.75
261	EG-N-FS-II-47	589.99	-15.26	57.90	1.25
262	EG-N-FS-II-48	589.99	-15.26	57.35	7.75
263	EG-N-FS-II-49	620.01	-14.72	57.90	1.25
264	EG-N-FS-II-50	620.01	-14.72	57.35	7.75
265	EG-N-FS-II-51	620.00	-15.21	57.89	1.38
266	EG-N-FS-II-52	620.00	-15.21	57.36	7.62
267	EG-N-FS-II-53	624.70	-9.96	57.90	1.25
268	EG-N-FS-II-54	624.70	-9.96	57.35	7.75
269	EG-N-FS-II-55	625.21	-9.97	57.89	1.38
270	EG-N-FS-II-56	625.21	-9.97	57.36	7.62
271	EG-N-FS-II-57	624.71	-19.99	57.90	1.25
272	EG-N-FS-II-58	624.71	-19.99	57.35	7.75

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
273	EG-N-FS-II-59	625.19	-19.99	57.90	1.25
274	EG-N-FS-II-60	625.19	-19.99	57.36	7.62
275	EG-N-FS-II-61	630.04	-14.73	57.90	1.25
276	EG-N-FS-II-62	630.04	-14.73	57.35	7.75
277	EG-N-FS-II-63	630.06	-15.23	57.90	1.25
278	EG-N-FS-II-64	630.06	-15.23	57.35	7.75
330	EG-N-SPU-II-1	594.98	-14.72	57.89	1.37
331	EG-N-SPU-II-2	594.98	-14.72	57.35	7.75
337	EG-N-SPU-II-3	615.03	-14.73	57.90	1.25
340	EG-N-SPU-II-4	615.03	-14.73	57.35	7.75
364	EG-N-SPU-II-5	591.50	-10.00	57.35	7.75
365	EG-N-SPU-II-6	593.50	-10.00	57.35	7.75
366	EG-N-SPU-II-7	616.50	-10.00	57.35	7.75
367	EG-N-SPU-II-8	618.50	-10.00	57.35	7.75
175	MS-N-FS	605.00	-14.96	55.31	32.28
359	PC-N-SPU-II-1	592.49	-7.50	56.78	14.60
362	PC-N-SPU-II-2	592.50	-7.43	55.31	32.28
360	PC-N-SPU-II-3	617.40	-7.47	56.75	15.02
363	PC-N-SPU-II-4	617.52	-7.51	55.35	31.80
368	RGM-N-FS-II-1L	620.00	-14.60	57.25	9.00
369	RGM-N-FS-II-2L	615.00	-14.60	57.25	9.00
370	RGM-N-FS-II-3T	624.58	-10.00	57.25	9.00
376	ROS-N-FS-II-1-Intercept	611.21	-13.79	57.25	9.00
377	ROS-N-FS-II-1A-T4-Q4	611.21	-13.46	57.25	9.00
378	ROS-N-FS-II-1B-D4-Q4	611.45	-13.55	57.25	9.00
379	ROS-N-FS-II-1C-L4-Q4	611.54	-13.79	57.25	9.00
380	ROS-N-FS-II-2-Intercept	613.79	-11.21	57.25	9.00
381	ROS-N-FS-II-2A-T4-Q4	613.79	-10.88	57.25	9.00
382	ROS-N-FS-II-2B-D4-Q4	614.03	-10.97	57.25	9.00
383	ROS-N-FS-II-2C-L4-Q4	614.12	-11.21	57.25	9.00
180	T-N-FS-II-1	537.47	-27.03	57.96	0.50
181	T-N-FS-II-2	537.47	-27.03	57.50	6.00
182	T-N-FS-II-3	537.47	-27.03	57.04	11.50

SOUTH

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
216	ECS-S-FS-II-1	514.78	14.73	57.00	12.00
217	ECS-S-FS-II-2	515.28	15.26	57.00	12.00
218	ECS-S-FS-II-3	545.25	14.75	57.00	12.00
219	ECS-S-FS-II-4	544.75	15.25	57.00	12.00
227	ECS-S-FS-II-5	584.66	14.72	57.25	9.00
228	ECS-S-FS-II-6	585.20	15.25	57.25	9.00
229	ECS-S-FS-II-7	625.23	14.75	57.25	9.00
230	ECS-S-FS-II-8	624.72	15.25	57.25	9.00
183	EG-S-FS-II-1	510.03	14.74	57.90	1.25
184	EG-S-FS-II-2	510.03	14.74	57.10	10.75
185	EG-S-FS-II-3	510.01	15.23	57.90	1.25
186	EG-S-FS-II-4	510.01	15.23	57.09	10.88
191	EG-S-FS-II-9	514.79	20.06	57.91	1.12
192	EG-S-FS-II-10	514.79	20.06	57.09	10.88
193	EG-S-FS-II-11	515.27	20.04	57.90	1.25
194	EG-S-FS-II-12	515.27	20.04	57.09	10.88
195	EG-S-FS-II-13	520.00	14.75	57.91	1.12
196	EG-S-FS-II-14	520.00	14.75	57.10	10.75
197	EG-S-FS-II-15	520.03	15.21	57.90	1.25
198	EG-S-FS-II-16	520.02	15.21	57.09	10.88
199	EG-S-FS-II-17	540.07	14.76	57.90	1.25
200	EG-S-FS-II-18	540.07	14.75	57.10	10.75
201	EG-S-FS-II-19	540.10	15.24	57.90	1.25
202	EG-S-FS-II-20	540.10	15.24	57.09	10.88
207	EG-S-FS-II-25	544.83	20.01	57.90	1.25
208	EG-S-FS-II-26	544.83	20.01	57.09	10.88
209	EG-S-FS-II-27	545.29	19.99	57.91	1.12
210	EG-S-FS-II-28	545.29	19.99	57.10	10.75
211	EG-S-FS-II-29	550.03	14.71	57.90	1.25
212	EG-S-FS-II-30	550.03	14.71	57.09	10.88
213	EG-S-FS-II-31	550.00	15.26	57.90	1.25
214	EG-S-FS-II-32	550.00	15.26	57.09	10.88
279	EG-S-FS-II-33	580.00	14.75	57.90	1.25
280	EG-S-FS-II-34	580.00	14.75	57.35	7.75
281	EG-S-FS-II-35	579.96	15.26	57.90	1.25

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
282	EG-S-FS-II-36	579.96	15.26	57.35	7.75
283	EG-S-FS-II-41	584.71	20.01	57.89	1.38
284	EG-S-FS-II-42	584.71	20.01	57.35	7.75
285	EG-S-FS-II-43	585.19	20.04	57.90	1.25
286	EG-S-FS-II-44	585.19	20.04	57.35	7.75
287	EG-S-FS-II-45	590.01	14.76	57.89	1.38
288	EG-S-FS-II-46	590.01	14.76	57.35	7.75
289	EG-S-FS-II-47	590.01	15.26	57.89	1.38
290	EG-S-FS-II-48	590.01	15.26	57.35	7.75
291	EG-S-FS-II-49	620.02	14.75	57.90	1.25
292	EG-S-FS-II-50	620.02	14.75	57.35	7.75
293	EG-S-FS-II-51	620.06	15.28	57.90	1.25
294	EG-S-FS-II-52	620.06	15.28	57.35	7.75
295	EG-S-FS-II-57	624.68	20.04	57.90	1.25
296	EG-S-FS-II-58	624.68	20.04	57.35	7.75
297	EG-S-FS-II-59	625.22	20.05	57.90	1.25
298	EG-S-FS-II-60	625.22	20.05	57.36	7.62
299	EG-S-FS-II-61	630.04	14.75	57.90	1.25
300	EG-S-FS-II-62	630.04	14.75	57.36	7.62
301	EG-S-FS-II-63	630.03	15.25	57.90	1.25
302	EG-S-FS-II-64	630.03	15.25	57.35	7.75
342	EG-S-SPU-II-1	594.98	14.77	57.90	1.25
341	EG-S-SPU-II-2	594.98	14.77	57.36	7.63
345	EG-S-SPU-II-3	615.05	14.76	57.90	1.25
346	EG-S-SPU-II-4	615.05	14.76	57.35	7.75
215	MS-S-FS	604.83	15.75	55.31	32.28
303	~~RG-S-FS-II-1~~	515.00	10.00	57.93	0.87
315	~~RG-S-FS-II-1b~~	530.00	10.00	57.93	0.87
304	~~RG-S-FS-II-2~~	515.00	10.00	57.16	10.12
316	~~RG-S-FS-II-2b~~	530.00	10.00	57.16	10.12
305	~~RG-S-FS-II-3~~	545.00	10.00	57.93	0.87
318	RG-S-FS-II-3b	560.00	10.00	57.94	0.75
306	~~RG-S-FS-II-4~~	545.00	10.00	57.16	10.12
317	RG-S-FS-II-4b	560.00	10.00	57.15	10.25
307	RG-S-FS-II-5	585.00	10.00	57.93	0.87

ID	SENSOR	X STA. (FEET)	Y OFFSET (FEET)	Z ELEV. (FEET)	DEPTH FROM TOP LAYER SURFACE AT ELEV. 58.0 (IN)
319	RG-S-FS-II-5b	600.00	10.00	57.93	0.87
308	RG-S-FS-II-6	585.00	10.00	57.40	7.25
320	RG-S-FS-II-6b	600.00	10.00	57.40	7.25
309	RG-S-FS-II-7	610.00	10.00	57.93	0.87
321	RG-S-FS-II-7b	625.00	10.00	57.93	0.87
310	RG-S-FS-II-8	610.00	10.00	57.39	7.38
322	RG-S-FS-II-8b	625.00	10.00	57.41	7.12
371	RGM-S-FS-II-1D	623.79	16.21	57.25	9.00
372	RGM-S-FS-II-2T	624.60	20.00	57.25	9.00
373	RGM-S-FS-II-3D	621.21	18.79	57.25	9.00
374	RGM-S-FS-II-4D	611.21	16.21	57.25	9.00
375	RGM-S-FS-II-5T	625.00	10.00	57.62	4.50
384	ROS-S-FS-II-1-Intercept	617.50	22.50	57.25	9.00
385	ROS-S-FS-II-1A-L4-Q2	617.17	22.50	57.25	9.00
386	ROS-S-FS-II-1B-D4-Q2	617.26	22.26	57.25	9.00
387	ROS-S-FS-II-1C-T4-Q2	617.50	22.17	57.25	9.00
388	ROS-S-FS-II-2-Intercept	638.79	13.79	57.25	9.00
389	ROS-S-FS-II-2A-T4-Q2	638.79	13.46	57.25	9.00
390	ROS-S-FS-II-2B-D4-Q2	638.55	13.55	57.25	9.00
391	ROS-S-FS-II-2C-L4-Q2	638.46	13.79	57.25	9.00
392	ROS-S-FS-II-3-Intercept	626.21	13.79	57.25	9.00
393	ROS-S-FS-II-3A-T4-Q1	626.21	13.46	57.25	9.00
394	ROS-S-FS-II-3B-D4-Q1	626.45	13.55	57.25	9.00
395	ROS-S-FS-II-3C-L4-Q1	626.54	13.79	57.25	9.00
220	T-S-FS-II-1	537.44	27.03	57.96	0.50
221	T-S-FS-II-2	537.44	27.03	57.50	6.00
222	T-S-FS-II-3	537.44	27.03	57.04	11.50

INSTRUMENT KEY		
⊢⊣	EG	EMBEDDED STRAIN GAUGE
●	T	THERMOCOUPLE
▬	MS	MOISTURE SENSOR
◉	ECS	EDDY CURRENT SENSOR
■	RG	RESISTANCE GAGE
◎	PC	PRESSURE CELL

* - ADDITIONAL INSTRUMENTATION INSTALLED DURING CONSTRUCTION
~~EG-S-O-1-2~~ - CROSSED NAME DESIGNATES SENSORS FAILED DURING CONSTRUCTION

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY

OVERLAY TEST	JOINT COMPARISON	STRENGTH/FATIGUE

CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR NATIONAL AIRPORT PAVEMENT TEST FACILITY

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED		
FAA APPROVAL DATE:		

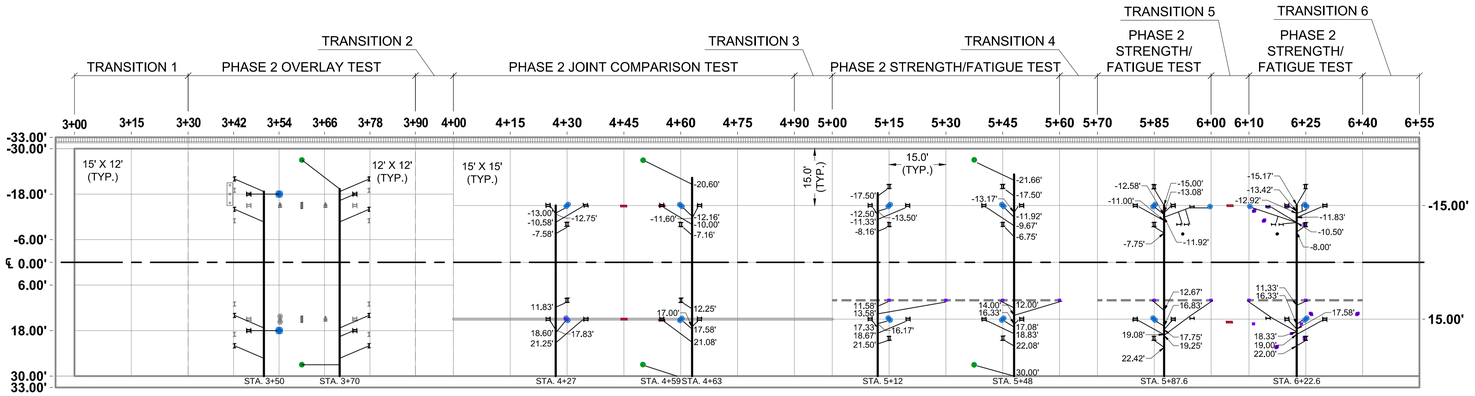
NAPTF CONSTRUCTION CYCLE 8

FATIGUE & STRENGTH INSTRUMENTATION AS-BUILT PLAN STA. 5+00 TO 6+55

PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 16 OF 34

CAD FILE: CC8-INSTR-AS-BUILT.DWG

PLAN NORTH



KERF CUTS PLAN VIEW

SCALE: 1"=20'

INSTRUMENT KEY		
	EG	EMBEDDED STRAIN GAUGE
	T	THERMOCOUPLE
	MS	MOISTURE SENSOR
	ECS	EDDY CURRENT SENSOR
	RG	RESISTANCE GAGE
	PC	PRESSURE CELL
	POT	POTENTIOMETER

LEGEND:

- CENTER LINE MARKER - MAG NAIL
- CONTROL POINT - MAG NAIL
- NOTCH
- 3" WIDE KERF CUT
- 1" WIDE KERF CUT

20 0 20 40 60

GRAPHIC SCALE

1" = 20'

NOTES:

1. ALL CUTS WERE NO GREATER THAN 3" WIDE AND 1" IN DEPTH.
2. ALL CUTS FROM STATION 3+00 TO 4+00 WERE MADE IN THE ASPHALT INTERLAYER AND CUTS FROM 4+00 TO 6+55 WERE MADE IN THE P-306 SURFACE.
3. THE CUTS WERE FILLED WITH A RAPID SETTING HEAVY DUTY FLOWABLE REPAIR MORTAR (HD-50 OR SIMILAR APPROVED PRODUCT) AFTER THE INSTRUMENTATION HAS BEEN INSTALLED.
4. INSTRUMENTATION INSTALLED IN PHASE 1 SHOWN WITH GRAY COLOR.
5. KERF CUTS BETWEEN STA. 3+00 AND 4+00 ARE APPROXIMATE. KERF CUTS BETWEEN STA. 4+00 AND 6+55 ARE BASED ON AS-BUILD SURVEY.

EDDY CURRENT SENSORS

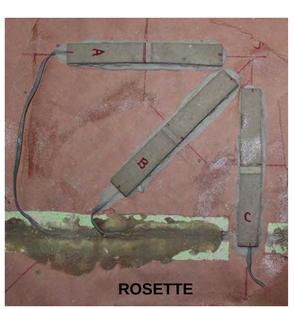
N.T.S.

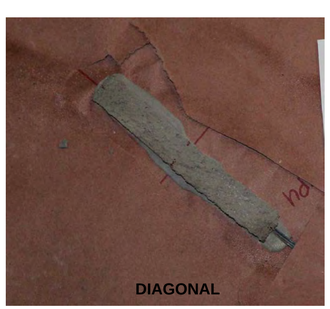
EMBEDDED STRAIN GAGES

N.T.S.

POTENTIOMETER

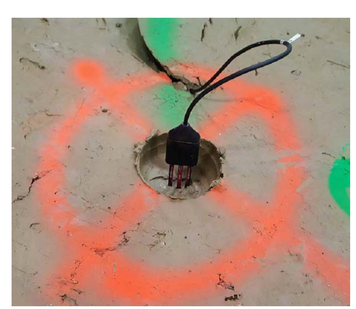
N.T.S.





MODIFIED RESISTANCE GAGES

N.T.S.



MOISTURE SENSOR

N.T.S.

PRESSURE CELL

N.T.S.

RESISTANCE GAGE

N.T.S.

THERMOCOUPLE

N.T.S.

NO.	REVISIONS	DATE	BY	CHK	APR

CSRA — SRA INTERNATIONAL, INC., A CSRA COMPANY, 200 DECADON DRIVE, EGG HARBOR, NJ 08234, PHONE: (609) 601-6800

FOR — NATIONAL AIRPORT PAVEMENT TEST FACILITY

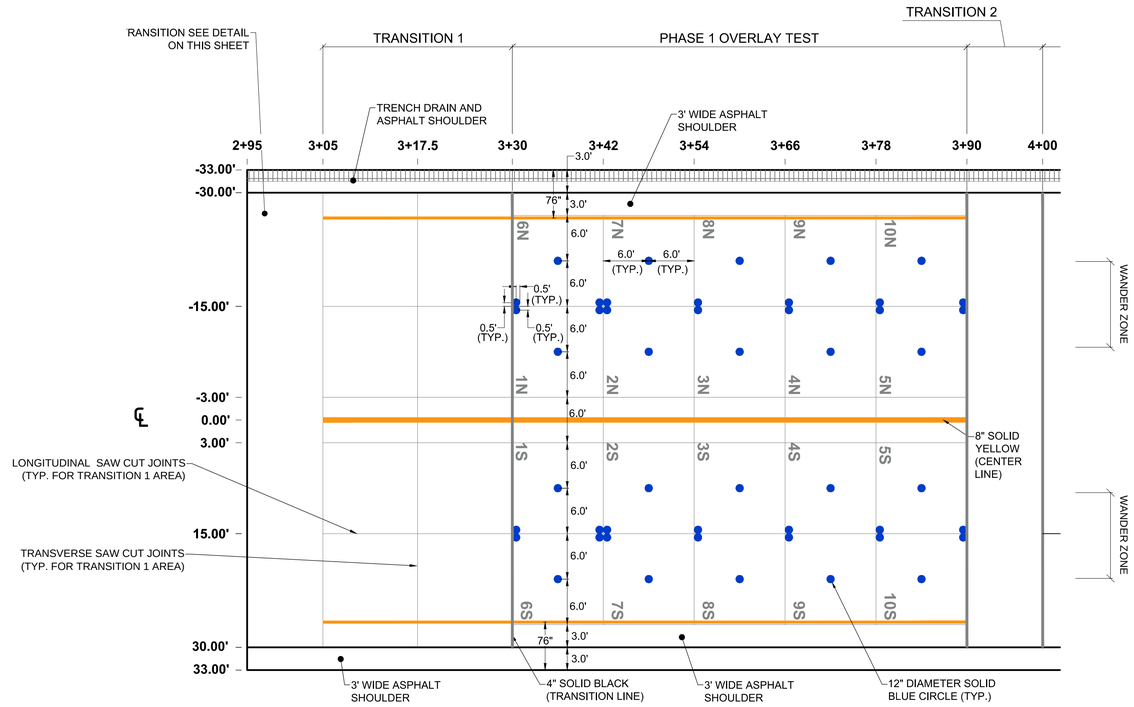
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED		
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8

PHASE 2 INSTRUMENTATION KERF CUT DIAGRAMS AND SENSOR PHOTOGRAPHS AS-BUILT PLAN

PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 17 OF 34

CAD FILE: CC8-CONS-KERF-CUTS-AS-BUILT.DWG



PLAN VIEW

SCALE: 1"=10'

PAVEMENT PAINTING KEY	
	8" SOLID YELLOW CENTER LINE
	4" SOLID YELLOW SAFETY LINE
	4" SOLID WHITE TRANSITION LINE
	1' BLUE CIRCLE
1N	12" WHITE

GENERAL NOTES:

1. CENTERLINE TO BE 8" WIDE AND PAINTED YELLOW.
2. TRANSITION LINES TO BE 4" WIDE AND PAINTED WHITE.
3. SAFETY LINES TO BE 4" WIDE AND PAINTED YELLOW.
4. CIRCLES TO BE 12" DIAMETER AND PAINTED BLUE.
5. LETTERING TO BE 12" TALL, 2.5" THICK, PAINTED WHITE, AND ARE TO BE PAINTED OUTSIDE OF THE TEST AREA.
6. STATIONS AND DIMENSIONS ARE FOR PLAN REFERENCE ONLY AND ARE NOT TO BE PAINTED.

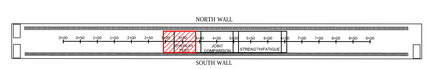
10' 0 10' 20' 30'

GRAPHIC SCALE

1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

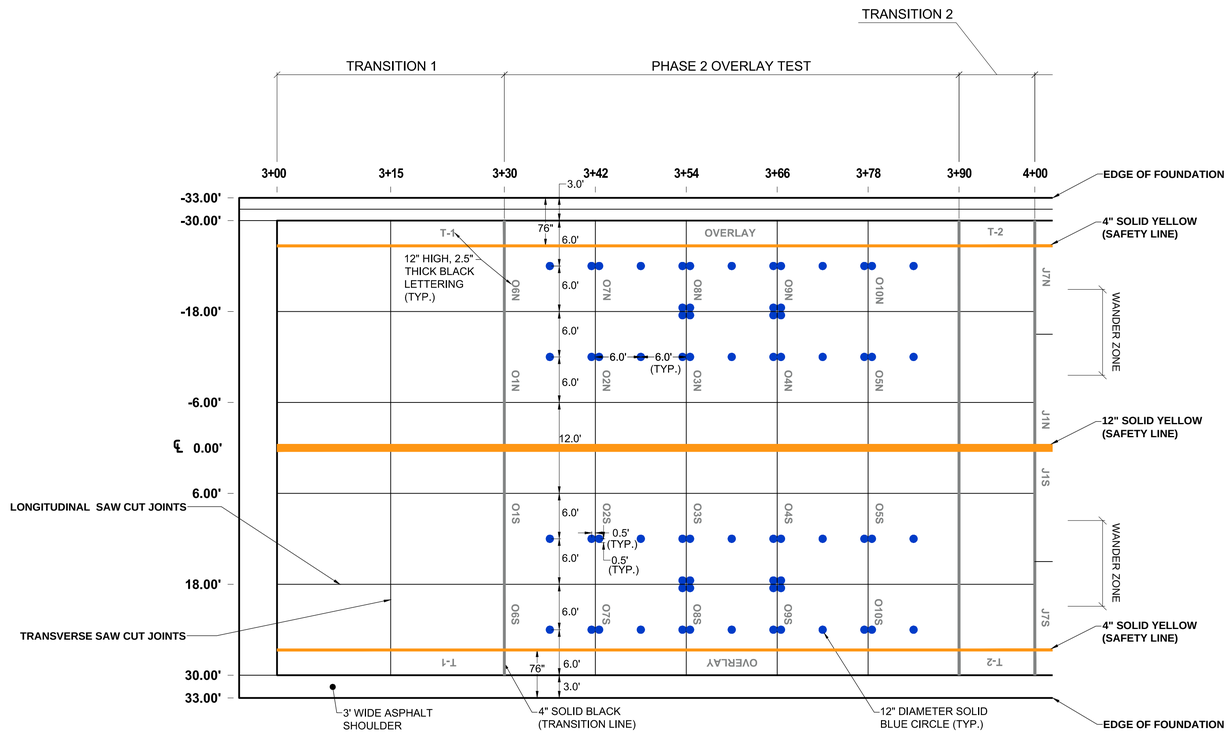
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8

PAVEMENT PAINTING AS-BUILT PLAN
PHASE 1 OVERLAY - STA. 2+95 TO 4+00

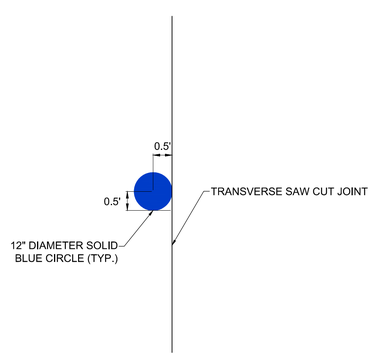
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 18 OF 34

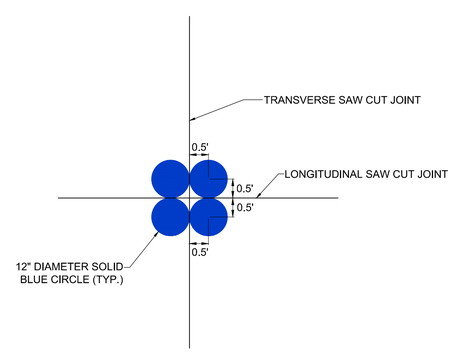
CAD FILE: CC8-PNTG-AS-BUILT.DWG



PLAN VIEW

SCALE: 1"=10'





GENERAL NOTES:

1. CENTERLINE TO BE 12" WIDE AND PAINTED YELLOW.
2. TRANSITION LINES TO BE 4" WIDE AND PAINTED BLACK.
3. SAFETY LINES TO BE 4" WIDE AND PAINTED YELLOW.
4. CIRCLES TO BE 12" DIAMETER AND PAINTED BLUE.
5. LETTERING TO BE 12" TALL, 2.5" THICK, PAINTED BLACK, AND ARE TO BE PAINTED OUTSIDE OF THE TEST AREA.
6. STATIONS AND DIMENSIONS ARE FOR PLAN REFERENCE ONLY AND ARE NOT TO BE PAINTED.

PAVEMENT PAINTING KEY	
	12" SOLID YELLOW CENTER LINE
	4" SOLID YELLOW SAFETY LINE
	4" SOLID BLACK TRANSITION LINE
●	12" BLUE CIRCLE
T-1	12" BLACK

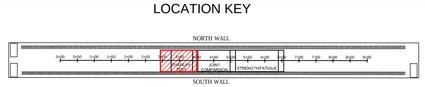
10' 0 10' 20' 30'

GRAPHIC SCALE

1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



CSRA, INC.
1201 NEW ROAD, SUITE 242
LINWOOD, NEW JERSEY 08221
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ

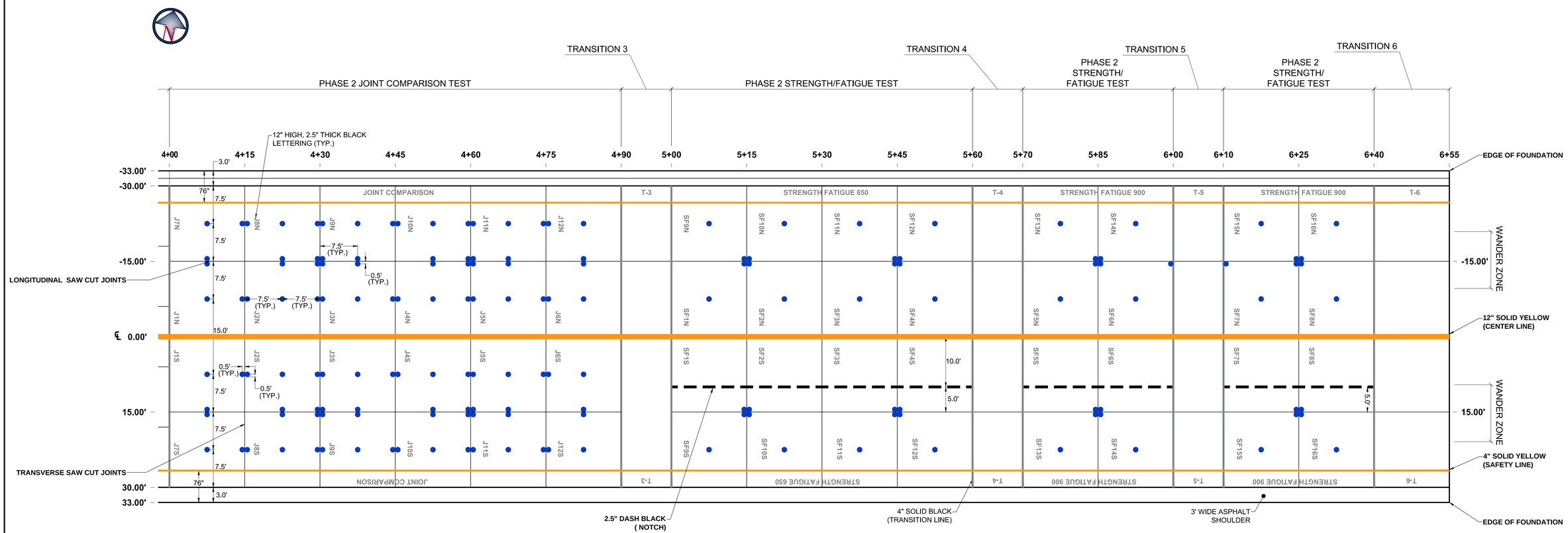
	NAME	DATE
DRAWN	J.SAJEWSKA	03/19/2018
CHECKED		
FAA APPROVAL DATE:		

NAPTF CONSTRUCTION CYCLE 8

PAVEMENT PAINTING AS-BUILT PLAN
PHASE 2 OVERLAY - STA. 2+95 TO 4+00

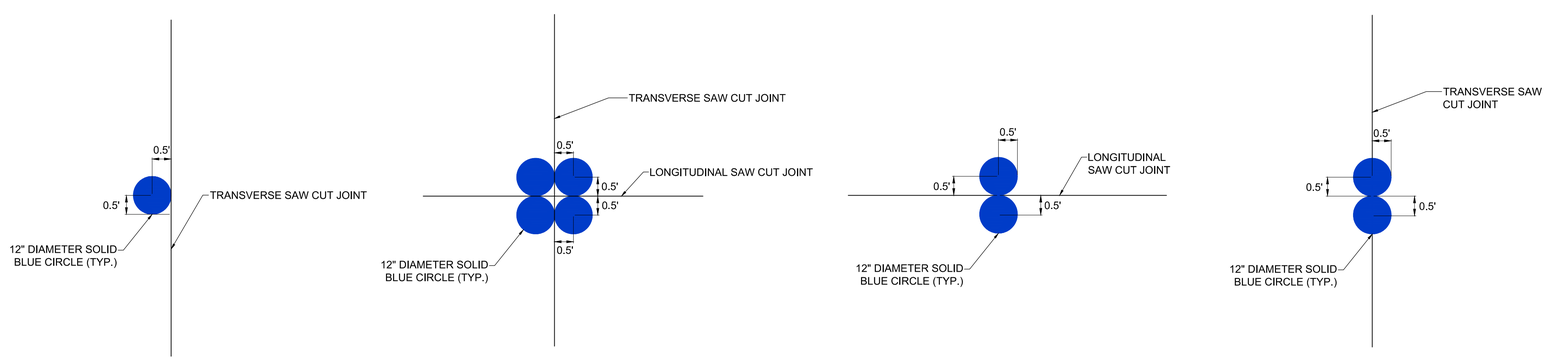
PROJECT NO: CC8 | SIZE: ANSI D | SCALE: AS NOTED | SHEET 19 OF 34

CAD FILE: CC8-PNTG-AS-BUILT.DWG



PLAN VIEW

SCALE: 1"=10'



GENERAL NOTES:

1. CENTERLINE TO BE 12" WIDE AND PAINTED YELLOW.
2. TRANSITION LINES TO BE 4" WIDE AND PAINTED BLACK.
3. SAFETY LINES TO BE 4" WIDE AND PAINTED YELLOW.
4. CIRCLES TO BE 12" DIAMETER AND PAINTED BLUE.
5. LETTERING TO BE 12" TALL, 2.5" THICK, PAINTED BLACK, AND ARE TO BE PAINTED OUTSIDE OF THE TEST AREA.
6. NOTCH LINE TO BE 2.5" x 12" DASHES WITH 6" SPACES AND PAINTED BLACK.
7. STATIONS AND DIMENSIONS ARE FOR PLAN REFERENCE ONLY AND ARE NOT TO BE PAINTED.

PAVEMENT PAINTING KEY	
	12" SOLID YELLOW CENTER LINE
	4" SOLID YELLOW SAFETY LINE
	4" SOLID BLACK TRANSITION LINE
	2.5" x 6" DASHED BLACK LINE WITH 6" SPACES
	12" BLUE CIRCLE
T-1	12" BLACK

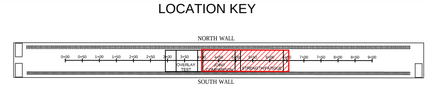
10' 0 10' 20' 30'

GRAPHIC SCALE

1" = 10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



CSRA, INC.
1201 NEW ROAD, SUITE 242
LINWOOD, NEW JERSEY 08221
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ

	NAME	DATE
DRAWN	J.SAJEWSKA	03/19/2018
CHECKED		
FAA APPROVAL DATE:		
PROJECT NO: CC8		

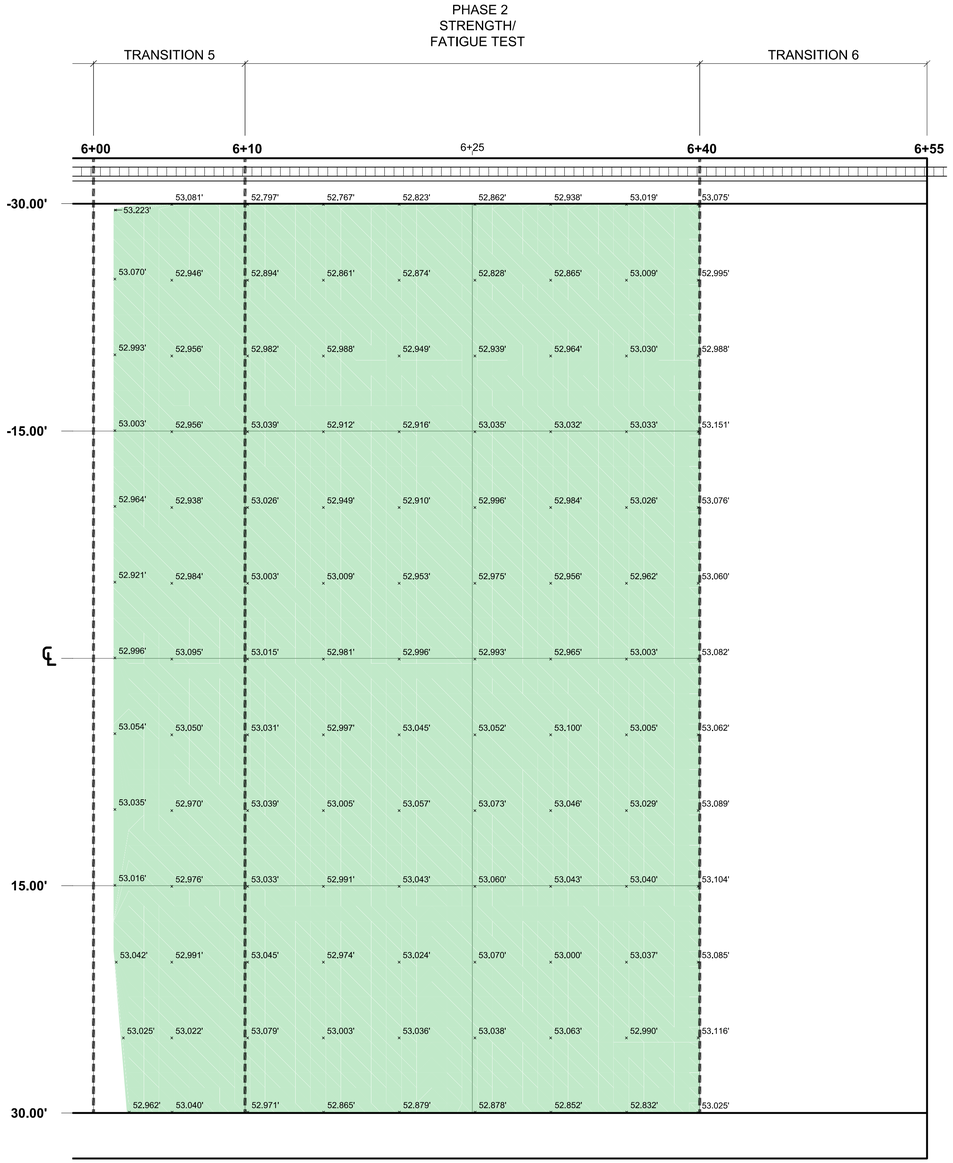
NAPTF CONSTRUCTION CYCLE 8

PAVEMENT PAINTING AS-BUILT PLAN

PHASE 2 - STA. 4+00 TO 6+55

SIZE: ANSI D | SCALE: AS NOTED | SHEET 20 OF 34

CAD FILE: CC8-PNTG-AS-BUILT.DWG



LEGEND:

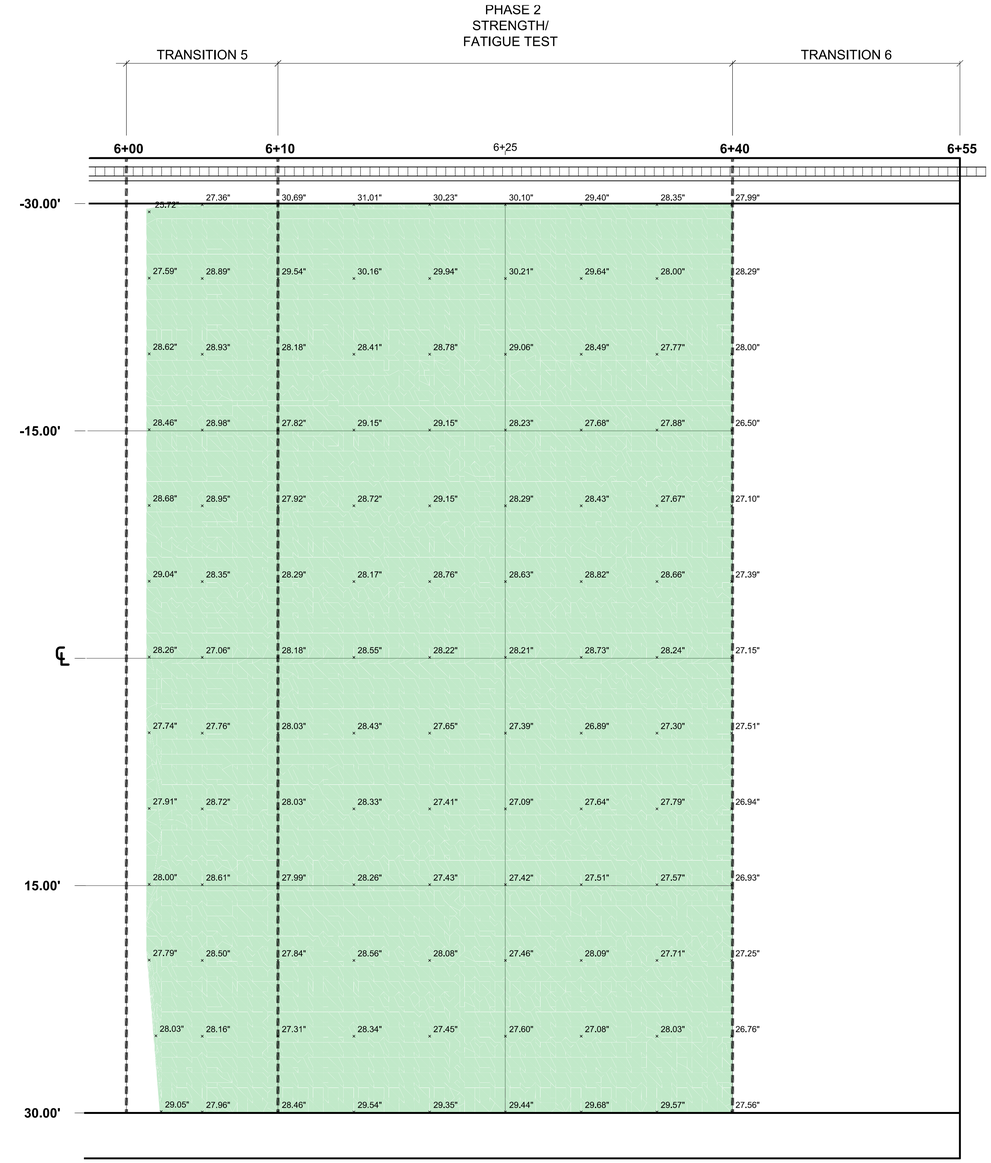
x 53.330' - SPOT ELEVATION

MINIMUM ELEVATION: 53.330'

CONFORMING ELEVATION (<53.330')

SUBGRADE BOTTOM ELEVATION MAP

SCALE: 1"=5'



LEGEND:

x 24.00" - THICKNESS LABEL

TARGET THICKNESS: MINIMUM 24.00" (2.000')

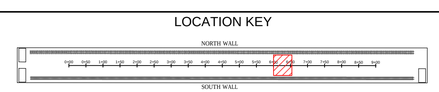
CONFORMING THICKNESS >24.00" (2.000')

SUBGRADE THICKNESS MAP

SCALE: 1"=5'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



SRA INTERNATIONAL, INC.,
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200 DECADON DRIVE
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PHONE: (609) 601-6800

FOR

NATIONAL
AIRPORT PAVEMENT
TEST FACILITY
ATLANTIC CITY
AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

CONSTRUCTION CYCLE 8

SUBGRADE CBR 3-4 MAPS STA. 6+00 TO 6+55

AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 21 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG

SCALE: 1"=10'

PHASE 1 OVERLAY (STA. 3+05 TO 4+00) LEGEND:

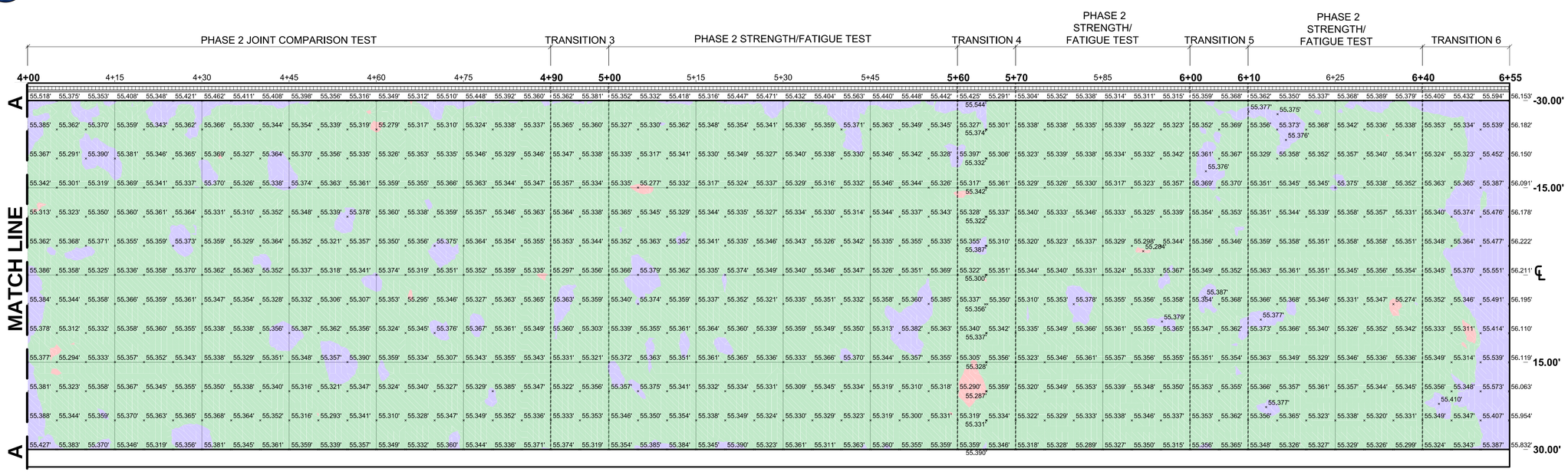
x 55.500' - SPOT ELEVATION

TARGET ELEVATION: 55.500' ± 0.042'(½")

CONFORMING ELEVATION (55.458' - 55.542')

ELEVATION BELOW THE CONFORMANCE RANGE (<55.458')

ELEVATION ABOVE THE CONFORMANCE RANGE (>55.542')



SCALE: 1"=10'

PHASE 2 STA. 4+00 TO 6+55 LEGEND:

x 55.330' - SPOT ELEVATION

TARGET ELEVATION: 55.330' ± 0.042'(½")

CONFORMING ELEVATION (55.288' - 55.372')

ELEVATION BELOW THE CONFORMANCE RANGE (<55.288')

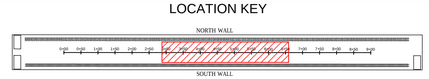
ELEVATION ABOVE THE CONFORMANCE RANGE (>55.372')

NOTES:

1. GRADE TOLERANCE PER SPECIFICATIONS FOR NAPTF CONSTRUCTION CYCLE 8 (CC8) ISSUED FOR CONSTRUCTION, NOVEMBER 16, 2016, REV. 1 12/20/2016.
2. SUBGRADE GRADE CONFORMANCE TOLERANCE: ±½"(0.042').

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

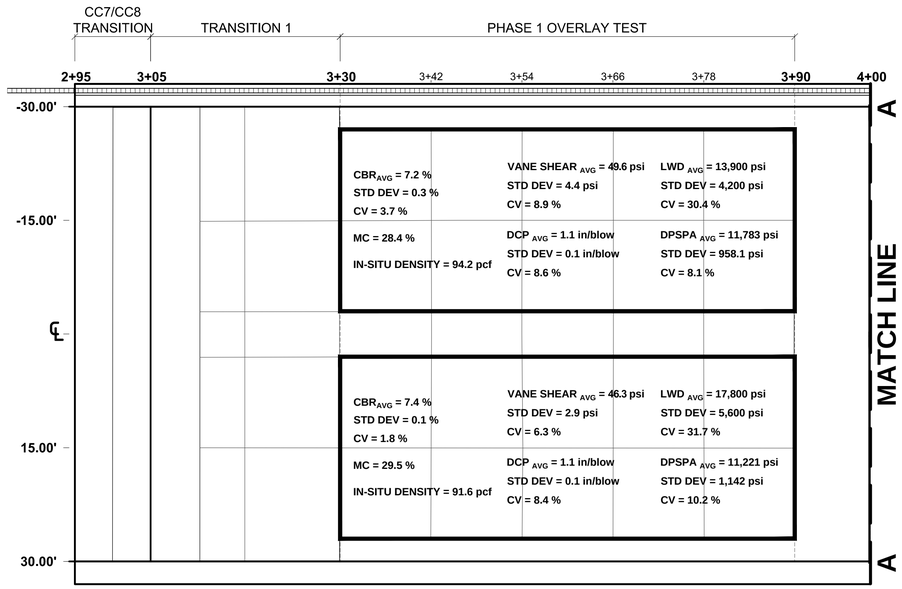
CONSTRUCTION CYCLE 8

SUBGRADE ELEVATION MAP

AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 22 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG

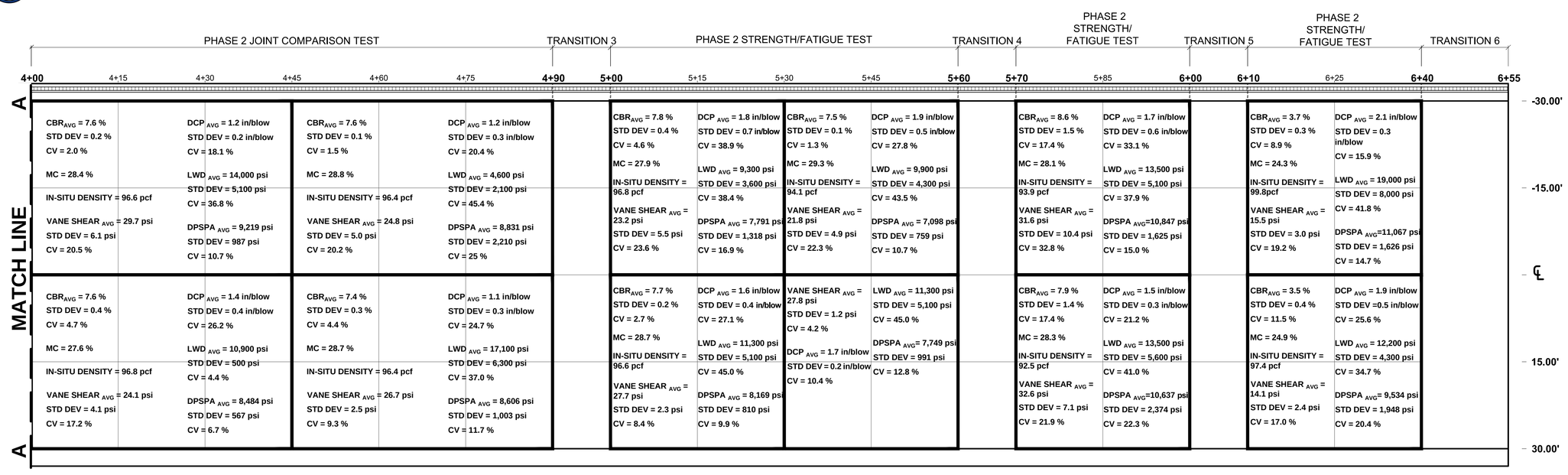


SCALE: 1"=10'

PLATE LOAD		
STA.	OFF.	K VALUE psi/in
3+60	-15	109.6
3+60	+15	131.1
4+50	-15	154.0
4+50	+15	196.9
5+40	-15	117.4
5+40	+15	179.9
5+90	-15	119.1
5+90	+15	140.9
6+30	-15	82.7
6+30	+15	76.0

TRIAXIAL TESTING SUMMARY												
Specimen	Compaction Condition			Resilient Modulus							Quick Shear	
ID	ρ_{wet} (pcf)	w (%)	ρ_{dry} (pcf)	M_R (psi)	k_1	k_2	k_3	S_e/S_y	R^2_{Adj}	σ_3 (psi)	$\sigma_{v\text{-}max}$ (psi)
Sta. 5+65 North -25	123.3	25.2	98.5	10,410	960	0.503	-2.399	0.366	0.84	4	38.3
Sta. 5+65 South +25	116.3	29.9	89.5	10,912	888	0.395	-1.649	0.254	0.92	4	35.6
Sta. 4+95 North -25	123.2	25.9	97.9	NA	NA	NA	NA	NA	NA	0	36.1
Sta. 4+95 South +25	97.4	29.3	75.3	NA	NA	NA	NA	NA	NA	0	36.3

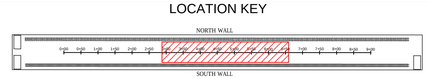
Note: modulus estimated for σ_3=6 psi and σ_{cyclic}=9 psi



SCALE: 1"=10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

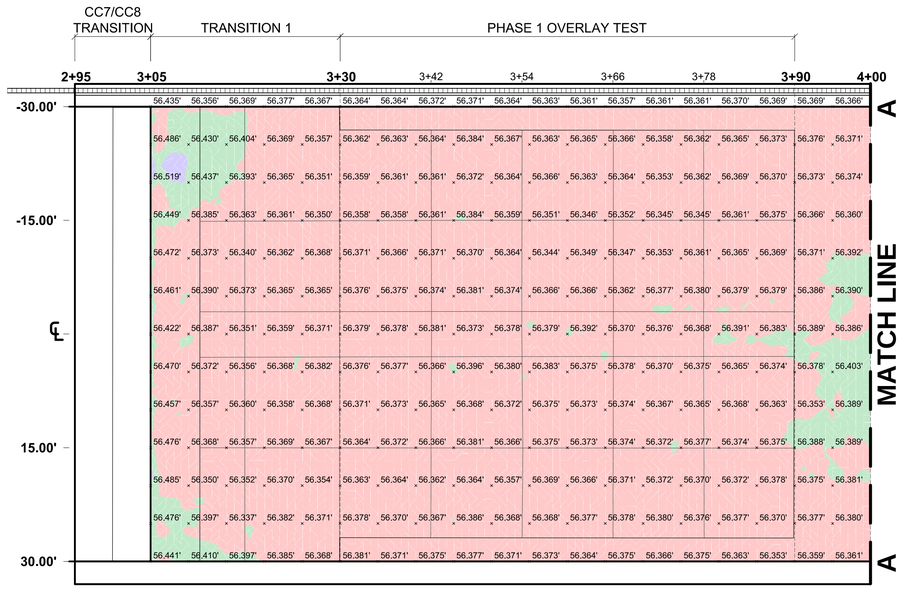
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		
PROJECT NO:		

CONSTRUCTION CYCLE 8

SUBGRADE ACCEPTANCE AND CHARACTERIZATION RESULTS - AS-BUILT

SIZE: ANSI D | SCALE: AS NOTED | SHEET 23 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG



SCALE: 1"=10'

PHASE 1 OVERLAY (STA. 3+05 TO 4+00) LEGEND:

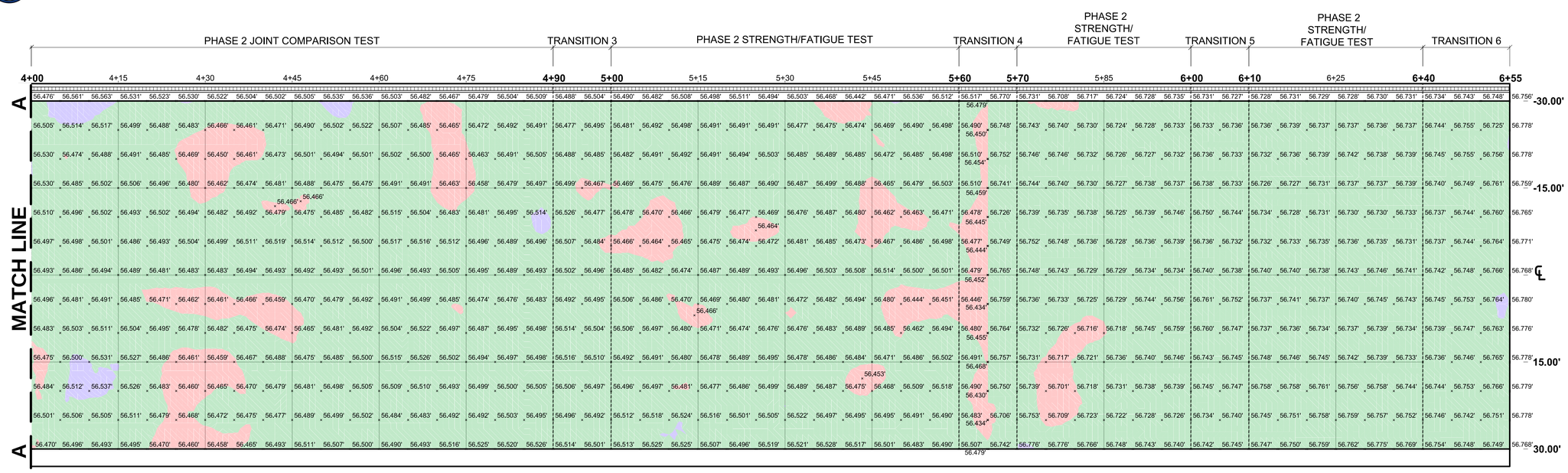
x 56.420' - SPOT ELEVATION

TARGET ELEVATION: 56.420' ± 0.031'(3/8")

CONFORMING ELEVATION (56.389' - 56.451')

ELEVATION BELOW THE CONFORMANCE RANGE (<56.389')

ELEVATION ABOVE THE CONFORMANCE RANGE (>56.451')



SCALE: 1"=10'

PHASE 2 STA. 4+00 TO 5+65 LEGEND:

x 56.500' - SPOT ELEVATION

TARGET ELEVATION: 56.500' ± 0.031'(3/8")

CONFORMING ELEVATION (56.469' - 56.531')

ELEVATION BELOW THE CONFORMANCE RANGE (<56.469')

ELEVATION ABOVE THE CONFORMANCE RANGE (>56.531')

PHASE 2 STA. 5+65 TO 6+55 LEGEND:

x 56.750' - SPOT ELEVATION

TARGET ELEVATION: 56.750' ± 0.031'(3/8")

CONFORMING ELEVATION (56.719' - 56.781')

ELEVATION BELOW THE CONFORMANCE RANGE (<56.719')

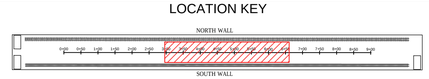
ELEVATION ABOVE THE CONFORMANCE RANGE (>56.781')

NOTES:

1. GRADE TOLERANCE PER SPECIFICATIONS FOR NAPTF CONSTRUCTION CYCLE 8 (CC8) ISSUED FOR CONSTRUCTION, NOVEMBER 16, 2016, REV. 1 12/20/2016.
2. P-154 GRADE CONFORMANCE TOLERANCE: ±3/8" (0.031').

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		
PROJECT NO:		

CONSTRUCTION CYCLE 8

P-154 ELEVATION MAP

AS-BUILT

SIZE: ANSI D | SCALE: AS NOTED | SHEET 24 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG

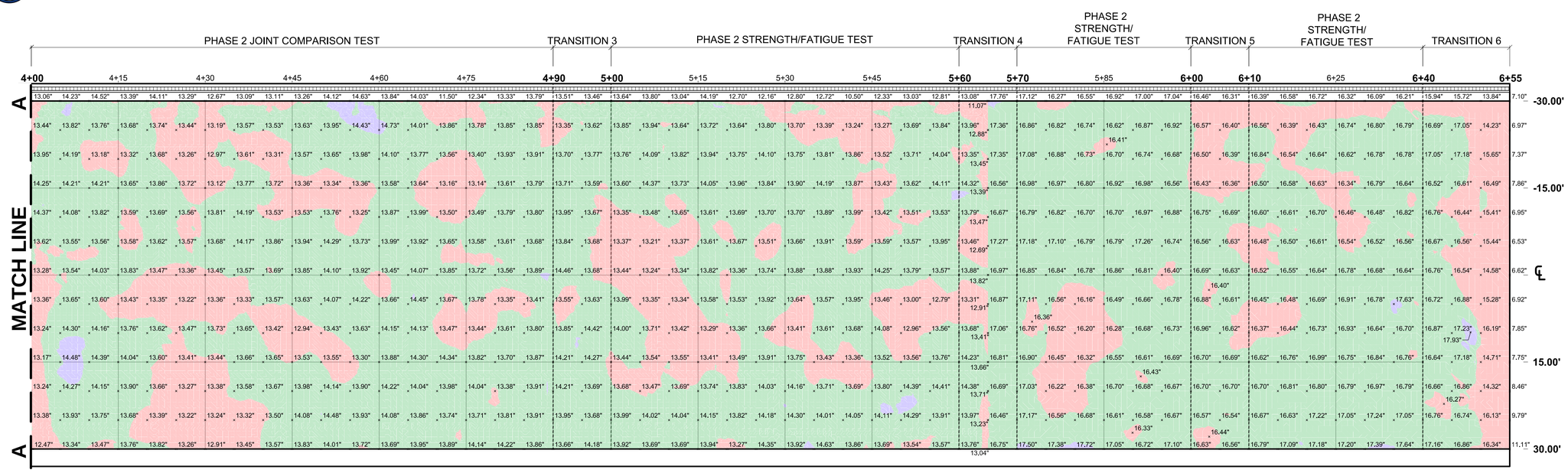
SCALE: 1"=10'

PHASE 1 OVERLAY (STA. 3+05 TO 4+00) LEGEND:

x 11.00" - THICKNESS LABEL

TARGET THICKNESS: 11" ± ½" (0.917' ± 0.042')

- CONFORMING THICKNESS 10.50" - 11.50" (0.875' - 0.958')
- THICKNESS BELOW THE CONFORMANCE RANGE <10.50" (0.875')
- THICKNESS ABOVE THE CONFORMANCE RANGE >11.50" (0.958')



SCALE: 1"=10'

PHASE 2 STA. 4+00 TO 5+65 LEGEND:

x 14.00" - SPOT ELEVATION

TARGET THICKNESS: 14" ± ½" (1.170' ± 0.042')

- CONFORMING THICKNESS 13.50" - 14.50" (1.128' - 1.212')
- THICKNESS BELOW THE CONFORMANCE RANGE <13.50" (1.128')
- THICKNESS ABOVE THE CONFORMANCE RANGE >14.50" (1.212')

PHASE 2 STA. 5+65 TO 6+55 LEGEND:

x 17.00"' - SPOT ELEVATION

TARGET THICKNESS: 17"' ± ½" (1.420' ± 0.042')

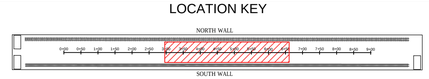
- CONFORMING THICKNESS 16.50" - 17.50" (1.375' - 1.458')
- THICKNESS BELOW THE CONFORMANCE RANGE <16.50" (1.375')
- THICKNESS ABOVE THE CONFORMANCE RANGE >17.50" (1.458')

NOTES:

1. THICKNESS TOLERANCE PER SPECIFICATIONS FOR NAPTF CONSTRUCTION CYCLE 8 (CC8) ISSUED FOR CONSTRUCTION, NOVEMBER 16, 2016, REV. 1 12/20/2016.
2. P-154 THICKNESS CONFORMANCE TOLERANCE: ±½" (0.042').

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

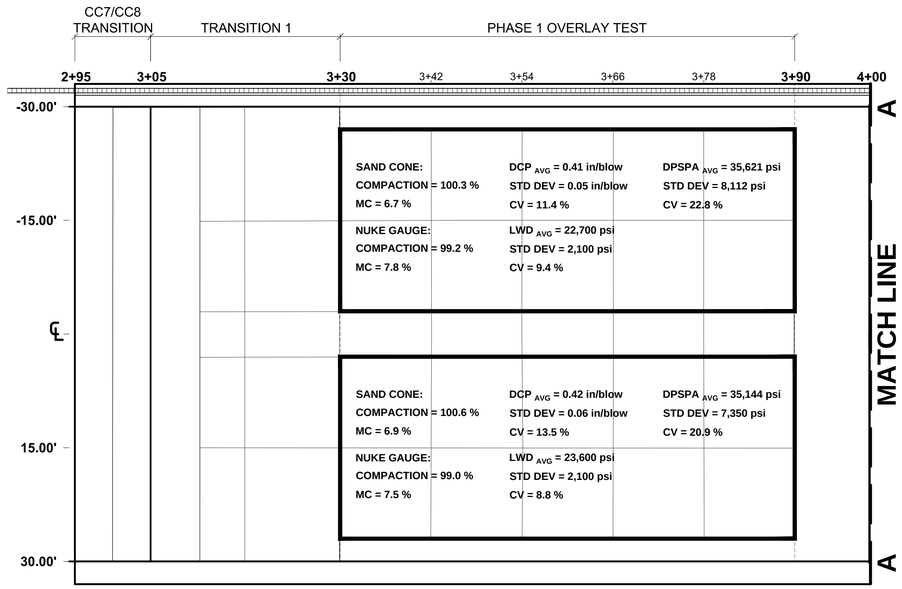
CONSTRUCTION CYCLE 8

P-154 THICKNESS MAP

AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 25 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG

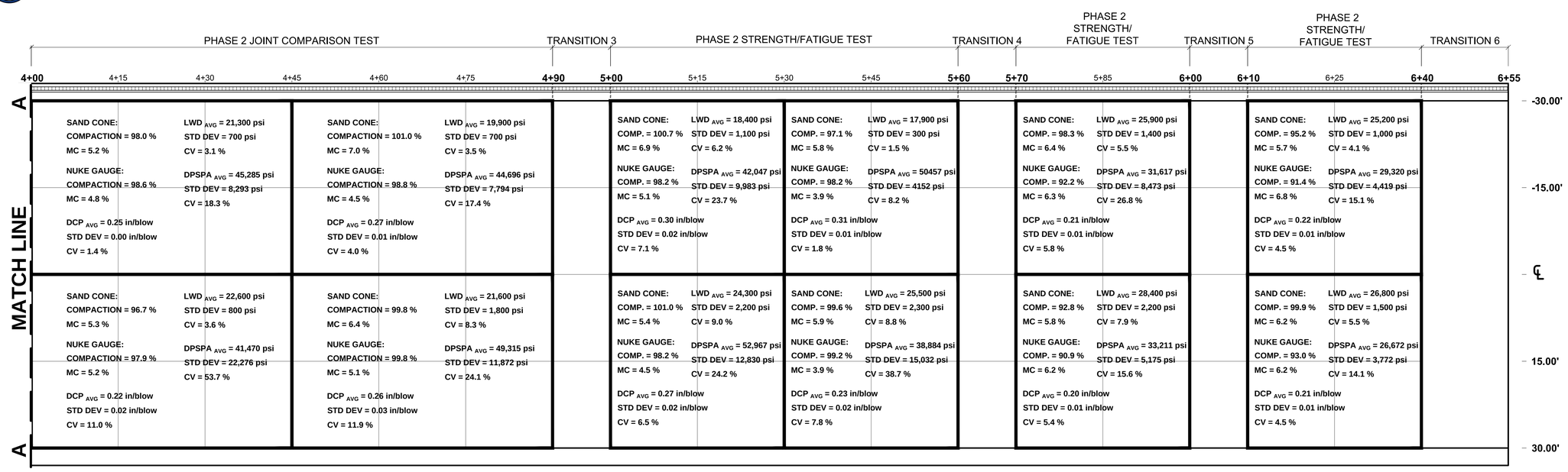


SCALE: 1"=10'

PLATE LOAD		
STA.	OFF.	K VALUE PSI/IN
3+60	-15	216
3+60	+15	272
4+50	-15	154
4+50	+15	197
5+40	-15	208
5+40	+15	371
5+90	-15	324
5+90	+15	357
6+30	-15	347
6+30	+15	242

TRIAXIAL TESTING SUMMARY											
Specimen	Compaction Condition				Resilient Modulus					Quick Shear	
ID	ρ_{wet} (pcf)	w (%)	ρ_{dry} (pcf)	M_R (psi)	k_1	k_2	k_3	S_e/S_y	R^2_{Adj}	σ_3 (psi)	$\sigma_{v\text{-}max}$ (psi)
STA. 4+00 – 5+65 #1	140.4	6	132.4	33,196	1003	0.544	-0.085	0.205	0.95	4	188
STA. 4+00 – 5+65 #2	143	6	134.9	31,017	779	0.627	-0.001	0.164	0.97	4	205
STA. 5+65 – 6+55 #1 TRIM	137	6.1	129.1	36,135	988	0.574	-0.001	0.179	0.96	4	203
STA. 5+65 – 6+55 #2 TRIM	130.7	6.3	123	39,732	1387	0.522	-0.261	0.141	0.98	4	244

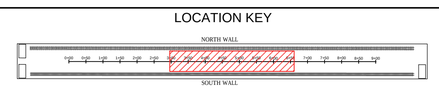
Note: modulus estimated for σ_3=15 psi and σ_{cyclic}=27 psi



SCALE: 1"=10'

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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ATLANTIC CITY AIRPORT, NJ 08234

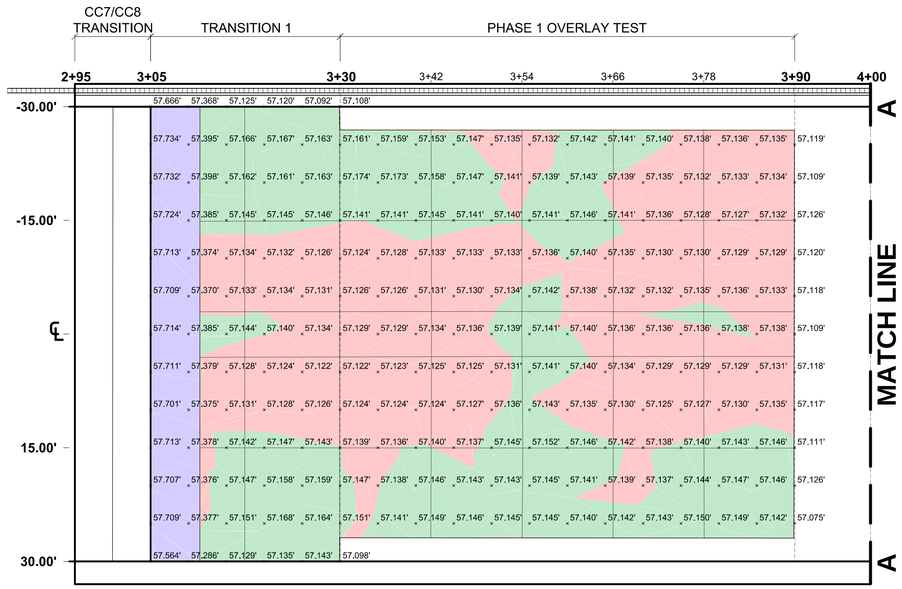
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		
PROJECT NO:		

CONSTRUCTION CYCLE 8

P-154 ACCEPTANCE AND CHARACTERIZATION RESULTS AS-BUILT

SIZE: ANSI D | SCALE: AS NOTED | SHEET 26 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG



SCALE: 1"=10'

PHASE 1 OVERLAY PRE-TRAFFIC P-501 (STA. 3+05 TO 4+00) LEGEND:

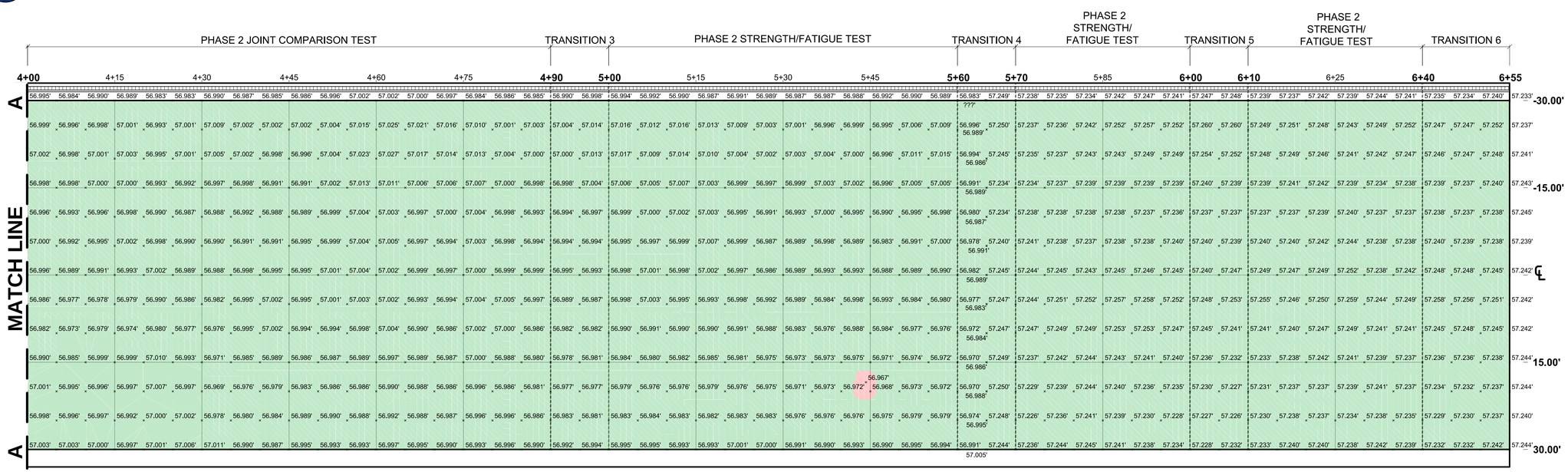
x 57.170' - SPOT ELEVATION

TARGET ELEVATION: 57.170' ± 0.031' ($\frac{3}{8}$")

CONFORMING ELEVATION (57.139' - 57.201')

ELEVATION BELOW THE CONFORMANCE RANGE (<57.139')

ELEVATION ABOVE THE CONFORMANCE RANGE (>57.201')



SCALE: 1"=10'

PHASE 2 STA. 4+00 TO 5+65 P-306 LEGEND:

x 57.000' - SPOT ELEVATION

TARGET ELEVATION: 57.000' ± 0.031' ($\frac{3}{8}$")

CONFORMING ELEVATION (56.969' - 57.031')

ELEVATION BELOW THE CONFORMANCE RANGE (<56.969')

ELEVATION ABOVE THE CONFORMANCE RANGE (>57.031')

PHASE 2 STA. 5+65 TO 6+55 P-306 LEGEND:

x 57.250' - SPOT ELEVATION

TARGET ELEVATION: 57.250' ± 0.031' ($\frac{3}{8}$")

CONFORMING ELEVATION (56.219' - 57.281')

ELEVATION BELOW THE CONFORMANCE RANGE (<56.219")

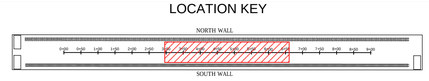
ELEVATION ABOVE THE CONFORMANCE RANGE (>57.281')

NOTES:

1. GRADE TOLERANCE PER SPECIFICATIONS FOR NAPTF CONSTRUCTION CYCLE 8 (CC8) ISSUED FOR CONSTRUCTION, NOVEMBER 16, 2016, REV. 1 12/20/2016.
2. P-501 AND P-306 GRADE CONFORMANCE TOLERANCE: ±$\frac{3}{8}$" (0.031').

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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FOR

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ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

CONSTRUCTION CYCLE 8

PRE-TRAFFIC P-501 AND P-306 ELEVATION MAP AS-BUILT

PROJECT NO:	SIZE: ANSI D	SCALE: AS NOTED	SHEET 27 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG

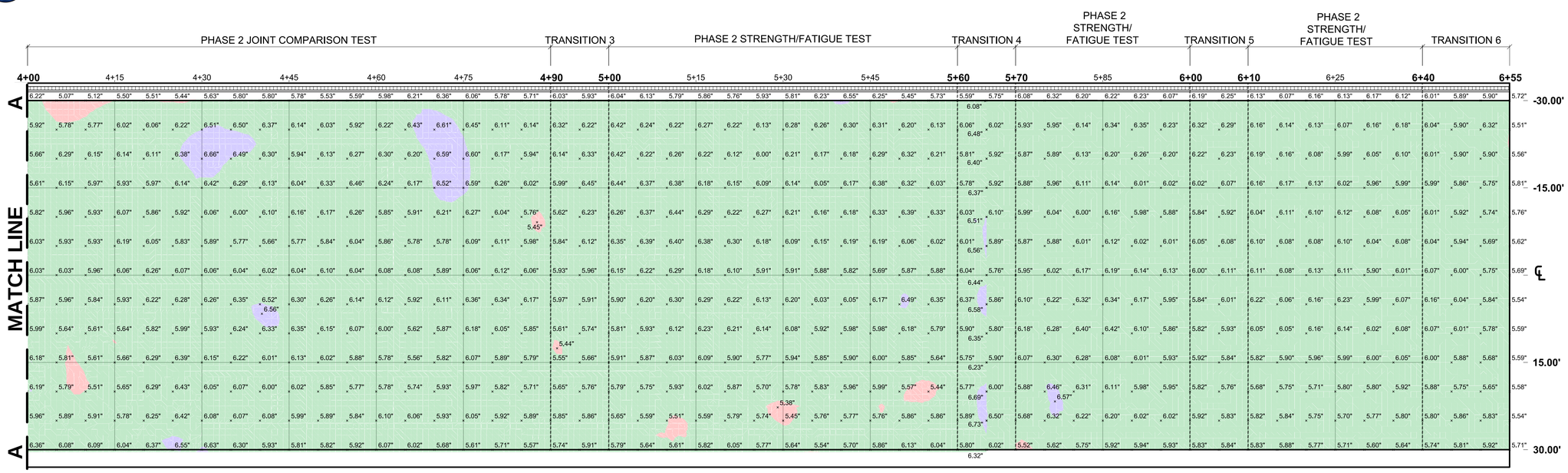
SCALE: 1"=10'

PHASE 1 OVERLAY PRE-TRAFFIC P-501 (STA. 3+05 TO 4+00) LEGEND:

x 9.00" - THICKNESS LABEL

TARGET THICKNESS: 9" ± ½" (0.750' ± 0.042')

- CONFORMING THICKNESS 8.50" - 9.50" (0.708' - 0.792')
- THICKNESS BELOW THE CONFORMANCE RANGE <8.50" (0.708')
- THICKNESS ABOVE THE CONFORMANCE RANGE >9.50" (0.792')



SCALE: 1"=10'

PHASE 2 STA. 4+00 TO 5+65 P-306 LEGEND:

x 6.00" - THICKNESS LABEL

TARGET THICKNESS: 6" ± ½" (0.500' ± 0.042')

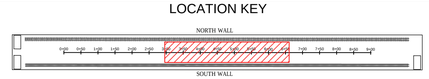
- CONFORMING THICKNESS 5.50" - 6.50" (0.458' - 0.542')
- THICKNESS BELOW THE CONFORMANCE RANGE <5.50" (0.458')
- THICKNESS ABOVE THE CONFORMANCE RANGE >6.50" (0.542')

NOTES:

1. THICKNESS TOLERANCE PER SPECIFICATIONS FOR NAPTF CONSTRUCTION CYCLE 8 (CC8) ISSUED FOR CONSTRUCTION, NOVEMBER 16, 2016, REV. 1 12/20/2016.
2. P-501 AND P-306 THICKNESS CONFORMANCE TOLERANCE: ±½" (0.042').

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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ATLANTIC CITY AIRPORT, NJ 08234

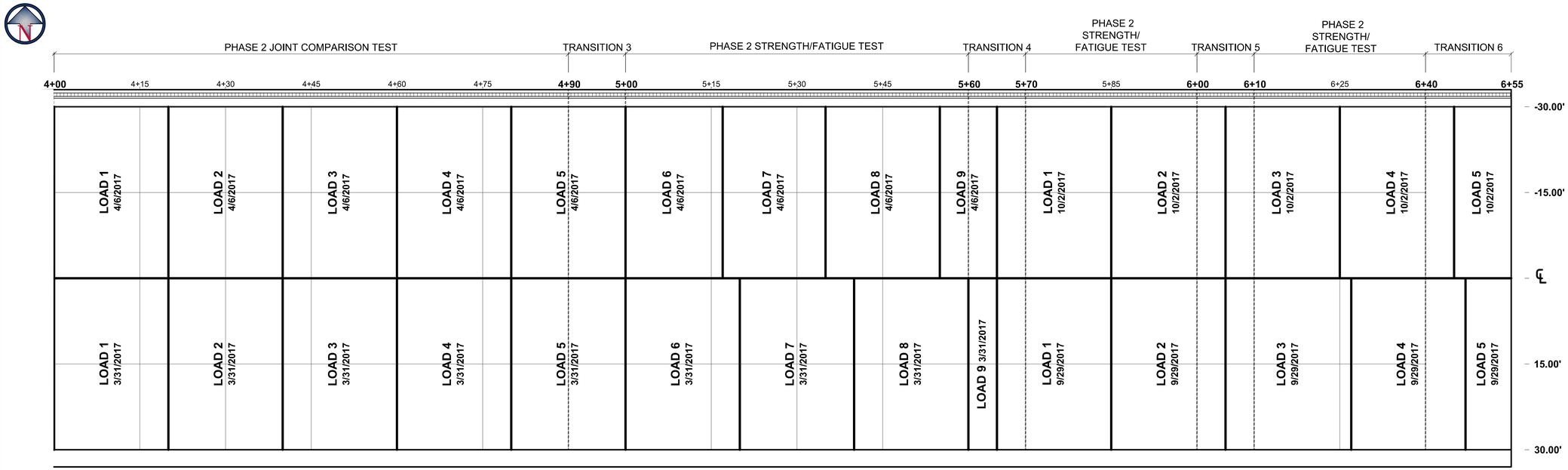
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

CONSTRUCTION CYCLE 8

PRE-TRAFFIC P-501 AND P-306 THICKNESS MAP AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 28 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG



PHASE 2 P-306

SCALE: 1"=10'

P-306 ACCEPTANCE AND CHARACTERIZATION TESTING RESULTS

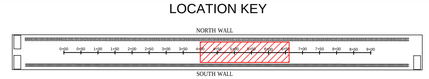
ID	Date	Load	Location	Acceptance & Characterization							
				QC Air	QC Slump	QC Unit Weight	QC Temp	7 Day Compressive Strength	7 Day Resonant Frequency	28 Day Compressive Strength	28 Day Resonant Frequency
				%	in	pcf	°F	psi	psi	psi	psi
LC-001	3/31/2017	1	4+00 to 4+20 South	5.0	2.50	138.7	65	400 (390-410)	2,258,000	N/T	N/T
LC-002	3/31/2017	4	4+60 to 4+80 South	4.6	8.00	142.0	64	660 (640-680)	3,484,000	N/T	N/T
LC-003	3/31/2017	7	5+20 to 5+40 South	4.8	4.50	141.0	66	540 (520-560)	2,938,000	N/T	N/T
LC-004	3/31/2017	8	5+40 to 5+60 South	4.3	5.00	143.0	68	545 (530-560)	2,881,000	N/T	N/T
LC-005	4/6/2017	1	4+00 to 4+20 North	6.1	4.50	137.1	69	395 (390-400)	2,291,000	N/T	N/T
LC-006	4/6/2017	4	4+60 to 4+80 North	5.2	5.50	140.6	72	440 (430-450)	2,600,000	N/T	N/T
LC-007	4/6/2017	7	5+17 to 5+35 North	5.1	3.25	141.3	68	575 (520-630)	3,388,000	N/T	N/T
LC-008	4/6/2017	8	5+35 to 5+55 North	4.5	6.75	143.0	70	415 (400-430)	2,661,000	N/T	N/T
LC-009	9/29/2017	1	5+65 to 5+85 South	6.7	3.25	138.7	69	625 (610-640)	N/T	840 (820-860)	N/T
LC-010	9/29/2017	2	5+85 to 6+05 South	5.6	3.50	141.3	68	585 (580-590)	N/T	760 (750-770)	N/T
LC-011	9/29/2017	3	6+05 to 6+27 South	6.8	5.00	138.7	70	775 (770-780)	N/T	1,020 (990-1,050)	3,946,000
LC-012	9/29/2017	4	6+27 to 6+47 South	7.0	3.00	139.2	72	730 (730-730)	N/T	920 (890-950)	3,814,000
LC-013	9/29/2017	5	6+47 to 6+55 South	7.6	3.50	141.0	70	830 (830-830)	N/T	1,095 (1,090-1,100)	4,305,000
LC-014	10/2/2017	1	5+65 to 5+85 North	7.6	2.75	137.8	64	685 (680-690)	N/T	925 (920-930)	3,603,000
LC-015	10/2/2017	2	5+85 to 6+05 North	6.5	4.25	137.6	66	560 (550-570)	N/T	735 (720-750)	3,346,000
LC-016	10/2/2017	3	6+05 to 6+25 North	6.3	3.00	139.6	67	860 (860-860)	N/T	1,160 (1,140-1,180)	4,055,000
LC-017	10/2/2017	4	6+25 to 6+45 North	6.7	2.75	138.6	67	745 (740-750)	N/T	890 (840-940)	3,818,000
LC-018	10/2/2017	5	6+45 to 6+55 North	5.8	3.50	139.7	69	640 (630-650)	N/T	855 (830-880)	3,564,000

	Strength		Std Dev	CV
4+00 to 4+45, North	7-day Compressive Strength, psi	395	7.07	1.8
	7-day Resonant Freq, psi	2,291,000	N/A	N/A
4+00 to 4+45, South	7-day Compressive Strength, psi	400	14.14	3.5
	7-day Resonant Freq, psi	2,258,000	N/A	N/A
4+45 to 4+90, North	7-day Compressive Strength, psi	440	14.14	3.2
	7-day Resonant Freq, psi	2,600,000	N/A	N/A
4+45 to 4+90, South	7-day Compressive Strength, psi	660	28.28	4.3
	7-day Resonant Freq, psi	3,484,000	N/A	N/A
5+00 to 5+30, North	7-day Compressive Strength, psi	575	77.78	13.5
	7-day Resonant Freq, psi	3,388,000	N/A	N/A
5+00 to 5+30, South	7-day Compressive Strength, psi	540	28.28	5.2
	7-day Resonant Freq, psi	2,938,000	N/A	N/A
5+30 to 5+60, North	7-day Compressive Strength, psi	495	103.44	20.9
	7-day Resonant Freq, psi	3,024,500	514.07	17.0
5+30 to 5+60, South	7-day Compressive Strength, psi	543	20.62	3.8
	7-day Resonant Freq, psi	2,909,250	40.66	1.4

	Strength		Std Dev	CV
5+70 to 6+00, North	7-day Compressive Strength, psi	623	72.74	11.7
	28-day Compressive Strength, psi	830	110.45	13.3
	28-day Resonant Freq, psi	3,474,000	181.73	5.2
5+70 to 6+00, South	7-day Compressive Strength, psi	605	26.46	4.4
	28-day Compressive Strength, psi	800	49.67	6.2
6+10 to 6+40, North	7-day Compressive Strength, psi	803	66.52	8.3
	28-day Compressive Strength, psi	1025	161.97	15.8
	28-day Resonant Freq, psi	3,936,000	167.58	4.3
6+10 to 6+40, South	7-day Compressive Strength, psi	755	35.36	4.7
	28-day Compressive Strength, psi	970	67.33	6.9
	28-day Resonant Freq, psi	3,880,000	93.34	2.4

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

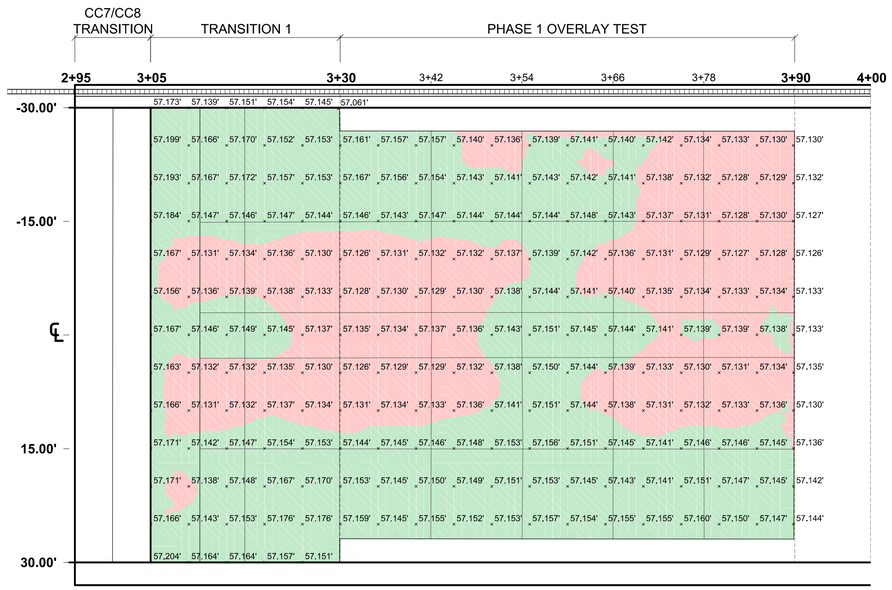
CONSTRUCTION CYCLE 8

P-306 ACCEPTANCE AND CHARACTERIZATION RESULTS

AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 29 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG



SCALE: 1"=10'

PHASE 1 OVERLAY POST-TRAFFIC P-501 (STA. 3+05 TO 4+00) LEGEND:

x 57.170' - SPOT ELEVATION

TARGET ELEVATION: 57.170' ±0.031' ($\frac{3}{8}$")

CONFORMING ELEVATION (57.139' - 57.201')

ELEVATION BELOW THE CONFORMANCE RANGE (<57.139')

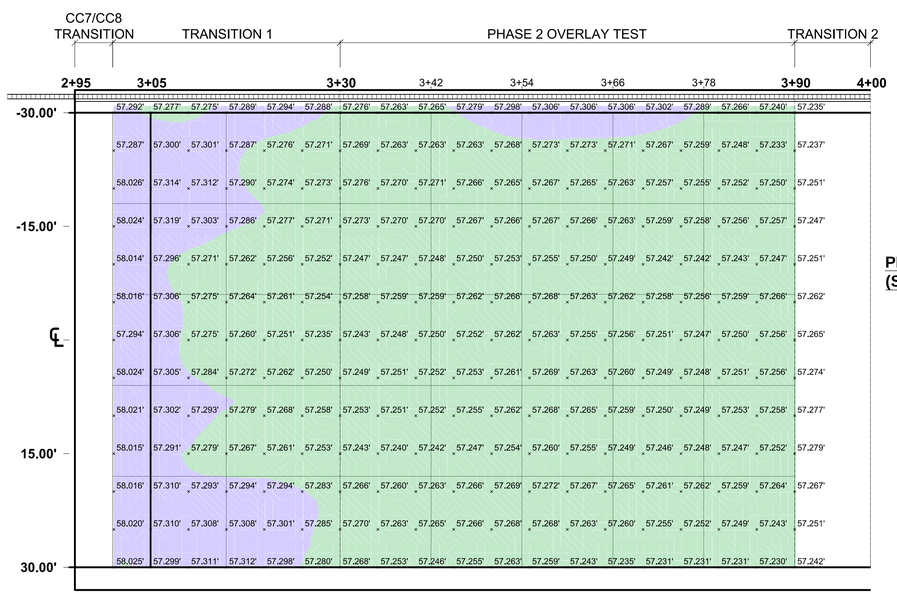
ELEVATION ABOVE THE CONFORMANCE RANGE (>57.201')

INTERLAYER ACCEPTANCE TESTING RESULTS

ID	Date	Station	Location	Compaction	Air Voids
				%	%
AC-001	12/13/2016	3+70	Pass 1	93.2	6.8
AC-002	12/13/2016	3+55	Pass 2	92.9	7.1
AC-003	12/13/2016	3+75	Pass 3	92.7	7.3
AC-004	12/13/2016	3+55	Pass 4	93.1	6.9
AC-005	12/13/2016	3+60	Pass 5	93.0	7.0
AC-006	12/13/2016	3+75	Joint 1	90.4	9.6
AC-007	12/13/2016	3+50	Joint 2	90.1	9.9
AC-008	12/13/2016	3+60	Joint 3	91.0	9.0
AC-009	12/13/2016	3+55	Joint 4	90.6	9.4

INTERLAYER CHARACTERIZATION TESTING RESULTS

Mix	Sieve	JMF	12/9/2016 Results	12/12/2016 Results
			%	%
9.5M64	3/4 in	100.0	100.0	100.0
	1/2 in	100.0	100.0	100.0
	3/8 in	92.5	96.3	95.8
	No. 4	60.3	55.9	63.9
	No. 16	29.3	26.2	32.8
	No. 50	11.2	10.4	13.1
	No. 200	4.5	3.1	4.5
	Asphalt Content	5.40	5.44	5.58
	VMA	16.9	17.4	16.4



SCALE: 1"=10'

PHASE 2 OVERLAY INTERLAYER (STA. 3+05 TO 4+00) GRADE LEGEND:

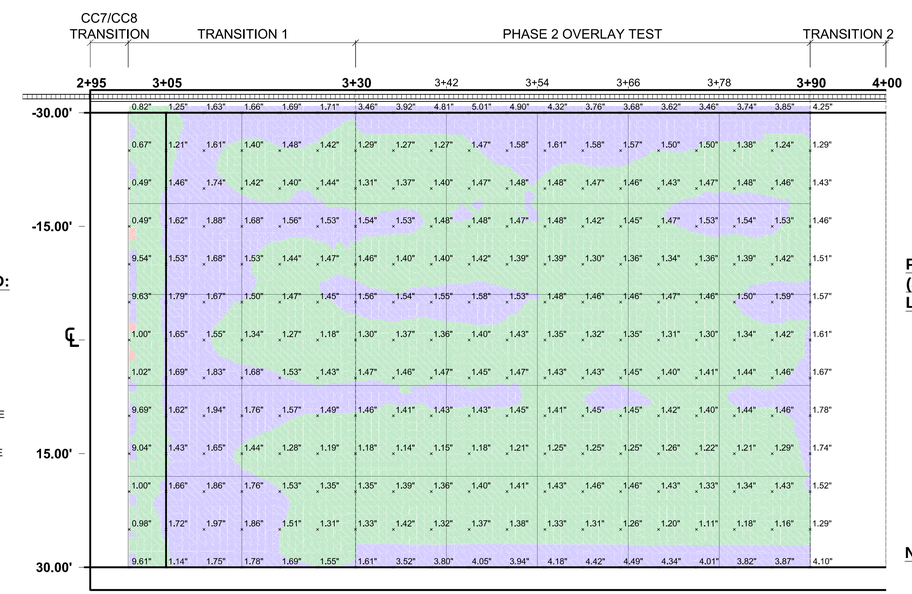
x 57.250' - SPOT ELEVATION

TARGET ELEVATION: 57.250' ± 0.031' ($\frac{3}{8}$")

CONFORMING ELEVATION (57.219' - 57.281')

ELEVATION BELOW THE CONFORMANCE RANGE (<57.219')

ELEVATION ABOVE THE CONFORMANCE RANGE (>57.281')



SCALE: 1"=10'

PHASE 2 OVERLAY INTERLAYER (STA. 4+00 TO 5+65) THICKNESS LEGEND:

x 1.00"' - THICKNESS LABEL

TARGET THICKNESS: 1" ± $\frac{1}{8}$" (0.083' ± 0.042')

CONFORMING THICKNESS 0.50" - 1.50" (0.042' - 0.125')

THICKNESS BELOW THE CONFORMANCE RANGE <0.50" (0.042')

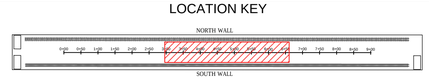
THICKNESS ABOVE THE CONFORMANCE RANGE >1.50" (0.125')

NOTES:

1. THICKNESS AND GRADE TOLERANCE PER SPECIFICATIONS FOR NAPTF CONSTRUCTION CYCLE 8 (CC8) ISSUED FOR CONSTRUCTION, NOVEMBER 16, 2016, REV. 1 12/20/2016.

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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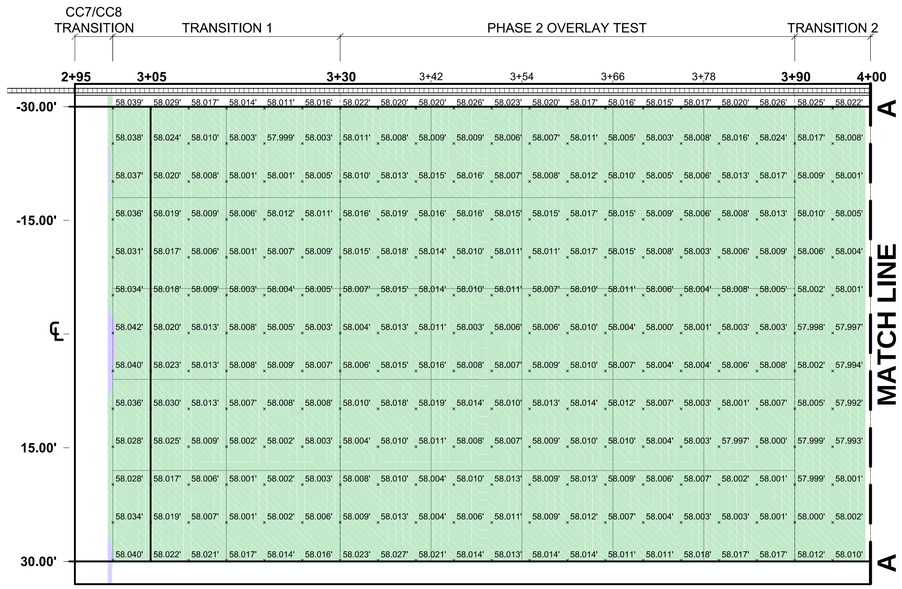
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

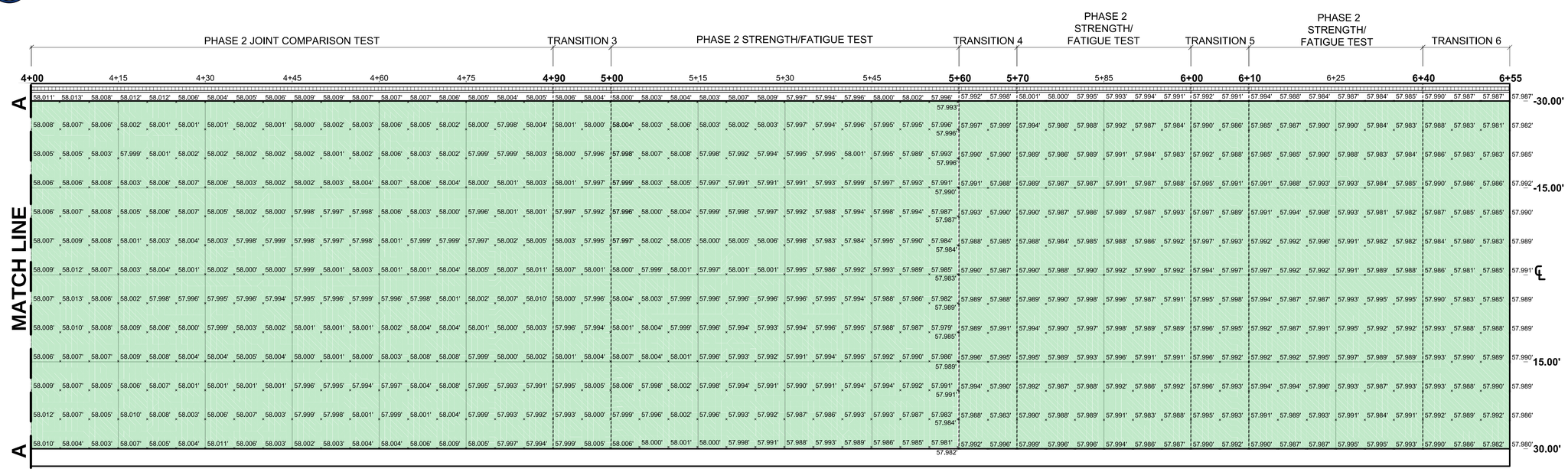
CONSTRUCTION CYCLE 8
POST-TRAFFIC P-501 ELEVATION MAP, INTERLAYER ELAVATION & THICKNESS MAPS AND TESTING RESULTS AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 30 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG



SCALE: 1"=10'



SCALE: 1"=10'

PHASE 2 P-501 LEGEND:

x 58.000' - SPOT ELEVATION

TARGET ELEVATION: 58.000' ± 0.04'

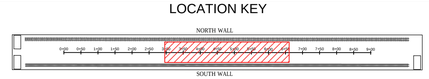
- CONFORMING ELEVATION (57.960' - 58.040')
- ELEVATION BELOW THE CONFORMANCE RANGE (<57.960')
- ELEVATION ABOVE THE CONFORMANCE RANGE (>58.040')

NOTES:

1. GRADE TOLERANCE PER SPECIFICATIONS FOR NAPTF CONSTRUCTION CYCLE 8 (CC8) ISSUED FOR CONSTRUCTION, NOVEMBER 16, 2016, REV. 1 12/20/2016.
2. P-501GRADE CONFORMANCE TOLERANCE: ±0.04 FEET.

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

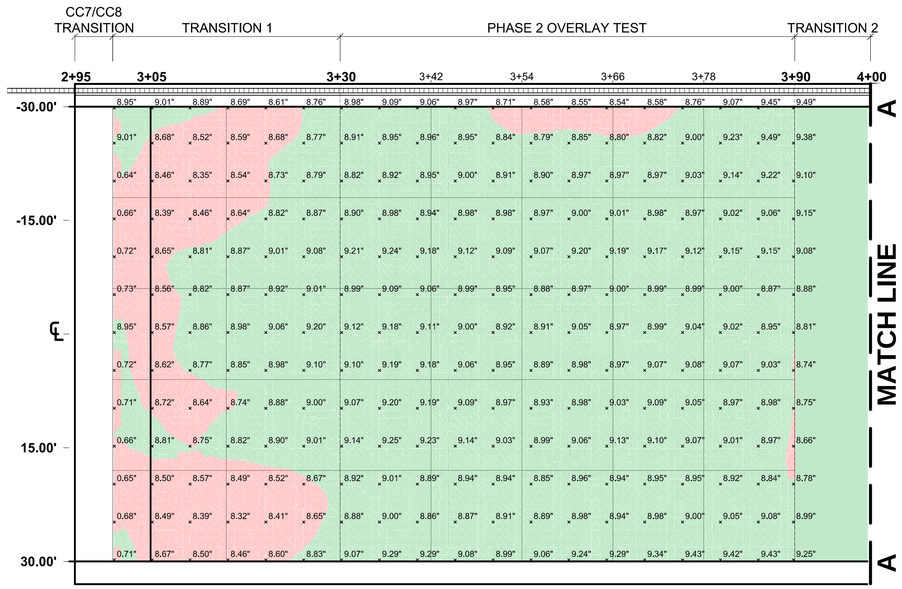
CONSTRUCTION CYCLE 8

P-501 ELEVATION MAP

AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 31 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG



SCALE: 1"=10'

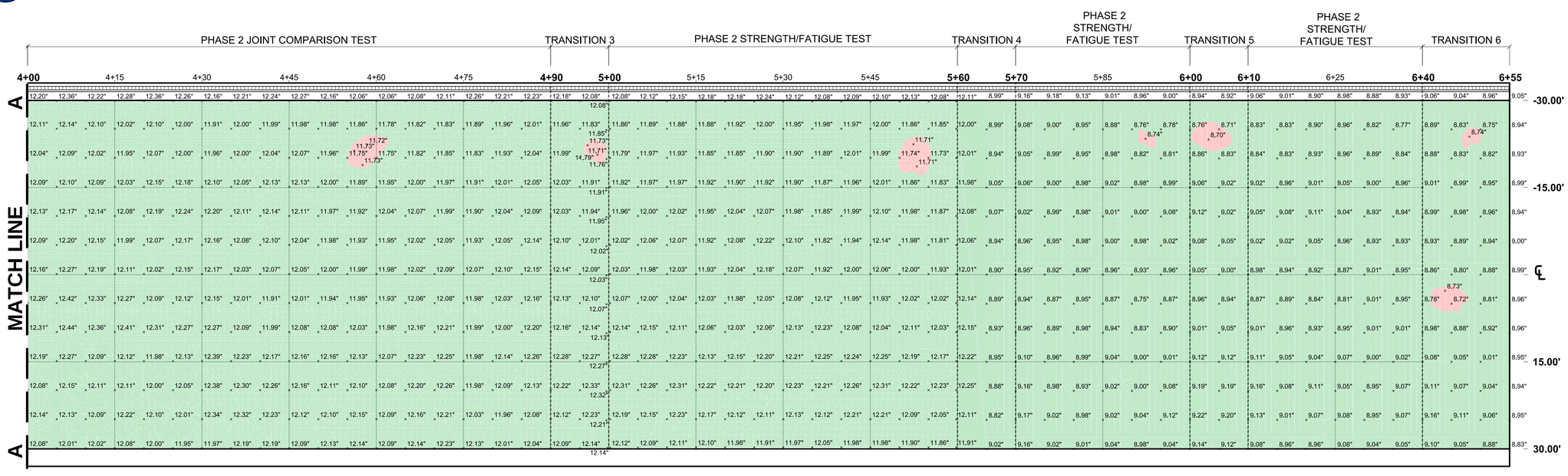
PHASE 2 OVERLAY (STA. 3+05 TO 4+00) LEGEND:

x 9.00" - THICKNESS LABEL

TARGET THICKNESS: T = 9.00" (0.750')

CONFORMING THICKNESS 8.75" - 10.00" (OR 0.729' - 0.833')

- CONFORMING THICKNESS 8.75" - 10.00" (0.729' - 0.833')
- THICKNESS BELOW THE CONFORMANCE RANGE <8.75" (0.729')
- THICKNESS ABOVE THE CONFORMANCE RANGE >10.00" (0.833')



SCALE: 1"=10'

PHASE 2 (STA. 4+00 TO 5+65) LEGEND:

x 12.00" - THICKNESS LABEL

TARGET THICKNESS: T = 12.00" (1.000')

CONFORMING THICKNESS 11.75" - 13.00" (OR 0.979' - 1.083")

- CONFORMING THICKNESS 11.75" - 13.00" (0.979' - 1.083')
- THICKNESS BELOW THE CONFORMANCE RANGE <11.75" (0.979')
- THICKNESS ABOVE THE CONFORMANCE RANGE >13.00" (1.083')

PHASE 2 (STA. 5+65 TO 6+55) LEGEND:

x 9.00" - THICKNESS LABEL

TARGET THICKNESS: T = 9.00" (0.750')

CONFORMING THICKNESS 8.75" - 10.00" (OR 0.729' - 0.833')

- CONFORMING THICKNESS 8.75" - 10.00" (0.729' - 0.833')
- THICKNESS BELOW THE CONFORMANCE RANGE <8.75" (0.729')
- THICKNESS ABOVE THE CONFORMANCE RANGE >10.00" (0.833')

NOTES:

1. THICKNESS TOLERANCE PER SPECIFICATIONS FOR NAPTF CONSTRUCTION CYCLE 8 (CC8) ISSUED FOR CONSTRUCTION, NOVEMBER 16, 2016, REV. 1 12/20/2016.
2. P-501 THICKNESS CONFORMANCE TOLERANCE:

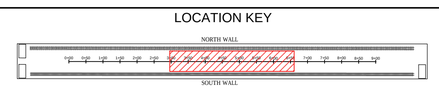
   LOWER TOLERANCE: T - 0.25"

   UPPER TOLERANCE: T + 1"

   WHERE T = LOT PLAN THICKNESS IN INCHES.

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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ATLANTIC CITY AIRPORT, NJ 08234

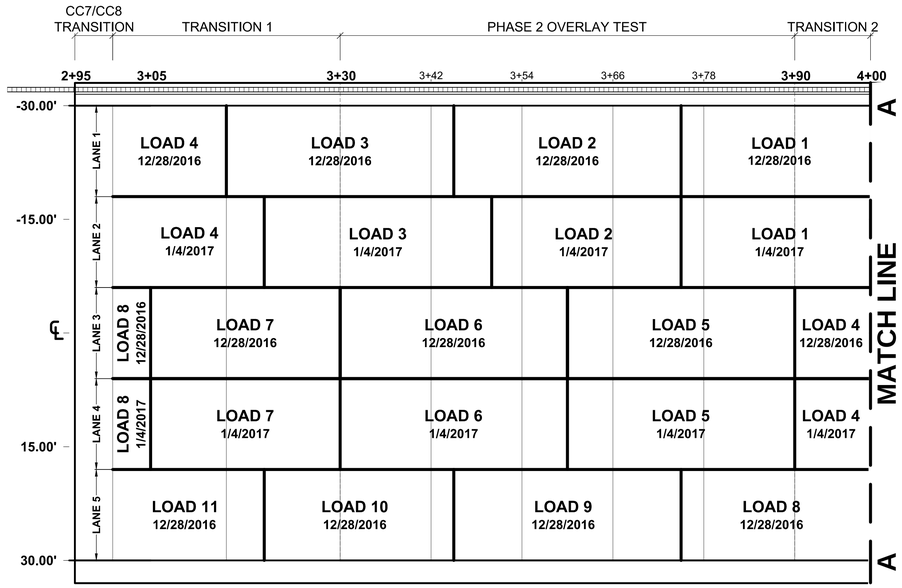
	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		
PROJECT NO:		

CONSTRUCTION CYCLE 8

P-501 THICKNESS MAP AS-BUILT

SIZE: ANSI D | SCALE: AS NOTED | SHEET 32 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG

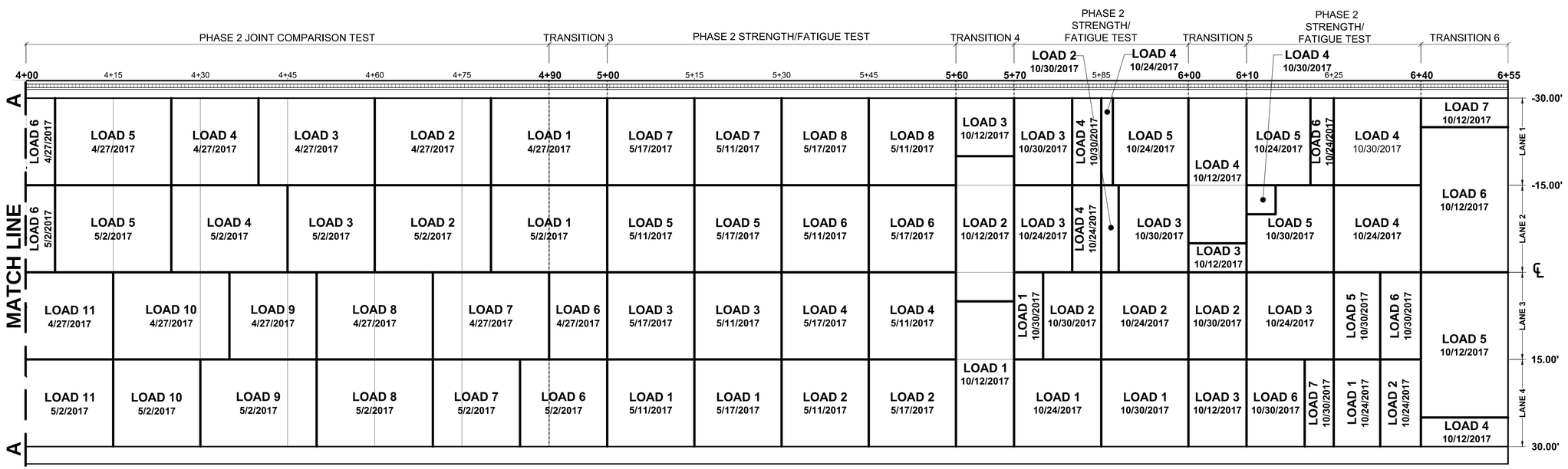


Location	Parameter	Average	Standard Deviation	Coefficient of Variation, %
3+30 to 3+90, North	7-day Flexural Strength, psi	471	30.87	6.6
	28-day Flexural Strength, psi	554	30.96	5.6
	28-day Compressive Strength, psi	4,376	234.81	5.4
	28-day Resonant Freq, psi	5,621,000	2514.11	0.0
3+30 to 3+90, South	7-day Flexural Strength, psi	472	24.13	5.1
	28-day Flexural Strength, psi	506	170.49	33.7
	28-day Compressive Strength, psi	4,529	295.44	6.5
	28-day Resonant Freq, psi	5,693,000	72.37	0.0
4+00 to 4+45, North	7-day Flexural Strength, psi	476	24.95	5.2
	7-day Resonant Freq, psi	4,766,000	246.99	0.0
	28-day Flexural Strength, psi	596	33.55	5.6
	28-day Compressive Strength, psi	4,442	304.53	6.9
	28-day Resonant Freq, psi	5,158,000	194.10	0.0
4+00 to 4+45, South	7-day Flexural Strength, psi	471	25.96	5.5
	7-day Resonant Freq, psi	4,666,000	309.31	0.0
	28-day Flexural Strength, psi	585	26.07	4.5
	28-day Compressive Strength, psi	4,310	160.11	3.7
	28-day Resonant Freq, psi	5,154,000	83.96	0.0
4+45 to 4+90, North	7-day Flexural Strength, psi	473	61.70	13.1
	7-day Resonant Freq, psi	4,562,000	397.50	0.0
	28-day Flexural Strength, psi	594	60.75	10.2
	28-day Compressive Strength, psi	4,492	455.20	10.1
	28-day Resonant Freq, psi	5,168,000	179.07	0.0
4+45 to 4+90, South	7-day Flexural Strength, psi	462	34.74	7.5
	7-day Resonant Freq, psi	4,784,000	172.47	0.0
	28-day Flexural Strength, psi	597	24.31	4.1
	28-day Compressive Strength, psi	4,485	214.02	4.8
	28-day Resonant Freq, psi	5,212,000	89.94	0.0
5+00 to 5+30, North	7-day Flexural Strength, psi	416	17.97	4.3
	7-day Resonant Freq, psi	4,353,000	86.73	0.0
	28-day Flexural Strength, psi	504	27.21	5.4
	28-day Compressive Strength, psi	3,629	203.49	5.6
	28-day Resonant Freq, psi	4,652,000	102.53	0.0

NOTE: PSPA DATA NOT INCLUDED DUE TO INCOMPLETE DATA SET. PRE-TRAFFIC PSPA DATA WILL BE INCLUDED IN APPENDIX OF THE CONSTRUCTION REPORT.

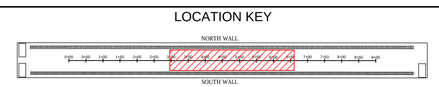
Location	Parameter	Average	Standard Deviation	Coefficient of Variation, %
5+00 to 5+30, South	7-day Flexural Strength, psi	418	60.21	14.4
	7-day Resonant Freq, psi	4,472,000	167.85	0.0
	28-day Flexural Strength, psi	513	47.59	9.3
	28-day Compressive Strength, psi	3,200	1101.31	34.4
	28-day Resonant Freq, psi	4,807,000	188.77	0.0
5+30 to 5+60, North	7-day Flexural Strength, psi	424	45.89	10.8
	7-day Resonant Freq, psi	4,432,000	289.11	0.0
	28-day Flexural Strength, psi	535	50.95	9.5
	28-day Compressive Strength, psi	3,810	523.09	13.7
	28-day Resonant Freq, psi	4,773,000	243.02	0.0
5+30 to 5+60, South	7-day Flexural Strength, psi	444	22.87	5.2
	7-day Resonant Freq, psi	4,572,000	272.22	0.0
	28-day Flexural Strength, psi	550	43.06	7.8
	28-day Compressive Strength, psi	3,902	460.77	11.8
	28-day Resonant Freq, psi	4,965,000	212.57	0.0
5+70 to 6+00, North	7-day Flexural Strength, psi	794	69.78	8.8
	7-day Resonant Freq, psi	6,211,000	152.63	0.0
	28-day Flexural Strength, psi	897	80.31	9.0
	28-day Compressive Strength, psi	5,436	506.23	9.3
	28-day Resonant Freq, psi	6,445,000	134.37	0.0
5+70 to 6+00, South	7-day Flexural Strength, psi	764	75.63	9.9
	7-day Resonant Freq, psi	6,018,000	157.75	0.0
	28-day Flexural Strength, psi	833	81.03	9.7
	28-day Compressive Strength, psi	5,146	367.46	7.1
	28-day Resonant Freq, psi	6,405,000	251.62	0.0
6+10 to 6+40, North	7-day Flexural Strength, psi	755	65.97	8.7
	7-day Resonant Freq, psi	6,029,000	320.03	0.0
	28-day Flexural Strength, psi	853	103.21	12.1
	28-day Compressive Strength, psi	5,235	678.34	13.0
	28-day Resonant Freq, psi	6,361,000	222.00	0.0
6+10 to 6+40, South	7-day Flexural Strength, psi	802	49.65	6.2
	7-day Resonant Freq, psi	6,077,000	129.95	0.0
	28-day Flexural Strength, psi	871	71.59	8.2
	28-day Compressive Strength, psi	5,274	342.88	6.5
	28-day Resonant Freq, psi	6,548,000	235.69	0.0

SEE SHEET 34 FOR ADDITIONAL P-501 ACCEPTANCE AND CHARACTERIZATION TESTING RESULTS



NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



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ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

CONSTRUCTION CYCLE 8

P-501 ACCEPTANCE AND CHARACTERIZATION RESULTS AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 33 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG

P-501 (650 PSI) Acceptance and Characterization Results

ID	Date	Load	Location	QC Slump	QC Air	QC Unit Weight	QC Temp	Avg. 28 Day Flexural Strength (Range)	7 Day Flexural Strength	7 Day Resonant Frequency	Avg. 28 Day Compressive Strength (Range)	28 Day Resonant Frequency*
				in	*%*	*pcf*	*°F*	*psi*	*psi*	*psi*	*psi*	*psi*
PCC-001	12/28/2016	1	4+00 to 3+75 Lane 1	5.25	6.5	138.2	70	580 (555-625)	500	N/T	4430 (4320-4550)	5,607,000*
PCC-002	12/28/2016	2	3+75 to 3+45 Lane 1	3.50	4.5	137.8	70	528 (475-560)	480	N/T	4397 (4370-4440)	N/T
PCC-003	12/28/2016	3	3+45 to 3+15 Lane 1	4.00	4.0	141.3	72	550 (500-580)	505	N/T	4363 (4330-4400)	5,585,000*
PCC-004	12/28/2016	4	3+15 to 3+00 Lane 1 & 4+00 to 3+90 Lane 3	3.50	6.9	137.4	70	522 (480-560)	480	N/T	4347 (4160-4460)	N/T
PCC-005	12/28/2016	5	3+90 to 3+60 Lane 3	5.25	6.2	137.6	66	545 (530-560)	480	N/T	4523 (4450-4630)	5,608,000*
PCC-006	12/28/2016	6	3+60 to 3+30 Lane 3	5.50	5.3	140.2	65	558 (540-590)	485	N/T	4613 (4480-4720)	5,684,000*
PCC-007	12/28/2016	7	3+30 to 3+05 Lane 3	3.50	5.8	138.8	68	568 (554-580)	455	N/T	4693 (4630-4760)	N/T
PCC-008	12/28/2016	8	3+05 to 3+00 Lane 3 & 4+00 to 3+75 Lane 5	4.25	6.0	140.1	69	525 (520-530)	480	N/T	4560 (4480-4610)	5,765,000*
PCC-009	12/28/2016	9	3+75 to 3+45 Lane 5	4.50	5.5	140.2	69	575 (560-590)	485	N/T	4717 (4630-4790)	5,783,000*
PCC-010	12/28/2016	10	3+45 to 3+20 Lane 5	4.50	7.0	137.4	68	600 (560-645)	495	N/T	4947 (4760-5120)	5,779,000*
PCC-011	12/28/2016	11	3+20 to 3+00 Lane 5	3.50	6.0	139.2	66	N/T	N/T	N/T	4450 (4240-4690)	N/T
PCC-012	1/4/2017	1	4+00 to 3+75 Lane 2	4.50	6.8	138.7	69	557 (540-565)	465	N/T	4580 (4490-4670)	5,736,000*
PCC-013	1/4/2017	2	3+75 to 3+50 Lane 2	5.00	7.4	137.9	65	568 (560-575)	420	N/T	4023 (3720-4290)	5,507,000*
PCC-014	1/4/2017	3	3+50 to 3+20 Lane 2	4.75	7.0	138.4	68	545 (515-590)	430	N/T	4080 (4040-4100)	N/T
PCC-015	1/4/2017	4	3+20 to 3+00 Lane 2 & 4+00 to 3+90 Lane 4	3.00	5.3	140.3	70	570 (555-595)	480	N/T	4760 (4670-4820)	5,647,000*
PCC-016	1/4/2017	5	3+90 to 3+60 Lane 4	5.25	5.6	140.4	67	560 (545-580)	455	N/T	4167 (3820-4350)	5,659,000*
PCC-017	1/4/2017	6	3+60 to 3+30 Lane 4	3.50	5.4	141.4	65	543 (540-550)	425	N/T	4173 (4130-4200)	5,646,000*
PCC-018	1/4/2017	7	3+30 to 3+05 Lane 4	3.75	5.6	139.4	61	568 (545-585)	480	N/T	4307 (4150-4400)	5,649,000*
PCC-019	1/4/2017	8	3+05 to 3+00 Lane 4	4.75	1.8	145.2	71	N/T	N/T	N/T	N/T	N/T
PCC-020	4/27/2017	1	5+00 to 4+80 Lane 1	2.50	6.0	140.2	68	685 (660-700)	530	4,113,000	5240 (5160-5370)	5,332,000
PCC-021	4/27/2017	2	4+80 to 4+60 Lane 1	2.75	6.7	139.3	68	635 (620-655)	505	4,869,000	4720 (4640-4770)	5,320,000
PCC-022	4/27/2017	3	4+60 to 4+40 Lane 1	4.75	7.0	137.8	68	607 (595-615)	495	4,704,000	4453 (4390-4520)	5,056,000
PCC-023	4/27/2017	4	4+40 to 4+25 Lane 1	2.50	5.1	140.6	69	588 (580-600)	455	5,022,000	4607 (4490-4700)	5,231,000
PCC-024	4/27/2017	5	4+25 to 4+05 Lane 1	4.00	5.1	140.7	72	603 (585-625)	480	4,841,000	4597 (4550-4660)	5,255,000
PCC-025	4/27/2017	6	4+05 to 4+00 Lane 1 & 5+00 to 4+90 Lane 3	3.25	5.0	141.3	71	657 (650-665)	510	4,949,000	4813 (4680-5070)	5,449,000
PCC-026	4/27/2017	7	4+90 to 4+70 Lane 3	3.25	5.5	140.2	71	610 (580-630)	455	4,680,000	4413 (4280-4510)	5,175,000
PCC-027	4/27/2017	8	4+70 to 4+50 Lane 3	3.50	4.5	141.6	74	615 (595-635)	480	4,947,000	4787 (4600-4910)	5,267,000
PCC-028	4/27/2017	9	4+50 to 4+35 Lane 3	3.00	5.3	141.4	72	613 (585-635)	510	4,970,000	4560 (4490-4680)	5,199,000
PCC-029	4/27/2017	10	4+35 to 4+15 Lane 3	4.50	5.2	140.8	72	593 (575-615)	455	4,852,000	4347 (4330-4360)	5,140,000
PCC-030	4/27/2017	11	4+15 to 4+00 Lane 3	3.50	6.1	140.5	71	605 (580-625)	440	4,724,000	4403 (4310-4450)	5,298,000
PCC-031	5/2/2017	1	5+00 to 4+80 Lane 2	4.50	4.9	139.7	73	557 (525-590)	500	N/T	4367 (4190-4470)	5,258,000
PCC-032	5/2/2017	2	4+80 to 4+60 Lane 2	4.00	5.6	137.0	75	515 (495-530)	360	N/T	3857 (3660-4240)	4,869,000
PCC-033	5/2/2017	3	4+60 to 4+45 Lane 2	3.75	5.8	138.5	74	563 (540-600)	445	N/T	4313 (4240-4420)	5,176,000
PCC-034	5/2/2017	4	4+45 to 4+25 Lane 2	5.00	6.9	135.7	74	562 (550-580)	435	4,323,000	4027 (3960-4090)	4,868,000
PCC-035	5/2/2017	5	4+25 to 4+05 Lane 2	4.00	6.5	139.0	74	565 (550-580)	475	N/T	4090 (3710-4360)	5,003,000
PCC-036	5/2/2017	6	4+05 to 4+00 Lane 2 & 5+00 to 4+85 Lane 4	4.00	5.1	141.0	76	593 (575-630)	485	4,756,000	4507 (4420-4550)	5,246,000
PCC-037	5/2/2017	7	4+85 to 4+70 Lane 4	4.00	5.0	141.0	75	595 (585-610)	400	N/T	4643 (4580-4750)	5,364,000
PCC-038	5/2/2017	8	4+70 to 4+50 Lane 4	4.00	5.1	139.8	75	578 (555-595)	450	4,569,000	4327 (4260-4360)	5,142,000
PCC-039	5/2/2017	9	4+50 to 4+30 Lane 4	4.50	6.0	139.4	75	573 (570-575)	455	N/T	4160 (4130-4200)	5,091,000
PCC-040	5/2/2017	10	4+30 to 4+15 Lane 4	4.25	6.0	139.5	76	552 (545-555)	475	4,166,000	4257 (4210-4280)	5,134,000
PCC-041	5/2/2017	11	4+15 to 4+00 Lane 4	4.00	5.0	140.6	77	573 (560-585)	490	4,618,000	4133 (4070-4190)	5,065,000
PCC-042	5/11/2017	1	5+00 to 5+15 off. 15' to 30'	4.50	5.8	138.4	71	489 (460-528)	390	4,420,000	3480 (3400-3560)	4,673,000
PCC-043	5/11/2017	2	5+30 to 5+45 off. 15' to 30'	4.25	5.0	140.6	68	568 (550-590)	455	4,723,000	4187 (4140-4230)	5,059,000
PCC-044	5/11/2017	3	5+15 to 5+30 off. 0' to 15'	5.00	5.8	139.3	78	548 (515-595)	420	4,514,000	4055 (4040-4070)	4,897,000
PCC-045	5/11/2017	4	5+45 to 5+60 off. 0' to 15'	6.00	7.0	138.8	68	548 (530-570)	460	4,603,000	3897 (3850-3930)	5,086,000
PCC-046	5/11/2017	5	5+00 to 5+15 off. 0' to -15'	4.50	7.5	136.8	69	493 (475-510)	405	4,352,000	3690 (3630-3760)	4,586,000
PCC-047	5/11/2017	6	5+30 to 5+45 off. 0' to -15'	4.75	7.0	137.2	69	507 (490-525)	415	4,353,000	3873 (3830-3960)	4,752,000
PCC-048	5/11/2017	7	5+15 to 5+30 off. -15' to -30'	5.75	Leaked	134.3	68	485 (465-505)	400	4,265,000	3310 (3250-3340)	4,551,000
PCC-049	5/11/2017	8	5+45 to 5+60 off. -15' to -30'	4.75	7.2	137.2	69	533 (505-565)	405	4,290,000	3530 (3460-3570)	4,640,000
PCC-050	5/17/2017	1	5+15 to 5+30 off. 15' to 30'	4.75	6.0	140.5	71	468 (425-505)	360	4,277,000	2850 (2730-3040)	4,629,000
PCC-051	5/17/2017	2	5+45 to 5+60 off. 15' to 30'	6.00	7.4	138.3	70	492 (455-510)	410	4,179,000	3193 (3110-3260)	4,647,000
PCC-052	5/17/2017	3	5+00 to 5+15 off. 0' to 15'	4.00	5.3	141.1	73	545 (520-570)	500	4,677,000	3767 (3710-3800)	5,029,000
PCC-053	5/17/2017	4	5+30 to 5+45 off. 0' to 15'	5.75	5.9	140.0	74	592 (580-605)	450	4,782,000	4330 (4230-4410)	5,069,000
PCC-054	5/17/2017	5	5+15 to 5+30 off. 0' to -15'	5.50	6.6	139.6	73	502 (485-525)	420	4,323,000	3697 (3670-3720)	4,696,000
PCC-055	5/17/2017	6	5+45 to 5+60 off. 0' to -15'	5.50	8.1	137.8	72	490 (480-495)	385	4,227,000	3253 (3180-3350)	4,579,000
PCC-056	5/17/2017	7	5+00 to 5+15 off. -15' to -30'	5.00	8.0	136.6	75	537 (520-565)	440	4,471,000	3820 (3800-3830)	4,775,000
PCC-057	5/17/2017	8	5+30 to 5+45 off. -15' to -30'	4.00	5.4	141.2	76	610 (590-620)	490	4,859,000	4583 (4550-4640)	5,121,000

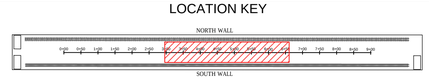
*Values for 28 Day resonant frequency results for 12/28/2017 and 1/4/2017 pours were pre-traffic results (age of specimens between 267 and 281 days)

P-501 (900 PSI) Acceptance and Characterization Results

ID	Date	Load	Location	QC Slump	QC Air	QC Unit Weight	QC Temp	Avg. 28 Day Flexural Strength (Range)	7 Day Flexural Strength	7 Day Resonant Frequency	Avg. 28 Day Compressive Strength (Range)	28 Day Resonant Frequency
				in	*%*	*pcf*	*°F*	*psi*	*psi*	*psi*	*psi*	*psi*
PCC-058	10/12/2017	1	5+60 to 5+70 off. 30' to 5'	5.75	3.6	145.6	78	967 (967-967)	750	6,239,000	5630 (5630-5630)	6,213,000
PCC-059	10/12/2017	2	5+60 to 5+70 off. 5' to -20'	4.50	5.0	147.8	79	921 (921-921)	760	6,344,000	5380 (5380-5380)	6,685,000
PCC-060	10/12/2017	3	5+60 to 5+70 off. -20' to -30' & 6+00 to 6+10 off. 30' to 15' & 0' to -5'	5.25	5.2	143.7	80	819 (819-819)	715	5,767,000	4790 (4790-4790)	6,064,000
PCC-061	10/12/2017	4	6+00 to 6+10 off. -5' to -30' & 6+40 to 6+55 off. 30' to 25'	5.50	5.7	142.2	75	896 (896-896)	750	5,879,000	5560 (5560-5560)	6,245,000
PCC-062	10/12/2017	5	6+40 to 6+55 off. 25' to 0'	5.00	7.1	141.5	75	881 (881-881)	745	5,809,000	4520 (4520-4520)	6,072,000
PCC-063	10/12/2017	6	6+40 to 6+55 off. 0' to -25'	5.00	4.6	146.3	76	940 (940-940)	790	6,394,000	6160 (6160-6160)	6,775,000
PCC-064	10/12/2017	7	6+40 to 6+55 off. -25' to -30'	5.50	5.9	143.8	75	835 (835-835)	705	5,766,000	5050 (5050-5050)	6,125,000
PCC-065	10/24/2017	1	5+70 to 5+85 & 6+25 to 6+33 off. 15' to 30'	4.25	5.7	144.8	76	894 (854-934)	808	6,199,000	5507 (5270-5820)	6,690,000
PCC-066	10/24/2017	2	6+33 to 6+40 off. 15' to 30' & 5+85 to 6+00 off. 0' to 15'	4.00	6.3	144.5	77	789 (759-813)	808	5,942,000	4797 (4620-5000)	6,314,000
PCC-067	10/24/2017	3	6+10 to 6+25 off. 0' to 15' & 5+70 to 5+80 off. 0' to -15'	4.25	6.7	143.1	77	928 (890-977)	876	6,255,000	5087 (4910-5200)	6,444,000
PCC-068	10/24/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. 0' to -15' & 5+85 to 5+87 off. -15' to -30'	3.75	5.6	146.8	76	805 (782-845)	843	6,252,000	5110 (4950-5330)	6,361,000
PCC-069	10/24/2017	5	5+87 to 6+00 & 6+10 to 6+21 off. -15' to -30'	3.75	5.9	146.3	79	788 (782-795)	795	6,028,000	4813 (4720-4880)	6,235,000
PCC-070	10/24/2017	6	6+21 to 6+25 off -15' to -30'	4.00	7.7	140.6	80	710 (615-780)	687	5,371,000	3890 (3850-3910)	5,942,000
PCC-071	10/30/2017	1	5+85 to 6+00 off. 15' to 30' & 5+70 to 5+75 off. 0' to 15'	5.25	6.7	143.7	67	816 (717-953)	677	5,912,000	5133 (4890-5280)	6,212,000
PCC-072	10/30/2017	2	5+75 to 5+85 & 6+00 to 6+10 off. 0' to 15' & 5+85 to 5+88 off. 0' to -15'	5.25	4.8	145.4	70	978 (958-1003)	819	6,468,000	6187 (6000-6350)	6,625,000
PCC-073	10/30/2017	3	5+88 to 6+00 off. 0' to -15' & 5+70 to 5+80 off. -15' to -30'	3.50	5.2	145.6	70	944 (905-997)	684	6,120,000	5607 (5460-5750)	6,492,000
PCC-074	10/30/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. -15' to -30' & 6+10 to 6+15 off. -10' to -15'	5.50	5.7	144.2	67	938 (917-975)	744	6,140,000	5810 (5600-5940)	6,511,000
PCC-075	10/30/2017	5	6+10 to 6+15 off. 0' to -10', 6+15 to 6+25 off. 0' to -15' & 6+25 to 6+33 off. 0' to 15'	4.00	6.3	144.0	66	849 (761-904)	789	5,944,000	5333 (5180-5440)	6,508,000
PCC-076	10/30/2017	6	6+33 to 6+40 off. 0' to 15' & 6+10 to 6+20 off. 15' to 30'	3.50	7.5	142.6	69	814 (763-841)	721	6,034,000	5257 (5150-5330)	6,382,000
PCC-077	10/30/2017	7	6+20 to 6+25 off. 15' to 30'	2.75	3.2	149.0	68	950 (926-970)	809	6,087,000	5663 (5270-5940)	6,952,000

NO.	REVISIONS	DATE	BY	CHK	APR

LOCATION KEY



CSRA
SRA INTERNATIONAL, INC., A CSRA COMPANY
200 DECADON DRIVE
EGG HARBOR, NJ 08234
PHONE: (609) 601-6800

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ 08234

	NAME	DATE
DRAWN	M.MAZUREK	03/19/2018
CHECKED	R.A./J.G.	
FAA APPROVAL DATE:		

CONSTRUCTION CYCLE 8

P-501 ACCEPTANCE AND CHARACTERIZATION RESULTS

AS-BUILT

PROJECT NO: | SIZE: ANSI D | SCALE: AS NOTED | SHEET 34 OF 34

CAD FILE: CC8-AS-BUILT-MODEL.DWG

P-152 Subgrade

Acceptance and Characterization Data

Station	Offset	Lift	CBR 1	CBR 2	CBR 3	M.C.	In-Situ Dry Density
	ft		*%*	*%*	*%*	*%*	*pcf*
3+37	-17	1	7.2	7.5	6.9	28.6	93.8
3+40	13	1	7.6	7.4	7.4	29.1	92.4
3+67	10	1	7.3	7.2	7.4	29.9	90.8
3+77	-17	1	7.6	7.1	7.1	28.1	94.5
4+15	10	1	7.7	7.9	7.9	27.7	96.4
4+20	-15	1	7.6	7.8	7.5	28.4	96.6
4+40	12	1	7.0	7.7	7.3	27.5	97.2
4+75	16	1	7.0	7.5	7.6	28.7	96.4
4+80	-10	1	7.5	7.5	7.7	28.8	96.4
5+10	-12	1	7.5	7.7	8.2	27.9	96.8
5+25	8	1	7.9	7.5	7.8	28.7	96.6
5+40	-14	1	7.4	7.5	7.6	29.3	94.1
5+77	18	1	9.5	9.2	9.4	28.6	93.6
5+77	7	1	7.8	7.6	8.3	28.9	88.2
5+77	-8	1	10.1	10.1	10.7	28.1	92.5
5+87	-2	1	9.4	9.7	9.7	28.3	93.5
5+87	-2	1 (2"↓)	7.3	7.9	7.5	28.3	93.5
5+90	16	1	7.8	8.9	8.4	27.8	94.0
5+90	16	1 (2"↓)	6.3	5.7	5.6	27.8	94.0
5+90	-18	1	6.7	7.1	6.8	27.5	96.2
6+17	19	1	3.4	3.4	3.8	24.4	96.5
6+28	-20	1	3.3	3.7	3.4	24.1	100.3
6+23	22	2	3.9	4.1	3.5	25.1	97.5
6+36	-23	2	3.8	4.0	4.2	23.8	100.7
6+24	-14	3	3.3	3.6	4.0	25.0	98.3
6+31	24	3	3.0	3.1	3.0	25.3	98.3

Station	Offset	Lift	Vane Shear 1	Vane Shear 2	Vane Shear 3	Vane Shear 4	Vane Shear 5	Shear Strength	PL k-value	LWD Modulus 1	LWD Modulus 2
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*psi*	*psi/in*	*psi*	*psi*
3+40	13	1	24	22	22	N/T	N/T	45.0	N/T	N/T	N/T
3+45	-25	1	26	28	27	N/T	N/T	54.0	N/T	8900	8700
3+45	-15	1	27	27	26	N/T	N/T	53.2	N/T	15600	15100
3+45	-5	1	24	26	24	N/T	N/T	49.3	N/T	13100	12800
3+45	5	1	21	20	20	N/T	N/T	40.6	N/T	12200	11200
3+45	15	1	25	26	21	N/T	N/T	48.6	N/T	17300	16100
3+45	25	1	24	23	24	N/T	N/T	47.4	N/T	23100	22800
3+60	-25	1	23	24	23	N/T	N/T	46.8	N/T	15600	15100
3+60	-15	1	23	20	23	N/T	N/T	44.0	109.6	27000	24300
3+60	-5	1	20	22	21	N/T	N/T	42.0	N/T	13800	13000
3+60	5	1	24	23	25	N/T	N/T	47.8	N/T	21800	21000
3+60	15	1	25	23	23	N/T	N/T	47.6	131.1	18900	17800
3+60	25	1	25	26	25	N/T	N/T	51.0	N/T	15600	15000
3+67	10	1	21	21	21	N/T	N/T	42.2	N/T	N/T	N/T
3+75	-25	1	27	25	28	N/T	N/T	53.1	N/T	11500	10900
3+75	-15	1	26	27	26	N/T	N/T	52.4	N/T	15200	14100
3+75	-5	1	26	26	26	N/T	N/T	52.1	N/T	14400	13500
3+75	5	1	24	24	22	N/T	N/T	46.4	N/T	27100	26800
3+75	15	1	23	22	24	N/T	N/T	46.2	N/T	25500	24300
3+75	25	1	23	22	23	N/T	N/T	45.4	N/T	10000	9500
4+05	-25	1	15	14	N/T	N/T	N/T	28.7	N/T	N/T	N/T
4+05	-15	1	18	17	N/T	N/T	N/T	34.2	N/T	N/T	N/T
4+05	-5	1	20	20	N/T	N/T	N/T	39.3	N/T	N/T	N/T
4+10	-25	1	15	16	16	N/T	N/T	31.7	N/T	N/T	N/T
4+10	-15	1	20	21	21	N/T	N/T	40.8	N/T	N/T	N/T
4+10	-5	1	19	20	20	N/T	N/T	39.0	N/T	N/T	N/T
4+10	5	1	12	13	N/T	N/T	N/T	24.8	N/T	N/T	N/T
4+10	15	1	11	11	N/T	N/T	N/T	22.3	N/T	N/T	N/T
4+10	25	1	12	12	N/T	N/T	N/T	23.9	N/T	N/T	N/T
4+15	-25	1	12	12	N/T	N/T	N/T	24.1	N/T	N/T	N/T
4+15	-15	1	13	14	N/T	N/T	N/T	27.6	N/T	N/T	N/T
4+15	-5	1	17	16	N/T	N/T	N/T	33.1	N/T	N/T	N/T
4+15	5	1	15	15	16	N/T	N/T	30.3	N/T	N/T	N/T
4+15	10 (Test 1)	1	14	13	14	14	14	27.4	N/T	N/T	N/T
4+15	10 (Test 2)	1	14	15	14	14	13	28.1	N/T	N/T	N/T
4+15	10 (Test 3)	1	15	14	14	14	14	28.4	N/T	N/T	N/T
4+15	15	1	14	13	13	N/T	N/T	26.9	N/T	N/T	N/T
4+15	20	1	15	13	16	N/T	N/T	29.9	N/T	N/T	N/T
4+15	25	1	11	11	11	N/T	N/T	21.7	N/T	N/T	N/T
4+20	-25	1	13	13	12	N/T	N/T	26.1	N/T	N/T	N/T
4+20	-15	1	13	14	14	N/T	N/T	27.1	N/T	N/T	N/T
4+20	-15 (Test 1)	1	13	14	14	14	14	27.8	N/T	N/T	N/T
4+20	-15 (Test 2)	1	16	16	16	14	15	30.7	N/T	N/T	N/T

Station	Offset	Lift	Vane Shear 1	Vane Shear 2	Vane Shear 3	Vane Shear 4	Vane Shear 5	Shear Strength	PL k-value	LWD Modulus 1	LWD Modulus 2
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*psi*	*psi/in*	*psi*	*psi*
4+20	-15 (Test 3)	1	14	15	14	14	15	29.1	N/T	N/T	N/T
4+20	-5	1	13	13	12	N/T	N/T	25.5	N/T	N/T	N/T
4+20	5	1	14	15	15	N/T	N/T	29.3	N/T	N/T	N/T
4+20	15	1	11	13	12	N/T	N/T	24.1	N/T	N/T	N/T
4+20	20	1	10	10	11	N/T	N/T	20.6	N/T	N/T	N/T
4+20	25	1	9	9	9	N/T	N/T	17.5	N/T	N/T	N/T
4+25	-25	1	21	20	19	N/T	N/T	39.5	N/T	9000	8500
4+25	-15	1	13	14	14	N/T	N/T	27.5	N/T	20400	18900
4+25	-5	1	15	15	15	N/T	N/T	30.0	N/T	16700	15400
4+25	5	1	13	13	13	N/T	N/T	26.1	N/T	12500	11800
4+25	15	1	15	14	17	N/T	N/T	30.9	N/T	12500	10900
4+25	20	1	9	9	8	N/T	N/T	17.8	N/T	N/T	N/T
4+25	25	1	13	14	13	N/T	N/T	26.5	N/T	12900	11400
4+30	-25	1	9	10	N/T	N/T	N/T	19.0	N/T	N/T	N/T
4+30	-15	1	12	10	10	N/T	N/T	21.3	N/T	N/T	N/T
4+30	-5	1	12	11	N/T	N/T	N/T	23.2	N/T	N/T	N/T
4+30	5	1	11	12	N/T	N/T	N/T	22.8	N/T	N/T	N/T
4+30	15	1	12	11	N/T	N/T	N/T	22.6	N/T	N/T	N/T
4+30	20	1	10	10	10	N/T	N/T	19.4	N/T	N/T	N/T
4+30	25	1	10	10	N/T	N/T	N/T	19.7	N/T	N/T	N/T
4+35	15	1	12	12	11	N/T	N/T	23.3	N/T	N/T	N/T
4+35	20	1	10	10	10	N/T	N/T	19.3	N/T	N/T	N/T
4+35	25	1	7	8	8	N/T	N/T	14.9	N/T	N/T	N/T
4+40	12 (Test 1)	1	15	14	14	15	14	28.5	N/T	N/T	N/T
4+40	12 (Test 2)	1	13	13	13	15	15	27.6	N/T	N/T	N/T
4+40	12 (Test 3)	1	14	14	13	14	14	27.6	N/T	N/T	N/T
4+40	15	1	12	12	13	N/T	N/T	24.4	N/T	N/T	N/T
4+40	20	1	11	11	10	N/T	N/T	21.7	N/T	N/T	N/T
4+40	25	1	10	9	10	N/T	N/T	19.6	N/T	N/T	N/T
4+45	20	1	11	12	12	N/T	N/T	23.3	N/T	N/T	N/T
4+45	25	1	10	11	11	N/T	N/T	21.2	N/T	N/T	N/T
4+50	-25	1	12	12	13	N/T	N/T	24.8	N/T	3100	2800
4+50	-15	1	16	16	18	N/T	N/T	33.6	154.0	4300	4100
4+50	-5	1	14	15	15	N/T	N/T	29.0	N/T	5800	5700
4+50	5	1	13	13	14	N/T	N/T	26.5	N/T	26000	24300
4+50	15	1	16	17	16	N/T	N/T	32.7	196.9	17700	16100
4+50	25	1	13	13	13	N/T	N/T	25.7	N/T	9900	9200
4+70	-25	1	7	8	N/T	N/T	N/T	15.1	N/T	N/T	N/T
4+70	-15	1	10	10	N/T	N/T	N/T	20.3	N/T	N/T	N/T
4+70	-5	1	12	12	N/T	N/T	N/T	23.5	N/T	N/T	N/T
4+70	5	1	13	13	N/T	N/T	N/T	26.1	N/T	N/T	N/T
4+70	15	1	15	14	N/T	N/T	N/T	29.0	N/T	N/T	N/T
4+70	25	1	13	13	N/T	N/T	N/T	26.8	N/T	N/T	N/T

Station	Offset	Lift	Vane Shear 1	Vane Shear 2	Vane Shear 3	Vane Shear 4	Vane Shear 5	Shear Strength	PL k-value	LWD Modulus 1	LWD Modulus 2
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*psi*	*psi/in*	*psi*	*psi*
4+75	-25	1	13	11	13	N/T	N/T	25.0	N/T	2700	2600
4+75	-15	1	14	15	14	N/T	N/T	28.6	N/T	4400	4400
4+75	-5	1	15	16	16	N/T	N/T	31.2	N/T	8400	8400
4+75	5	1	13	14	14	N/T	N/T	26.9	N/T	27500	26400
4+75	15	1	15	14	14	N/T	N/T	28.0	N/T	16100	15000
4+75	16 (Test 1)	1	15	13	15	13	13	27.4	N/T	N/T	N/T
4+75	16 (Test 2)	1	14	13	13	14	13	26.6	N/T	N/T	N/T
4+75	16 (Test 3)	1	14	14	15	14	12	27.5	N/T	N/T	N/T
4+75	25	1	12	12	12	N/T	N/T	24.2	N/T	15100	14500
4+80	-10 (Test 1)	1	13	13	13	12	13	25.7	N/T	N/T	N/T
4+80	-10 (Test 2)	1	13	12	15	12	13	26.2	N/T	N/T	N/T
4+80	-10 (Test 3)	1	14	12	12	12	13	25.3	N/T	N/T	N/T
4+90	-25	1	8	9	N/T	N/T	N/T	16.8	N/T	N/T	N/T
4+90	-15	1	11	10	N/T	N/T	N/T	20.9	N/T	N/T	N/T
4+90	-5	1	13	12	N/T	N/T	N/T	25.2	N/T	N/T	N/T
4+90	5	1	13	13	N/T	N/T	N/T	26.0	N/T	N/T	N/T
4+90	15	1	14	15	N/T	N/T	N/T	28.3	N/T	N/T	N/T
4+90	25	1	15	14	N/T	N/T	N/T	28.4	N/T	N/T	N/T
5+10	-25	1	9	8	N/T	N/T	N/T	17.1	N/T	N/T	N/T
5+10	-15	1	10	9	N/T	N/T	N/T	19.1	N/T	N/T	N/T
5+10	-12(Test 1)	1	13	14	12	13	13	26.1	N/T	N/T	N/T
5+10	-12 (Test 2)	1	13	14	14	13	13	26.7	N/T	N/T	N/T
5+10	-12 (Test 3)	1	13	14	14	13	14	27.2	N/T	N/T	N/T
5+10	-5	1	11	12	N/T	N/T	N/T	23.2	N/T	N/T	N/T
5+10	5	1	16	15	N/T	N/T	N/T	30.5	N/T	N/T	N/T
5+10	15	1	17	16	N/T	N/T	N/T	32.5	N/T	N/T	N/T
5+10	25	1	14	14	N/T	N/T	N/T	28.4	N/T	N/T	N/T
5+20	-25	1	15	16	14	N/T	N/T	30.0	N/T	8600	8200
5+20	-15	1	14	15	14	N/T	N/T	28.6	N/T	15300	14000
5+20	-5	1	15	15	15	N/T	N/T	29.2	N/T	6900	6700
5+20	5	1	14	14	13	N/T	N/T	27.3	N/T	13500	12300
5+20	15	1	15	15	15	N/T	N/T	29.9	N/T	5500	5800
5+20	25	1	12	11	12	N/T	N/T	24.0	N/T	17700	16500
5+25	8 (Test 1)	1	13	14	13	13	13	26.2	N/T	N/T	N/T
5+25	8 (Test 2)	1	14	13	13	13	12	26.2	N/T	N/T	N/T
5+25	8 (Test 3)	1	12	14	12	14	14	26.5	N/T	N/T	N/T
5+30	-25	1	8	7	N/T	N/T	N/T	14.9	N/T	N/T	N/T
5+30	-15	1	9	8	N/T	N/T	N/T	17.1	N/T	N/T	N/T
5+30	-5	1	10	9	N/T	N/T	N/T	18.6	N/T	N/T	N/T
5+30	5	1	13	13	N/T	N/T	N/T	26.1	N/T	N/T	N/T
5+30	15	1	14	13	N/T	N/T	N/T	27.6	N/T	N/T	N/T
5+30	25	1	13	13	N/T	N/T	N/T	26.8	N/T	N/T	N/T
5+40	-25	1	14	15	14	N/T	N/T	29.0	N/T	12000	11300

Station	Offset	Lift	Vane Shear 1	Vane Shear 2	Vane Shear 3	Vane Shear 4	Vane Shear 5	Shear Strength	PL k-value	LWD Modulus 1	LWD Modulus 2
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*psi*	*psi/in*	*psi*	*psi*
5+40	-15	1	12	14	12	N/T	N/T	25.1	117.4	5700	5500
5+40	-14 (Test 1)	1	12	14	13	14	14	26.7	N/T	N/T	N/T
5+40	-14(Test 2)	1	14	12	13	14	15	27.4	N/T	N/T	N/T
5+40	-14 (Test 3)	1	13	14	13	13	12	26.0	N/T	N/T	N/T
5+40	-5	1	10	11	10	N/T	N/T	20.9	N/T	14700	14200
5+40	5	1	15	15	15	N/T	N/T	29.8	N/T	14600	13500
5+40	15	1	15	14	15	N/T	N/T	28.8	179.9	2800	3100
5+40	25	1	13	14	15	N/T	N/T	27.5	N/T	17700	15900
5+50	-25	1	8	8	N/T	N/T	N/T	16.0	N/T	N/T	N/T
5+50	-15	1	9	10	N/T	N/T	N/T	19.1	N/T	N/T	N/T
5+50	-5	1	10	10	N/T	N/T	N/T	20.6	N/T	N/T	N/T
5+50	5	1	14	15	N/T	N/T	N/T	29.0	N/T	N/T	N/T
5+50	15	1	14	13	N/T	N/T	N/T	27.0	N/T	N/T	N/T
5+50	25	1	14	14	N/T	N/T	N/T	28.1	N/T	N/T	N/T
5+65	-25	1	11	10	11	N/T	N/T	21.3	N/T	N/T	N/T
5+65	-15	1	11	12	11	N/T	N/T	22.4	N/T	N/T	N/T
5+65	-5	1	10	11	10	N/T	N/T	20.5	N/T	N/T	N/T
5+65	5	1	13	13	13	N/T	N/T	26.5	N/T	N/T	N/T
5+65	15	1	14	15	13	N/T	N/T	27.8	N/T	N/T	N/T
5+65	25	1	13	12	12	N/T	N/T	25.3	N/T	N/T	N/T
5+70	-25	1	8	8	N/T	N/T	N/T	16.7	N/T	N/T	N/T
5+70	-15	1	9	9	N/T	N/T	N/T	18.7	N/T	N/T	N/T
5+70	-5	1	9	9	N/T	N/T	N/T	17.4	N/T	N/T	N/T
5+70	5	1	12	11	N/T	N/T	N/T	23.4	N/T	N/T	N/T
5+70	15	1	12	12	N/T	N/T	N/T	23.8	N/T	N/T	N/T
5+70	25	1	12	13	N/T	N/T	N/T	24.7	N/T	N/T	N/T
5+77	7 (Test 1)	1	16	16	15	N/T	N/T	31.3	N/T	N/T	N/T
5+77	7 (Test 2)	1	17	16	16	N/T	N/T	32.6	N/T	N/T	N/T
5+77	7 (Test 3)	1	15	16	16	N/T	N/T	31.0	N/T	N/T	N/T
5+80	-25	1	21	20	20	N/T	N/T	40.6	N/T	14200	13500
5+80	-25	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	10400	9600
5+80	-15	1	20	20	20	N/T	N/T	40.2	N/T	8400	8400
5+80	-15	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	19800	16300
5+80	-5	1	23	24	23	N/T	N/T	46.6	N/T	16400	15400
5+80	-5	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	28000	27600
5+80	5	1	22	21	23	N/T	N/T	44.1	N/T	21400	21800
5+80	5	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	16400	15600
5+80	15	1	21	20	20	N/T	N/T	40.6	N/T	20700	19500
5+80	15	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	13000	12100
5+80	25	1	23	22	23	N/T	N/T	45.4	N/T	8900	9200
5+80	25	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	21100	20100
5+90	-25	1	21	21	20	N/T	N/T	41.4	N/T	16500	14600
5+90	-25	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	15100	14500

Station	Offset	Lift	Vane Shear 1	Vane Shear 2	Vane Shear 3	Vane Shear 4	Vane Shear 5	Shear Strength	PL k-value	LWD Modulus 1	LWD Modulus 2
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*psi*	*psi/in*	*psi*	*psi*
5+90	-18 (Test 1)	1	16	16	15	N/T	N/T	30.7	N/T	N/T	N/T
5+90	-18 (Test 2)	1	15	16	15	N/T	N/T	30.2	N/T	N/T	N/T
5+90	-18 (Test 3)	1	16	15	16	N/T	N/T	31.6	N/T	N/T	N/T
5+90	-15	1	16	18	17	N/T	N/T	34.3	119.1	15600	14800
5+90	-15	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	14400	13500
5+90	-5	1	18	16	19	N/T	N/T	35.1	N/T	8300	8000
5+90	-5	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	10600	10100
5+90	5	1	18	16	15	N/T	N/T	32.6	N/T	10400	10000
5+90	5	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	5400	5400
5+90	15	1	16	15	15	N/T	N/T	30.0	140.9	5200	5400
5+90	15	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	18000	16700
5+90	25	1	16	15	14	N/T	N/T	30.0	N/T	12000	11200
5+90	25	1 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	21600	20800
6+17	18 (Test 1)	1	16	17	16	17	15	16.2	N/T	N/T	N/T
6+17	18 (Test 2)	1	16	15	15	16	16	15.5	N/T	N/T	N/T
6+17	18 (Test 3)	1	16	17	16	17	16	16.4	N/T	N/T	N/T
6+20	-25	3	16	17	16	N/T	N/T	16.0	N/T	8200	7300
6+20	-25	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	21800	19800
6+20	-15	3	17	15	15	N/T	N/T	15.7	N/T	9900	9600
6+20	-15	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	27500	25800
6+20	-5	3	15	14	15	N/T	N/T	14.7	N/T	6700	7100
6+20	-5	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	28400	27800
6+20	5	3	16	17	15	N/T	N/T	16.1	N/T	15600	15700
6+20	5	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	13000	11300
6+20	15	3	15	14	15	N/T	N/T	15.0	N/T	4400	4000
6+20	15	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	9200	8900
6+20	25	3	16	14	14	N/T	N/T	14.5	N/T	16500	14000
6+20	25	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	10400	10200
6+23	22 (Test 1)	2	15	15	14	N/T	N/T	14.6	N/T	N/T	N/T
6+23	22 (Test 2)	2	15	15	15	N/T	N/T	15.0	N/T	N/T	N/T
6+23	22 (Test 3)	2	15	13	15	15	N/T	14.2	N/T	N/T	N/T
6+24	-14 (Test 1)	3	11	11	12	N/T	N/T	11.2	N/T	N/T	N/T
6+24	-14 (Test 2)	3	11	10	10	N/T	N/T	10.4	N/T	N/T	N/T
6+24	-14 (Test 3)	3	10	10	11	N/T	N/T	10.5	N/T	N/T	N/T
6+28	-20 (Test 1)	1	15	17	16	15	15	15.5	N/T	N/T	N/T
6+28	-20 (Test 2)	1	16	17	17	16	17	16.6	N/T	N/T	N/T
6+28	-20 (Test 3)	1	17	16	16	16	16	16.1	N/T	N/T	N/T
6+30	-25	3	21	22	23	N/T	N/T	22.0	N/T	26800	26000
6+30	-25	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	18800	18000
6+30	-15	3	18	19	17	N/T	N/T	17.9	82.7	15200	14300
6+30	-15	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	24300	23500
6+30	-5	3	16	16	16	N/T	N/T	16.2	N/T	34700	32100
6+30	-5	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	23400	22900

Station	Offset	Lift	Vane Shear 1	Vane Shear 2	Vane Shear 3	Vane Shear 4	Vane Shear 5	Shear Strength	PL k-value	LWD Modulus 1	LWD Modulus 2
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*psi*	*psi/in*	*psi*	*psi*
6+30	5	3	16	16	17	N/T	N/T	16.4	N/T	24600	22900
6+30	5	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	13600	12900
6+30	15	3	14	14	14	N/T	N/T	14.0	76.0	10500	9700
6+30	15	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	14900	14200
6+30	25	3	13	12	13	N/T	N/T	12.7	N/T	12800	11700
6+30	25	3 (LWD 2)	N/T	N/T	N/T	N/T	N/T	N/T	N/T	16400	16100
6+31	24 (Test 1)	3	8	9	9	N/T	N/T	8.8	N/T	N/T	N/T
6+31	24 (Test 2)	3	10	10	10	N/T	N/T	10.0	N/T	N/T	N/T
6+31	24 (Test 3)	3	12	11	10	N/T	N/T	11.0	N/T	N/T	N/T
6+36	-23 (Test 1)	2	16	18	17	N/T	N/T	17.0	N/T	N/T	N/T
6+36	-23 (Test 2)	2	16	16	16	N/T	N/T	16.1	N/T	N/T	N/T
6+36	-23 (Test 3)	2	16	17	17	N/T	N/T	16.6	N/T	N/T	N/T

Station	Offset	Lift	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*in/blow*	*psi*
3+40	13	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
3+45	-25	1	8600	8400	8650	13482	11718	1.21	N/T
3+45	-15	1	14700	14500	14975	11466	11466	0.97	N/T
3+45	-5	1	12100	11300	12325	11907	12380	1.20	N/T
3+45	5	1	10600	10100	11025	10206	10584	1.04	N/T
3+45	15	1	15000	13900	15575	12474	12096	0.95	N/T
3+45	25	1	21600	20000	21875	10584	11340	1.15	N/T
3+60	-25	1	14300	13300	14575	10206	10584	1.03	N/T
3+60	-15	1	23600	20900	23950	11151	11340	1.08	N/T
3+60	-5	1	12800	12500	13025	11529	10395	1.01	N/T
3+60	5	1	19800	18700	20325	10962	10206	1.19	N/T
3+60	15	1	17300	16500	17625	13797	12096	1.16	N/T
3+60	25	1	14700	14000	14825	8505	11718	1.08	N/T
3+67	10	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
3+75	-25	1	10800	10400	10900	12474	12474	0.97	N/T
3+75	-15	1	13800	12700	13950	13608	12852	0.99	N/T
3+75	-5	1	12500	11700	13025	11718	11340	1.09	N/T
3+75	5	1	25600	23800	25825	11088	10395	1.11	N/T
3+75	15	1	23100	22700	23900	11340	10773	1.11	N/T
3+75	25	1	9200	8800	9375	11907	11907	1.28	N/T
4+05	-25	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+05	-15	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+05	-5	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+10	-25	1	N/T	N/T	N/T	N/T	N/T	1.00	N/T
4+10	-15	1	N/T	N/T	N/T	N/T	N/T	1.58	N/T
4+10	-5	1	N/T	N/T	N/T	N/T	N/T	1.15	N/T
4+10	5	1	N/T	N/T	N/T	N/T	N/T	1.98	N/T
4+10	15	1	N/T	N/T	N/T	N/T	N/T	1.32	N/T
4+10	25	1	N/T	N/T	N/T	N/T	N/T	1.68	N/T
4+15	-25	1	N/T	N/T	N/T	N/T	N/T	1.03	N/T
4+15	-15	1	N/T	N/T	N/T	N/T	N/T	1.31	N/T
4+15	-5	1	N/T	N/T	N/T	N/T	N/T	1.52	N/T
4+15	5	1	N/T	N/T	N/T	N/T	N/T	1.44	N/T
4+15	10 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+15	10 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+15	10 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+15	15	1	N/T	N/T	N/T	N/T	N/T	1.85	N/T
4+15	20	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+15	25	1	N/T	N/T	N/T	N/T	N/T	1.26	N/T
4+20	-25	1	N/T	N/T	N/T	N/T	N/T	0.81	N/T
4+20	-15	1	N/T	N/T	N/T	N/T	N/T	1.01	N/T
4+20	-15 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+20	-15 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T

Station	Offset	Lift	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*in/blow*	*psi*
4+20	-15 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+20	-5	1	N/T	N/T	N/T	N/T	N/T	1.13	N/T
4+20	5	1	N/T	N/T	N/T	N/T	N/T	1.06	N/T
4+20	15	1	N/T	N/T	N/T	N/T	N/T	1.13	N/T
4+20	20	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+20	25	1	N/T	N/T	N/T	N/T	N/T	1.12	N/T
4+25	-25	1	8200	7800	8375	8442	10836	1.21	N/T
4+25	-15	1	18000	16700	18500	9954	8694	1.33	N/T
4+25	-5	1	14600	13300	15000	9072	8316	1.19	N/T
4+25	5	1	11200	10000	11375	9072	8568	1.75	N/T
4+25	15	1	9900	8400	10425	8316	9072	1.62	N/T
4+25	20	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+25	25	1	10400	8900	10900	8316	7560	1.37	N/T
4+30	-25	1	N/T	N/T	N/T	N/T	N/T	0.94	N/T
4+30	-15	1	N/T	N/T	N/T	N/T	N/T	1.03	N/T
4+30	-5	1	N/T	N/T	N/T	N/T	N/T	1.30	N/T
4+30	5	1	N/T	N/T	N/T	N/T	N/T	2.07	N/T
4+30	15	1	N/T	N/T	N/T	N/T	N/T	1.09	N/T
4+30	20	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+30	25	1	N/T	N/T	N/T	N/T	N/T	1.16	N/T
4+35	15	1	N/T	N/T	N/T	N/T	N/T	0.85	N/T
4+35	20	1	N/T	N/T	N/T	N/T	N/T	1.00	N/T
4+35	25	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+40	12 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+40	12 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+40	12 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+40	15	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+40	20	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+40	25	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+45	20	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+45	25	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+50	-25	1	2700	2500	2775	6804	7182	1.69	N/T
4+50	-15	1	4300	4300	4250	8946	6804	1.57	N/T
4+50	-5	1	5300	5100	5475	8568	8694	1.19	N/T
4+50	5	1	23400	20100	23450	9198	7938	1.69	N/T
4+50	15	1	14900	13400	15525	9450	10206	1.01	N/T
4+50	25	1	8300	7200	8650	8316	8694	1.13	N/T
4+70	-25	1	N/T	N/T	N/T	N/T	N/T	1.07	N/T
4+70	-15	1	N/T	N/T	N/T	N/T	N/T	1.03	N/T
4+70	-5	1	N/T	N/T	N/T	N/T	N/T	0.97	N/T
4+70	5	1	N/T	N/T	N/T	N/T	N/T	1.03	N/T
4+70	15	1	N/T	N/T	N/T	N/T	N/T	0.89	N/T
4+70	25	1	N/T	N/T	N/T	N/T	N/T	0.77	N/T

Station	Offset	Lift	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*in/blow*	*psi*
4+75	-25	1	2500	2500	2575	7686	8442	1.37	N/T
4+75	-15	1	4500	4600	4475	8442	10962	1.44	N/T
4+75	-5	1	8300	8200	8325	8568	14868	1.13	N/T
4+75	5	1	25500	23400	25700	9450	6804	0.81	N/T
4+75	15	1	14800	13700	14900	N/T	N/T	1.07	N/T
4+75	16 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+75	16 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+75	16 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+75	25	1	14200	13700	14375	7686	8316	1.04	N/T
4+80	-10 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+80	-10 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+80	-10 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
4+90	-25	1	N/T	N/T	N/T	N/T	N/T	1.02	N/T
4+90	-15	1	N/T	N/T	N/T	N/T	N/T	1.32	N/T
4+90	-5	1	N/T	N/T	N/T	N/T	N/T	0.92	N/T
4+90	5	1	N/T	N/T	N/T	N/T	N/T	0.98	N/T
4+90	15	1	N/T	N/T	N/T	N/T	N/T	1.46	N/T
4+90	25	1	N/T	N/T	N/T	N/T	N/T	0.94	N/T
5+10	-25	1	N/T	N/T	N/T	N/T	N/T	1.10	N/T
5+10	-15	1	N/T	N/T	N/T	N/T	N/T	0.89	N/T
5+10	-12(Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+10	-12 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+10	-12 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+10	-5	1	N/T	N/T	N/T	N/T	N/T	0.97	N/T
5+10	5	1	N/T	N/T	N/T	N/T	N/T	1.29	N/T
5+10	15	1	N/T	N/T	N/T	N/T	N/T	0.94	N/T
5+10	25	1	N/T	N/T	N/T	N/T	N/T	1.02	N/T
5+20	-25	1	7900	7800	8125	5670	6804	2.54	N/T
5+20	-15	1	12900	11100	13325	7812	8946	2.71	N/T
5+20	-5	1	6400	5900	6475	8694	8820	2.37	N/T
5+20	5	1	12000	10100	11975	8316	7308	1.80	N/T
5+20	15	1	6100	6100	5875	8694	7686	1.91	N/T
5+20	25	1	15700	13800	15925	9450	7560	2.26	N/T
5+25	8 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+25	8 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+25	8 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+30	-25	1	N/T	N/T	N/T	N/T	N/T	1.51	N/T
5+30	-15	1	N/T	N/T	N/T	N/T	N/T	1.96	N/T
5+30	-5	1	N/T	N/T	N/T	N/T	N/T	2.09	N/T
5+30	5	1	N/T	N/T	N/T	N/T	N/T	1.66	N/T
5+30	15	1	N/T	N/T	N/T	N/T	N/T	1.87	N/T
5+30	25	1	N/T	N/T	N/T	N/T	N/T	1.78	N/T
5+40	-25	1	10500	9300	10775	6048	6804	1.72	N/T

Station	Offset	Lift	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*in/blow*	*psi*
5+40	-15	1	5000	4600	5200	7434	7182	2.63	N/T
5+40	-14 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+40	-14(Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+40	-14 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+40	-5	1	13400	12300	13650	8316	6804	2.27	N/T
5+40	5	1	13000	12300	13350	8316	6426	2.04	N/T
5+40	15	1	3000	3300	3050	6804	8442	1.68	N/T
5+40	25	1	14500	13100	15300	8946	7560	1.78	N/T
5+50	-25	1	N/T	N/T	N/T	N/T	N/T	1.33	N/T
5+50	-15	1	N/T	N/T	N/T	N/T	N/T	1.10	N/T
5+50	-5	1	N/T	N/T	N/T	N/T	N/T	2.51	N/T
5+50	5	1	N/T	N/T	N/T	N/T	N/T	1.80	N/T
5+50	15	1	N/T	N/T	N/T	N/T	N/T	1.41	N/T
5+50	25	1	N/T	N/T	N/T	N/T	N/T	1.58	N/T
5+65	-25	1	N/T	N/T	N/T	N/T	N/T	1.32	10410
5+65	-15	1	N/T	N/T	N/T	N/T	N/T	1.79	N/T
5+65	-5	1	N/T	N/T	N/T	N/T	N/T	1.92	N/T
5+65	5	1	N/T	N/T	N/T	N/T	N/T	2.18	N/T
5+65	15	1	N/T	N/T	N/T	N/T	N/T	1.41	N/T
5+65	25	1	N/T	N/T	N/T	N/T	N/T	1.67	10912
5+70	-25	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+70	-15	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+70	-5	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+70	5	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+70	15	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+70	25	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+77	7 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+77	7 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+77	7 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+80	-25	1	13000	11900	13150	11340	9828	1.06	N/T
5+80	-25	1 (LWD 2)	9200	8300	9375	N/T	N/T	N/T	N/T
5+80	-15	1	7600	7000	7850	9072	8190	1.59	N/T
5+80	-15	1 (LWD 2)	14800	13100	16000	N/T	N/T	N/T	N/T
5+80	-5	1	14900	14200	15225	12348	14364	2.38	N/T
5+80	-5	1 (LWD 2)	26400	25900	26975	N/T	N/T	N/T	N/T
5+80	5	1	20500	18900	20650	12474	13356	1.95	N/T
5+80	5	1 (LWD 2)	15200	14300	15375	N/T	N/T	N/T	N/T
5+80	15	1	16800	15100	18025	9576	8316	1.73	N/T
5+80	15	1 (LWD 2)	12000	11200	12075	N/T	N/T	N/T	N/T
5+80	25	1	9800	10400	9575	10332	13608	1.19	N/T
5+80	25	1 (LWD 2)	19200	18200	19650	N/T	N/T	N/T	N/T
5+90	-25	1	13100	13000	14300	11214	11592	1.19	N/T
5+90	-25	1 (LWD 2)	13700	12600	13975	N/T	N/T	N/T	N/T

Station	Offset	Lift	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*in/blow*	*psi*
5+90	-18 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+90	-18 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+90	-18 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
5+90	-15	1	13500	11600	13875	9954	9828	2.33	N/T
5+90	-15	1 (LWD 2)	12400	11200	12875	N/T	N/T	N/T	N/T
5+90	-5	1	7700	7500	7875	11466	10962	1.55	N/T
5+90	-5	1 (LWD 2)	9700	9300	9925	N/T	N/T	N/T	N/T
5+90	5	1	9200	8700	9575	8316	8316	1.58	N/T
5+90	5	1 (LWD 2)	5200	5600	5400	N/T	N/T	N/T	N/T
5+90	15	1	5100	4900	5150	11214	9072	1.35	N/T
5+90	15	1 (LWD 2)	15700	14300	16175	N/T	N/T	N/T	N/T
5+90	25	1	10500	9100	10700	8316	14742	1.16	N/T
5+90	25	1 (LWD 2)	20000	18000	20100	N/T	N/T	N/T	N/T
6+17	18 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+17	18 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+17	18 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+20	-25	3	7900	6600	7500	11970	9702	2.59	N/T
6+20	-25	3 (LWD 2)	18900	17200	19425	N/T	N/T	N/T	N/T
6+20	-15	3	9600	9600	9675	13230	11340	2.32	N/T
6+20	-15	3 (LWD 2)	25900	24200	25850	N/T	N/T	N/T	N/T
6+20	-5	3	7100	6900	6950	11466	8694	1.90	N/T
6+20	-5	3 (LWD 2)	25700	23300	26300	N/T	N/T	N/T	N/T
6+20	5	3	15200	13900	15100	10206	10962	2.04	N/T
6+20	5	3 (LWD 2)	11300	10300	11475	N/T	N/T	N/T	N/T
6+20	15	3	4000	3900	4075	9828	5670	1.12	N/T
6+20	15	3 (LWD 2)	9100	9300	9125	N/T	N/T	N/T	N/T
6+20	25	3	12700	11200	13600	10710	9828	2.30	N/T
6+20	25	3 (LWD 2)	9800	9500	9975	N/T	N/T	N/T	N/T
6+23	22 (Test 1)	2	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+23	22 (Test 2)	2	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+23	22 (Test 3)	2	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+24	-14 (Test 1)	3	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+24	-14 (Test 2)	3	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+24	-14 (Test 3)	3	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+28	-20 (Test 1)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+28	-20 (Test 2)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+28	-20 (Test 3)	1	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+30	-25	3	24600	22700	25025	Incorrect Data	Incorrect Data	2.20	N/T
6+30	-25	3 (LWD 2)	16900	15600	17325	Incorrect Data	Incorrect Data	N/T	N/T
6+30	-15	3	13800	12600	13975	Incorrect Data	Incorrect Data	1.88	N/T
6+30	-15	3 (LWD 2)	23600	21800	23300	Incorrect Data	Incorrect Data	N/T	N/T
6+30	-5	3	30000	26100	30725	Incorrect Data	Incorrect Data	1.68	N/T
6+30	-5	3 (LWD 2)	22000	20700	22250	Incorrect Data	Incorrect Data	N/T	N/T

Station	Offset	Lift	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*psi*	*psi*	*psi*	*in/blow*	*psi*
6+30	5	3	20000	17800	21325	Incorrect Data	Incorrect Data	1.47	N/T
6+30	5	3 (LWD 2)	12600	11900	12750	Incorrect Data	Incorrect Data	N/T	N/T
6+30	15	3	8800	7500	9125	Incorrect Data	Incorrect Data	2.27	N/T
6+30	15	3 (LWD 2)	13000	11700	13450	Incorrect Data	Incorrect Data	N/T	N/T
6+30	25	3	10800	9700	11250	Incorrect Data	Incorrect Data	2.14	N/T
6+30	25	3 (LWD 2)	15400	15000	15725	Incorrect Data	Incorrect Data	N/T	N/T
6+31	24 (Test 1)	3	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+31	24 (Test 2)	3	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+31	24 (Test 3)	3	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-23 (Test 1)	2	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-23 (Test 2)	2	N/T	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-23 (Test 3)	2	N/T	N/T	N/T	N/T	N/T	N/T	N/T

CC8
4/27/2009

ACCEPTANCE CBR TESTS ON CC8 SUBGRADE SURFACE- NORTH - DUPONT CLAY

Station	Offset, feet	CBR Value, %					Dry Density pcf	Moisture Content %
		Test-1	Test-2	Test-3	Test -4	Average CBR		
337	N-17	7.2	7.5	6.9	-	7.2	93.8	28.6
377	N-17	7.6	7.1	7.1	-	7.3	94.5	28.1
Minimum:	***6.9***				***Mean***	***7.2***		
Maximum:	***7.6***				***Std. Dev.***	***0.27***		
Difference:	***0.7***				***COV, %***	***3.68***		

ACCEPTANCE

	Criterion	Mean for the Lift
Range	7.0 - 8.0	7.2

SRA RECOMMENDATION:

Lift be accepted since it meets acceptance criteria and is fairly uniform (Standard Deviation = 0.27, and COV = 3.68%).

ACCEPTED / REJECTED

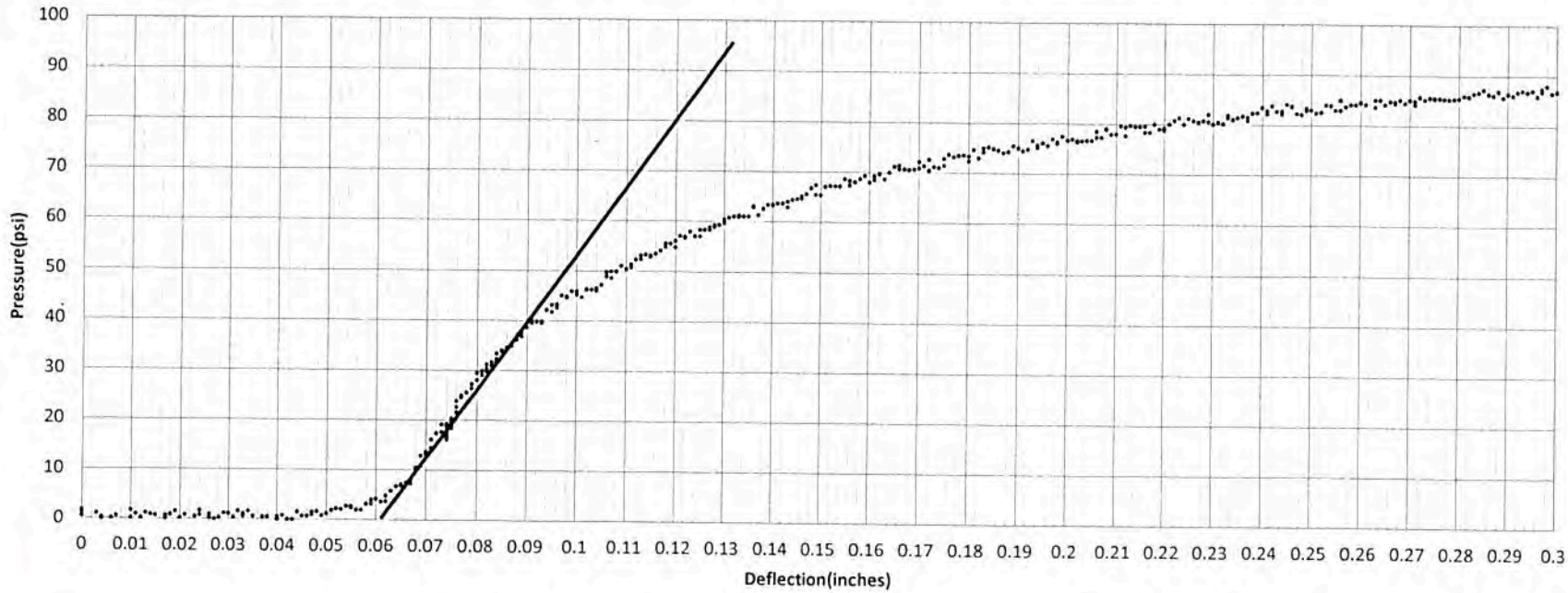
FAA's On-Site Engineer

4/28/15
Date

COMMENTS:

Project:	CC8	Date of Test:	April 27th, 2015
Test Location:	Sta. 338 Offset -17	Material Description:	South
Test Depth:	Top of subgrade		

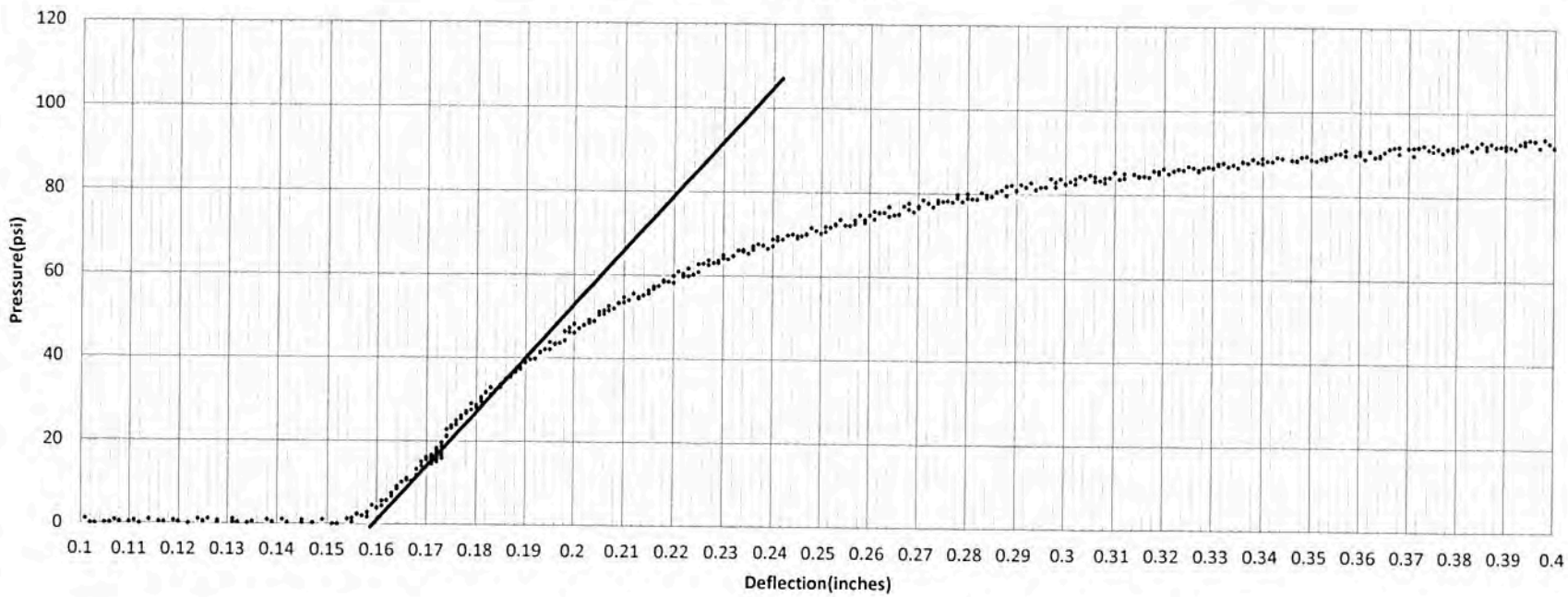
Stress -Penetration Curve



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.058		
Corrected Bearing Ratio at 0.1in (2.54mm): 6.9		Corrected Bearing Ratio at 0.2in (5.08mm): 5.6	
Vane Shear		Average	
Test Performed by: RA,CB&QL Date: April 27th, 2015		Reviewed by: Date:	

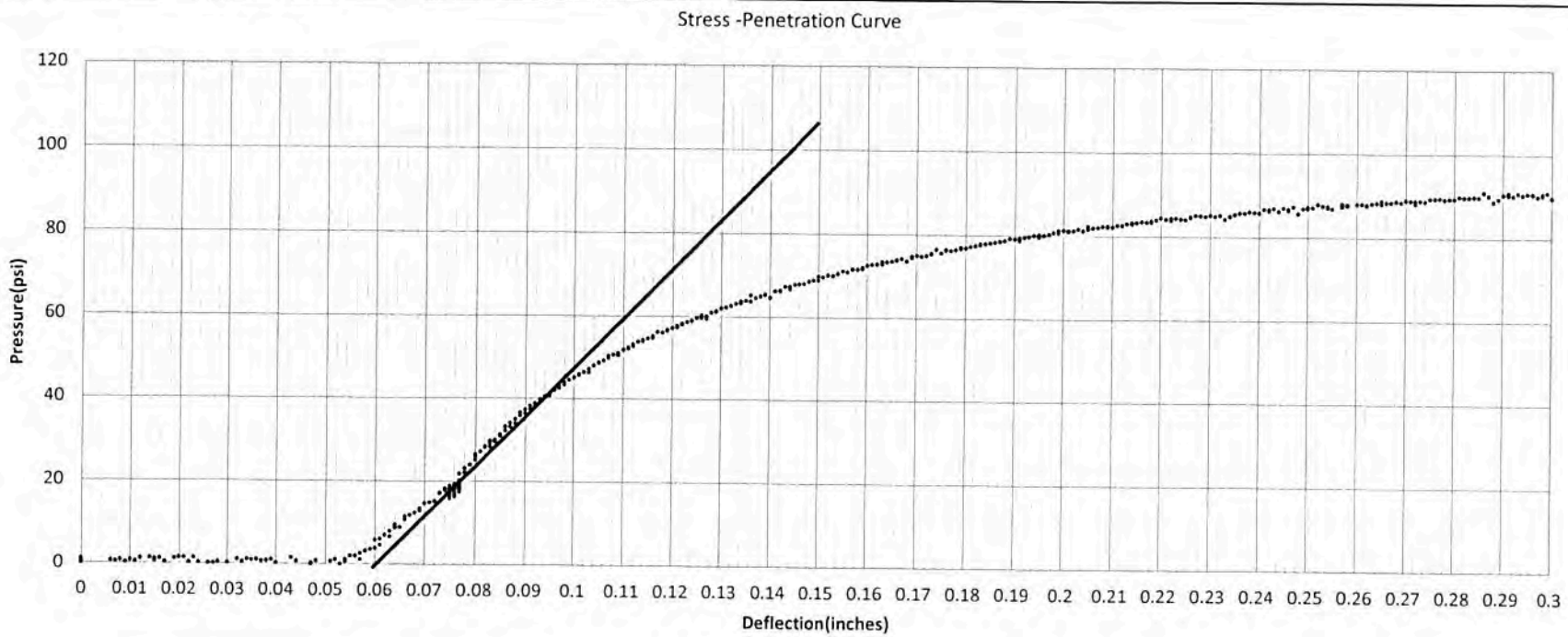
Project:	CC8	Date of Test:	April 27th, 2015
Test Location:	Sta. 338 Offset -17	Material Description:	South
Test Depth:	Top of subgrade		

Stress -Penetration Curve



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.158		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 6.0	
Vane Shear		Average	
Test Performed by: RA,CB&QL Date: April 27th, 2015		Reviewed by: Date:	

Project:	CC8	Date of Test:	April 27th, 2015
Test Location:	Sta. 338 Offset -17	Material Description:	South
Test Depth:	Top of subgrade		

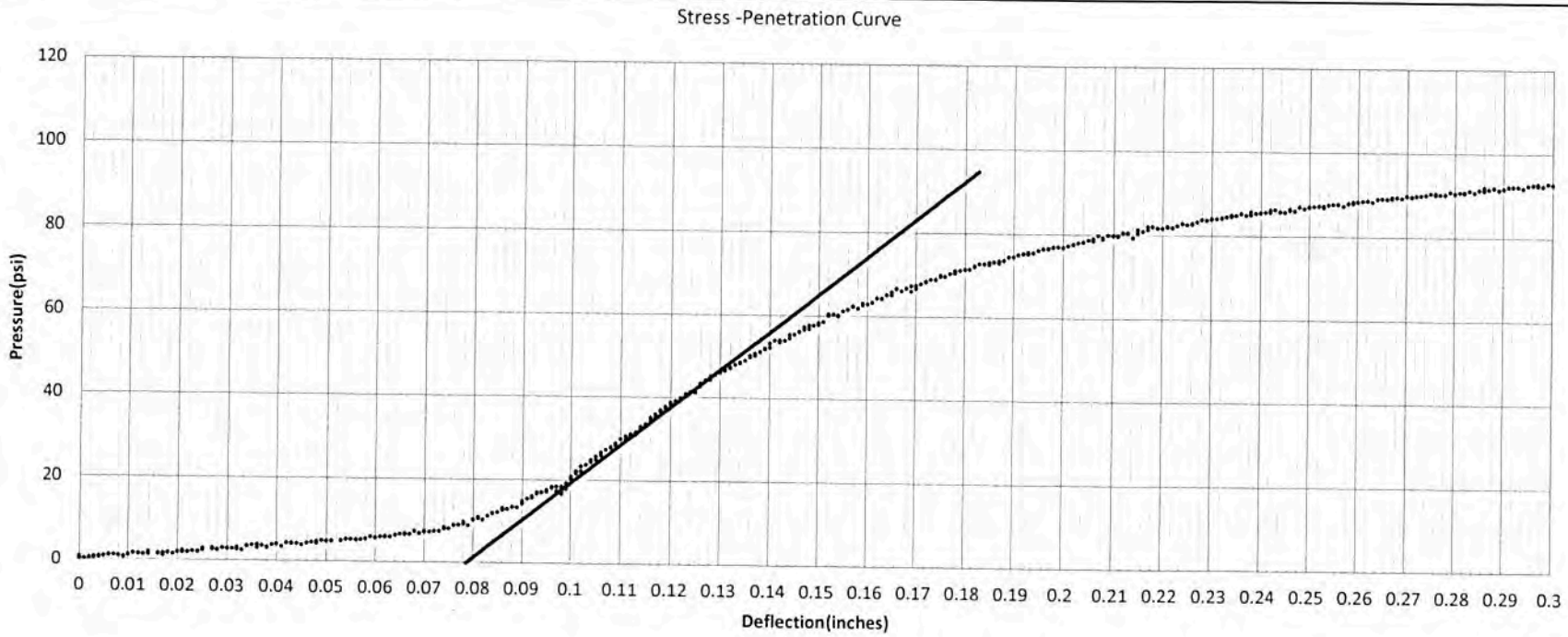


Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.058		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.2		Corrected Bearing Ratio at 0.2in (5.08mm): 5.9	

Vane Shear 154 158 164 150 162 Average 157.6

Test Performed by: RA,CB&QL	Reviewed by:
Date: April 27th, 2015	Date:

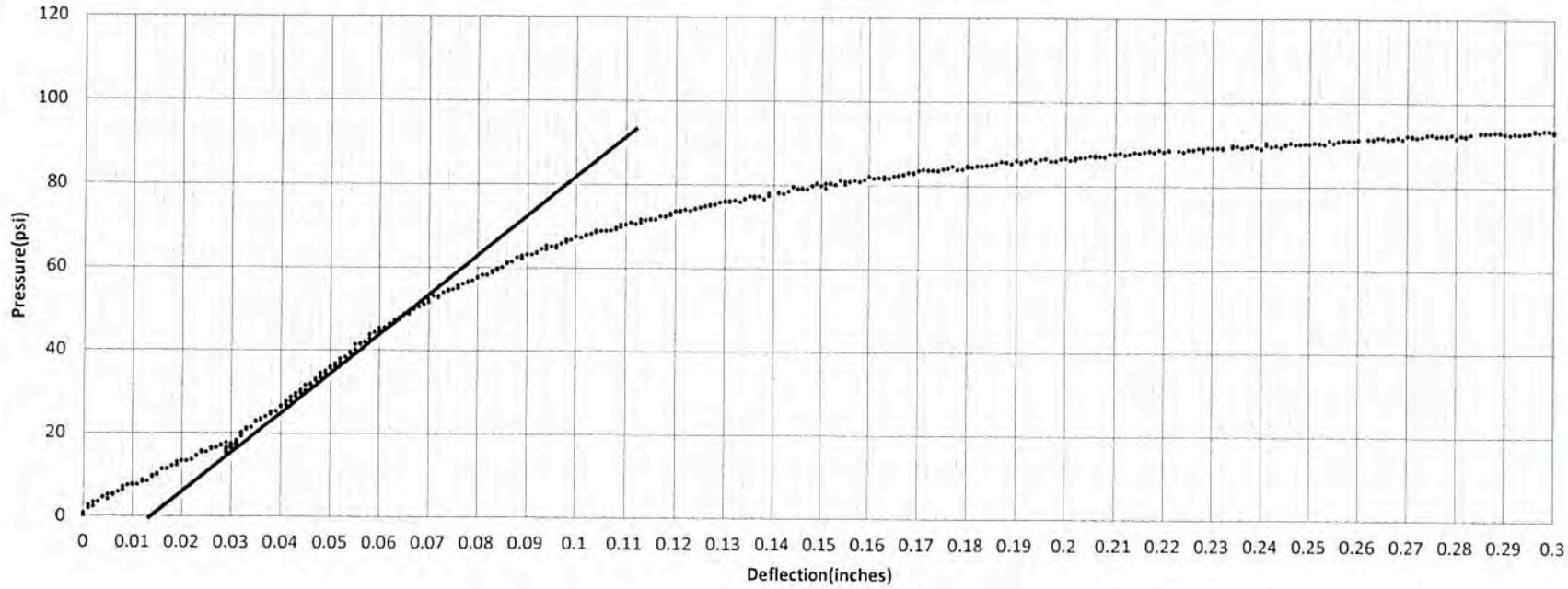
Project:	CC8	Date of Test:	April 27th, 2015
Test Location:	Sta. 374 Offset -17	Material Description:	South
Test Depth:	Top of subgrade		



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.078		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.1		Corrected Bearing Ratio at 0.2in (5.08mm): 6.0	
Vane Shear		Average	
Test Performed by: RA,CB&QL Date: April 27th, 2015		Reviewed by: Date:	

Project:	CC8	Date of Test:	April 27th, 2015
Test Location:	Sta. 374 Offset -17	Material Description:	South
Test Depth:	Top of subgrade		

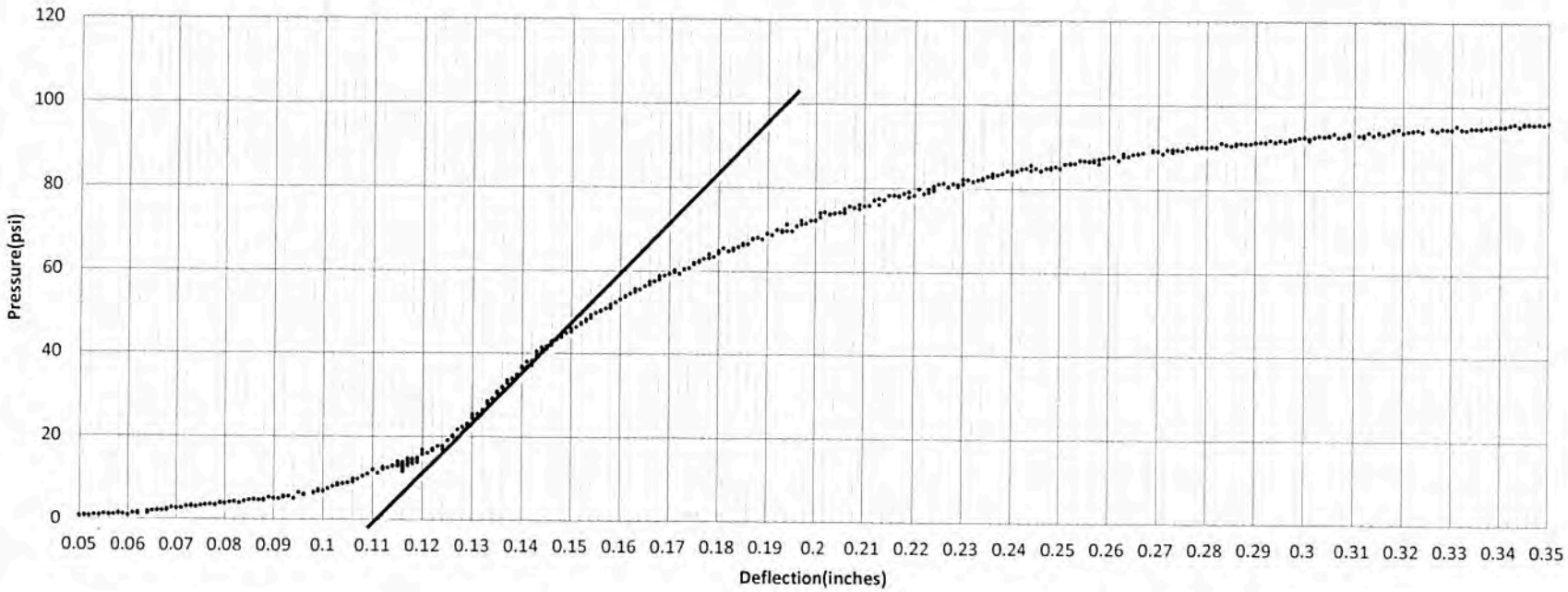
Stress -Penetration Curve



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.012		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.1		Corrected Bearing Ratio at 0.2in (5.08mm): 5.8	
Vane Shear		Average	
Test Performed by: RA,CB&QL Date: April 27th, 2015		Reviewed by: Date:	

Project:	CC8	Date of Test:	April 27th, 2015
Test Location:	Sta. 374 Offset -17	Material Description:	South
Test Depth:	Top of subgrade		

Stress -Penetration Curve



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.11		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.6		Corrected Bearing Ratio at 0.2in (5.08mm): 6.2	

Vane Shear	160	168	158	170	183	Average	167.8

Test Performed by: RA,CB&QL	Reviewed by:
Date: April 27th, 2015	Date:

CC8
4/15/2009

ACCEPTANCE CBR TESTS ON CC8 SUBGRADE SURFACE- SOUTH - DUPONT CLAY

Station	Offset, feet	CBR Value, %					Dry Density pcf	Moisture Content %
		Test-1	Test-2	Test-3	Test -4	Average CBR		
340	13S	7.6	7.4	7.4	-	7.5	92.4	29.1
367	10S	7.3	7.2	7.4	-	7.3	90.8	29.9

Minimum:	***7.2***	***Mean***	***7.4***
Maximum:	***7.6***	***Std. Dev.***	***0.13***
Difference:	***0.4***	***COV, %***	***1.80***

ACCEPTANCE

	Criterion	Mean for the Lift
Range	7.0 - 8.0	7.4

SRA RECOMMENDATION:

Lift be accepted since it meets acceptance criteria and is fairly uniform (Standard Deviation = 0.13, and COV = 1.80%).

ACCEPTED / REJECTED

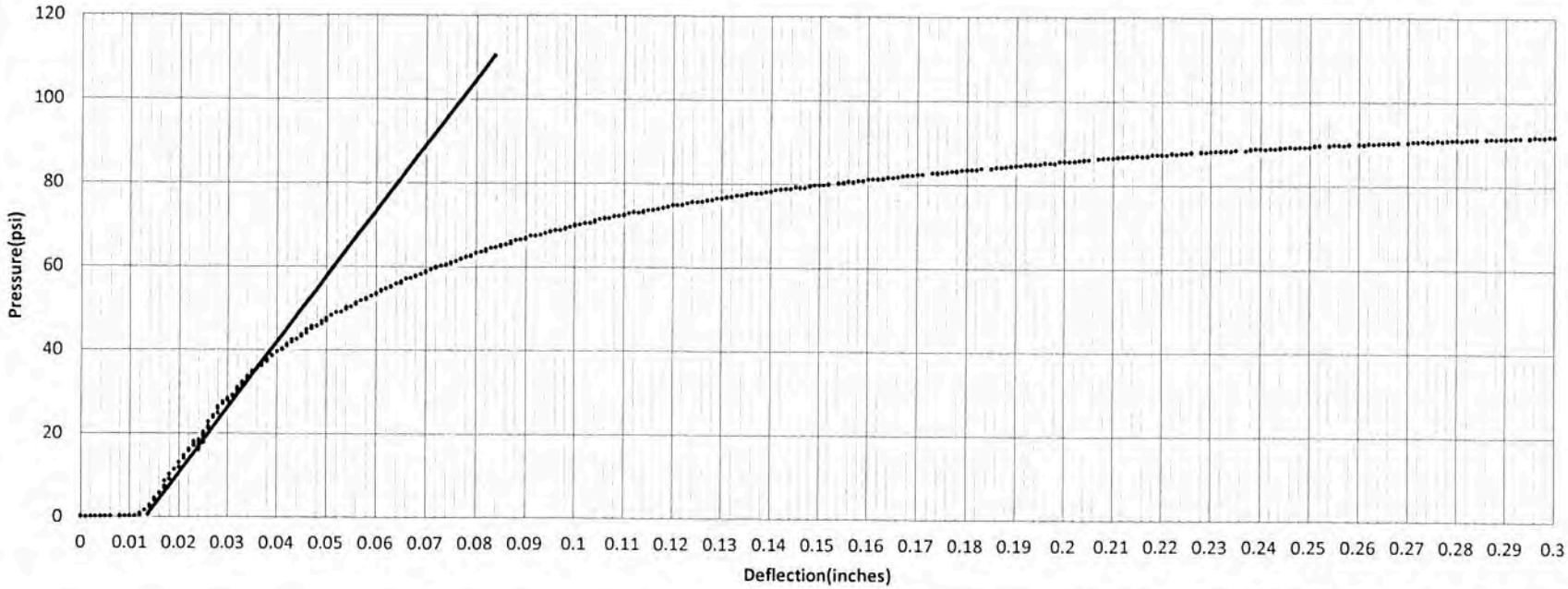
Murphy Flynn
FAA's On-Site Engineer

4/28/15
Date

COMMENTS:

Project:	CC8	Date of Test:	April 15th, 2015
Test Location:	Sta. 367 Offset 10	Material Description:	South
Test Depth:	Top of subgrade		

Stress -Penetration Curve



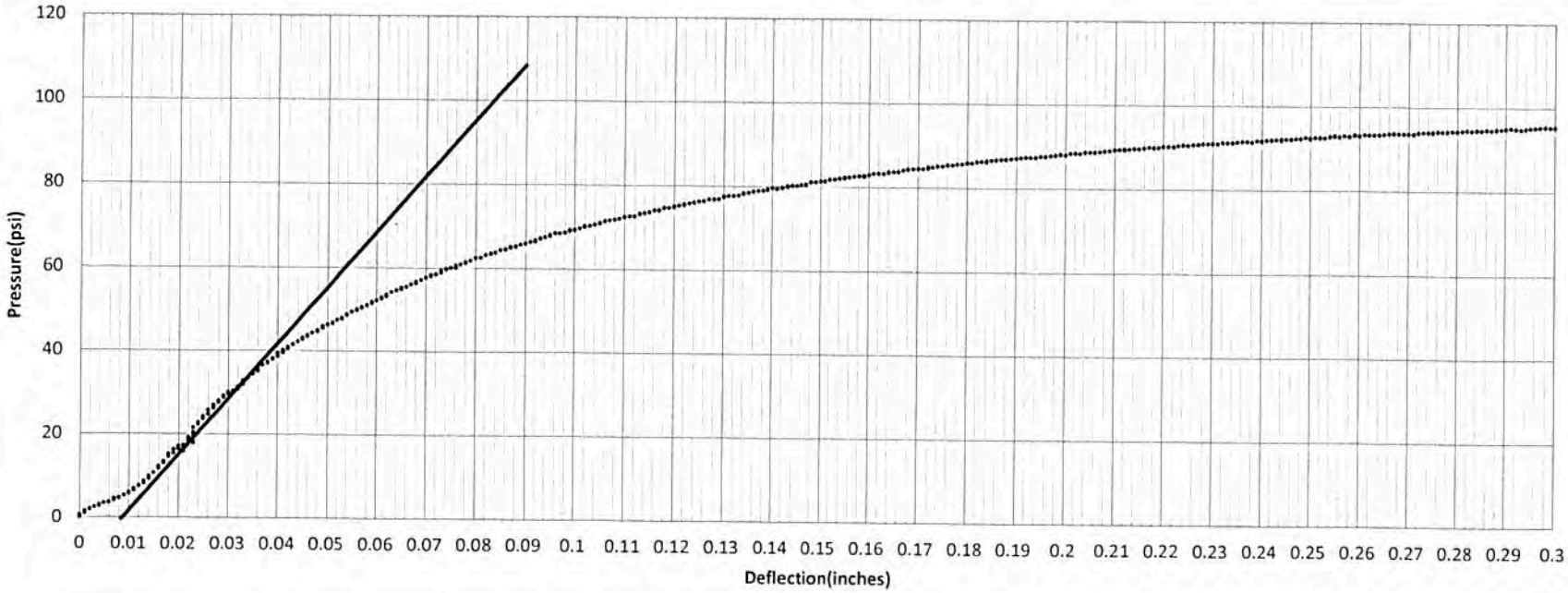
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.012		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.3		Corrected Bearing Ratio at 0.2in (5.08mm): 5.8	

Vane Shear	146	146	148	142	136	Average	143.6

Test Performed by: RA,CB,CC&QL	Reviewed by:
Date: April 15th, 2015	Date:

Project:	CC8	Date of Test:	April 15th, 2015
Test Location:	Sta. 367 Offset 10	Material Description:	South
Test Depth:	Top of subgrade		

Stress -Penetration Curve



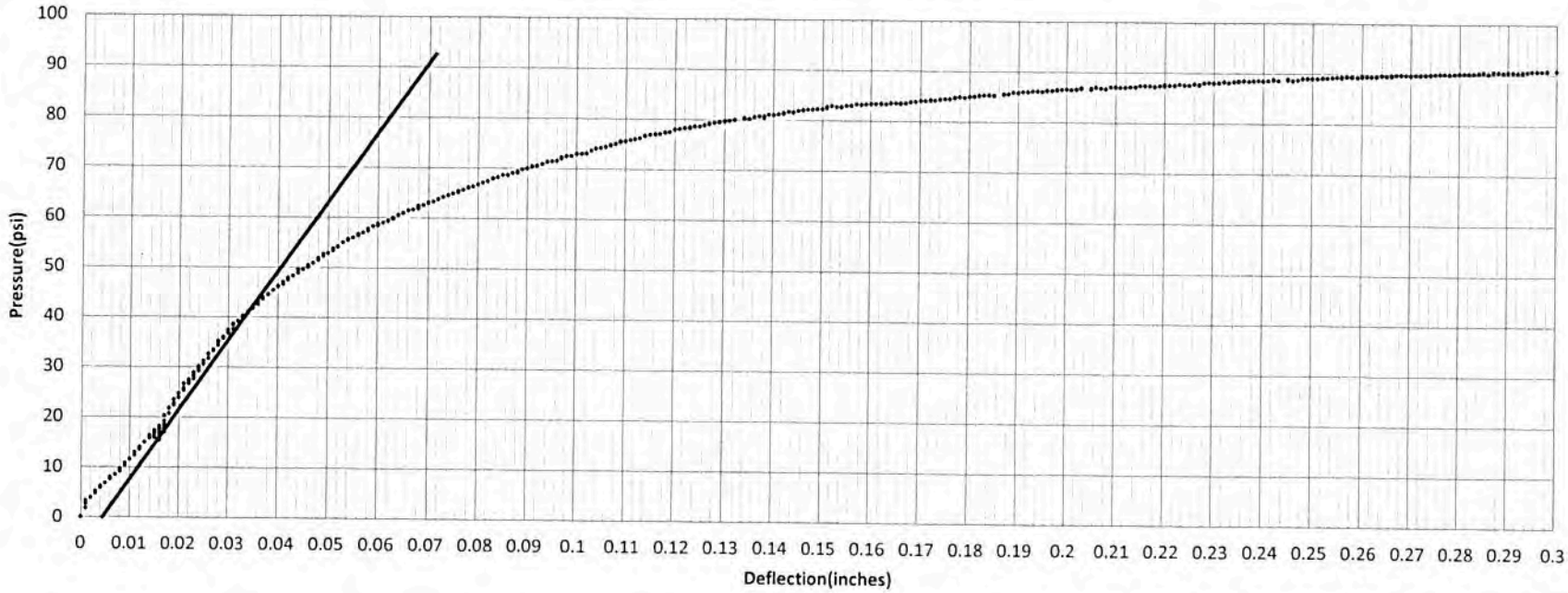
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.007		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.2		Corrected Bearing Ratio at 0.2in (5.08mm): 5.9	

Vane Shear 135 138 150 146 156 Average 145

Test Performed by: RA,CB,CC&QL	Reviewed by:
Date: April 15th, 2015	Date:

Project:	CC8	Date of Test:	April 15th, 2015
Test Location:	Sta. 367 Offset 10	Material Description:	South
Test Depth:	Top of subgrade		

Stress -Penetration Curve



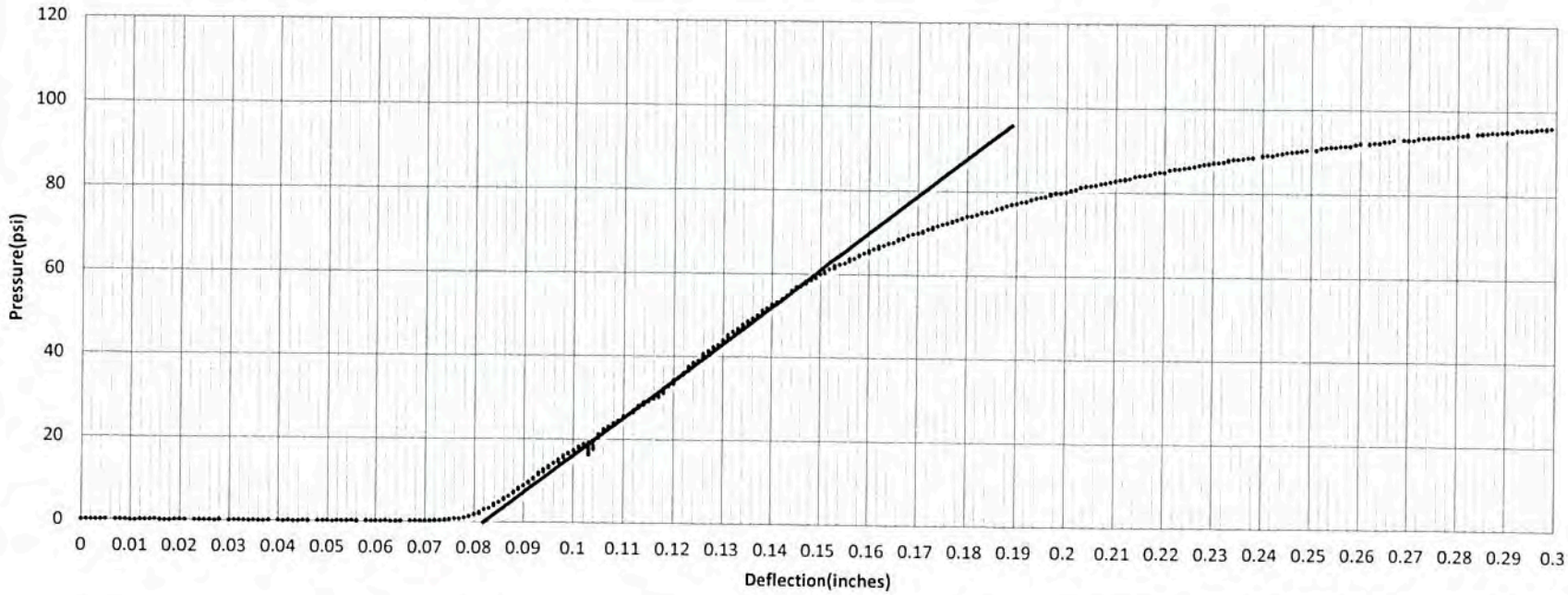
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.003		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.4		Corrected Bearing Ratio at 0.2in (5.08mm): 5.8	

Vane Shear	140	148	150	148	154	Average	148

Test Performed by: RA,CB,CC&QL	Reviewed by:
Date: April 15th, 2015	Date:

Project:	CC8	Date of Test:	April 15th, 2015
Test Location:	Sta. 340 Offset 13	Material Description:	South
Test Depth:	Top of subgrade		

Stress -Penetration Curve

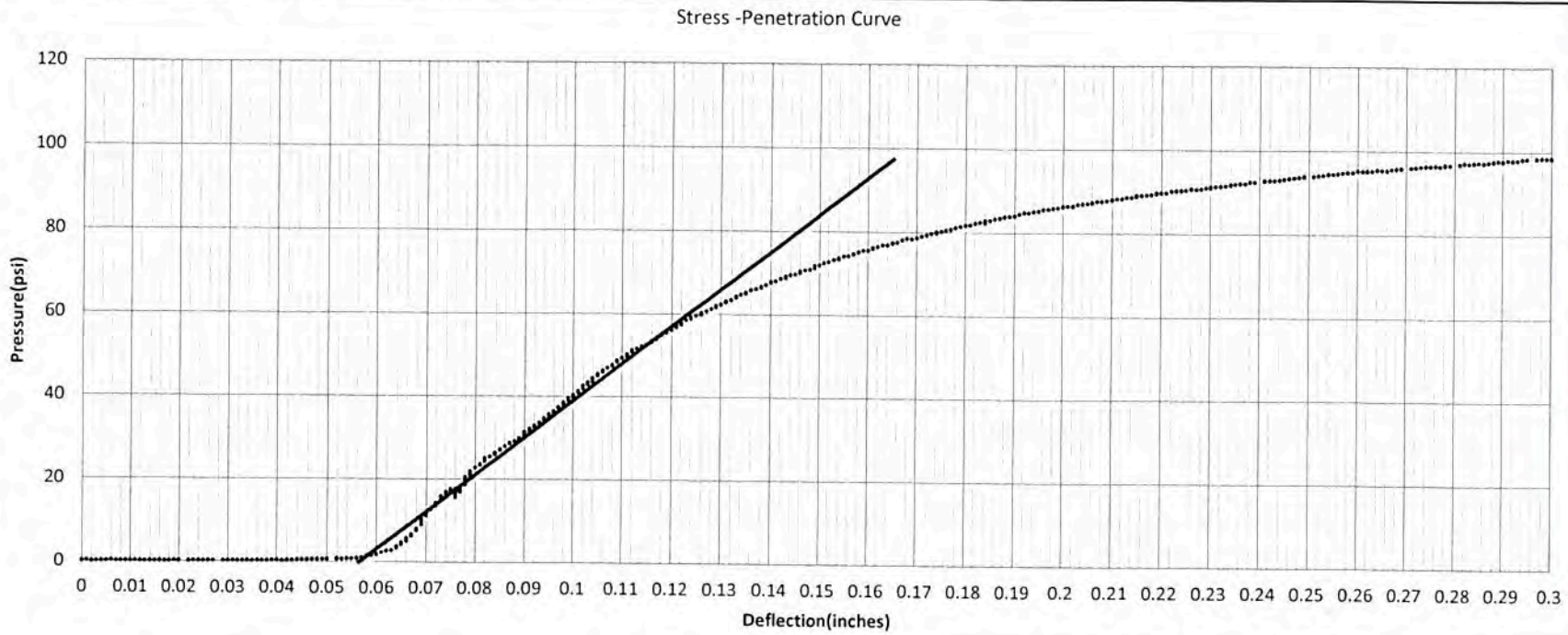


Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.081		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.4		Corrected Bearing Ratio at 0.2in (5.08mm): 6.3	

Vane Shear 170 158 164 176 150 Average 163.6

Test Performed by: RA,CB,CC&QL	Reviewed by:
Date: April 15th, 2015	Date:

Project:	CC8	Date of Test:	April 15th, 2015
Test Location:	Sta. 340 Offset 13	Material Description:	South
Test Depth:	Top of subgrade		



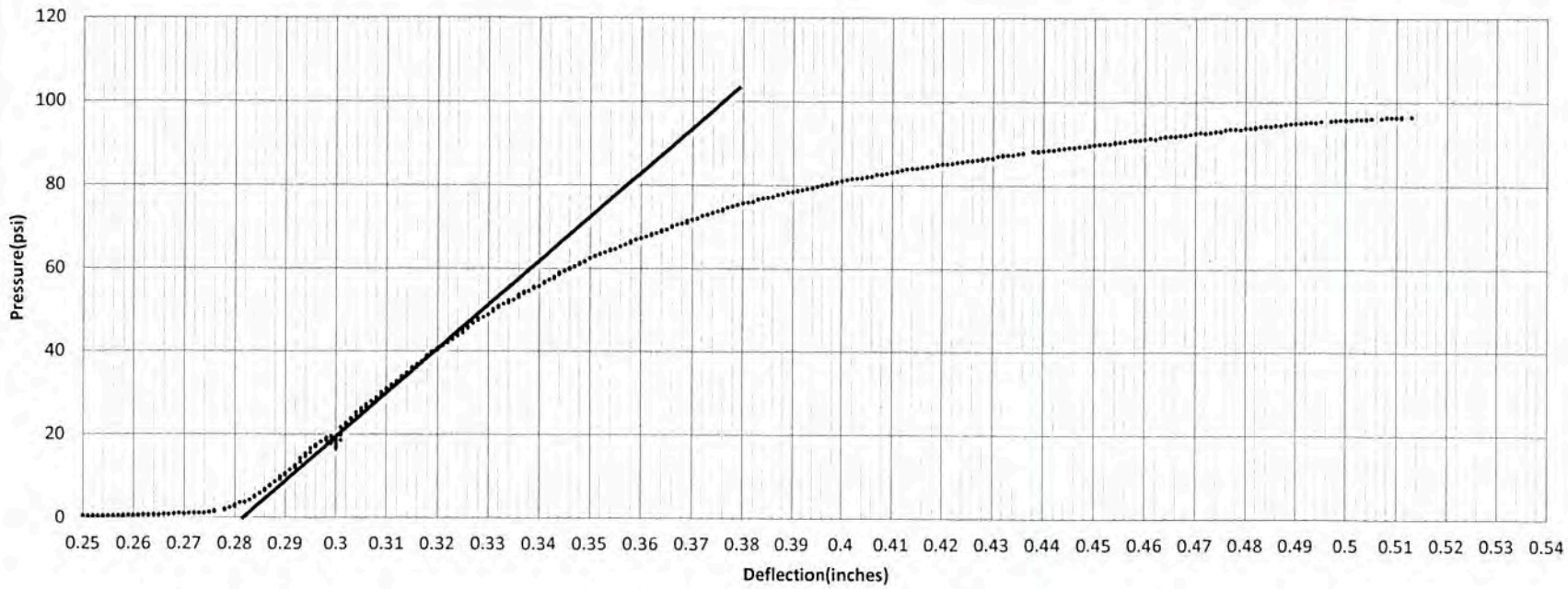
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.055		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.4		Corrected Bearing Ratio at 0.2in (5.08mm): 6.3	

Vane Shear	138	144	154	174	154	Average	152.8

Test Performed by: RA,CB,CC&QL	Reviewed by:
Date: April 15th, 2015	Date:

Project:	CC8	Date of Test:	April 15th, 2015
Test Location:	Sta. 340 Offset 13	Material Description:	South
Test Depth:	Top of subgrade		

Stress -Penetration Curve



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.28		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.6		Corrected Bearing Ratio at 0.2in (5.08mm): 6.2	

Vane Shear	140	148	148	150	160	Average	149.2

Test Performed by: RA,CB,CC&QL	Reviewed by:
Date: April 15th, 2015	Date:

CC8 Construction
2/06/2017-2/15/2017

CBR TEST ON TOP OF CC8 SUBGRADE-DUPONT CLAY

Station	Offset, feet	CBR Value, %			
		Test-1	Test-2	Test-3	Mean
475	16 (South)	7.0	7.5	7.6	7.4
525	8 (South)	7.9	7.5	7.8	7.7
415	10(South)	7.7	7.9	7.9	7.8
440	12(South)	7.0	7.7	7.3	7.3
420	-15(North)	7.6	7.8	7.5	7.6
480	-10(North)	7.5	7.5	7.7	7.6
510	-12(North)	7.5	7.7	8.2	7.8
540	-14(North)	7.4	7.5	7.6	7.5

Minimum:	**7.0**	**Mean:**	**7.6**
Maximum:	**8.2**	**Std. Dev.:**	**0.269**
Difference:	**1.2**	**COV:**	**3.5%**

DRIVE CYLINDER TESTS-DUPONT CLAY

Station	Offset, feet	Moisture Content, %	In-Situ Dry Density, pcf
475	16 (South)	28.7	96.4
525	8 (South)	28.7	96.6
415	10(South)	27.7	96.4
440	12(South)	27.5	97.2
420	-15(North)	28.4	96.6
480	-10(North)	28.8	96.4
510	-12(North)	27.9	96.8
540	-14(North)	29.3	94.1

ACCEPTANCE

	Criterion	Mean
Range	7.0-8.0	7.6

CSRA RECOMMENDATION

Lift is accepted since it meets acceptance criteria.

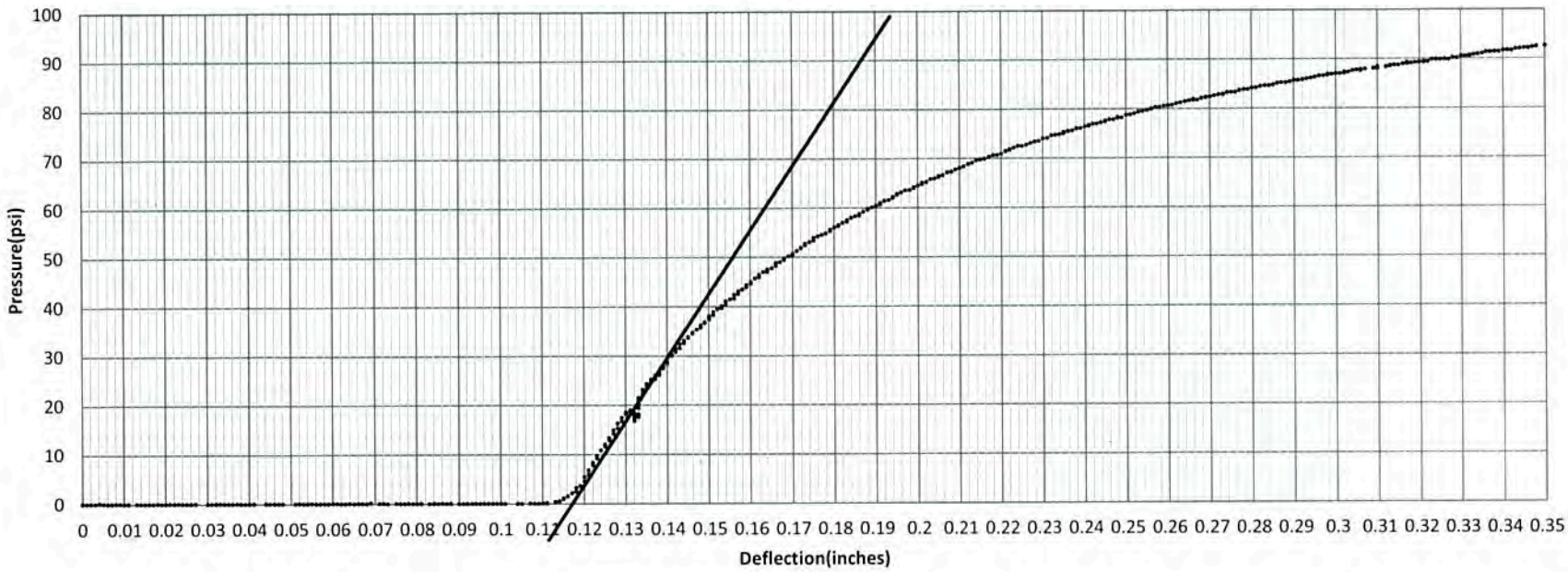
ACCEPTED / REJECTED

FAA's On-Site Engineer

2/27/17
Date

Project:	CC8			Date of Test:	2/6/2017
Test Location:	Sta.	475 Offset	16	Material Description:	South Test-1
Test Depth:	Top of subgrade				

Stress -Penetration Curve



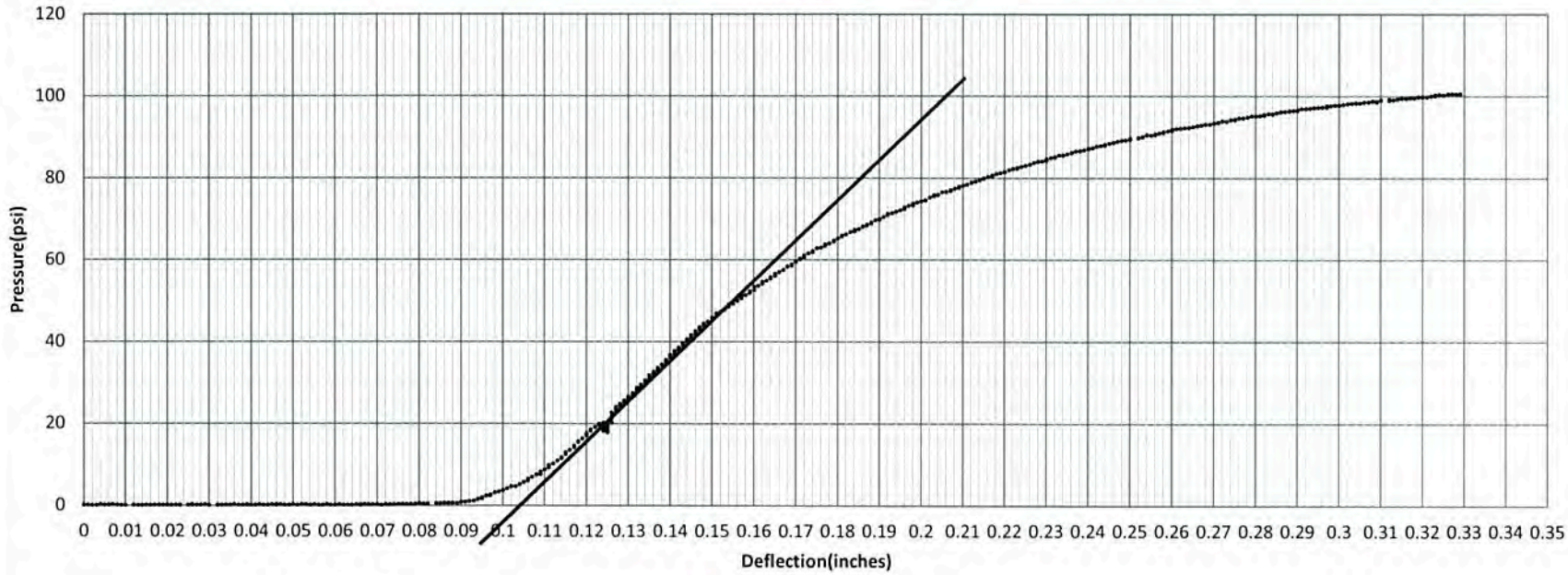
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.116		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.0		Corrected Bearing Ratio at 0.2in (5.08mm): 5.9	

Vane Shear	104	88	100	92	88	Average	94.4	Shear Strength	188.8 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/6/2017	Date:

Project:	CC8			Date of Test:	2/6/2017
Test Location:	Sta.	475 Offset	16	Material Description:	South Test-2
Test Depth:	Top of subgrade				

Stress -Penetration Curve



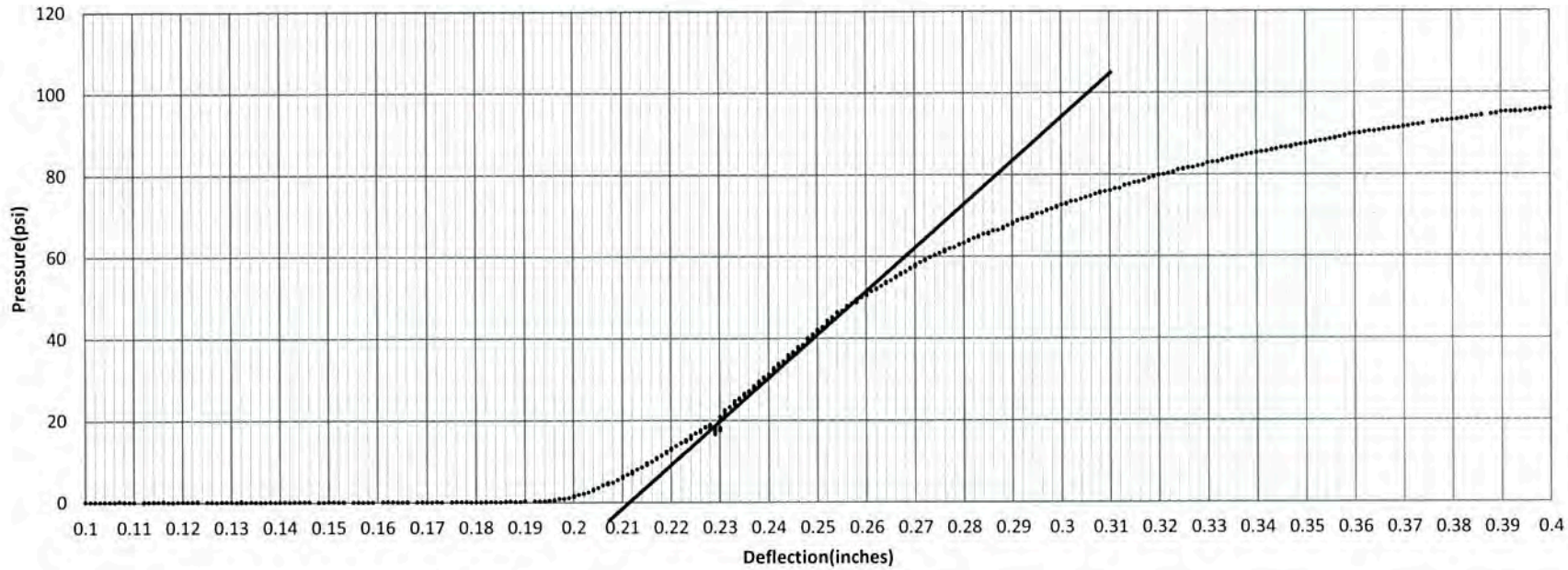
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.102		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 6.5	

Vane Shear	94	88	88	96	92	Average	91.6	Shear Strength	183.2 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/6/2017	Date:

Project:	CC8			Date of Test:	2/6/2017
Test Location:	Sta.	475 Offset	16	Material Description:	South Test-3
Test Depth:	Top of subgrade				

Stress -Penetration Curve



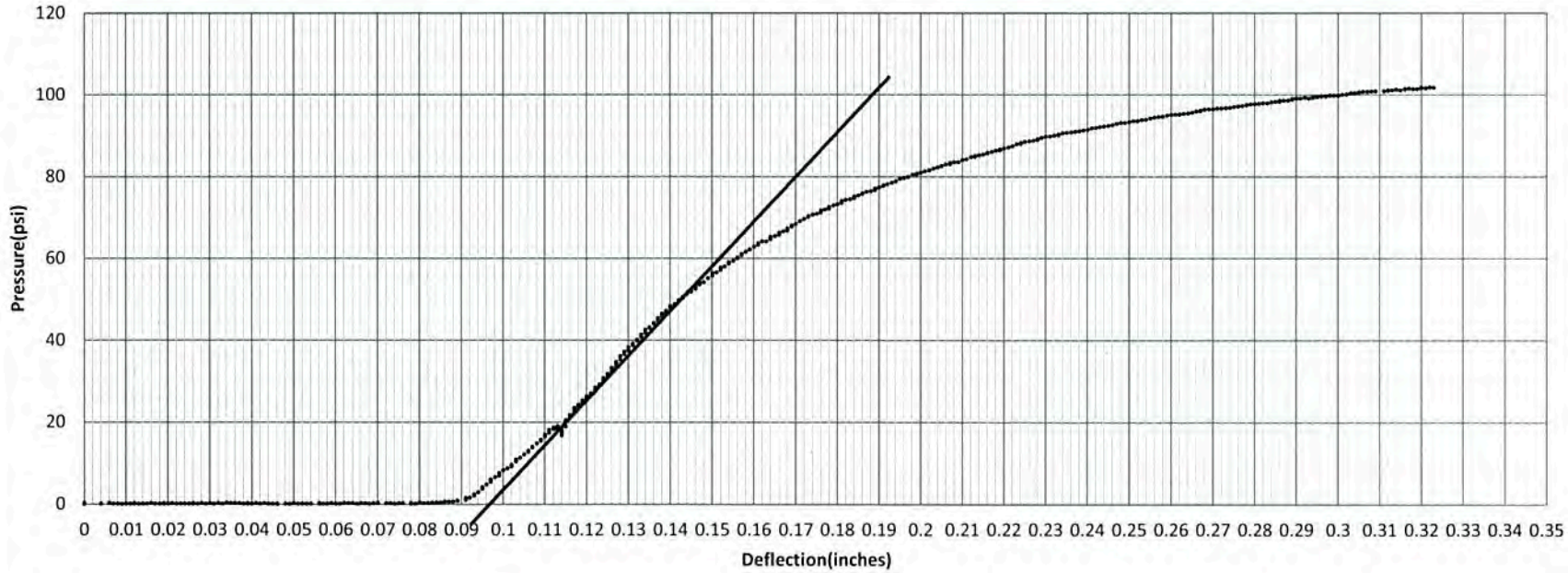
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.21		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.6		Corrected Bearing Ratio at 0.2in (5.08mm): 6.5	

Vane Shear	94	98	102	94	86	Average	94.8	Shear Strength	189.6 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/6/2017	Date:

Project:	CC8			Date of Test:	2/6/2017
Test Location:	Sta.	525 Offset	8	Material Description:	South Test-1
Test Depth:	Top of subgrade				

Stress -Penetration Curve



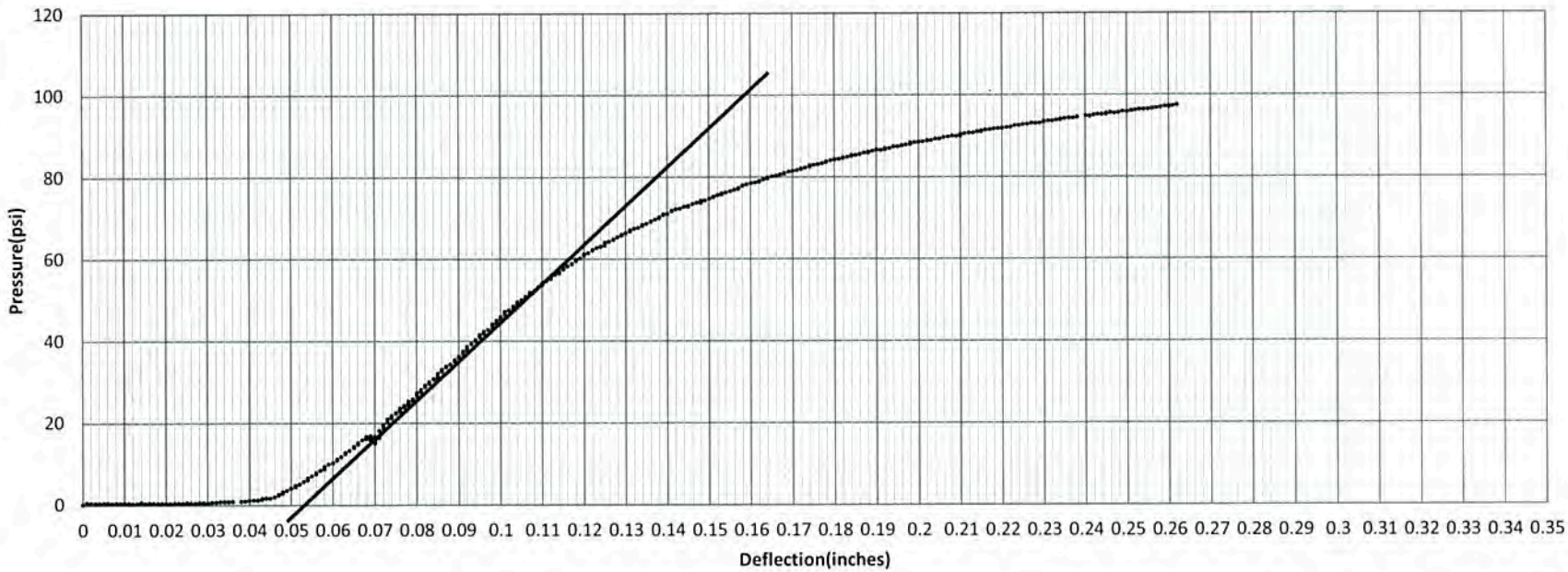
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.095		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.9		Corrected Bearing Ratio at 0.2in (5.08mm): 6.6	

Vane Shear	92	94	88	90	88	Average	90.4	Shear Strength	180.8 kPa

Test Performed by:	CR, RA&QL	Reviewed by:	
Date:	2/6/2017	Date:	

Project:	CC8			Date of Test:	2/6/2017
Test Location:	Sta.	525 Offset	8	Material Description:	South Test-2
Test Depth:	Top of subgrade				

Stress -Penetration Curve



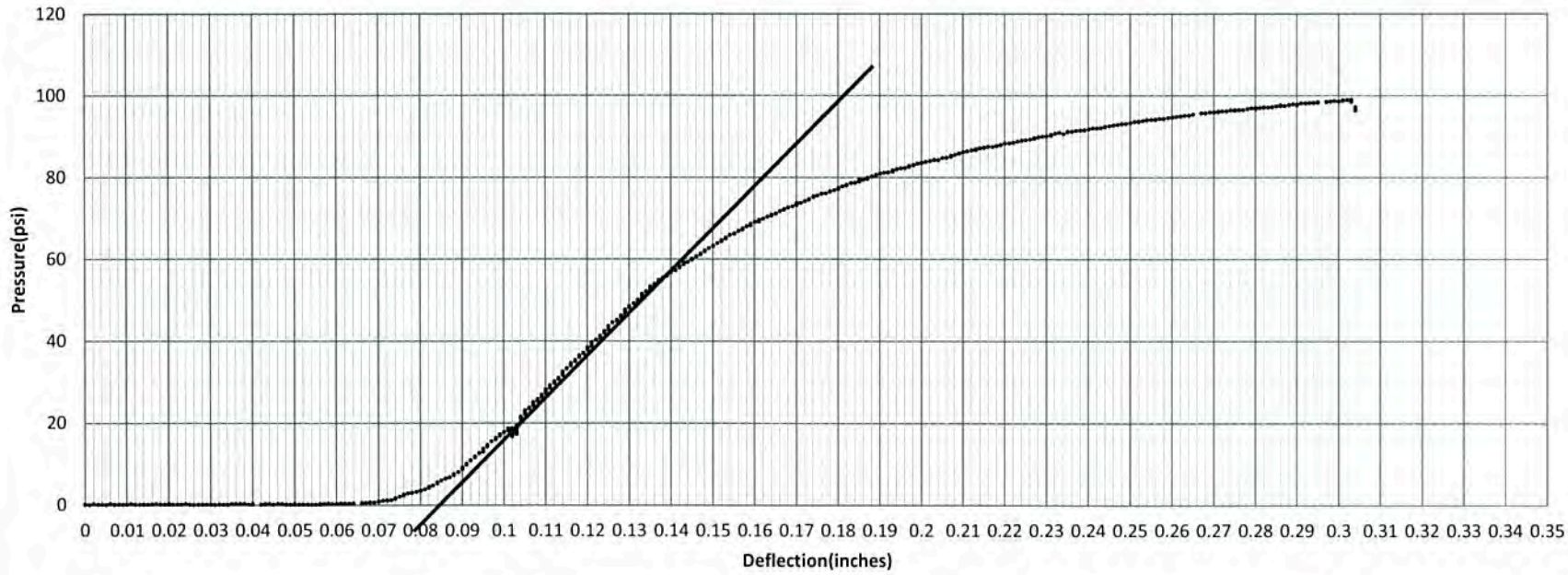
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.051		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 6.4	

Vane Shear	96	88	90	92	86	Average	90.4	Shear Strength	180.8 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/6/2017	Date:

Project:	CC8	Date of Test:	2/6/2017
Test Location:	Sta. 525 Offset 8	Material Description:	South Test-3
Test Depth:	Top of subgrade		

Stress -Penetration Curve



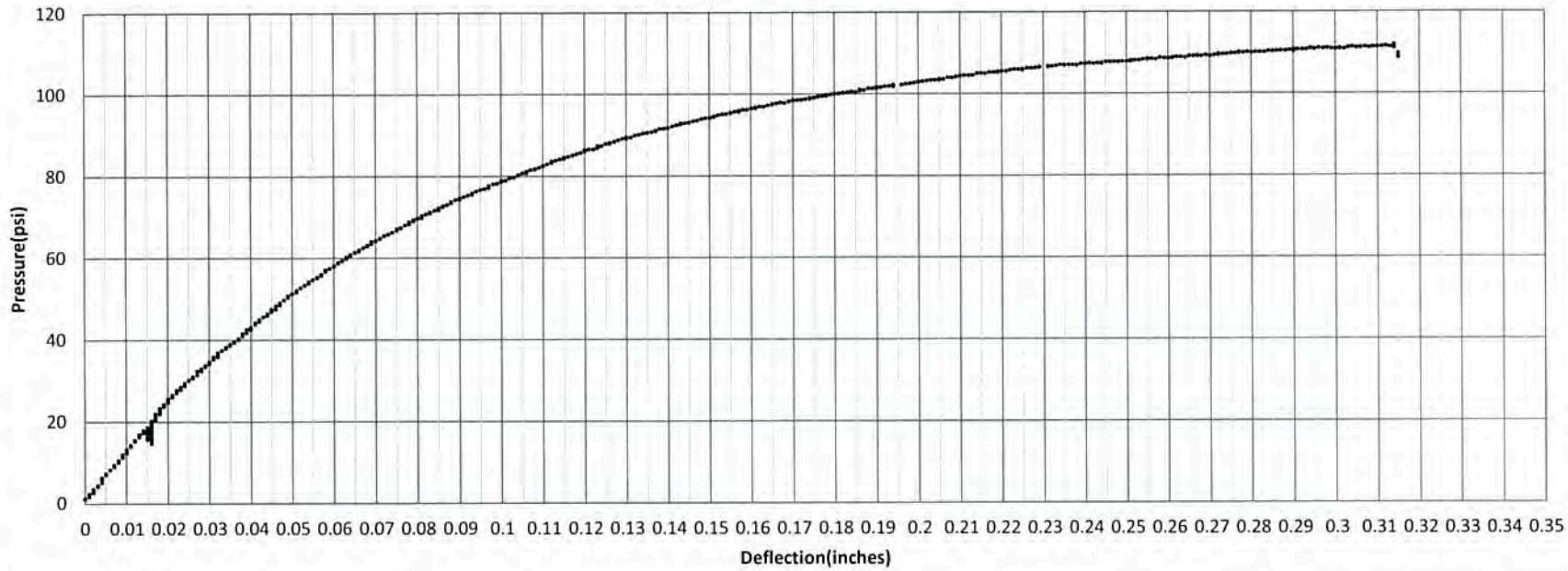
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.082		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.8		Corrected Bearing Ratio at 0.2in (5.08mm): 6.5	

Vane Shear	82	94	86	96	98	Average	91.2	Shear Strength	182.4 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/6/2017	Date:

Project:	CC8			Date of Test:	2/14/2017
Test Location:	Sta.	415 Offset	10	Material Description:	South Test-2
Test Depth:	Top of subgrade				

Stress -Penetration Curve

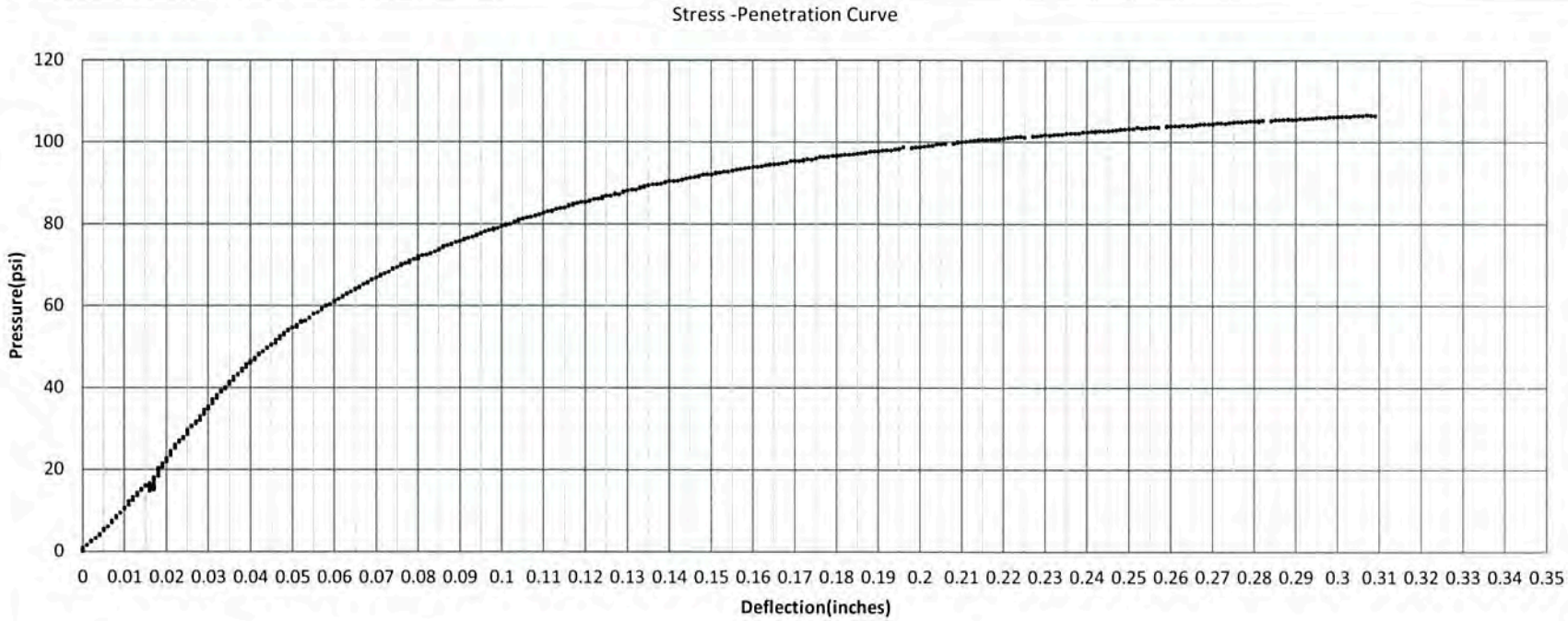


Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.9		Corrected Bearing Ratio at 0.2in (5.08mm): 6.9	

Vane Shear	96	102	98	96	92	Average	96.8	Shear Strength	193.6 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/14/2017	Date:

Project:	CC8	Date of Test:	2/14/2017
Test Location:	Sta. 415 Offset 10	Material Description:	South Test-3
Test Depth:	Top of subgrade		



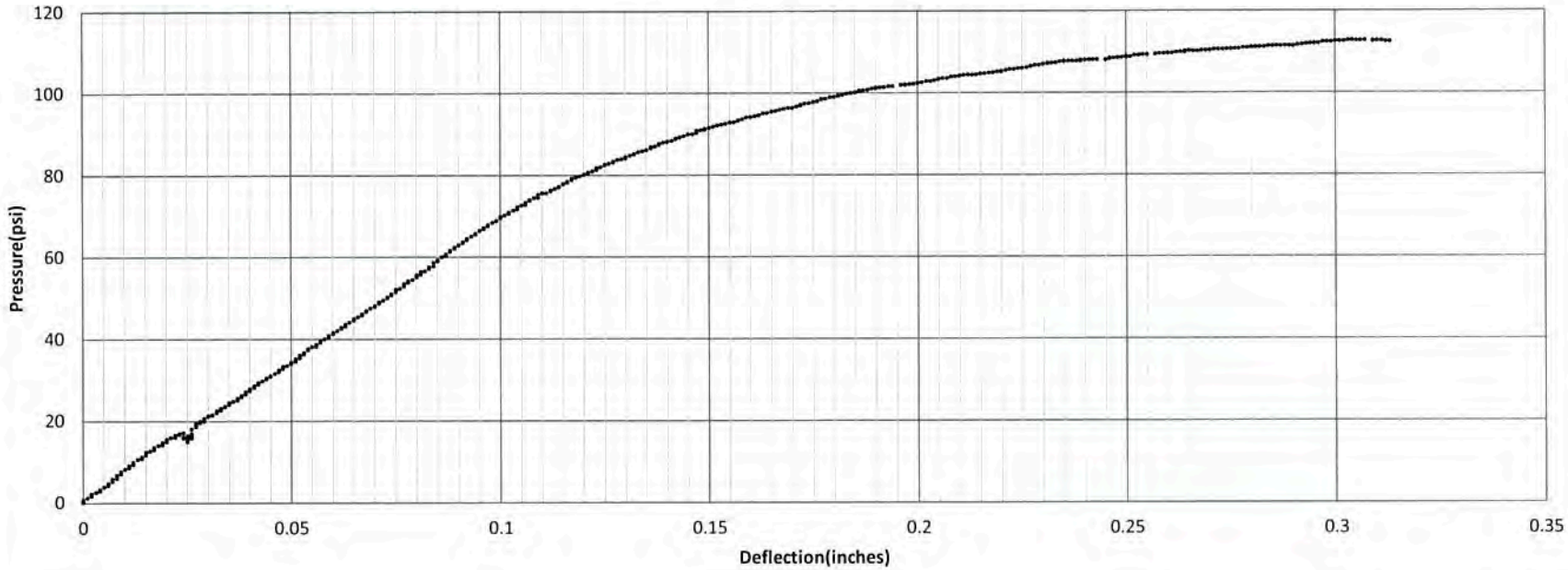
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.9		Corrected Bearing Ratio at 0.2in (5.08mm): 6.6	

Vane Shear	103	98	96	98	94	Average	97.8	Shear Strength	195.6 kPa

Test Performed by:	CR, RA&QL	Reviewed by:	
Date:	2/14/2017	Date:	

Project:	CC8			Date of Test:	2/14/2017
Test Location:	Sta.	440 Offset	12	Material Description:	South Test-1
Test Depth:	Top of subgrade				

Stress -Penetration Curve



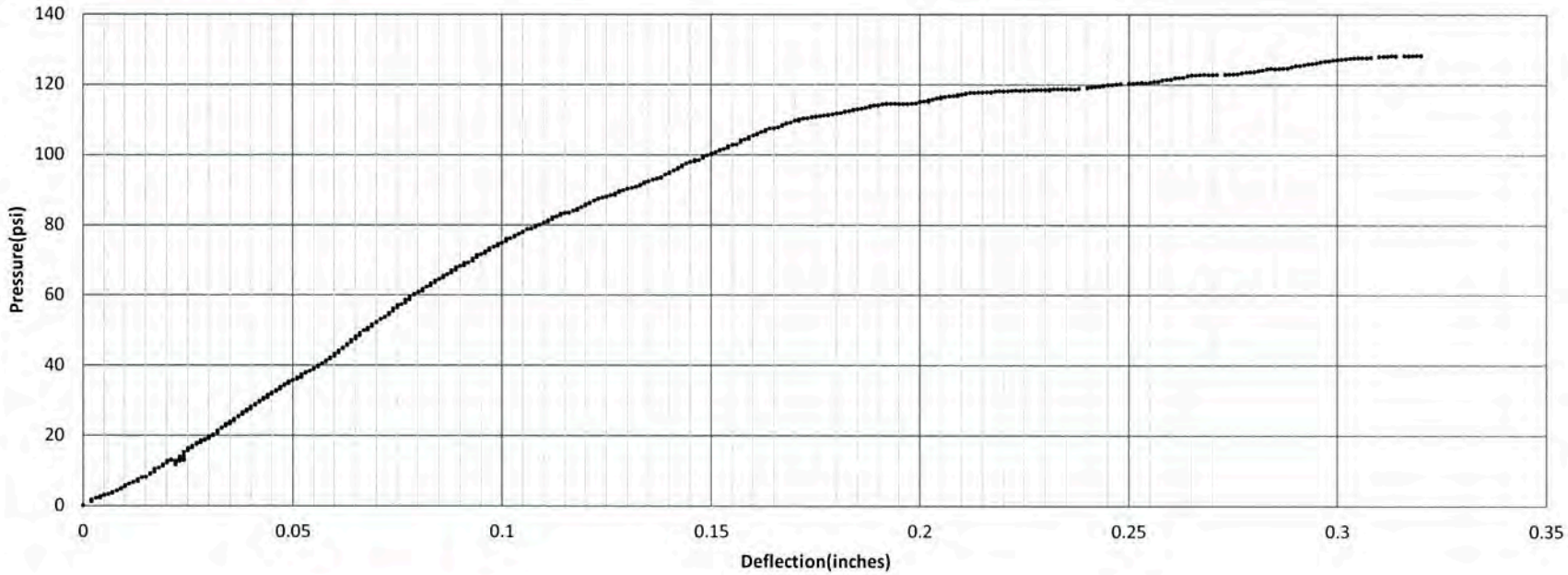
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.0		Corrected Bearing Ratio at 0.2in (5.08mm): 6.8	

Vane Shear	104	94	98	102	94	Average	98.4	Shear Strength	196.8 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/14/2017	Date:

Project:	CC8	Date of Test:	2/14/2017
Test Location:	Sta. 440 Offset 12	Material Description:	South Test-2
Test Depth:	Top of subgrade		

Stress -Penetration Curve



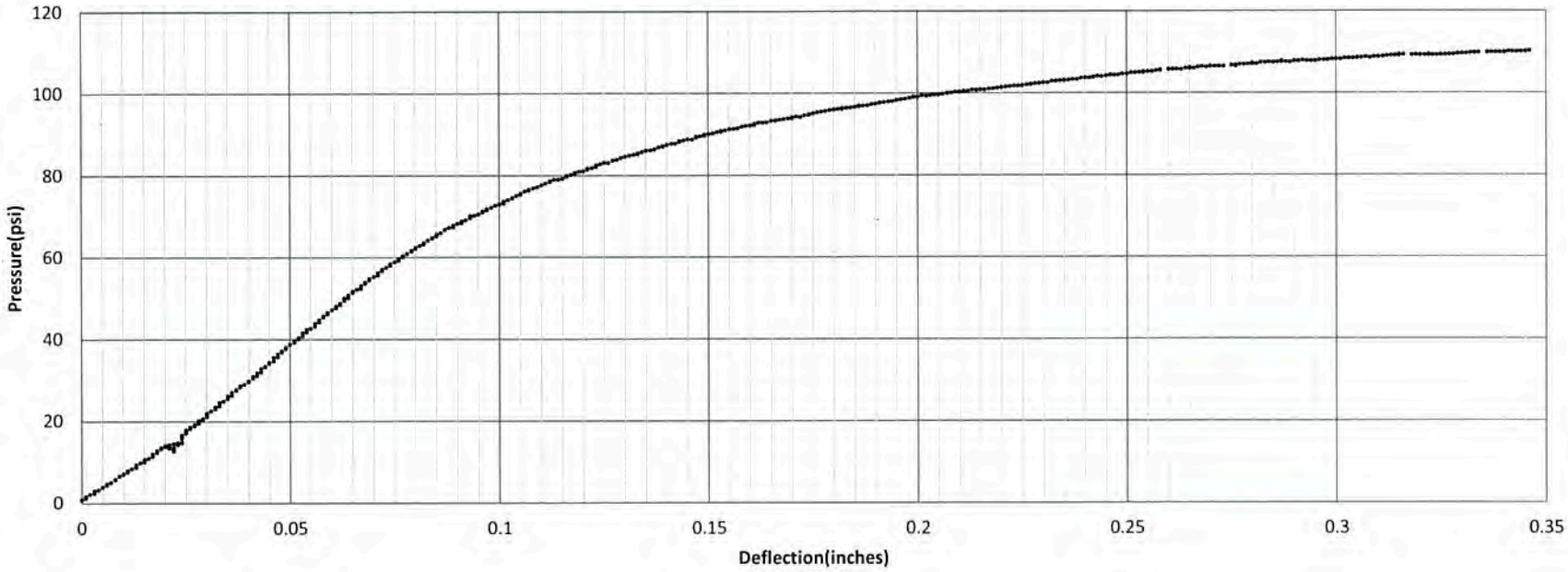
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 7.7	

Vane Shear	90	90	92	102	102	Average	95.2	Shear Strength	190.4 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/14/2017	Date:

Project:	CC8			Date of Test:	2/14/2017
Test Location:	Sta.	440 Offset	12	Material Description:	South Test-3
Test Depth:	Top of subgrade				

Stress -Penetration Curve



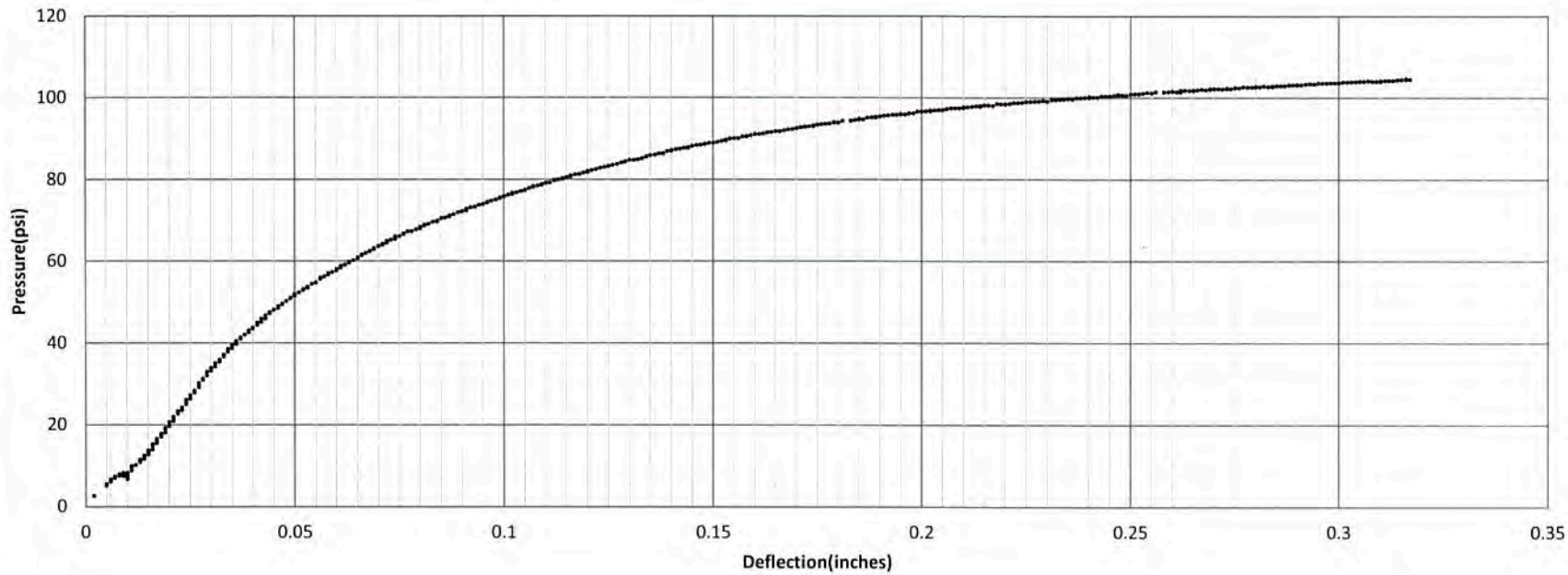
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.3		Corrected Bearing Ratio at 0.2in (5.08mm): 6.6	

Vane Shear	94	98	91	94	98	Average	95	Shear Strength	190 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/14/2017	Date:

Project:	CC8			Date of Test:	2/14/2017
Test Location:	Sta.	420 Offset	-15	Material Description:	North Test-1
Test Depth:	Top of subgrade				

Stress -Penetration Curve



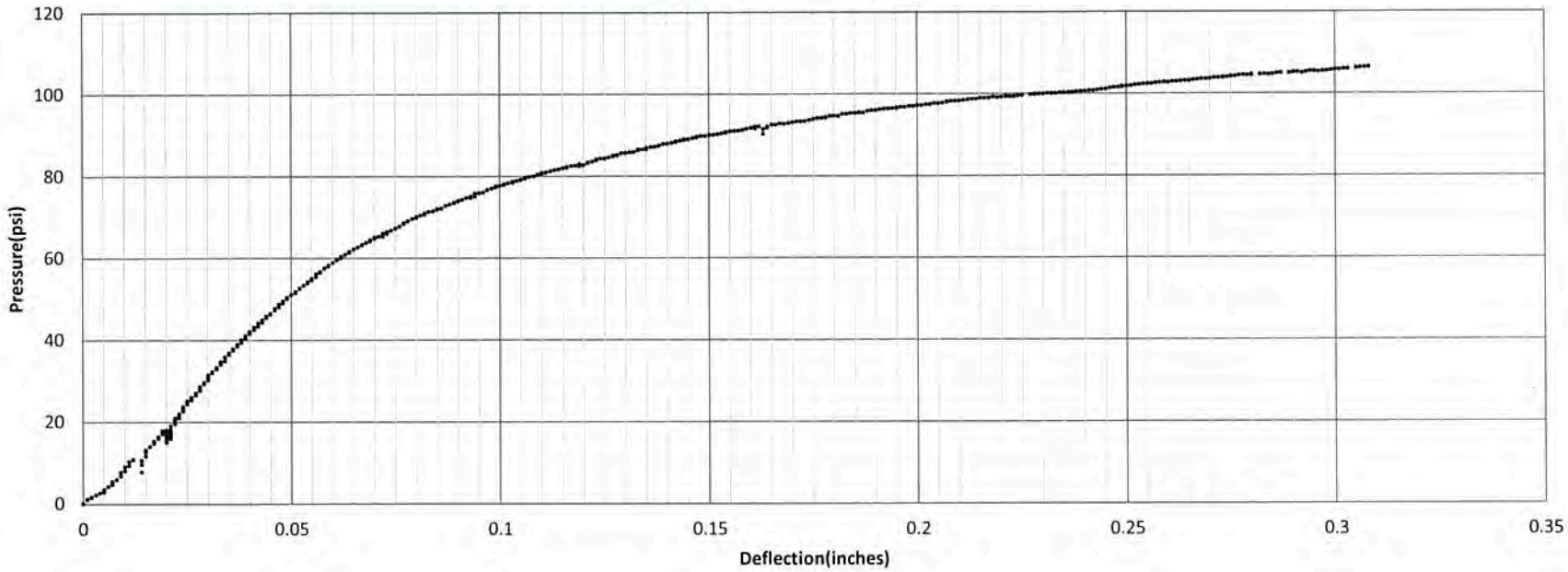
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.6		Corrected Bearing Ratio at 0.2in (5.08mm): 6.4	

Vane Shear	88	98	98	98	98	Average	96	Shear Strength	192 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/14/2017	Date:

Project:	CC8	Date of Test:	2/14/2017
Test Location:	Sta. 420 Offset -15	Material Description:	North Test-2
Test Depth:	Top of subgrade		

Stress -Penetration Curve



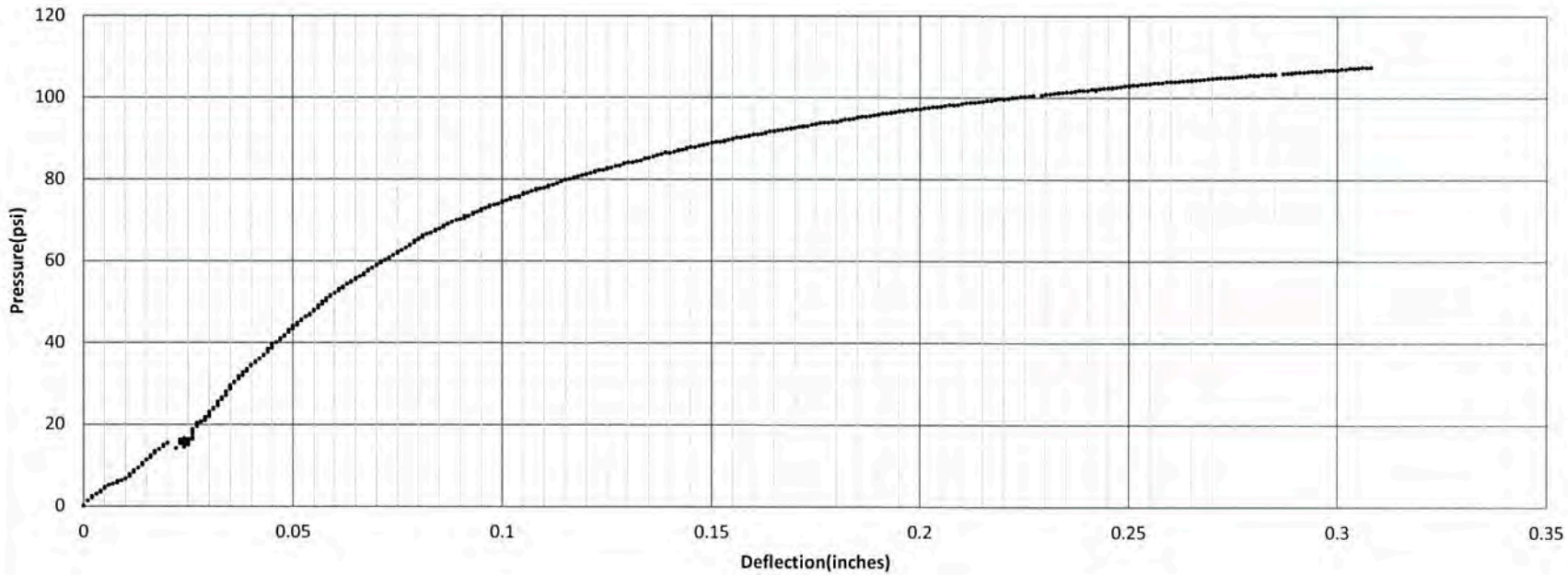
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.8		Corrected Bearing Ratio at 0.2in (5.08mm): 6.5	

Vane Shear	109	110	108	96	106	Average	105.8	Shear Strength	211.6 kPa

Test Performed by:	CR, RA&QL	Reviewed by:	
Date:	2/14/2017	Date:	

Project:	CC8	Date of Test:	2/14/2017
Test Location:	Sta. 420 Offset -15	Material Description:	North Test-3
Test Depth:	Top of subgrade		

Stress -Penetration Curve



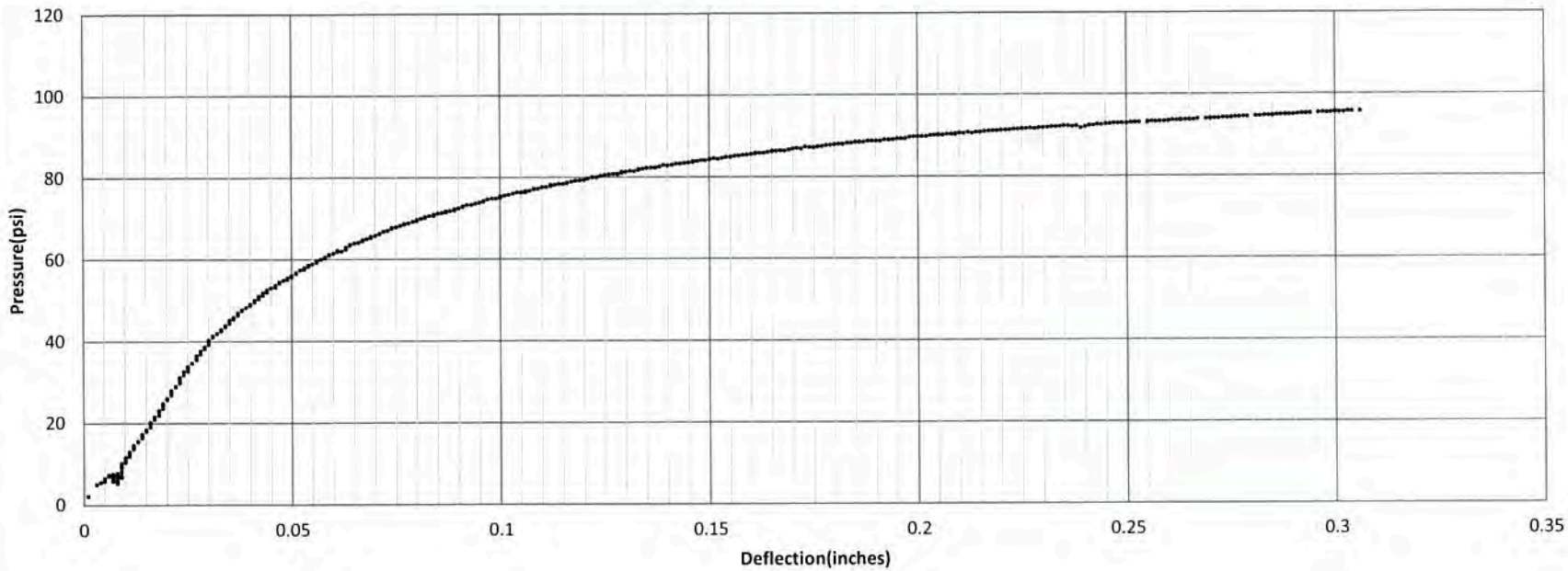
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 6.5	

Vane Shear	98	104	98	97	104	Average	100.2	Shear Strength	200.4 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/14/2017	Date:

Project:	CC8			Date of Test:	2/15/2017
Test Location:	Sta.	480 Offset	-10	Material Description:	North Test-1
Test Depth:	Top of subgrade				

Stress -Penetration Curve



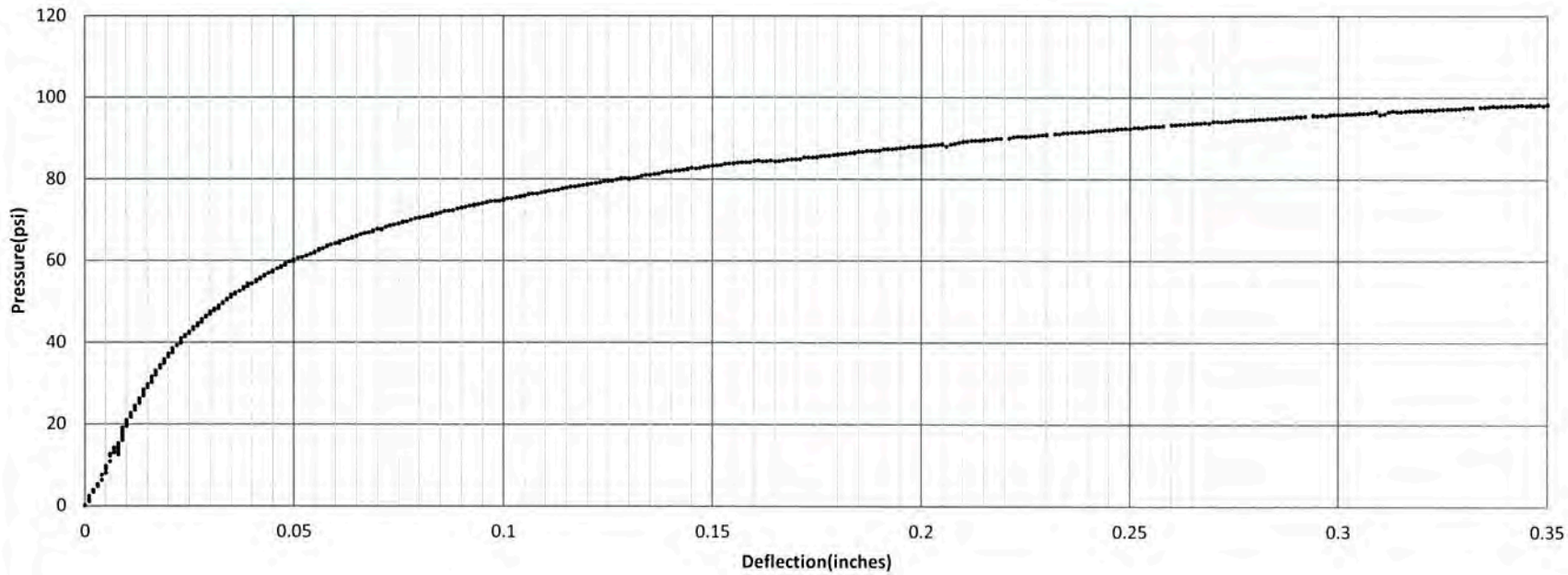
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 6.0	

Vane Shear	88	89	90	85	91	Average	88.6	Shear Strength	177.2 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/15/2017	Date:

Project:	CC8	Date of Test:	2/15/2017
Test Location:	Sta. 480 Offset -10	Material Description:	North Test-2
Test Depth:	Top of subgrade		

Stress -Penetration Curve



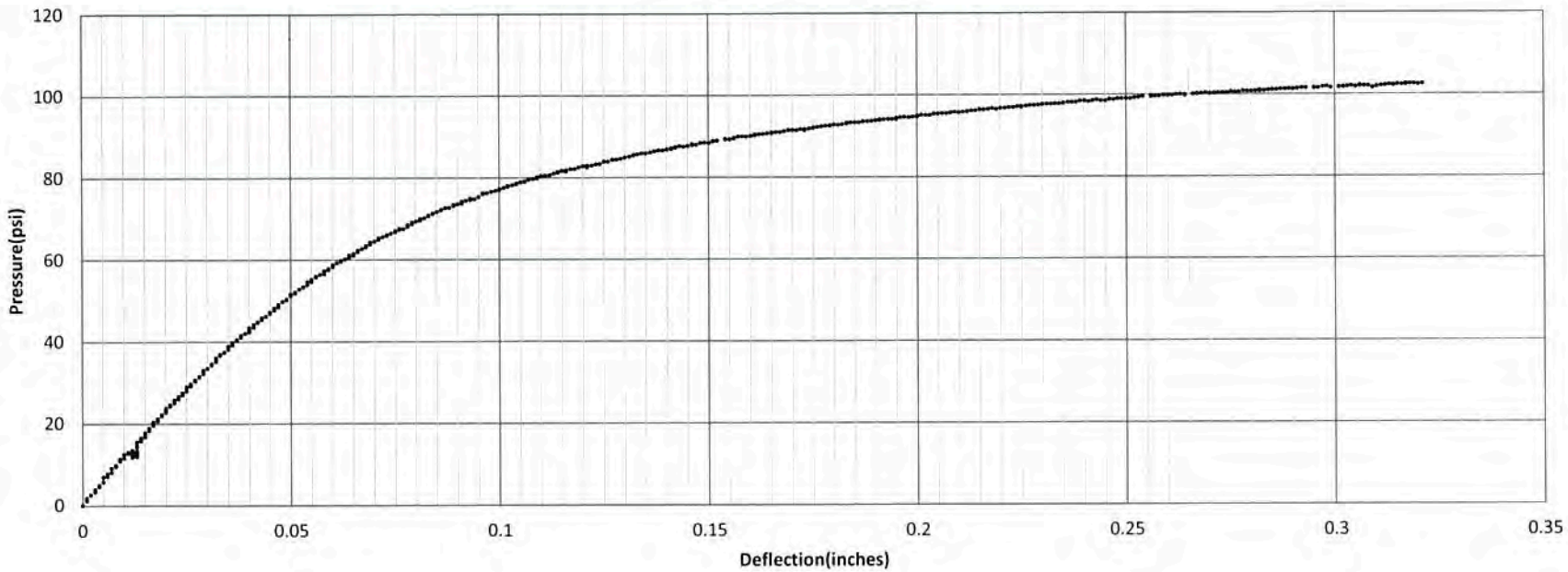
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 5.9	

Vane Shear	89	83	102	84	93	Average	90.2	Shear Strength	180.4 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/15/2017	Date:

Project:	CC8	Date of Test:	2/15/2017
Test Location:	Sta. 480 Offset -10	Material Description:	North Test-3
Test Depth:	Top of subgrade		

Stress -Penetration Curve



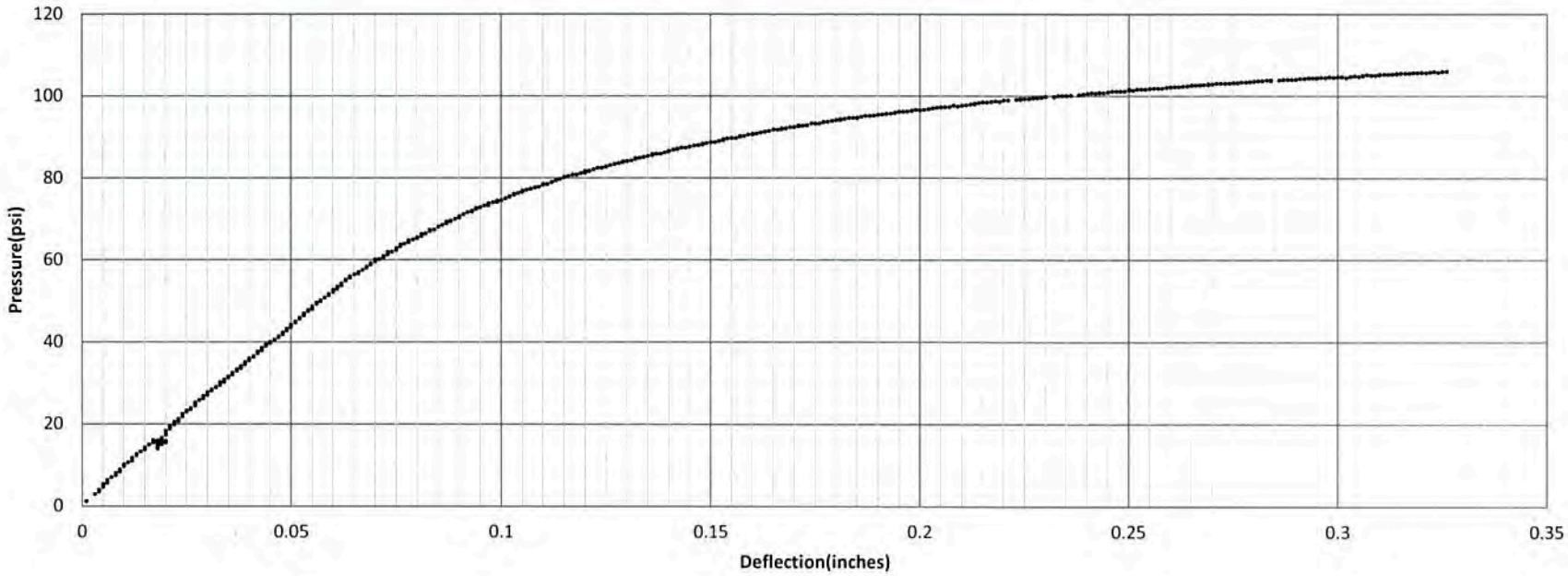
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.7		Corrected Bearing Ratio at 0.2in (5.08mm): 6.3	

Vane Shear	94	86	86	80	90	Average	87.2	Shear Strength	174.4 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/15/2017	Date:

Project:	CC8	Date of Test:	2/15/2017
Test Location:	Sta. 510 Offset -12	Material Description:	North Test-1
Test Depth:	Top of subgrade		

Stress -Penetration Curve



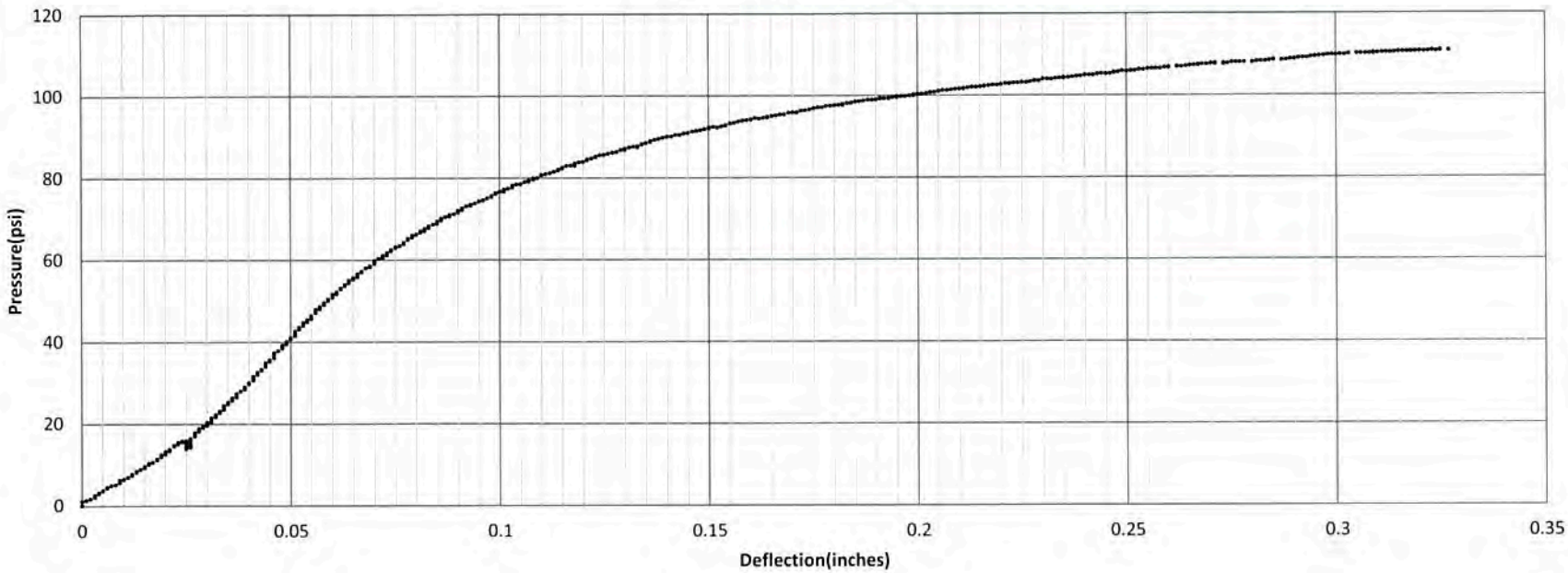
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 6.4	

Vane Shear	88	94	84	92	92	Average	90	Shear Strength	180 kPa

Test Performed by:	CR, RA&QL	Reviewed by:	
Date:	2/15/2017	Date:	

Project:	CC8	Date of Test:	2/15/2017
Test Location:	Sta. 510 Offset -12	Material Description:	North Test-2
Test Depth:	Top of subgrade		

Stress -Penetration Curve



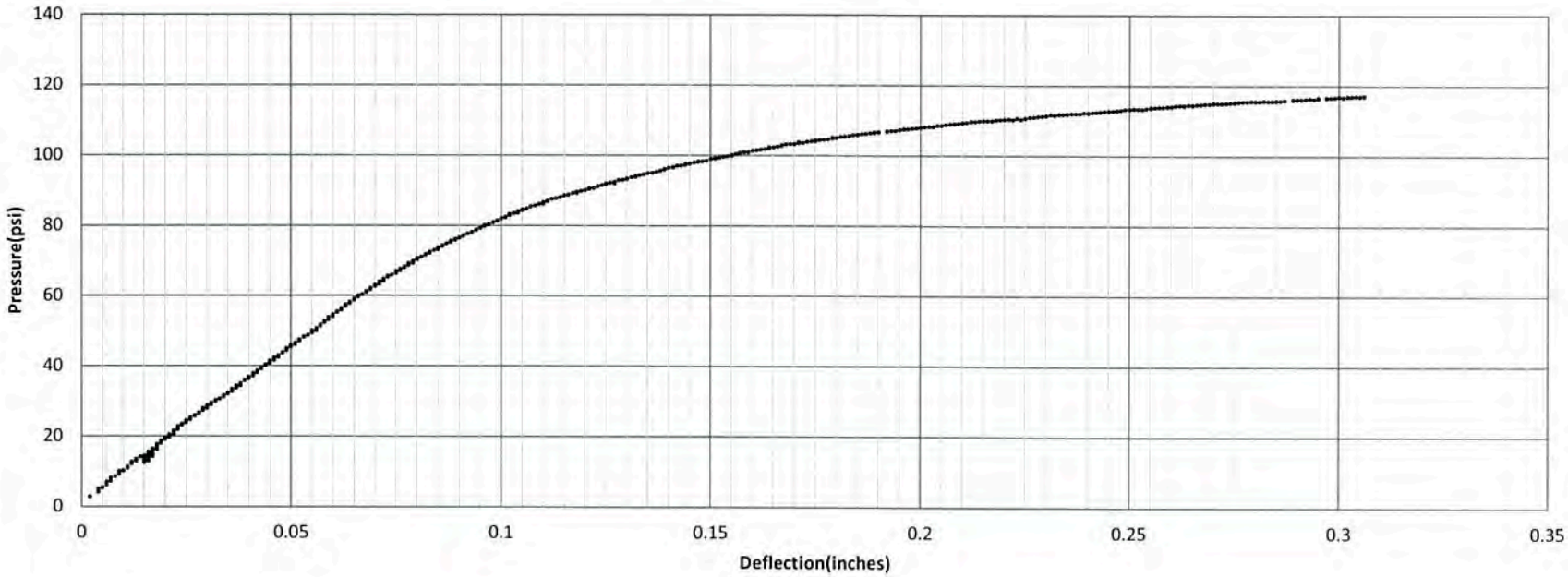
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.7		Corrected Bearing Ratio at 0.2in (5.08mm): 6.7	

Vane Shear	92	97	94	89	88	Average	92	Shear Strength	184 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/15/2017	Date:

Project:	CC8	Date of Test:	2/15/2017
Test Location:	Sta. 510 Offset -12	Material Description:	North Test-3
Test Depth:	Top of subgrade		

Stress -Penetration Curve



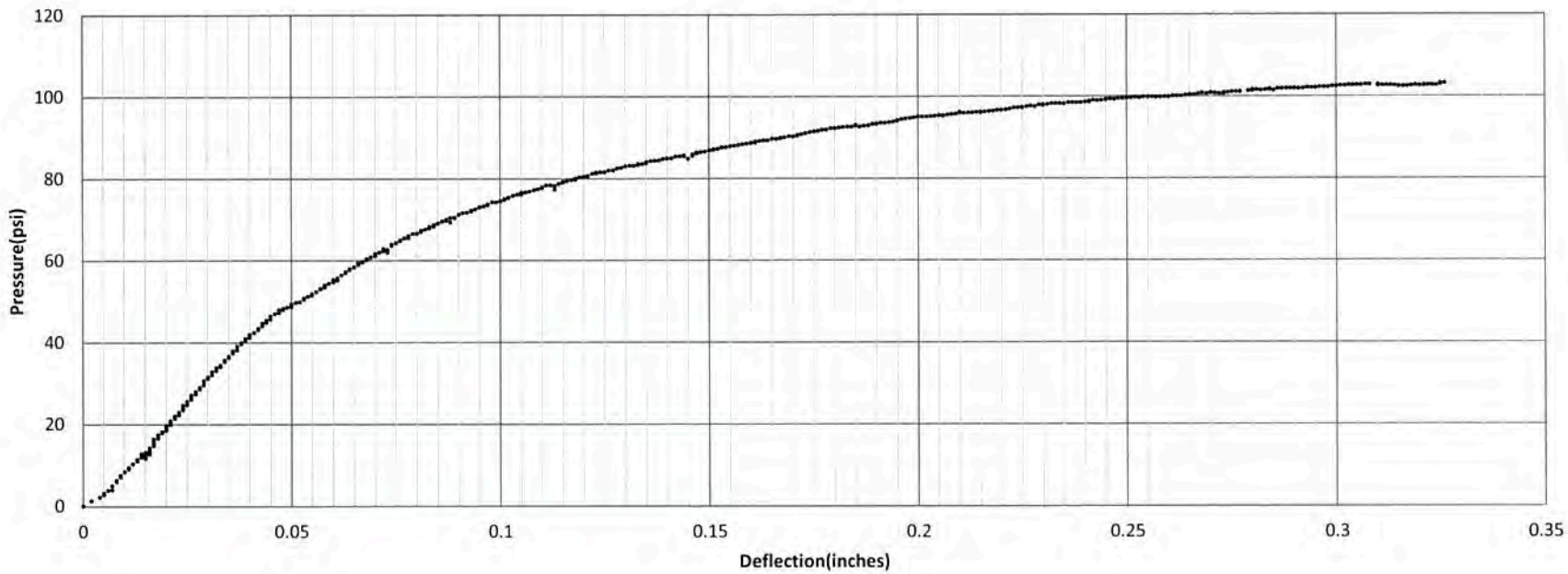
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 8.2		Corrected Bearing Ratio at 0.2in (5.08mm): 7.2	

Vane Shear	82	98	92	95	94	Average	92.2	Shear Strength	184.4 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/15/2017	Date:

Project:	CC8			Date of Test:	2/15/2017
Test Location:	Sta.	540 Offset	-14	Material Description:	North Test-1
Test Depth:	Top of subgrade				

Stress -Penetration Curve



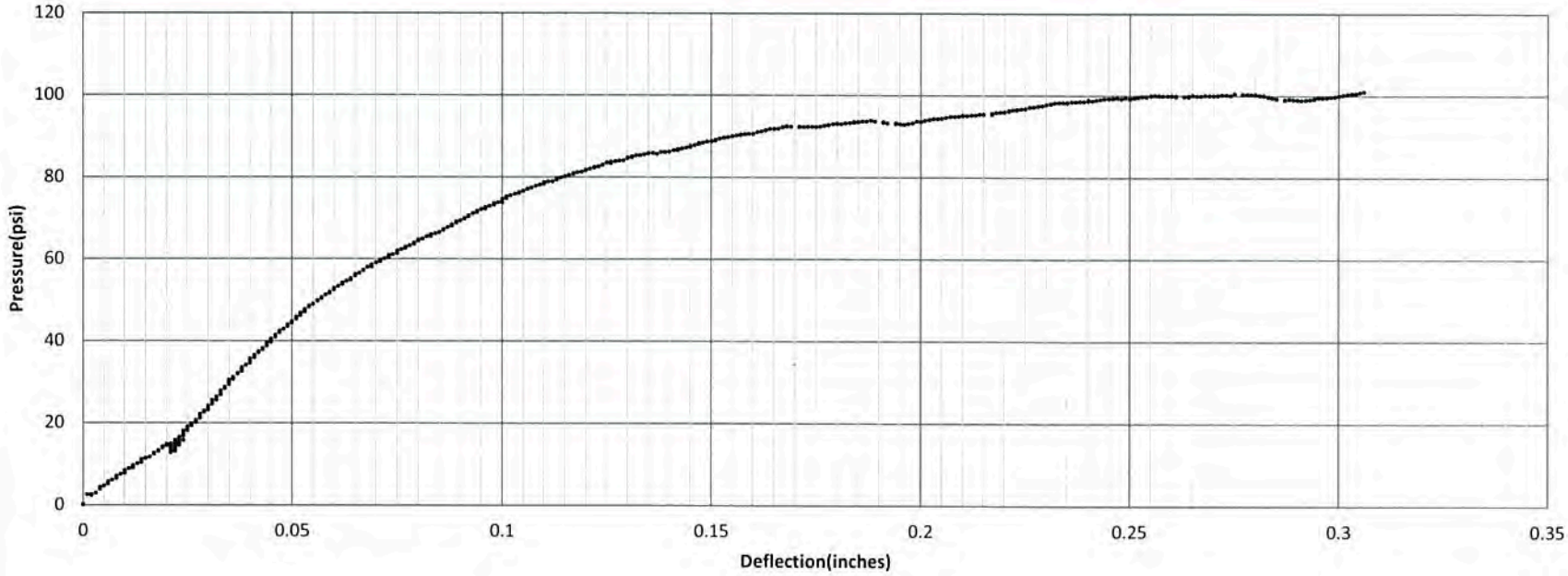
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.4		Corrected Bearing Ratio at 0.2in (5.08mm): 6.3	

Vane Shear	82	98	92	95	94	Average	92.2	Shear Strength	184.4 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/15/2017	Date:

Project:	CC8	Date of Test:	2/15/2017
Test Location:	Sta. 540 Offset -14	Material Description:	North Test-2
Test Depth:	Top of subgrade		

Stress -Penetration Curve



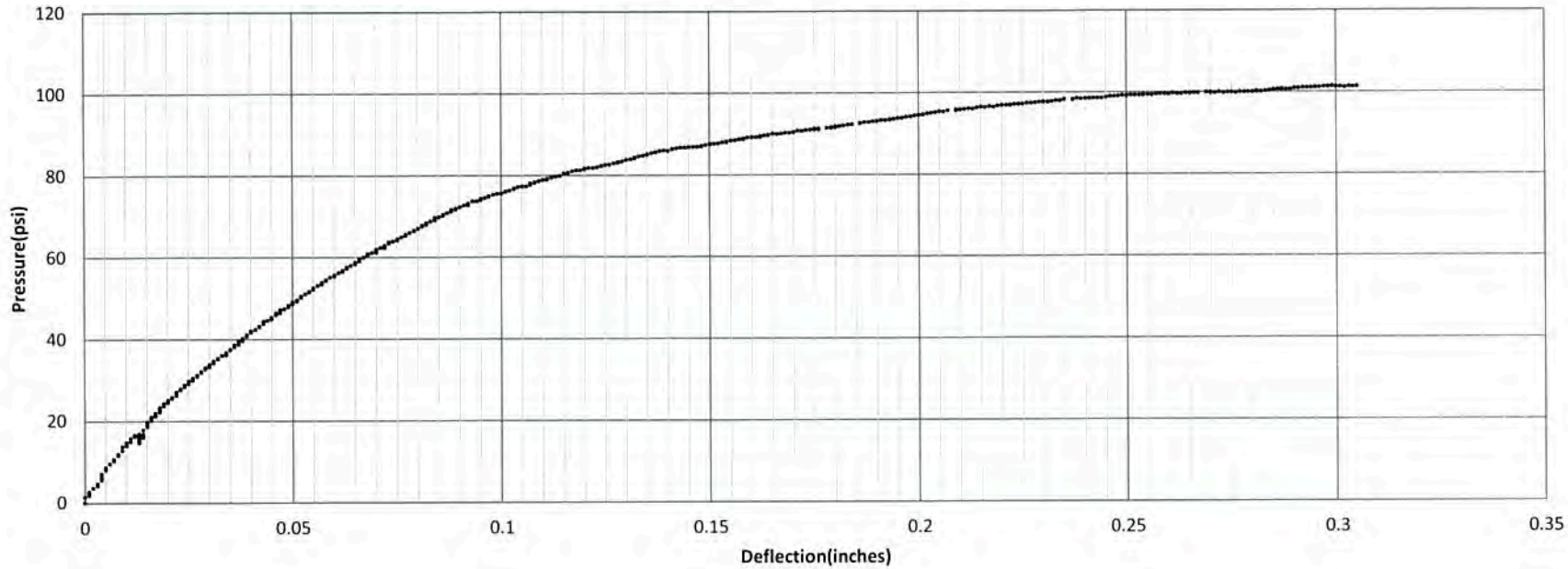
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.5		Corrected Bearing Ratio at 0.2in (5.08mm): 6.2	

Vane Shear	98	82	92	98	102	Average	94.4	Shear Strength	188.8 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/15/2017	Date:

Project:	CC8	Date of Test:	2/15/2017
Test Location:	Sta. 540 Offset -14	Material Description:	North Test-3
Test Depth:	Top of subgrade		

Stress -Penetration Curve



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 7.6		Corrected Bearing Ratio at 0.2in (5.08mm): 6.3	

Vane Shear	88	97	88	90	86	Average	89.8	Shear Strength	179.6 kPa

Test Performed by: CR, RA&QL	Reviewed by:
Date: 2/15/2017	Date:

Density of Soil In Place by Drive-Cylinder Method
ASTM D2937

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8 Subgrade Acceptance		Section			Date:	2/6/2017
Technician:	CR/MW		Location:	See Below			
Test No.	-						
Station	4+70	5+25					
Offset (ft.)	10	8					
Depth/Elevation (ft.)	-			-	-	-	
Mass of wet soil + cylinder (g)	2467.30	2523.9					
Mass of cylinder (g)	634.9	691.2					
Mass of wet soil (g)	1832.40	1832.70					
Height of cylinder(cm)	12.581	12.497					
Diameter of cylinder at top (cm)	9.683	9.706					
Diameter of cylinder at bottom (g)	9.636	9.657					
Volume of Cylinder (cm^3)	921	920					
Moisture sample can ID	B15	B17					
Moisture sample can mass (g)	157.55	158.85					
Mass of wet soil + can (g)	331.35	366.48					
Mass of dry soil + can (g)	292.57	320.19					
Mass of dry soil (g)	135.02	161.34					
Mass of water loss (g)	38.78	46.29					
Moisture content (%)*	28.7	28.7					
Wet soil density (g/cm^3)	1.989	1.993					
Dry soil density (g/cm^3)	1.545	1.549					
Wet soil unit weight (lb/ft^3)	124.1	124.4					
Dry soil unit weight (lb/ft^3)	96.4	96.6					

Density of Soil In Place by Drive-Cylinder Method
ASTM D2937

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project: CC-8 Subgrade Acceptance Section _____ Date: 2/14/2017

Technician: CR/MW Location: See Below

Test No.	1	2	3				
Station	4+15	4+40	4+20				
Offset (ft.)	10	12	-15				
Cylinder	Z	V	Y				
Mass of wet soil + cylinder (g)	2535.34	2418.62	2538.92				
Mass of cylinder (g)	691.76	598.54	696.13				
Mass of wet soil (g)	1843.58	1820.08	1842.79				
Height of cylinder(cm)	12.621	12.422	12.587				
Diameter of cylinder at top (cm)	9.69	9.649	9.723				
Diameter of cylinder at bottom (g)	9.741	9.746	9.653				
Volume of Cylinder (cm^3)	935	917	927				
Moisture sample can ID	B14	B15	B19				
Moisture sample can mass (g)	160.07	157.54	157.33				
Mass of wet soil + can (g)	302.21	304.7	321.39				
Mass of dry soil + can (g)	271.41	272.99	285.11				
Mass of dry soil (g)	111.34	115.45	127.78				
Mass of water loss (g)	30.8	31.71	36.28				
Moisture content (%)*	27.7	27.5	28.4				
Wet soil density (g/cm^3)	1.971	1.985	1.987				
Dry soil density (g/cm^3)	1.544	1.557	1.548				
Wet soil unit weight (lb/ft^3)	123.0	123.8	124.0				
Dry soil unit weight (lb/ft^3)	96.4	97.2	96.6				

Density of Soil In Place by Drive-Cylinder Method
ASTM D2937

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project: CC-8 Subgrade Acceptance Section _____ Date: 2/15/2017

Technician: CR Location: See Below

Test No.	1	2	3				
Station	4+80	5+10	5+40				
Offset (ft.)	-10	-12	-15				
Cylinder	W	X	Q				
Mass of wet soil + cylinder (g)	2519.14	2462.6	2506.37				
Mass of cylinder (g)	690.48	634.14	691.36				
Mass of wet soil (g)	1828.66	1828.46	1815.01				
Height of cylinder(cm)	12.497	12.581	12.634				
Diameter of cylinder at top (cm)	9.706	9.683	9.671				
Diameter of cylinder at bottom (g)	9.657	9.636	9.706				
Volume of Cylinder (cm^3)	920	921	931				
Moisture sample can ID	B-19	B-10	B-21				
Moisture sample can mass (g)	160.79	157.2	159.17				
Mass of wet soil + can (g)	544.77	553.96	571.32				
Mass of dry soil + can (g)	458.94	467.38	477.97				
Mass of dry soil (g)	298.15	310.18	318.80				
Mass of water loss (g)	85.83	86.58	93.35				
Moisture content (%)*	28.8	27.9	29.3				
Wet soil density (g/cm^3)	1.989	1.984	1.950				
Dry soil density (g/cm^3)	1.544	1.551	1.508				
Wet soil unit weight (lb/ft^3)	124.1	123.8	121.7				
Dry soil unit weight (lb/ft^3)	96.4	96.8	94.1				

CC8 Construction
8/25/2017, 09/06-07/2017

CBR TEST ON LIFT 1 OF CC8 SUBGRADE-DUPONT CLAY

The first two CBR result were taken for acceptance. An additional 6 CBRs were collected upon the request of the FAA for additional characterization

			CBR Value, %			
Station	Offset, feet	Depth, in	Test-1	Test-2	Test-3	Mean
590	-18 (North)	0	6.7	7.1	6.8	6.9
577	7 (South)	0	7.8	7.6	8.3	7.9
577	18 (South)	0	9.5	9.2	9.4	9.4
577	-8(North)	0	10.1	10.1	10.7	10.3
587	-2(North)	0	9.4	9.7	8.9	9.3
587	-2(North)	2	7.3	7.9	7.5	7.6
590	16 (South)	0	7.8	8.9	8.4	8.4
590	16 (South)	2	6.3	5.7	5.6	5.9

Minimum:	**6.7**	**Mean:**	**7.4**
Maximum:	**8.3**	**Std. Dev.:**	**0.624**
Difference:	**1.6**	**COV:**	**8.5%**

DRIVE CYLINDER TESTS-DUPONT CLAY

Station	Offset, feet	Depth, in	Moisture Content, %	In-Situ Dry Density, pcf
590	-18 (North)	0	27.5	96.2
577	7 (South)	0	28.9	88.2
577	18 (South)	0	28.6	93.6
577	-8(North)	0	28.1	92.5
587	-2(North)	0	28.3	93.5
590	16 (South)	0	27.8	94.0

ACCEPTANCE

	Criterion	Mean (Station 550-600)
Range	7.0-8.0	7.4

CSRA RECOMMENDATION

Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

FAA's On-Site Engineer

Date

Data Files Locations: G:\ACT\AAR\AJP6310\CC8\CC8 field testing\CC8 Acceptance test phase II\Subgrade\08252017

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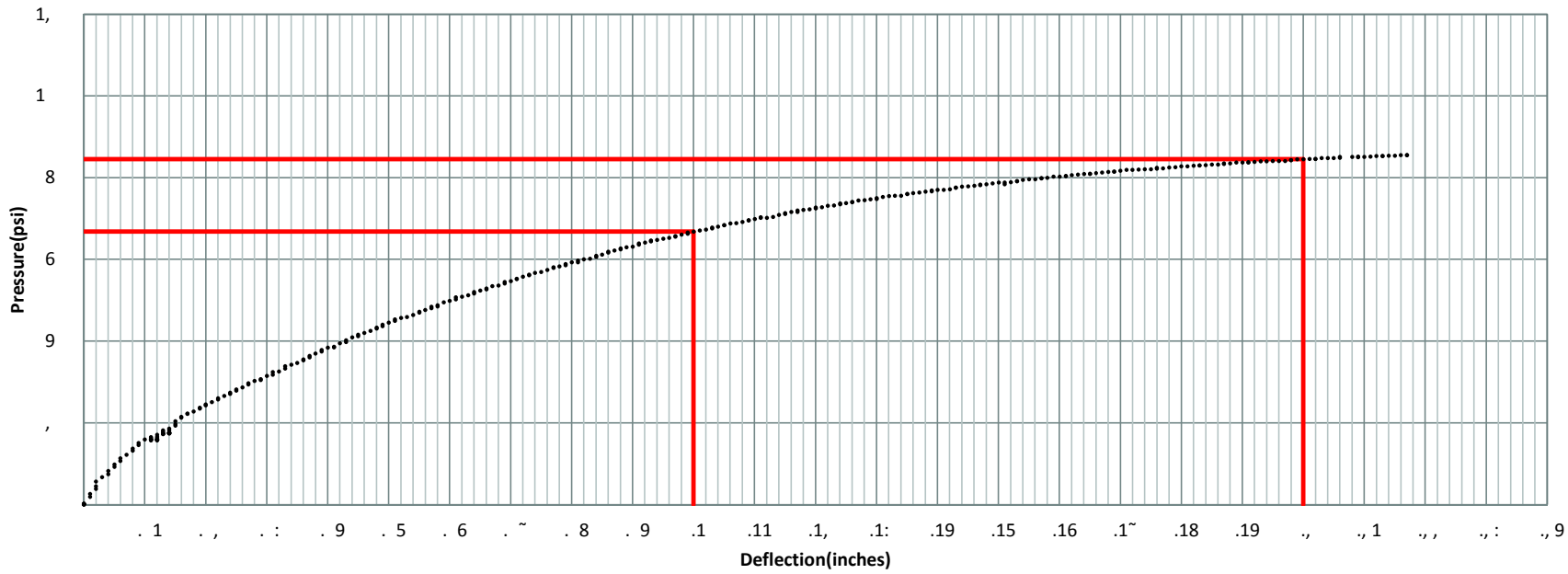

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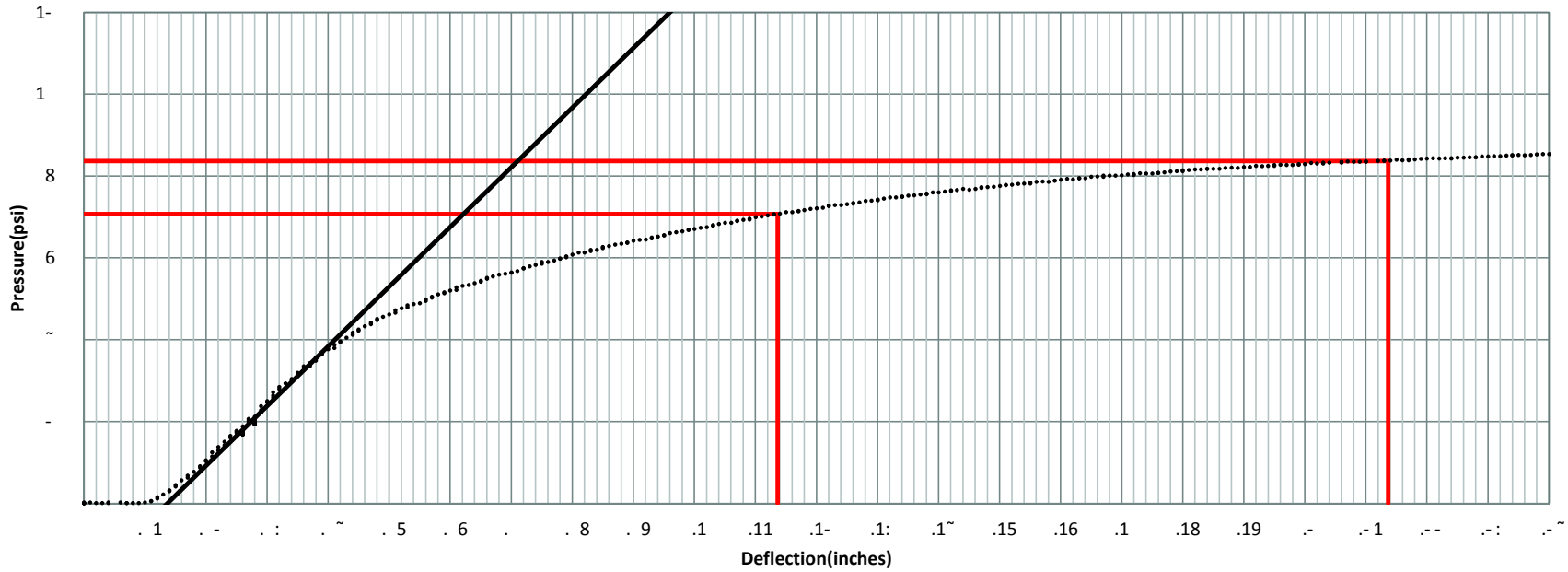

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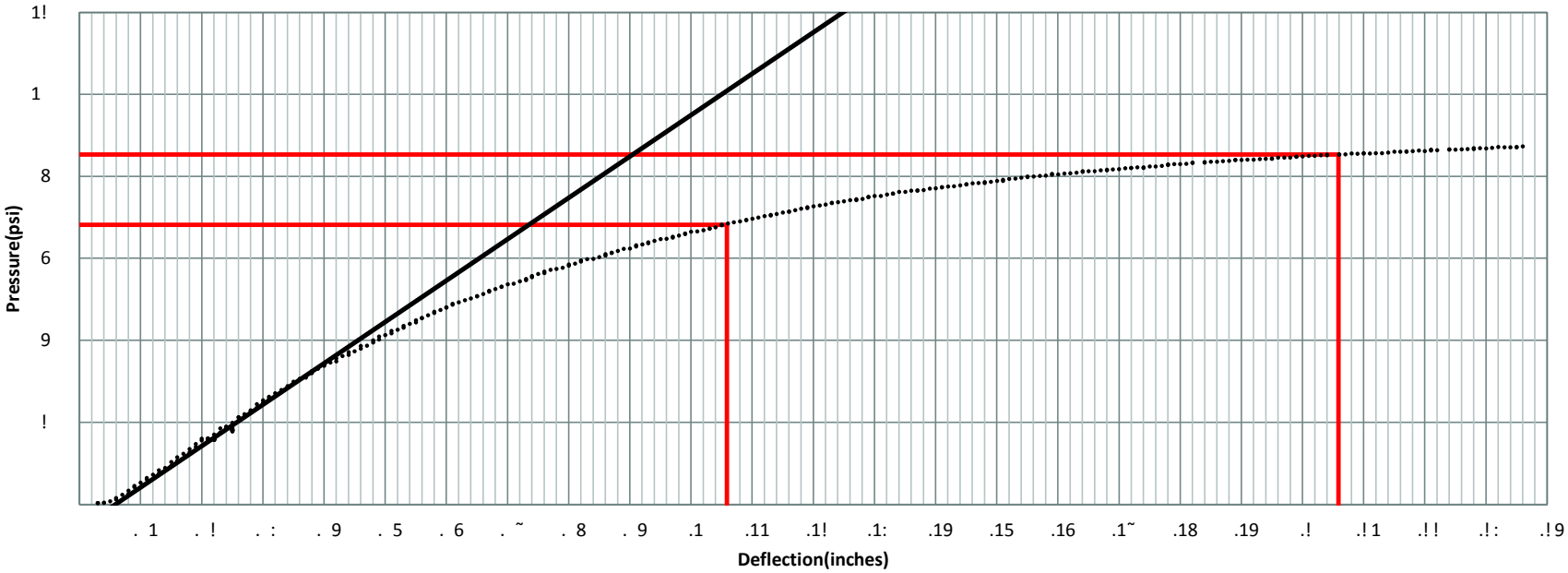

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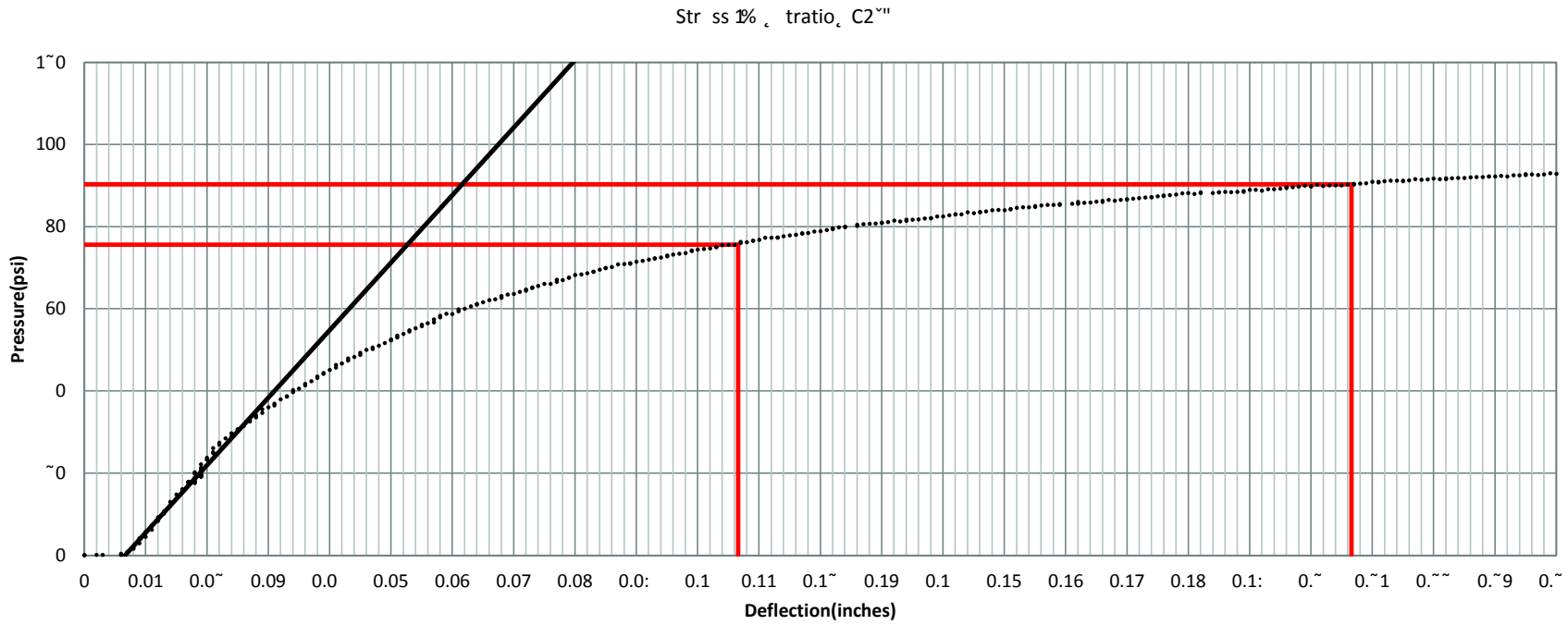
Coˆˆe˙ te˘ 6eari° $ Ratio at .1i° 7! .591 1 8˝ 6.8		Coˆˆe˙ te˘ 6eari° $ Ratio at .! i° 75. 81 1 8˝ 5.˜	
ane Shear	11 1 5 11!	" #eˆage 1 9.	Shear Stre° $th 1 9. %&a
Te t &eˆfoˆ1 e˘ /0˘ CC' () * (" ˝ ate˘ 8, ! 5, ! 1˜		Re#ie. e˘ /0˘ CC * + L ˝ ate˘ 8, ! 5, ! 1˜	

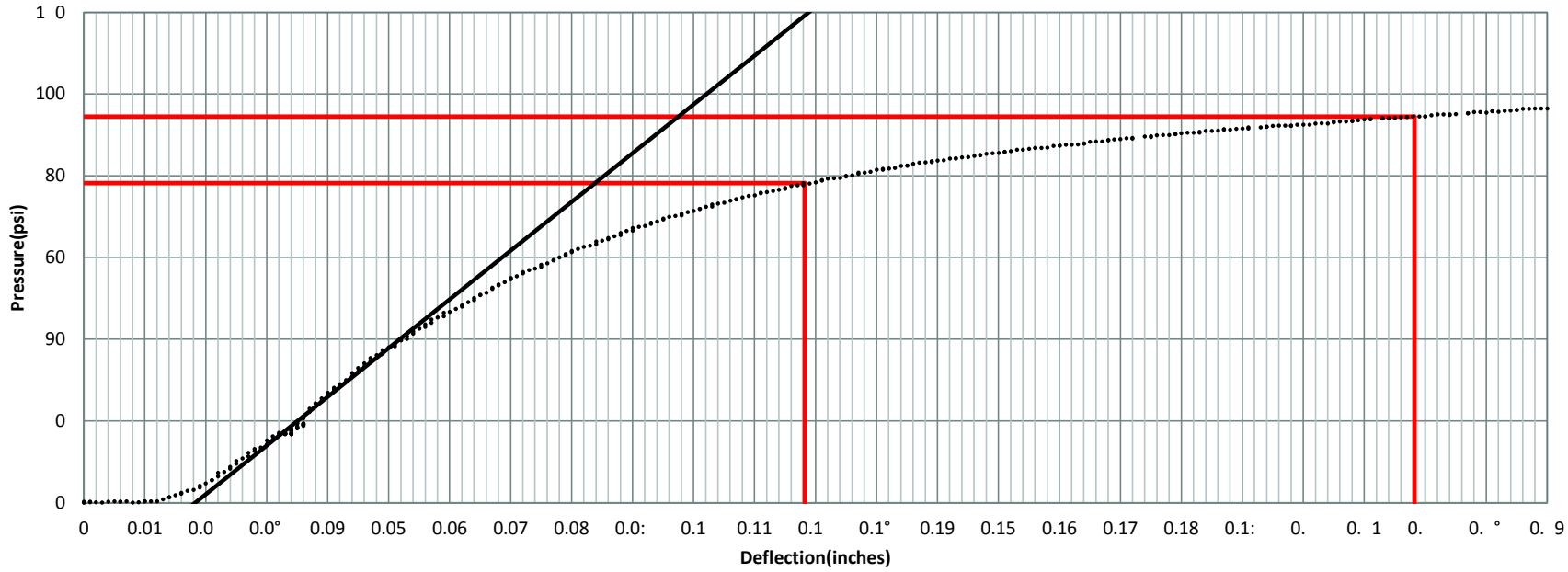
%˜o3 ˆt:	CC8	˙ ate of T st:	8+˜5+˜017
T st Loˆatio¸ ˘	Sta. 577 ffs t 7	Mat ˘ial ˙ sˆ˘i4tio¸ ˘	Sta.550 to 600
T st ˙ 4th˘	Lift 1		



˙ ¸ sity˘	T st Method	5 ate˘ Co¸ te¸ t:	T st Method˘
Co˘˘ ˆted ˙ f˘ ˆtio¸ ˘	0.007		
Co˘˘ ˆted 6 ari¸ # Ratio at 0.1i¸ 7˘.5 0 0 8˘ 7.6		Co˘˘ ˆted 6 ari¸ # Ratio at 0.˜i¸ 75.080 0 8˘ 6.0	
° an Sh ar	108 11˜ 10	! " ˘ag	108.0 Sh ar Str ¸ #th 108.0 $%a
T st % ˘fo˘0 d . /˘ CC&( ) '! ˙ ate˘ 8+˜5+˜017		, "i - d . /˘ CC) * L ˙ ate˘ 8+˜5+˜017	

%˜o3 ˆt:	CC8	˙ ate of T st:	8+ 5+ 017
T st Loˆatio¸ ˘	Sta. 577 ffs t 7	Mate˘ial ˙ sˆ˘i4tio¸ ˘	Sta.550 to 600
T st ˙ 4th˘	Lift 1		

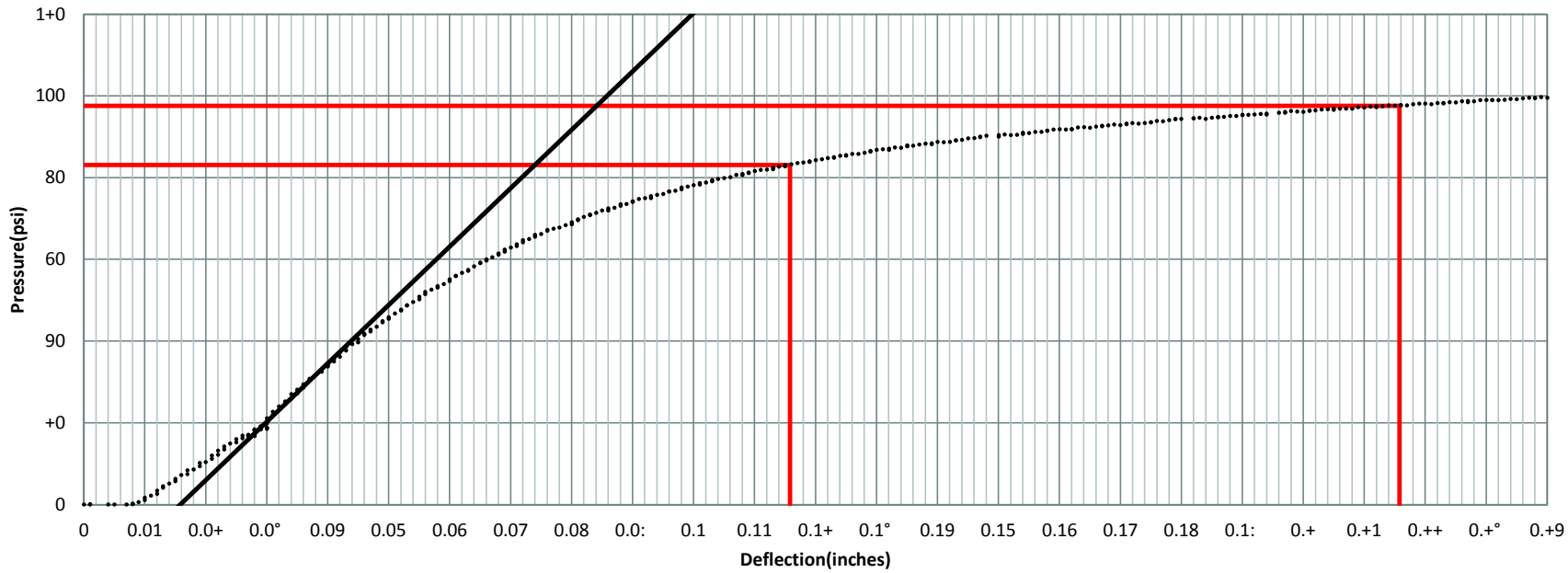
Str ss 1% ¸ tratio¸ C2˘"



˙ ¸ sity˘	T st Method	5 ate˘ Co¸ te¸ t:	T st Method˘
Co˘˘ ˆted ˙ f˜ ˆtio¸ ˘	0.018		
Co˘˘ ˆted 6 ari¸ # Ratio at 0.1i¸ 7 .590 0 8˜ 7.8		Co˘˘ ˆted 6 ari¸ # Ratio at 0. i¸ 75.080 0 8˜ 6.°	
˜an Sh ar 115 110 11		! " ˘ag 11 .°	Sh ar Str ¸ #th 11 .° $%a
T st % ˘fo˘0 d . /˘ CC&( ) '! ˙ ate˘ 8+ 5+ 017		, "i - d . /˘ CC) * L ˙ ate˘ 8+ 5+ 017	

$ˇo3 ˆt:	CC8	˙ ate of T st:	8*+5*+017
T st Loˆatio˛ ˇ	Sta. 577 ffs t 7	Mateˇial ˙ sˆˇi4tio˛ ˇ	Sta.550 to 600
T st ˙ 4thˇ	Lift 1		

Str ss 1$ ˛ tratio˛ C2ˇ!



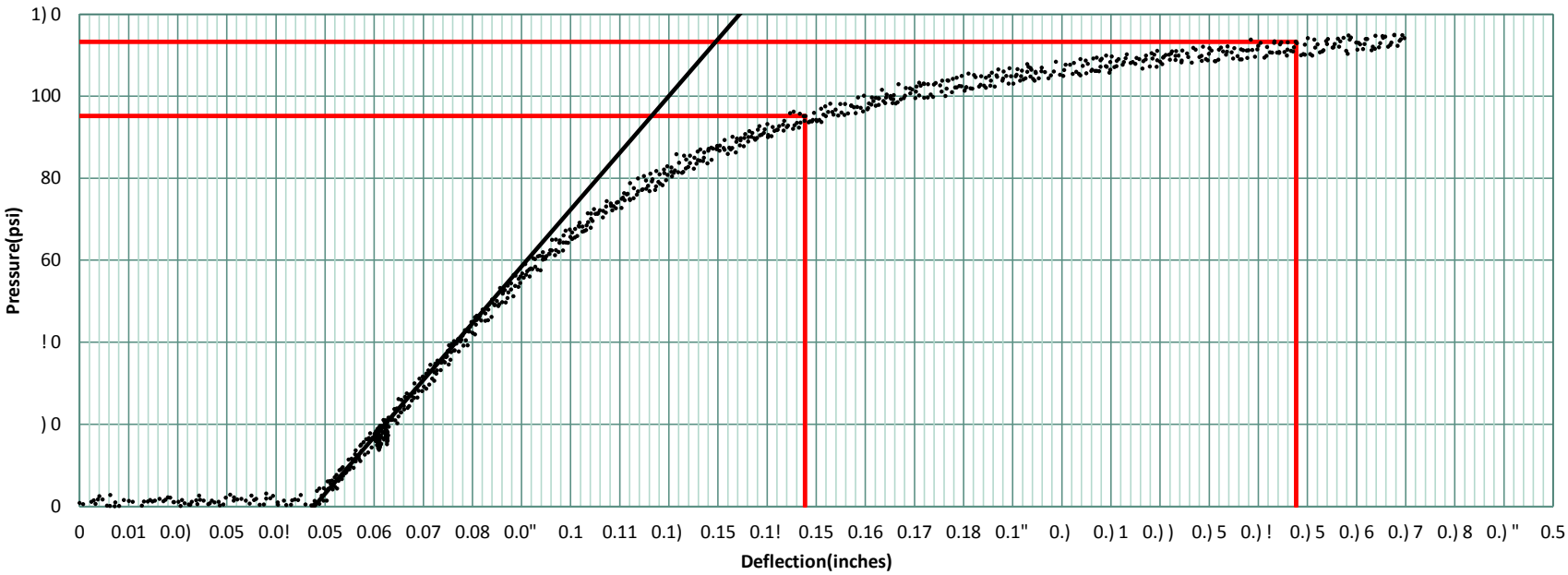
˙ ˛ sityˇ	T st Method	5 ateˇ Co˛ te˛ t:	T st Methodˇ
Coˇˇ ˆted ˙ f˝ ˆtio˛ ˇ	0.016		
Coˇˇ ˆted 6 ari˛ " Ratio at 0.1i˛ 7+.590 0 8˝ 8.°		Coˇˇ ˆted 6 ari˛ " Ratio at 0.+i˛ 75.080 0 8˝ 6.5	

˜an Sh ar	105	108	108	! ˇag	107.0	Sh ar Str ˛ "th	107.0 #$a

T st $ ˇfoˇ0 d . /ˇ CC%& (& ˙ ateˇ 8*+5*+017	, !i - d . /ˇ CC ( ) L ˙ ateˇ 8*+5*+017

- ro0 ˝t:	CC8	¸ ate of T st:	"(6() 017
T st ' o˝atio ˙	Sta. 577 ffs t 18	Mat r˜al ¸ s˝r˜ptio ˙	Sta.550 to 600
T st ¸ pth˙	Top of Subgrad		

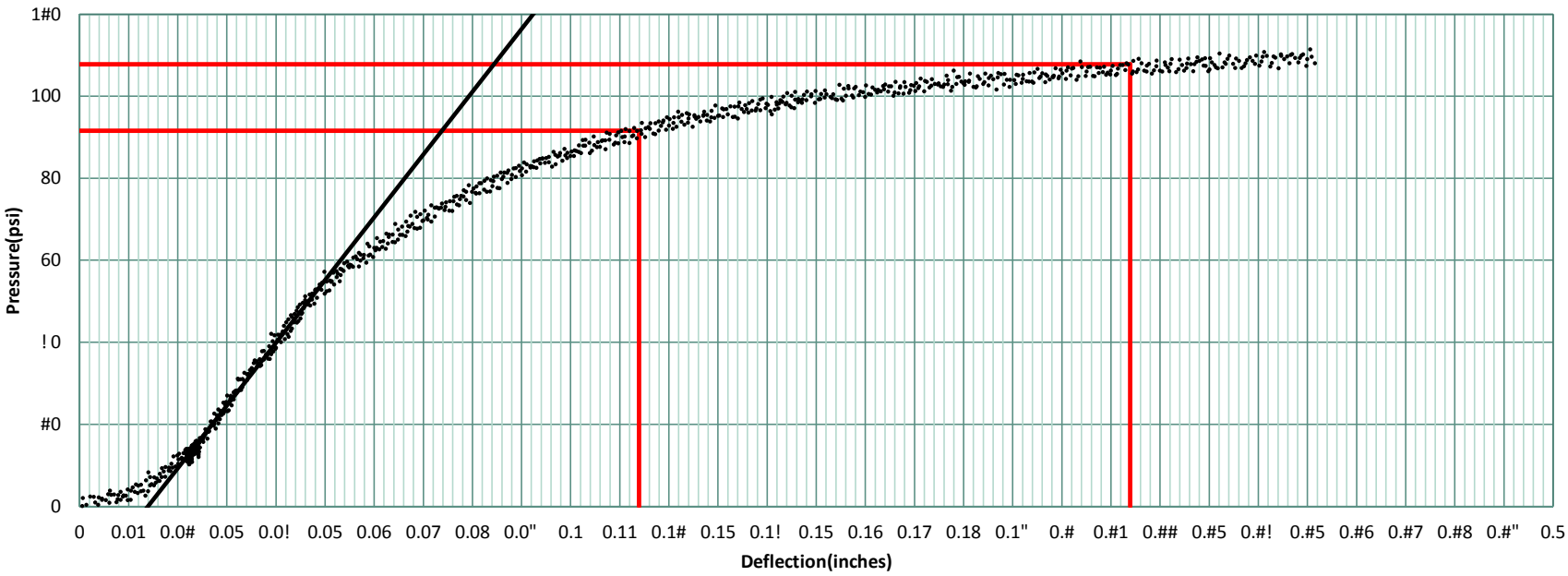
Str ss /- tratio Cur*



¸ s˜ty˙	T st ˘ tho˘	1 ater Co te t:	T st ˘ tho˘˙
Corr ˝te˘ ¸ f° ˝tio ˙	0.0! 8		
Corr ˝te˘ 2 ar˜ g Ratio at 0.1˜ 3) .5! . . 4 " .5		Corr ˝te˘ 2 ar˜ g Ratio at 0.) ˜ 35.08. . 4 7.6	
T st - rfor. ˘ b, ˙ CC#CR %&' ¸ ate˙ "(6() 017		$ *˜ + ˘ b, ˙ CC %&' ¸ ate˙ "(6() 017	

- ro0 ˝t:	CC8	¸ ate of T st:	")6)#017
T st (o˝atio ˙	Sta. 577 ffs t 18	Mater˜al ¸ s˝r˜ptio ˙	Sta.550 to 600
T st ¸ pth˙	Top of Subgrad		

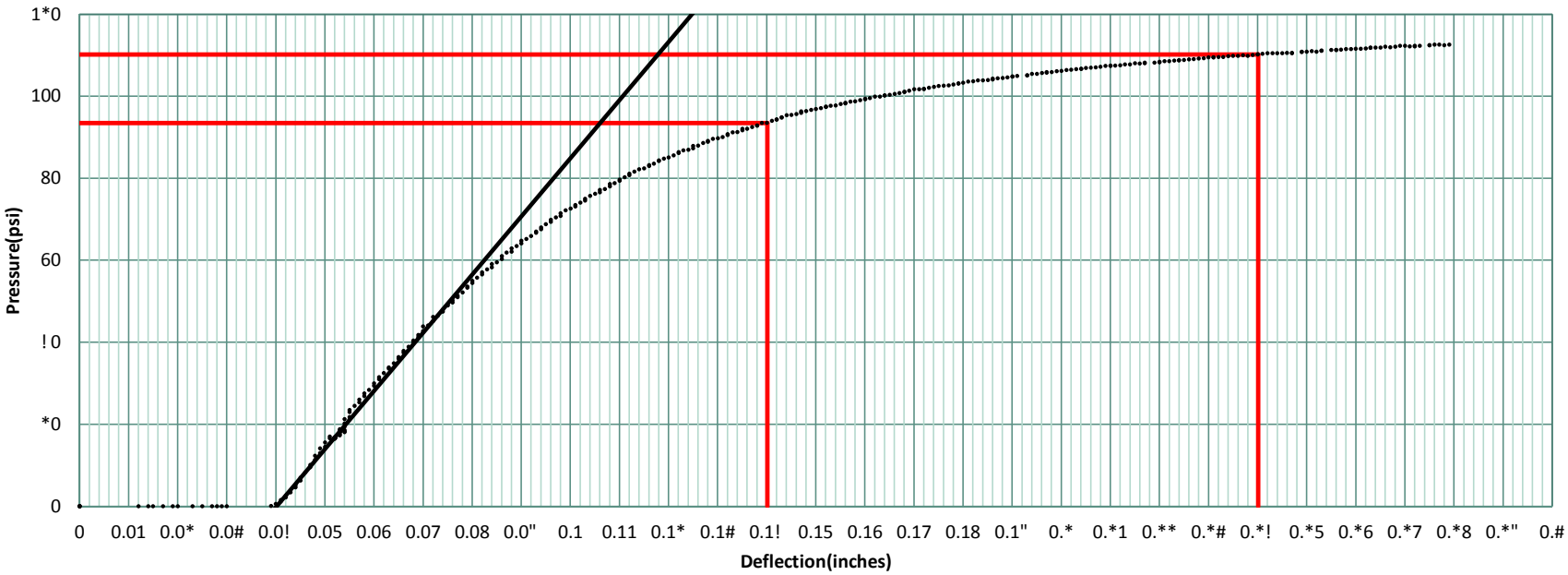
Str ss /- tratio Cur*



¸ s˜ty˙ T st ˘ tho˘	1 ater Co te t: T st ˘ tho˘˙
Corr ˝te˘ ¸ f° ˝tio ˙ 0.01!	
Corr ˝te˘ 2 ar˜ g Ratio at 0.1˜ 3#.5! . . 4 ".#	Corr ˝te˘ 2 ar˜ g Ratio at 0.#˜ 35.08. . 4 7.#
T st - rfor. ˘ b, ˙ CC$CR &' (¸ ate˙ ")6)#017	% *˜ + ˘ b, ˙ CC &' (¸ ate˙ ")6)#017

. ro1 ˝t:	CC8	¸ ate of T st:	")6)*017
T st (o˝atio ˙	Sta. 577 ffs t 18	Mater˜al ¸ s˝r˜ptio ˙	Sta.550 to 600
T st ¸ pth˙	Top of Subgrad		

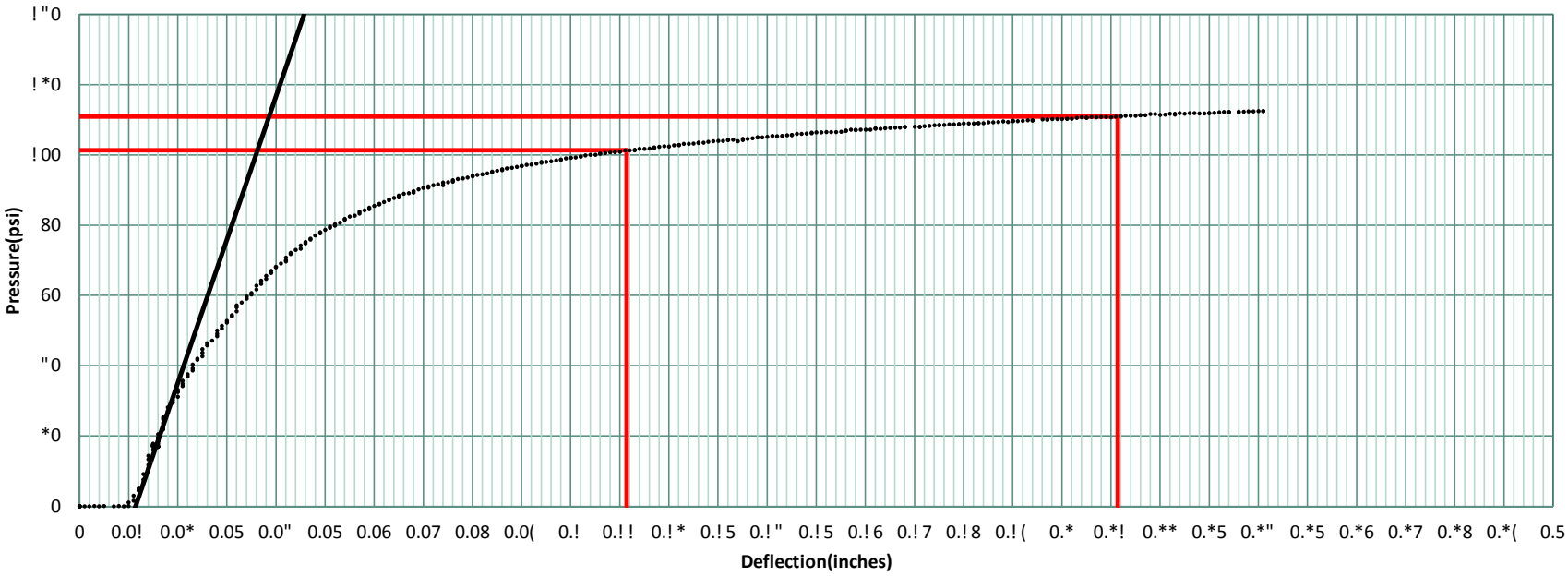
Str ss 0 tratio Cur+



¸ s˜ty˙ T st ˘ tho˘	2 ater Co te t: T st ˘ tho˘˙
Corr ˝te˘ ¸ f° ˝tio ˙ 0.0!0	
Corr ˝te˘ 3 ar˜ g Ratio at 0.1˜ 4*.5!/ / 5 ".!	Corr ˝te˘ 3 ar˜ g Ratio at 0.*˜ 45.08/ / 5 7.#
T st . rfor/ ˘ b-˙ CC$CR &' (¸ ate˙ ")6)*017	% +˜ , ˘ b-˙ CC &' (¸ ate˙ ")6)*017

. ro0 ˝t:	CC8	¸ ate of T st:	( )6)*0! 7
T st ' o˝atio ˙	Sta. 577 ffs t -8	Mat r˜al ¸ s˝r˜ptio ˙	Sta.550 to 600
T st ¸ pth˙	Top of Subgrad		

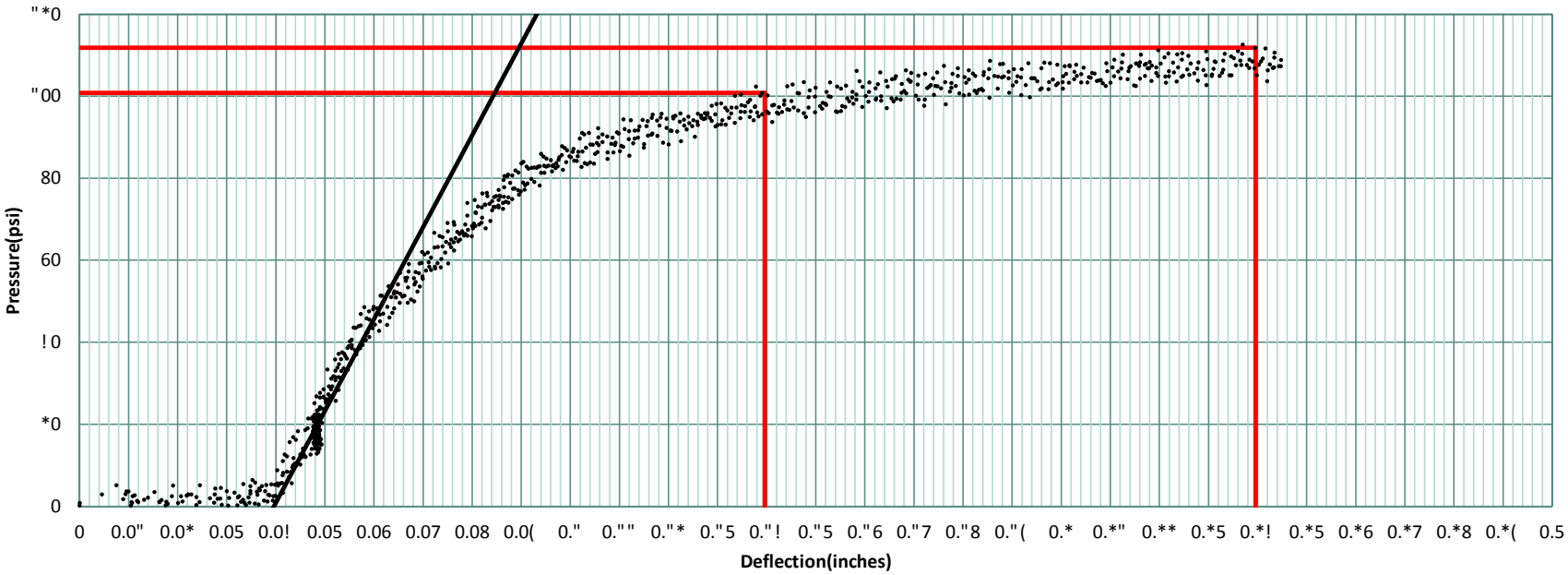
Str ss -. tratio Cur+



¸ s˜ty˙	T st ˘ tho˘	1 ater Co te t:	T st ˘ tho˘˙
Corr ˝te˘ ¸ f° ˝tio ˙	0.0! !		
Corr ˝te˘ 2 ar˜ g Ratio at 0.! ˜ 3*.5"/ / 4 ! 0.!		Corr ˝te˘ 2 ar˜ g Ratio at 0.*˜ 35.08/ / 4 7."	
T st . rfor/ ˘ b-˙ CC#CR %&' ¸ ate˙ ( )6)*0! 7		$ +˜ , ˘ b-˙ CC %&' ¸ ate˙ ( )6)*0! 7	

. ro0 ˝t:	CC8	¸ ate of T st:	( )6)*0"7
T st ' o˝atio ˙	Sta. 577 ffs t -8	Mat r˜al ¸ s˝r˜ptio ˙	Sta.550 to 600
T st ¸ pth˙	Top of Subgrad		

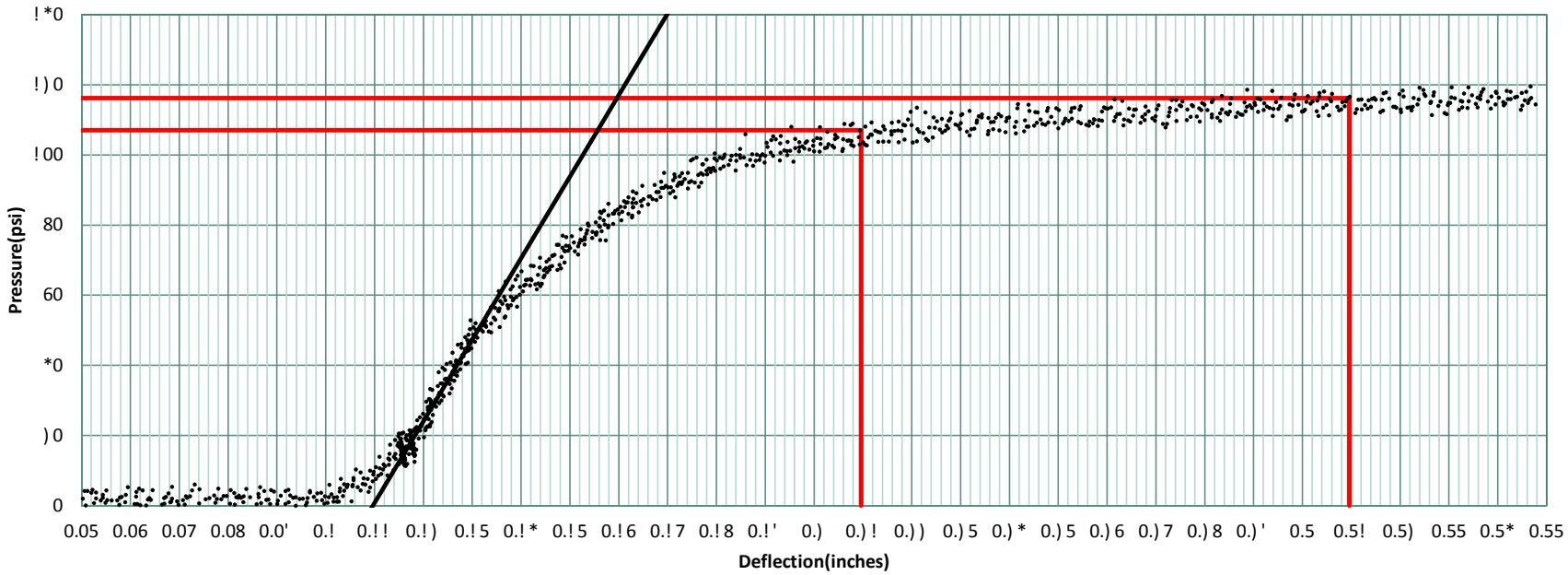
Str ss -. tratio Cur+



¸ s˜ty˙	T st ˘ tho˘	1 ater Co te t:	T st ˘ tho˘˙
Corr ˝te˘ ¸ f° ˝tio ˙	0.0!0		
Corr ˝te˘ 2 ar˜ g Ratio at 0."˜ 3*.5!/ / 4 "0."		Corr ˝te˘ 2 ar˜ g Ratio at 0.*˜ 35.08/ / 4 7.5	
T st . rfor/ ˘ b-˙ CC#CR %&' ¸ ate˙ ( )6)*0"7		$ +˜ , ˘ b-˙ CC %&' ¸ ate˙ ( )6)*0"7	

. ro0 ˝t:	CC8	˹ ate of T st:	' (6( ) 0! 7
T st &o˝atio ˙	Sta. 577 ffs t -8	Mat r˜al ˹ s˝r˜ptio ˙	Sta.550 to 600
T st ˹ pth˙	Top of Subgrad		

Str ss -. tratio Cur+

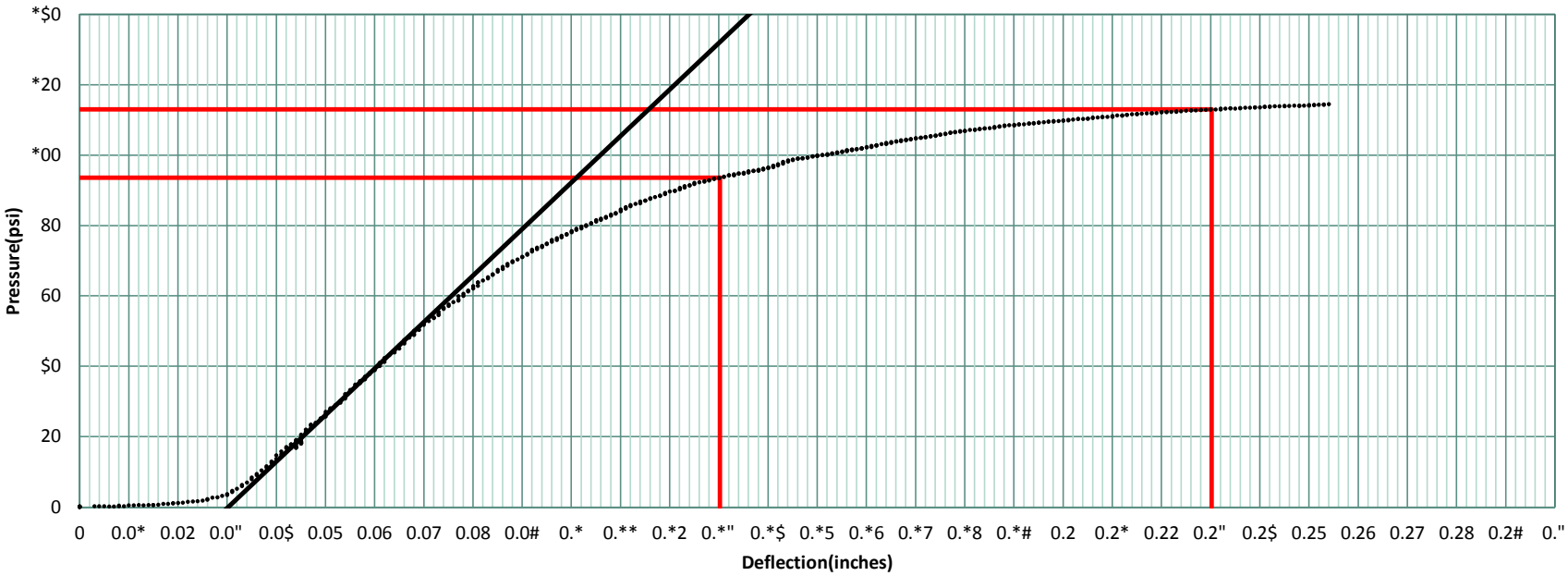


˹ s˜ty˙	T st ˘ tho˘	1 ater Co te t:	T st ˘ tho˘ ˙
Corr ˝te˘ ˹ f° ˝tio ˙	0.! ! 0		
Corr ˝te˘ 2 ar˜ g Ratio at 0.! ˜ 3) .5*/ / 4 ! 0.7		Corr ˝te˘ 2 ar˜ g Ratio at 0.) ˜ 35.08/ / 4 7.7	
T st . rfor/ ˘ b-˙	CC"CR $ %&	# +˜ , ˘ b-˙	CC $ %&
˹ ate˙	' (6( ) 0! 7	˹ ate˙	' (6( ) 0! 7

0.) 0' 607' ! 07.0*' ! * 0 0

. ˇo0 ˹ t:	CC8	° ate of T st:	#)7)20*7
T st (o˹ atio! ˝	Sta. 587 ffs t -2	Mat ˇ al ° s˹ ˇ ptio! ˝	Sta.550 to 600
T st ° pth˝	Top of Subgˇad		

Str ss -. ! tratio! Cuˇ+

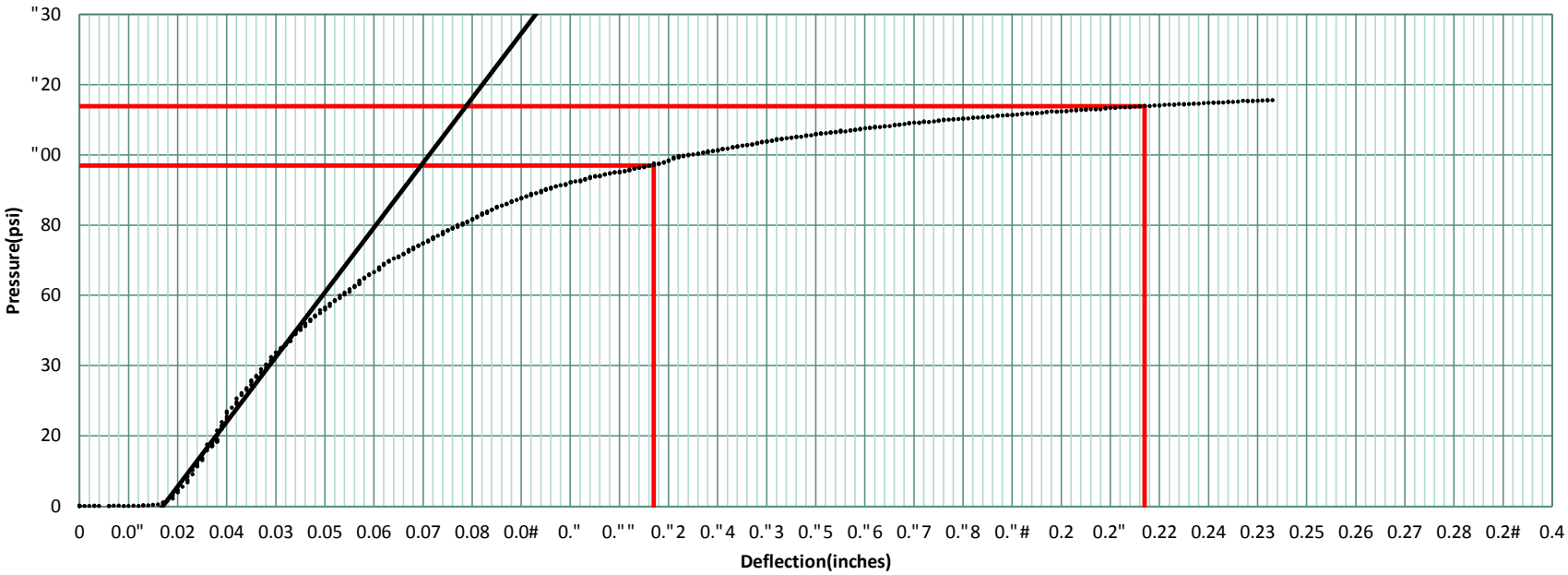


° ! s ty˝	T st ˆ tho˘	1 ateˇ Co! te! t:	T st ˆ thoˇ˝
Coˇˇ ˹ teˇ ° f˜ ˹ tio! ˝	0.0"0		
Coˇˇ ˹ teˇ 2 ar ! g Ratio at 0.* ! 32.5$/ / 4˝ #.$		Coˇˇ ˹ teˇ 2 ar ! g Ratio at 0.2 ! 35.08/ / 4˝ 7.5	

T st . ˇfoˇ/ ˇ b-˝ ° ate˝	CR &' (#)7)20*7	% + , ˇ b-˝ ° ate˝	' (#)7)20*7

, ˇo. ¸t:	CC8	° ate of T st:	#(7(20"7
T st ' o¸atio! ˝	Sta. 587 ffs t -2	Mat ˇ al ° s¸ˇptio! ˝	Sta.550 to 600
T st ° pth˝	Top of Subgˇad		

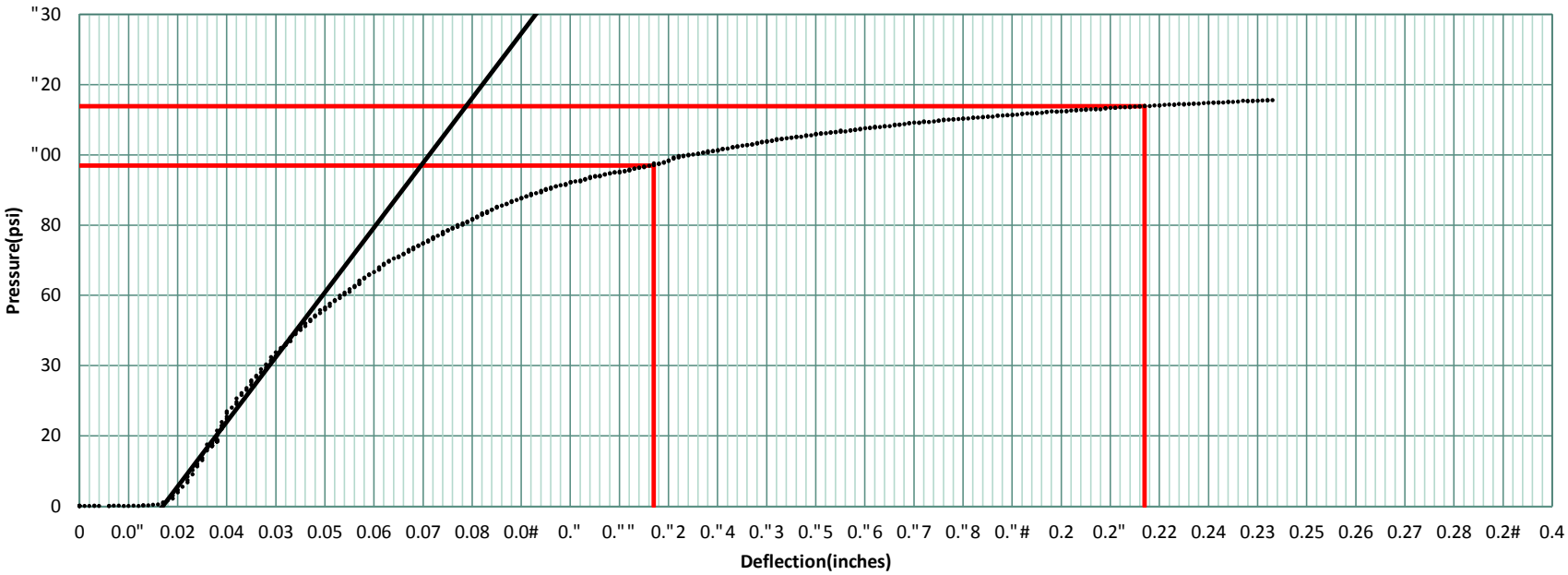
Str ss -, ! tratio! Cuˇ)



° ! s ty˝	T st ˆ tho˘	/ ateˇ Co! te! t:	T st ˆ thoˇ˝
Coˇˇ ¸teˇ ° f˜ ¸tio! ˝	0.0"7		
Coˇˇ ¸teˇ 0 ar ! g Ratio at 0." ! 12.53- - 2˝ #.7		Coˇˇ ¸teˇ 0 ar ! g Ratio at 0.2 ! 15.08- - 2˝ 7.6	
T st , ˇfoˇ- ˇ b+˝	CR %&'	$) * ˇ b+˝	&'
° ate˝	#(7(20"7	° ate˝	#(7(20"7

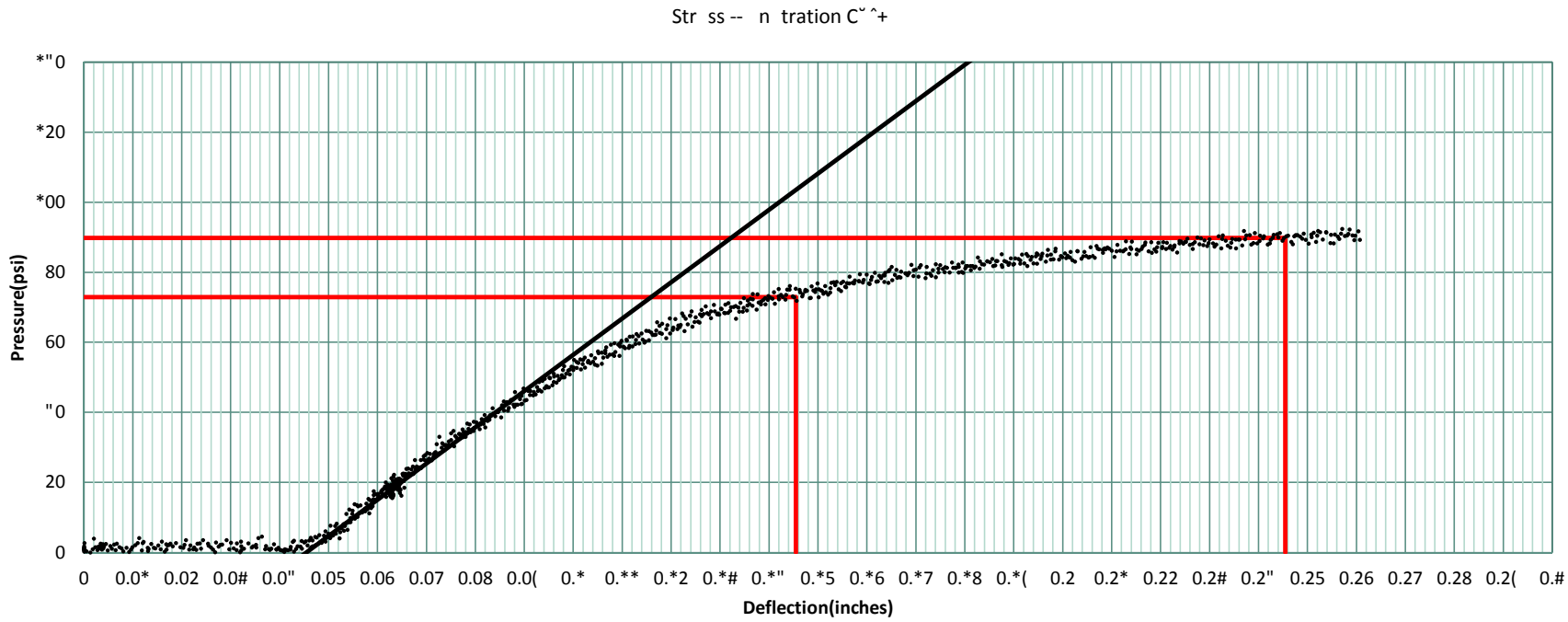
, ˇo. ˛t:	CC8	° ate of T st:	#(7(20"7
T st ' o˛atio! ˝	Sta. 587 ffs t -2	Mat ˇ al ° s˛ˇ ptio! ˝	Sta.550 to 600
T st ° pth˝	Top of Subgˇad		

Str ss -, ! tratio! Cuˇ)



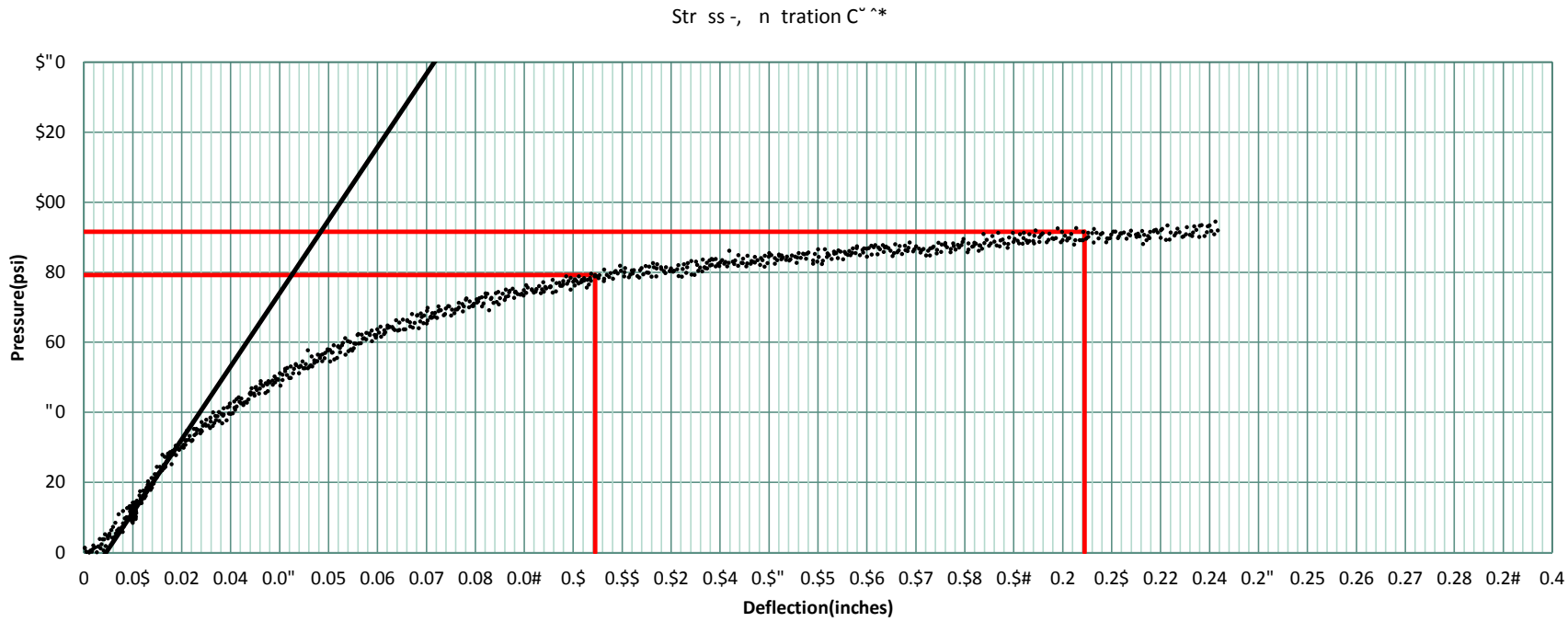
° ! s ty˝ T st ˆ thoˇ	/ ateˇ Co! te! t: T st ˆ thoˇ˝
Coˇˇ ˛teˇ ° f˜ ˛tio! ˝ 0.0"7	
Coˇˇ ˛teˇ 0 ar ! g Ratio at 0." ! 12.53- - 2˝ #.7	Coˇˇ ˛teˇ 0 ar ! g Ratio at 0.2 ! 15.08- - 2˝ 7.6
T st , ˇfoˇ- ˇ b+˝ CR %&' ° ate˝ #(7(20"7	$) * ˇ b+˝ &' ° ate˝ #(7(20"7

- ˆo/ ˝t:	CC8	! ate of ˛ st:	( )7)20*7
˛ st ' o˝ation	Sta. 587 ffs t -2	Mat ˆial ! s˝ˆi0tion	Sta.550 to 600
˛ st ! 0th	2in b low Sˇ bˇˆad Sˇ ˆfac		



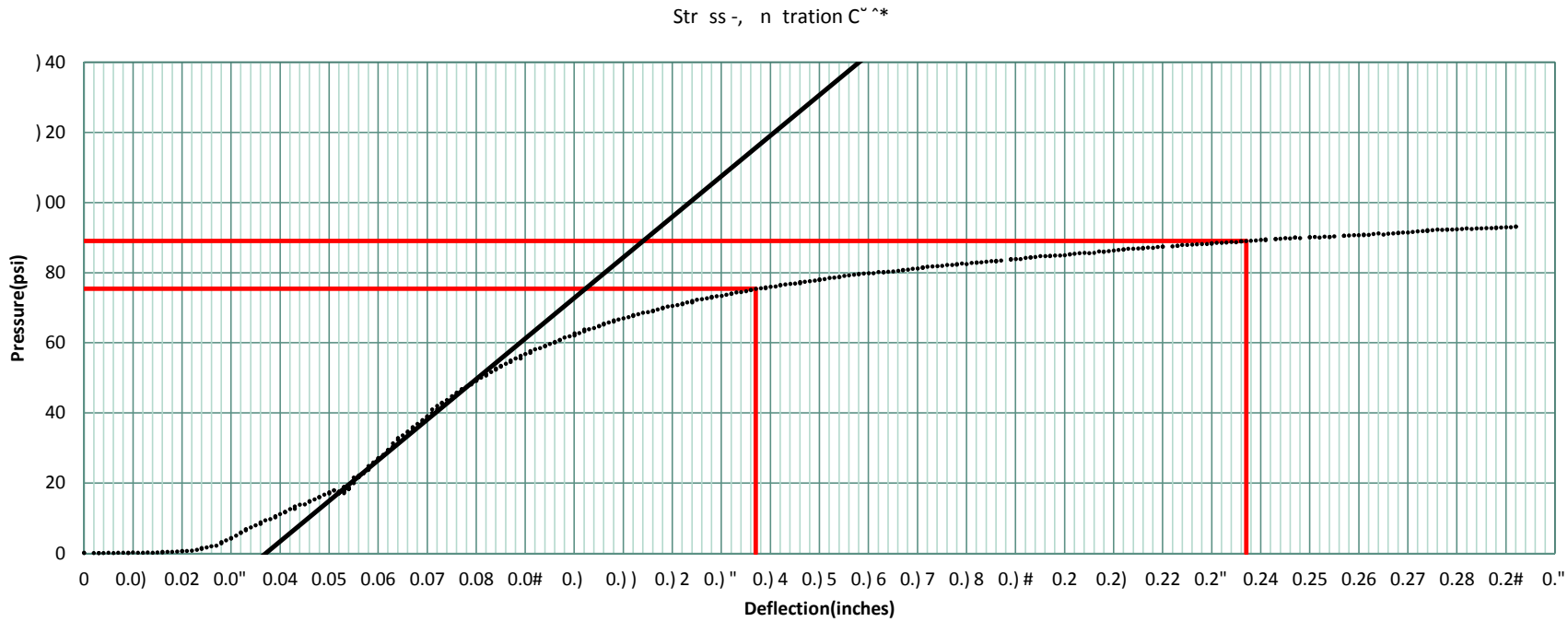
! nsity ˛ st ° tho˙	1 ateˆ Content: ˛ st ° tho˙
Coˆˆ ˝te˙ ! fl ˝tion 0.0"5	
Coˆˆ ˝te˙ 2 arinˇ Ratio at 0.*in 32.5". . 4 7.#	Coˆˆ ˝te˙ 2 arinˇ Ratio at 0.2in 35.08. . 4 6.0
˛ st - ˆfoˆ. ˙ b, CR %&' ! ate ( )7)20*7	$ +i w ˙ b, &' ! ate ( )7)20*7

, ˆo. ˝t: CC8	! ate of ¸ st: #)7)20$7
¸ st (o˝ation Sta. 587 ffs t -2	Mat ˆial ! s˝ˆi/tion Sta.550 to 600
¸ st ! /th 2in b low S˘ b˘ˆad S˘ ˆfac	



! nsity ¸ st ° tho˙	0 ateˆ Content: ¸ st ° tho˙
Coˆˆ ˝te˙ ! fl ˝tion 0.00"	
Coˆˆ ˝te˙ 1 arin˘ Ratio at 0.$in 22.5"- - 3 7.#	Coˆˆ ˝te˙ 1 arin˘ Ratio at 0.2in 25.08- - 3 6.$
¸ st , ˆfoˆ- ˙ b+ CR &' (! ate #)7)20$7	% *i w ˙ b+ ' (! ate #)7)20$7

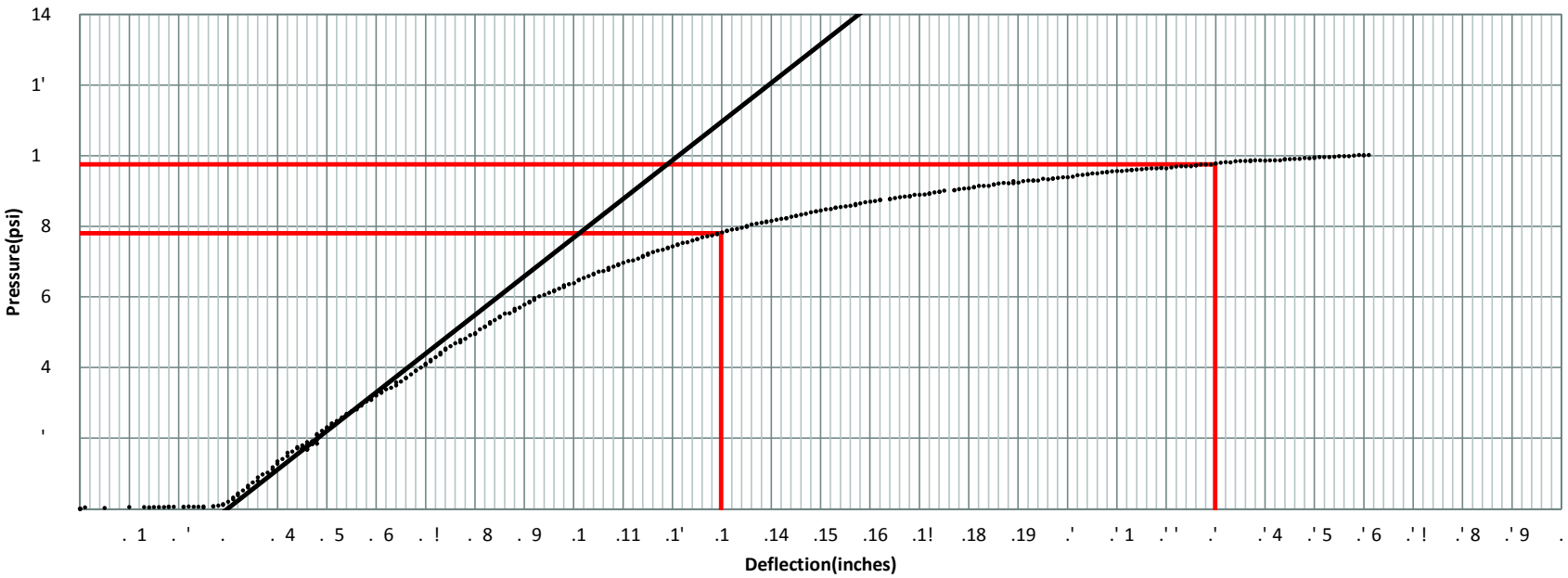
, ˆo. ˝t:	CC8	! ate of ˹ st:	#(7(20) 7
˹ st ' o˝ation	Sta. 587 ffs t -2	Mat ˆial ! s˝ˆi/ tion	Sta.550 to 600
˹ st ! / th	2in b low Sˇ bˇˆad Sˇ ˆfac		



! nsity ˹ st ° tho˙	0 ateˆ Content: ˹ st ° tho˙
Coˆˆ ˝te˙ ! fl ˝tion 0.0" 7	
Coˆˆ ˝te˙ 1 arinˇ Ratio at 0.) in 22.54- - 3 7.5	Coˆˆ ˝te˙ 1 arinˇ Ratio at 0.2in 25.08- - 3 5.#
˹ st , ˆfoˆ- ˙ b+ CR %&' ! ate #(7(20) 7	$ *i w ˙ b+ &' ! ate #(7(20) 7

+ro.ect:	CC8	˝ ate of ˘ e t:	9&l & 1!
˘ e t %ocatio˜˙	Sta. 59 Off et 16	Mater°al ˝ e cr°/ tio˜˙	Sta.55 to 6
˘ e t ˝ e/ th˙	Subgrade Surface		

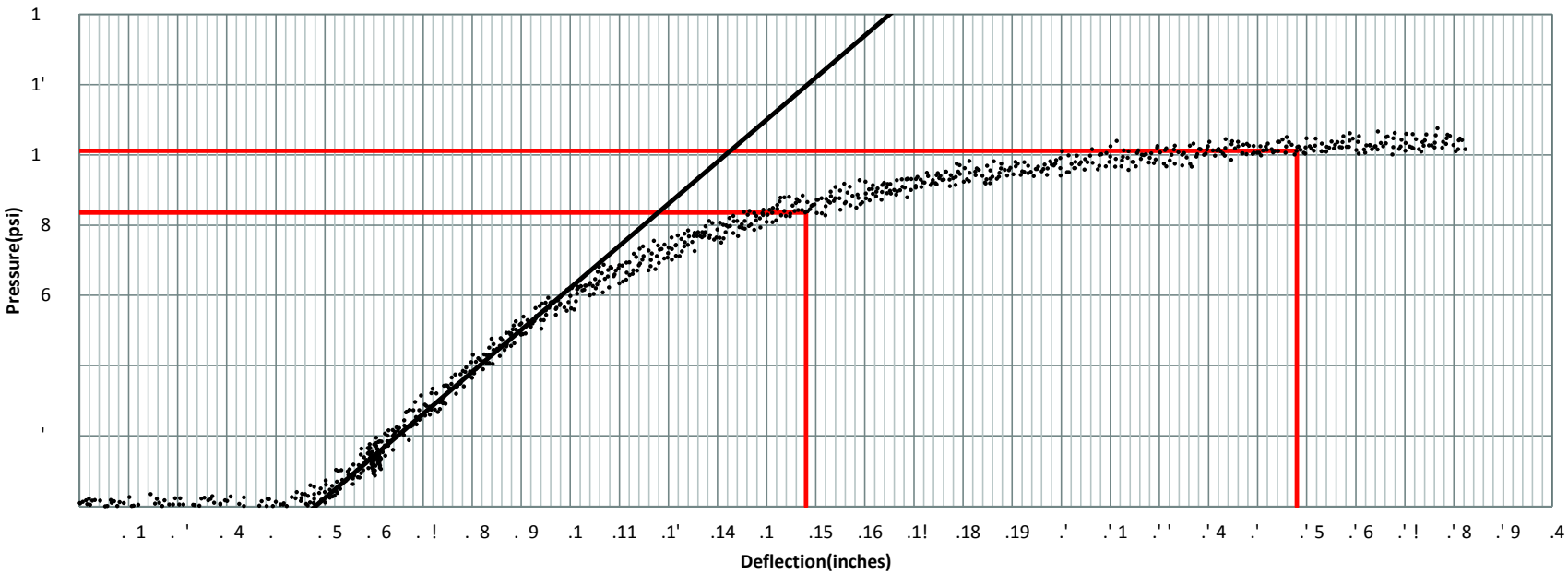
Stre -+e˜ etratio˜ Cur(e



˝ e˜ °ty˙	˘ e t Method	0 ater Co˜ te˜ t:	˘ e t Method˙
Corrected ˝ ef¸ectio˜˙	.		
Corrected 1ear°˜ g Ratio at .1°˜ 2 .54, , 3 ! .8		Corrected 1ear°˜ g Ratio at .' °˜ 25. 8, , 3 6.5	
˘ e t +erfor, ed b*˙ CR # $ % ˝ ate˙ 9&l & 1!		Re(°e) ed b*˙ $ % ˝ ate˙ 9&l & 1!	

+ro.ect:	CC8	˝ ate of ˘ e t:	9&l & 1!
˘ e t %ocatio˜˙	Sta. 59 Off et 16	Mater°al ˝ e cr°/ tio˜˙	Sta.55 to 6
˘ e t ˝ e/ th˙	Subgrade Surface		

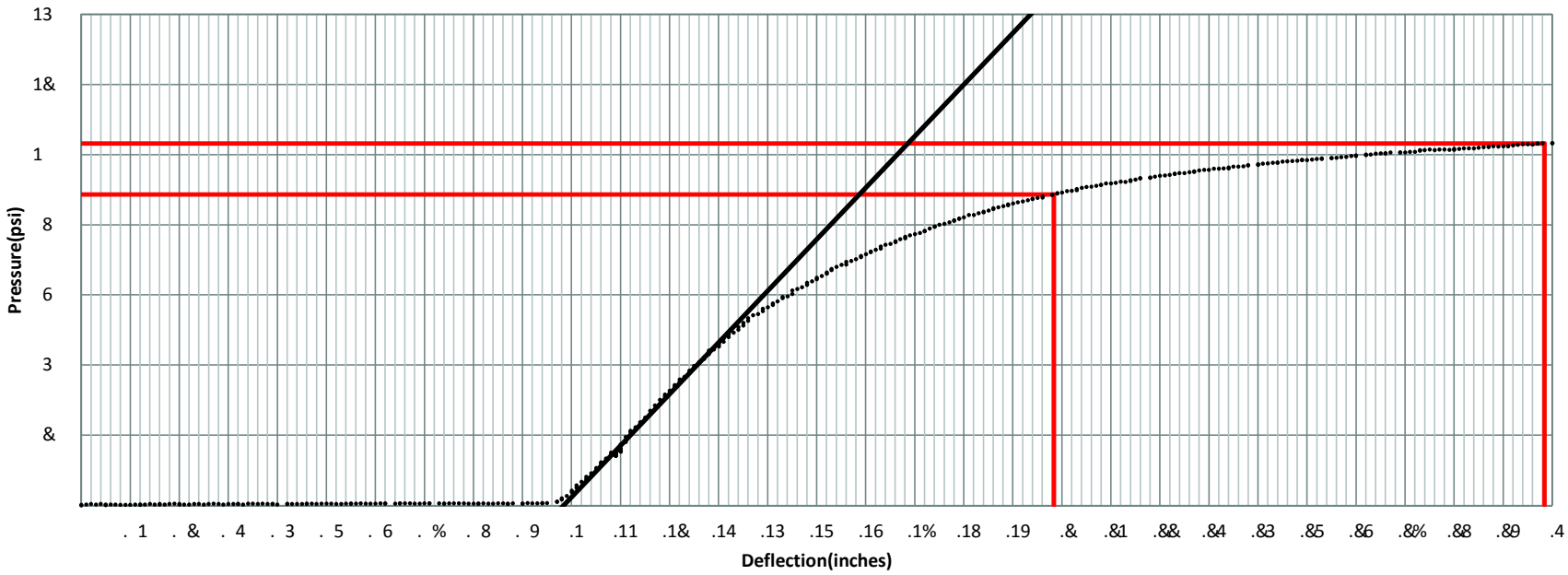
Stre -+e˜ etratio˜ Cur(e



˝ e˜ °ty˙	˘ e t Method	0 ater Co˜ te˜ t:	˘ e t Method˙
Corrected ˝ ef¸ectio˜˙	0.0 8		
Corrected 1ear°˜ g Ratio at .1°˜ 2 .5 , , 3 8.		Corrected 1ear°˜ g Ratio at .' °˜ 25. 8, , 3 6.!	
˘ e t +erfor, ed b*˙ CR # $ % ˝ ate˙ 9&l & 1!		Re(°e) ed b*˙ $ % ˝ ate˙ 9&l & 1!	

*ro-ect:	CC8	˝ ate of ˘ e t:	9$%$& 1%
˘ e t #ocatio˜˙	Sta. 59 Off et 16	Mater°al ˝ e cr°. tio˜˙	Sta.55 to 6
˘ e t ˝ e. th˙	Subgrade Surface		

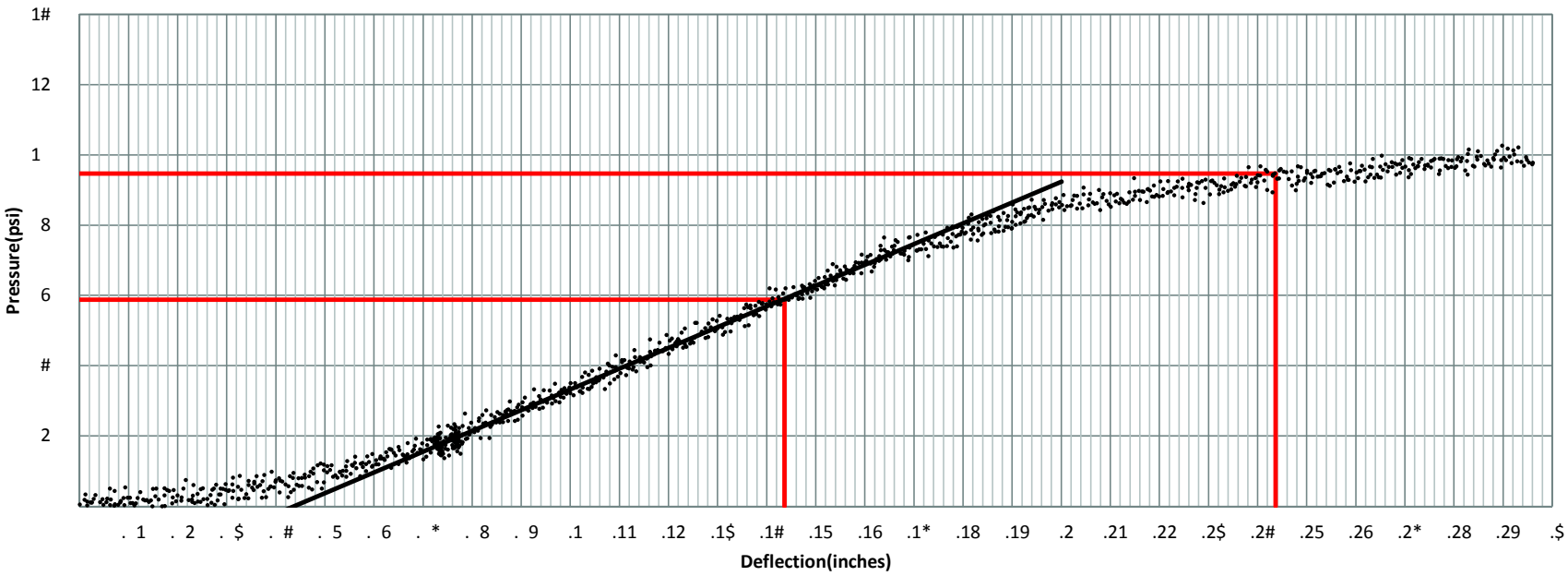
Stre ,*e˜etratio˜ Cur' e



˝ e˜ °ty˙ ˘ e t Method	/ ater Co˜ te˜ t: ˘ e t Method˙
Corrected ˝ ef¸ectio˜˙ . 98	
Corrected 0ear°˜ g Ratio at .1°˜ 1&.53+ + 2˙ 8.9	Corrected 0ear°˜ g Ratio at .&°˜ 15. 8+ + 2˙ 6.9
˘ e t *erfor+ ed b) ˙ CR ! " # ˝ ate˙ 9$%$& 1%	Re' °e(ed b) ˙ " # ˝ ate˙ 9$%$& 1%

- ˙oœe˛t: CC8	" ate of °e t: 9)*)2 1*
°e t (o˛ation! Sta. 59 Off et 16	Mate˙ial " e ˛˙i1tion! Sta.55 to 6
°e t " e1th! 2in Below S˘˘^˙ade S˘˙face	

Stre /- enetration C˘˙+e



" en ity! °e t Metho˝	2 ate˙ Content: °e t Metho˝!
Co˙˙e˛te˝ " efle˛tion! . ##	
Co˙˙e˛te˝ Bearin^ Ratio at .1in 32.5#. . 4! 5.9	Co˙˙e˛te˝ Bearin^ Ratio at .2in 35. 8. . 4! 6.$
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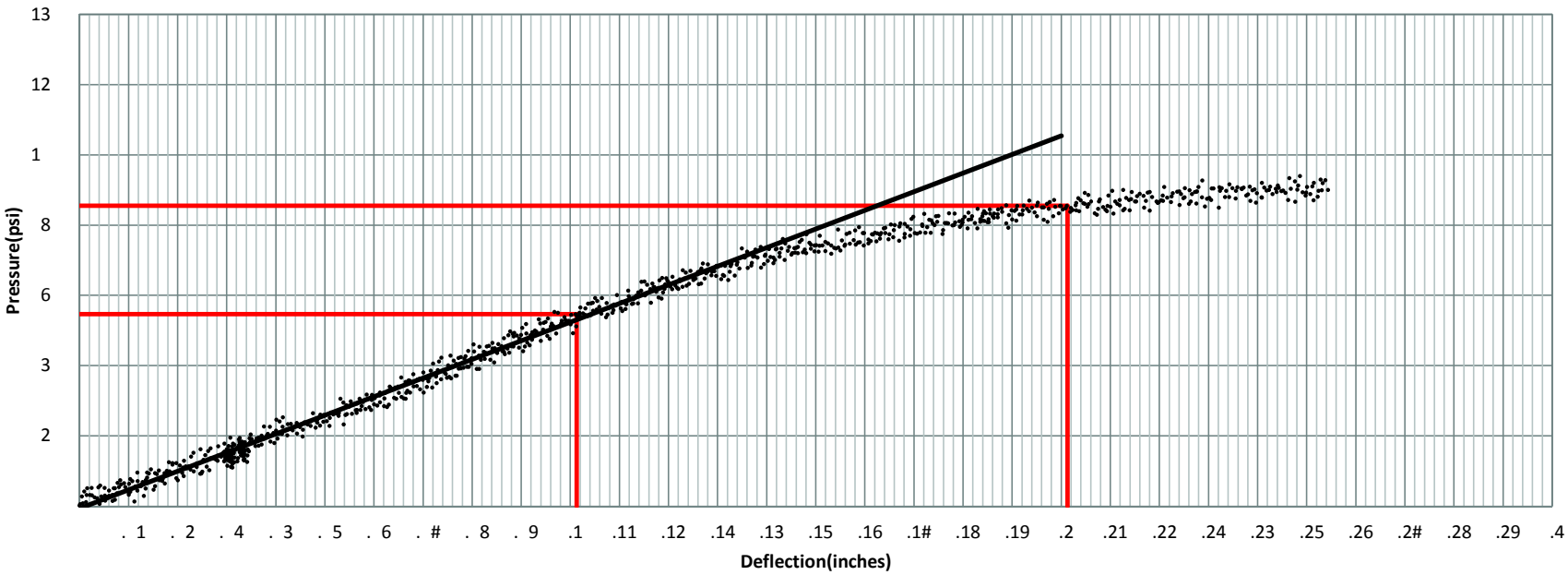

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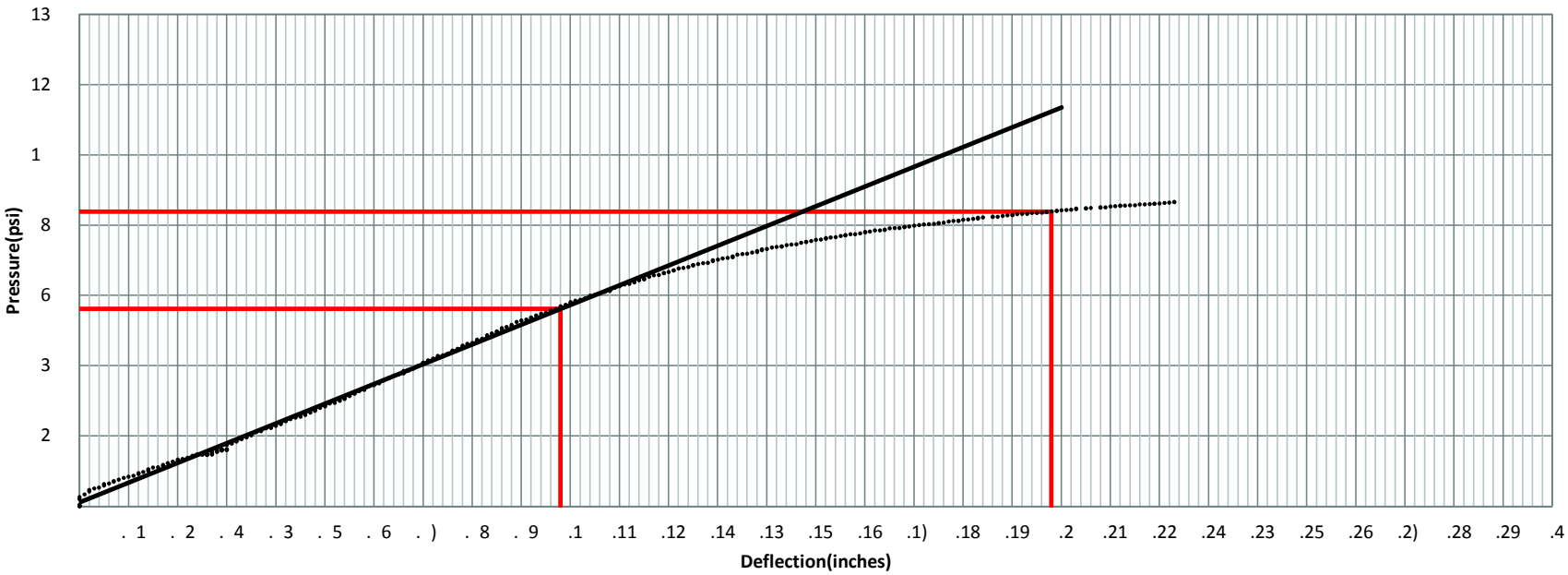

" en ity! °e t Metho˝	0 ate˙ Content: °e t Metho˝!
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Co˙˙e˛te˝ Bearin^ Ratio at .1in 12.53- - 2! 5.6	Co˙˙e˛te˝ Bearin^ Ratio at .2in 15. 8- - 2! 5.6
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Density of Soil In Place by Drive-Cylinder Method
ASTM D2937

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8 Acceptance Testing	Section	P-152
Technician:	MW (Testing)/Renee' (Data)	Location:	Sta 5+77 and 5+90

Date: 8/25/2017

Test No.	1	2					
Station	5+90	5+77					
Offset (ft.)	-17	7					
Depth/Elevation (ft.)	-	-					
Mass of wet soil + cylinder (g)	2532.8	2371.2					
Mass of cylinder (g)	695.9	690.2					
Mass of wet soil (g)	1836.9	1681					
Height of cylinder(cm)	12.675	12.649					
Diameter of cylinder at top (cm)	9.703	9.601					
Diameter of cylinder at bottom (g)	9.677	9.677					
Volume of Cylinder (cm^3)	934	923					
Moisture sample can ID	B7	P-4					
Moisture sample can mass (g)	159.1	94.3					
Mass of wet soil + can (g)	411.1	312.7					
Mass of dry soil + can (g)	356.7	263.7					
Mass of dry soil (g)	197.6	169.4					
Mass of water loss (g)	54.4	49					
Moisture content (%)	27.5	28.9					
Wet soil density (g/cm^3)	1.966	1.822					
Dry soil density (g/cm^3)	1.542	1.413					
Wet soil unit weight (lb/ft^3)	122.7	113.7					
Dry soil unit weight (lb/ft^3)	96.2	88.2					

Revised: 5/31/2013

Density of Soil In Place by Drive-Cylinder Method
ASTM D2937

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8 Acceptance Testing	Section	P-152
Technician:	MJW	Location:	Top Lift

Date: 9/8/2017

Test No.	X	V	Z	Y			
Station	5+87	5+77	5+90	5+77			
Offset (ft.)	-2	-18	16	-8			
Depth/Elevation (ft.)							
Mass of wet soil + cylinder (g)	2442.5	2392.4	2518.6	2484.6			
Mass of cylinder (g)	634.0	597.8	690.2	695.1			
Mass of wet soil (g)	1808.5	1794.6	1828.4	1789.5			
Height of cylinder(cm)	12.715	12.521	12.632	12.781			
Diameter of cylinder at top (cm)	9.701	9.722	9.785	9.664			
Diameter of cylinder at bottom (g)	9.709	9.738	9.783	9.723			
Volume of Cylinder (cm^3)	940	931	949	943			
Moisture sample can ID	B14	B16	B13	B20			
Moisture sample can mass (g)	160.1	159.8	160.8	158.7			
Mass of wet soil + can (g)	325.4	353.3	386.3	368.5			
Mass of dry soil + can (g)	288.9	310.3	337.2	322.5			
Mass of dry soil (g)	128.8	150.5	176.4	163.8			
Mass of water loss (g)	36.5	43.0	49.1	46.0			
Moisture content (%)	28.3	28.6	27.8	28.1			
Wet soil density (g/cm^3)	1.924	1.929	1.926	1.898			
Dry soil density (g/cm^3)	1.499	1.500	1.507	1.482			
Wet soil unit weight (lb/ft^3)	120.0	120.3	120.2	118.4			
Dry soil unit weight (lb/ft^3)	93.5	93.6	94.0	92.5			

Revised: 5/31/2013

CC8 Construction
7/18/2017

CBR TEST ON 1st LIFT OF CC8 SUBGRADE-DUPONT CLAY

		CBR Value, %			
Station	Offset, feet	Test-1	Test-2	Test-3	Mean
628	-20 (North)	3.3	3.7	3.4	3.5
617	19 (South)	3.4	3.4	3.8	3.5

Minimum:	**3.3**	**Mean:**	**3.5**
Maximum:	**3.8**	**Std. Dev.:**	**0.200**
Difference:	**0.5**	**COV:**	**5.7%**

DRIVE CYLINDER TESTS-DUPONT CLAY

Station	Offset, feet	Moisture Content, %	In-Situ Dry Density, pcf
628	-20 (North)	24.1	100.3
617	19 (South)	24.4	96.5

ACCEPTANCE

	Criterion	Mean (Station 450-570)
Range	3.0-4.0	3.5

CSRA RECOMMENDATION
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

FAA's On-Site Engineer

Date

Data Files Locations: G:\ACT\AAR\AJP6310\CC8\CC8 field testing\CC8 Acceptance test phase II\Subgrade\07182017

Density of Soil In Place by Drive-Cylinder Method
ASTM D2937

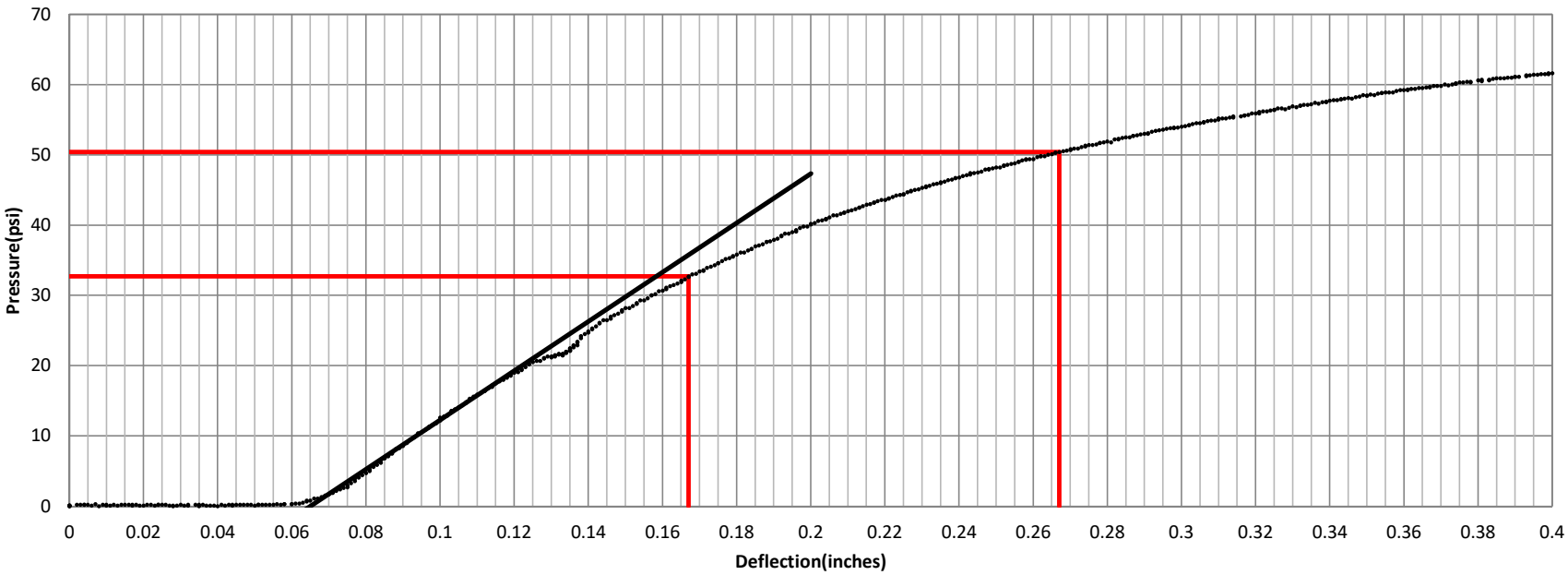
NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8 Phase 2	Section	Dupont Clay - P-152	Date:	7/18/2017
Technician:	CR (Testing) - RN (Data)	Location:	See Below		

Test No.	X	W					
Station	628	617					
Offset (ft.)	-20	19					
Depth/Elevation (ft.)	-	-					
Mass of wet soil + cylinder (g)	2477.3	2470.9					
Mass of cylinder (g)	634.1	690.5					
Mass of wet soil (g)	1843.2	1780.4					
Height of cylinder(cm)	12.560	12.603					
Diameter of cylinder at top (cm)	9.747	9.711					
Diameter of cylinder at bottom (g)	9.615	9.631					
Volume of Cylinder (cm^3)	924	925					
Moisture sample can ID	B17	2					
Moisture sample can mass (g)	158.9	132.3					
Mass of wet soil + can (g)	578.2	600.1					
Mass of dry soil + can (g)	496.7	508.4					
Mass of dry soil (g)	337.8	376.1					
Mass of water loss (g)	81.5	91.7					
Moisture content (%)	24.1	24.4					
Wet soil density (g/cm^3)	1.995	1.924					
Dry soil density (g/cm^3)	1.607	1.547					
Wet soil unit weight (lb/ft^3)	124.5	120.1					
Dry soil unit weight (lb/ft^3)	100.3	96.5					

Project:	CC8	Date of Test:	7/18/2017
Test Location:	Sta. 617 Offset 19	Material Description:	Sta.600 to 660
Test Depth:	Lift 1		

Stress -Penetration Curve



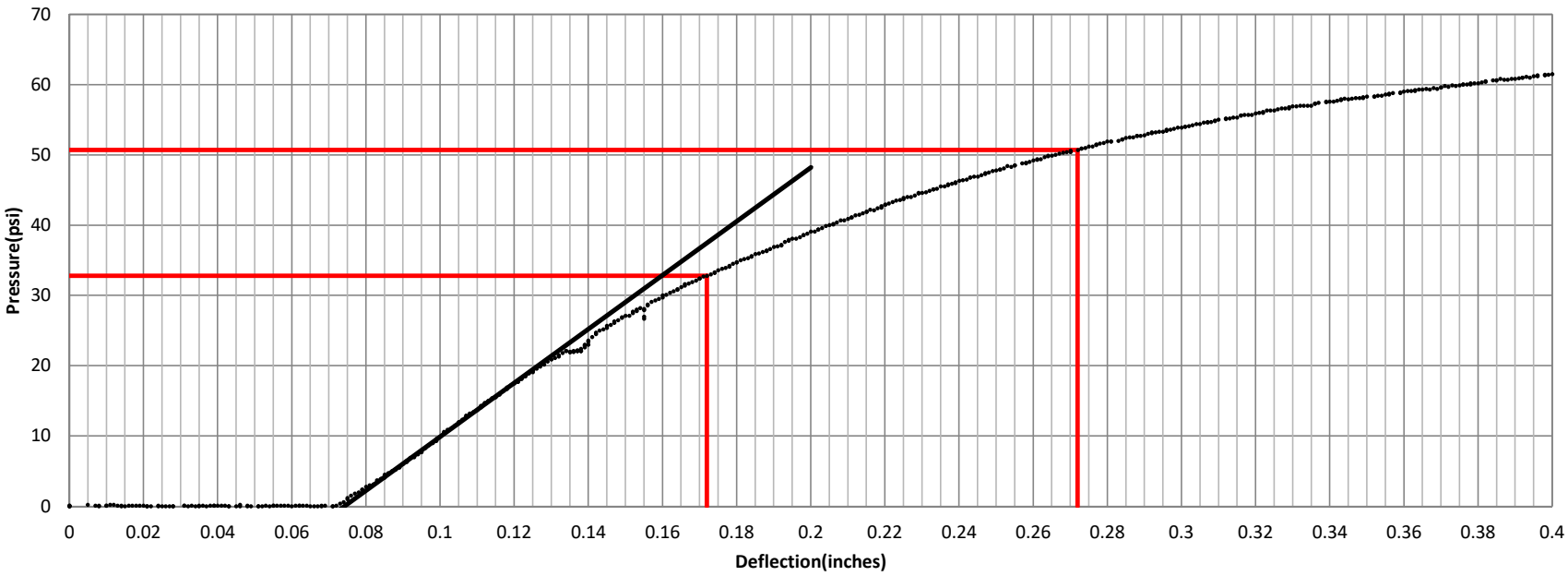
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.067		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.3		Corrected Bearing Ratio at 0.2in (5.08mm): 3.4	

Vane Shear	110	118	109	117	104	Average	111.6	Shear Strength	111.6 kPa

Test Performed by: CR &CC	Reviewed by:
Date: 7/18/2017	Date:

Project:	CC8	Date of Test:	7/18/2017
Test Location:	Sta. 617 Offset 19	Material Description:	Sta.600 to 660
Test Depth:	Lift 1		

Stress -Penetration Curve



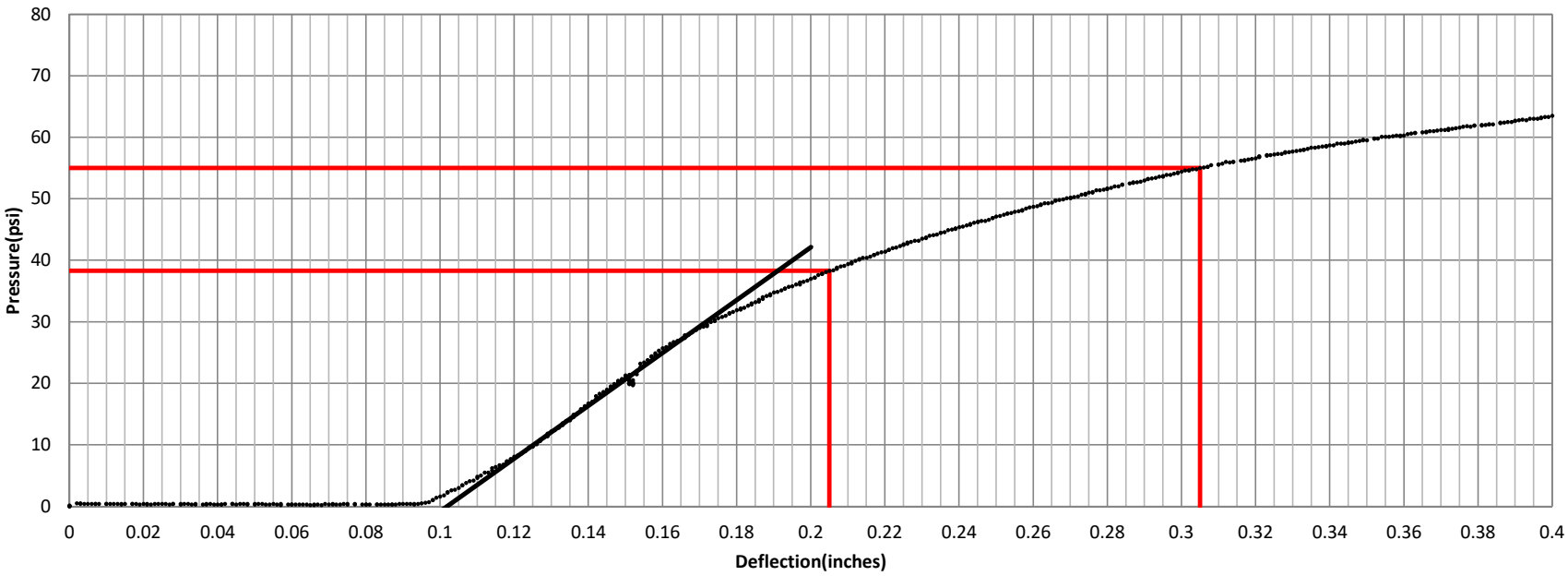
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.072		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.3		Corrected Bearing Ratio at 0.2in (5.08mm): 3.4	

Vane Shear	110	103	100	112	109	Average	106.8	Shear Strength	106.8 kPa

Test Performed by: CR &CC	Reviewed by:
Date: 7/18/2017	Date:

Project:	CC8	Date of Test:	7/18/2017
Test Location:	Sta. 617 Offset 19	Material Description:	Sta.600 to 660
Test Depth:	Lift 1		

Stress -Penetration Curve



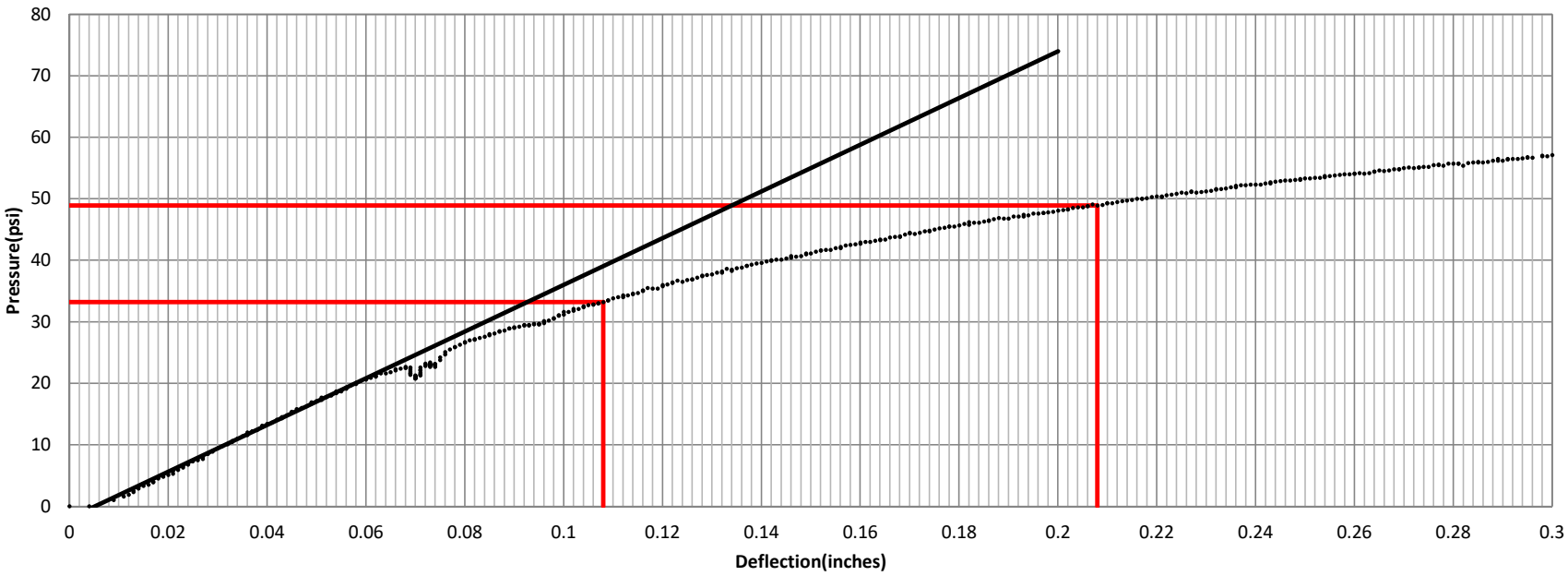
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.105		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.8		Corrected Bearing Ratio at 0.2in (5.08mm): 3.7	

Vane Shear	109	116	112	116	112	Average	113	Shear Strength	113 kPa

Test Performed by:	CR &CC	Reviewed by:	
Date:	7/18/2017	Date:	

Project:	CC8	Date of Test:	7/18/2017
Test Location:	Sta. 628 Offset -20	Material Description:	Sta.600 to 660
Test Depth:	Lift 1		

Stress -Penetration Curve



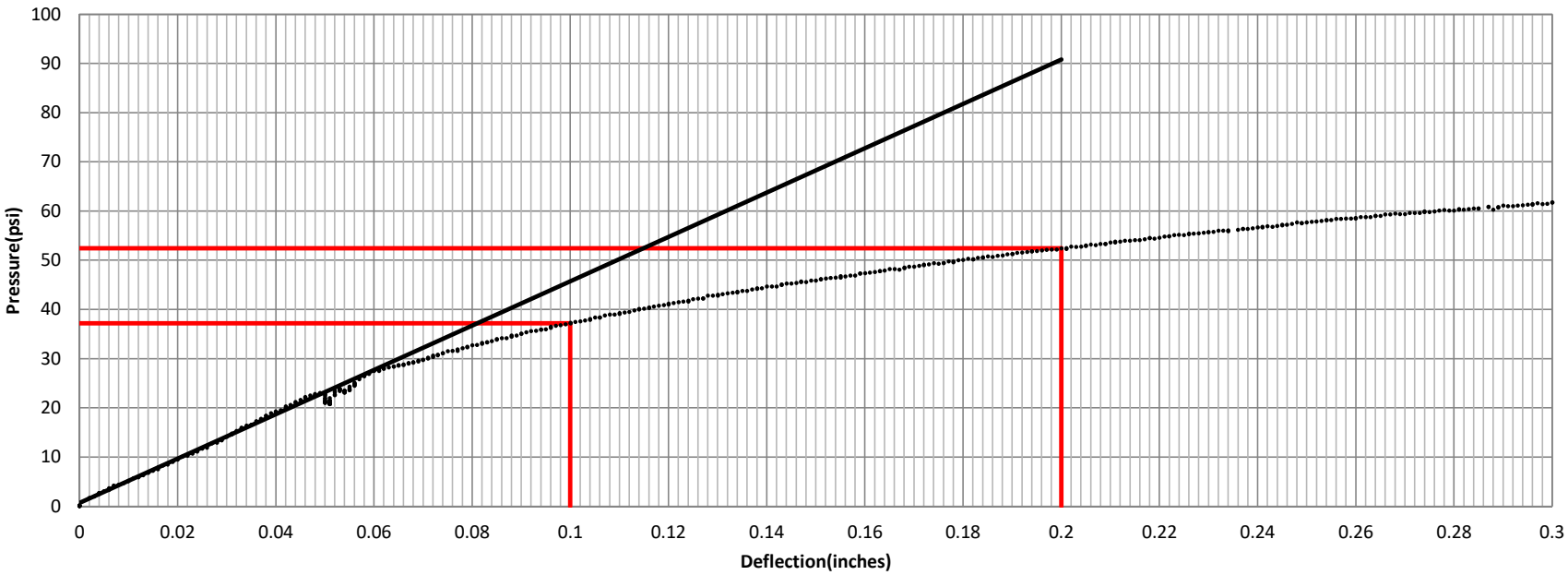
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.008		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.3		Corrected Bearing Ratio at 0.2in (5.08mm): 3.3	

Vane Shear	102	118	107	104	104	Average	107	Shear Strength	107 kPa

Test Performed by: CR &CC	Reviewed by:
Date: 7/18/2017	Date:

Project:	CC8	Date of Test:	7/18/2017
Test Location:	Sta. 628 Offset -20	Material Description:	Sta.600 to 660
Test Depth:	Lift 1		

Stress -Penetration Curve



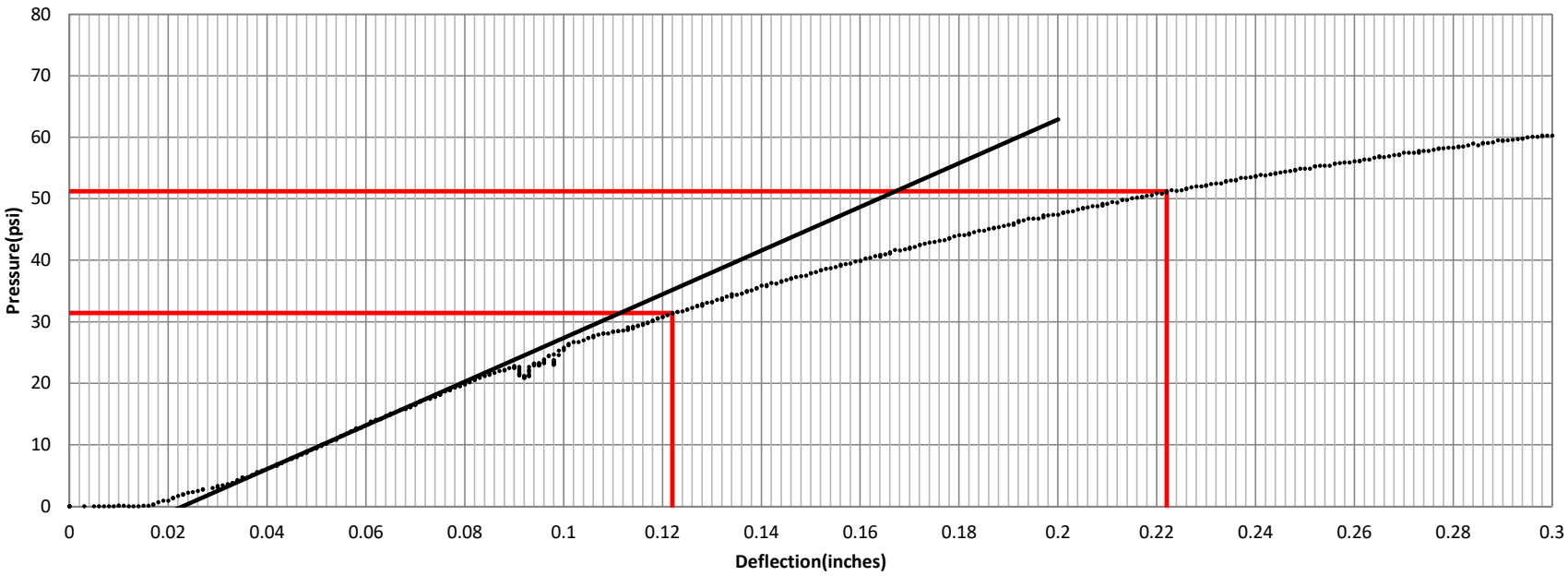
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.7		Corrected Bearing Ratio at 0.2in (5.08mm): 3.5	

Vane Shear	108	119	118	112	115	Average	114.4	Shear Strength	114.4 kPa

Test Performed by: CR &CC	Reviewed by:
Date: 7/18/2017	Date:

Project:	CC8	Date of Test:	7/18/2017
Test Location:	Sta. 628 Offset -20	Material Description:	Sta.600 to 660
Test Depth:	Lift 1		

Stress -Penetration Curve



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.022		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.1		Corrected Bearing Ratio at 0.2in (5.08mm): 3.4	

Vane Shear	115	110	111	110	109	Average	111	Shear Strength	111 kPa

Test Performed by: CR &CC	Reviewed by:
Date: 7/18/2017	Date:

CC8 Construction
7/28/2017

CBR TEST ON LIFT 2 OF CC8 SUBGRADE-DUPONT CLAY

		CBR Value, %			
Station	Offset, feet	Test-1	Test-2	Test-3	Mean
636	-23 (North)	3.8	4.0	4.2	4.0
623	22 (South)	3.9	4.1	3.5	3.8

Minimum:	**3.5**	**Mean:**	**3.9**
Maximum:	**4.2**	**Std. Dev.:**	**0.248**
Difference:	**0.7**	**COV:**	**6.3%**

DRIVE CYLINDER TESTS-DUPONT CLAY

Station	Offset, feet	Moisture Content, %	In-Situ Dry Density, pcf
636	-23 (North)	23.8	100.7
623	22 (South)	25.1	97.5

ACCEPTANCE

	Criterion	Mean (Station 600-650)
Range	3.0-4.0	3.9

CSRA RECOMMENDATION
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

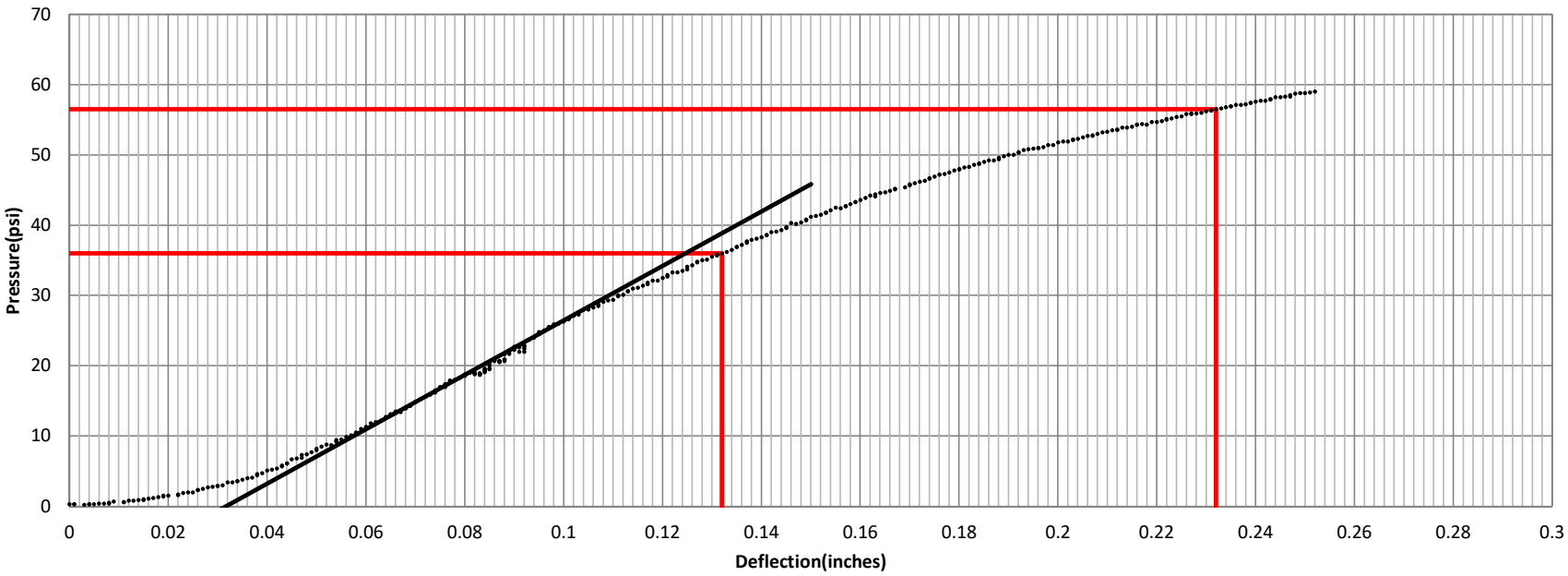
FAA's On-Site Engineer

Date

Data Files Locations: G:\ACT\AAR\AJP6310\CC8\CC8 field testing\CC8 Acceptance test phase II\Subgrade\07282017

Project:	CC8			Date of Test:	7/28/2017
Test Location:	Sta.	636 Offset	-23	Material Description:	Sta.600 to 660
Test Depth:	Lift 2				

Stress -Penetration Curve



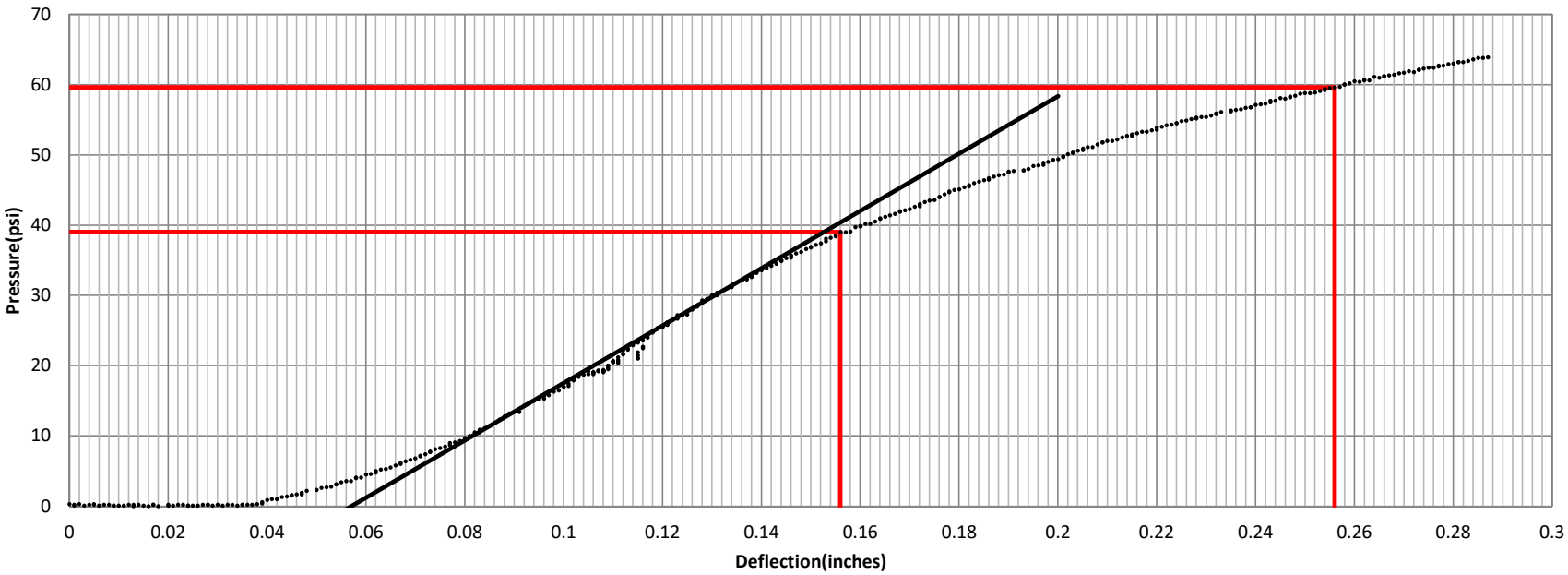
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.032		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.6		Corrected Bearing Ratio at 0.2in (5.08mm): 3.8	

Vane Shear	112	122	118	Average	117.3	Shear Strength	117.3 kPa

Test Performed by:	HF &JA	Reviewed by:	QL
Date:	7/28/2017	Date:	7/28/2017

Project:	CC8	Date of Test:	7/28/2017
Test Location:	Sta. 636 Offset -23	Material Description:	Sta.600 to 660
Test Depth:	Lift 2		

Stress -Penetration Curve



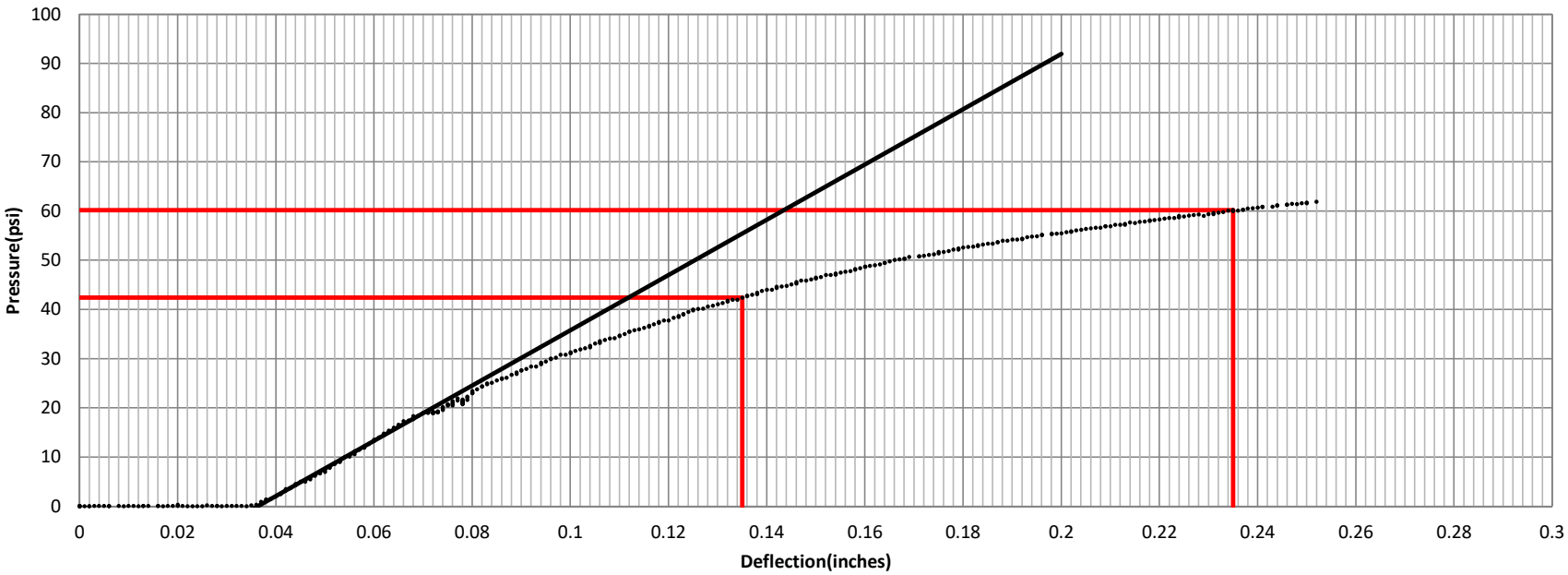
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.056		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.9		Corrected Bearing Ratio at 0.2in (5.08mm): 4.0	

Vane Shear	110	110	112	Average	110.7	Shear Strength	110.7 kPa

Test Performed by:	HF &JA	Reviewed by:	QL
Date:	7/28/2017	Date:	7/28/2017

Project:	CC8	Date of Test:	7/28/2017
Test Location:	Sta. 636 Offset -23	Material Description:	Sta.600 to 660
Test Depth:	Lift 2		

Stress -Penetration Curve



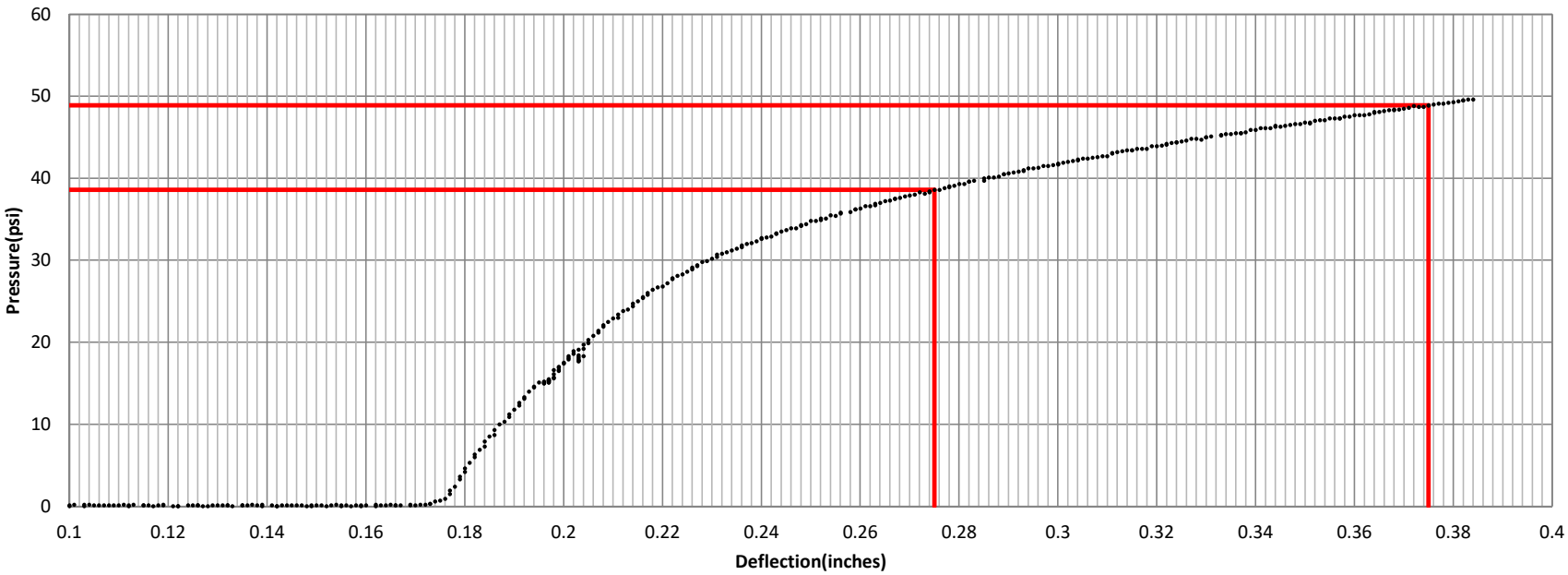
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.035		
Corrected Bearing Ratio at 0.1in (2.54mm): 4.2		Corrected Bearing Ratio at 0.2in (5.08mm): 4.0	

Vane Shear	112	118	114	Average	114.7	Shear Strength	114.7 kPa

Test Performed by:	HF &JA	Reviewed by:	QL
Date:	7/28/2017	Date:	7/28/2017

Project:	CC8	Date of Test:	7/28/2017
Test Location:	Sta. 623 Offset 22	Material Description:	Sta.600 to 660
Test Depth:	Lift 2		

Stress -Penetration Curve



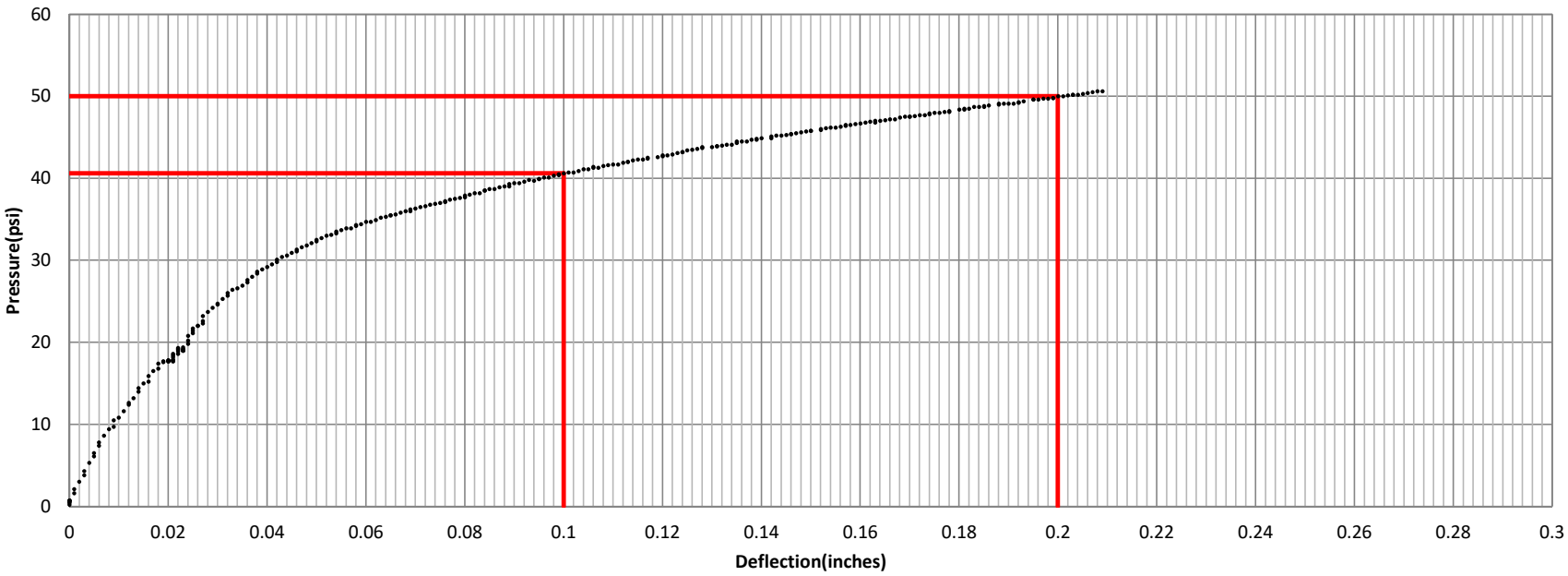
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0.175		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.9		Corrected Bearing Ratio at 0.2in (5.08mm): 3.3	

Vane Shear	106	100	96	Average	100.7	Shear Strength	100.7 kPa

Test Performed by:	HF &JA	Reviewed by:	QL
Date:	7/28/2017	Date:	7/28/2017

Project:	CC8	Date of Test:	7/28/2017
Test Location:	Sta. 623 Offset 22	Material Description:	Sta.600 to 660
Test Depth:	Lift 2		

Stress -Penetration Curve



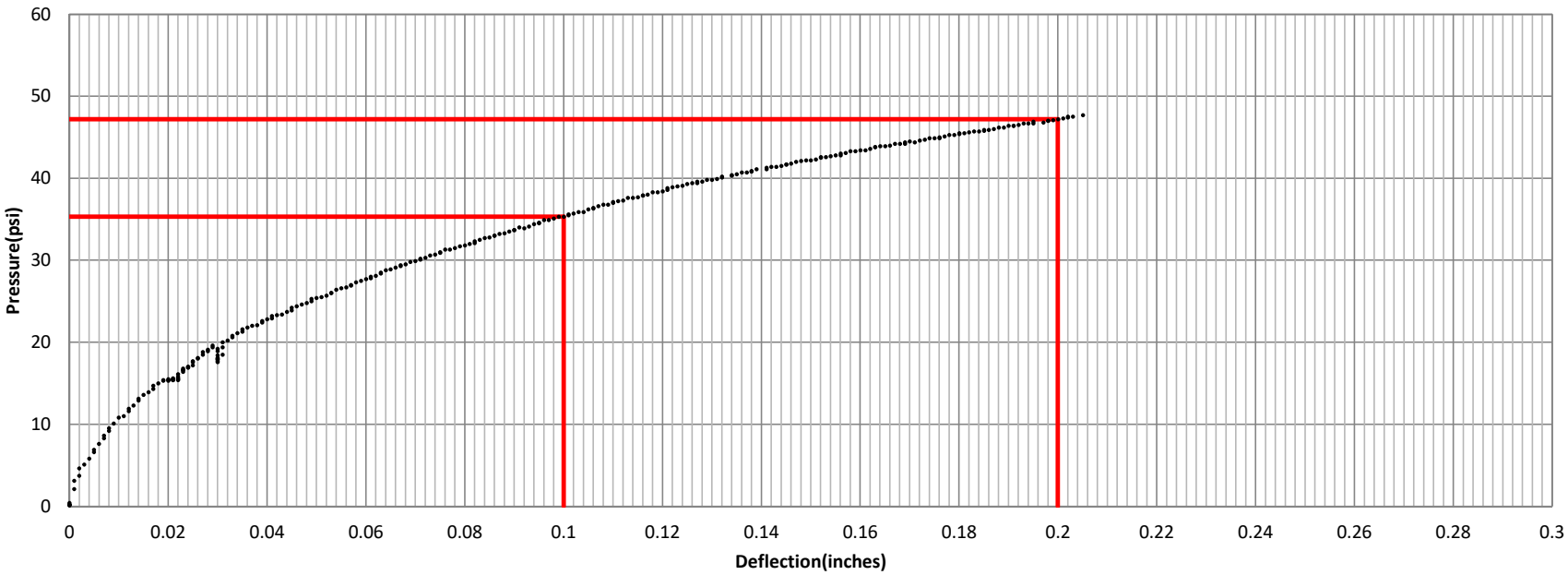
Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 4.1		Corrected Bearing Ratio at 0.2in (5.08mm): 3.3	

Vane Shear	102	104	104	Average	103.3	Shear Strength	103.3 kPa

Test Performed by:	HF & JA	Reviewed by:	QL
Date:	7/28/2017	Date:	7/28/2017

Project:	CC8	Date of Test:	7/28/2017
Test Location:	Sta. 623 Offset 22	Material Description:	Sta.600 to 660
Test Depth:	Lift 2		

Stress -Penetration Curve



Density:	Test Method	Water Content:	Test Method:
Corrected Deflection:	0		
Corrected Bearing Ratio at 0.1in (2.54mm): 3.5		Corrected Bearing Ratio at 0.2in (5.08mm): 3.1	

Vane Shear	100	92	100	100	Average	98.0	Shear Strength	98.0 kPa

Test Performed by:	HF &JA	Reviewed by:	QL
Date:	7/28/2017	Date:	7/28/2017

Density of Soil In Place by Drive-Cylinder Method
ASTM D2937

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8 Phase 2	Section	Dupont Clay - P-152	Date:	7/28/2017
Technician:	CR (Testing) - RN (Data)	Location:	2nd Lift		

Test No.	Q	Z					
Station	6+36	6+23					
Offset (ft.)	-23	22					
Depth/Elevation (ft.)	-	-					
Mass of wet soil + cylinder (g)	2544.7	2518.9					
Mass of cylinder (g)	690.9	691.0					
Mass of wet soil (g)	1853.8	1827.9					
Height of cylinder(cm)	12.646	12.675					
Diameter of cylinder at top (cm)	9.676	9.7					
Diameter of cylinder at bottom (g)	9.654	9.688					
Volume of Cylinder (cm^3)	927	935					
Moisture sample can ID	B19	B3					
Moisture sample can mass (g)	157.36	159.19					
Mass of wet soil + can (g)	493.67	445.5					
Mass of dry soil + can (g)	428.96	388.1					
Mass of dry soil (g)	271.6	228.95					
Mass of water loss (g)	64.7	57.36					
Moisture content (%)	23.8	25.1					
Wet soil density (g/cm^3)	1.999	1.955					
Dry soil density (g/cm^3)	1.614	1.563					
Wet soil unit weight (lb/ft^3)	124.7	122.0					
Dry soil unit weight (lb/ft^3)	100.7	97.5					

CC8 Construction
8/11/2017

CBR TEST ON LIFT 3 OF CC8 SUBGRADE-DUPONT CLAY

		CBR Value, %			
Station	Offset, feet	Test-1	Test-2	Test-3	Mean
624	-14 (North)	3.3	3.6	4.0	3.6
631	24 (South)	3.0	3.1	3.0	3.0

Minimum:	**3.0**	**Mean:**	**3.3**
Maximum:	**4.0**	**Std. Dev.:**	**0.398**
Difference:	**1.0**	**COV:**	**11.9%**

DRIVE CYLINDER TESTS-DUPONT CLAY

Station	Offset, feet	Moisture Content, %	In-Situ Dry Density, pcf
624	-14 (North)	25.0	98.3
631	24 (South)	25.3	98.3

ACCEPTANCE

	Criterion	Mean (Station 600-660)
Range	3.0-4.0	3.3

CSRA RECOMMENDATION
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

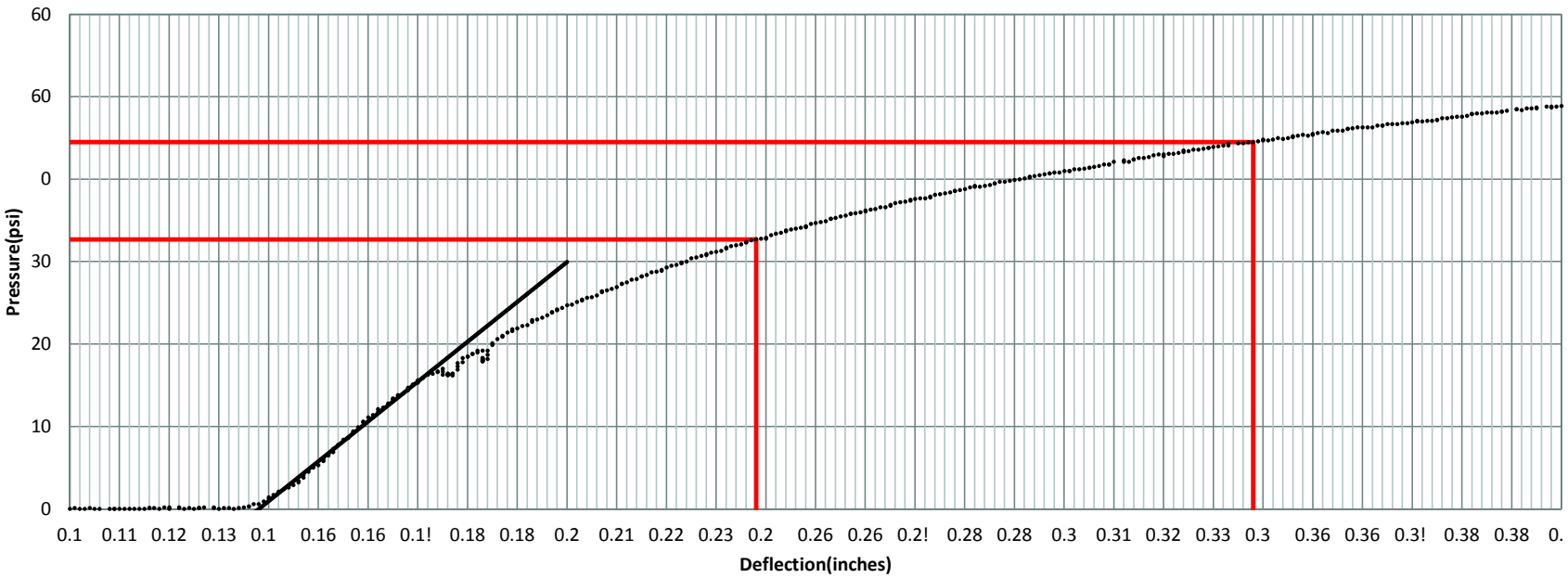
FAA's On-Site Engineer

Date

Data Files Locations: G:\ACT\AAR\AJP6310\CC8\CC8 field testing\CC8 Acceptance test phase II\Subgrade\08112017

&˙o1e˝t:	CC8	˛ ate of Te t:	8*11*201!
Te t Lo˝atio˜ˆ	Sta. 62 Off et -1	Mate˙ial ˛ e ˝˙i2tio˜ˆ	Sta.600 to 660
Te t ˛ e2thˆ	Lift 3		

Stre -&e˜etratio˜ C0˙#e



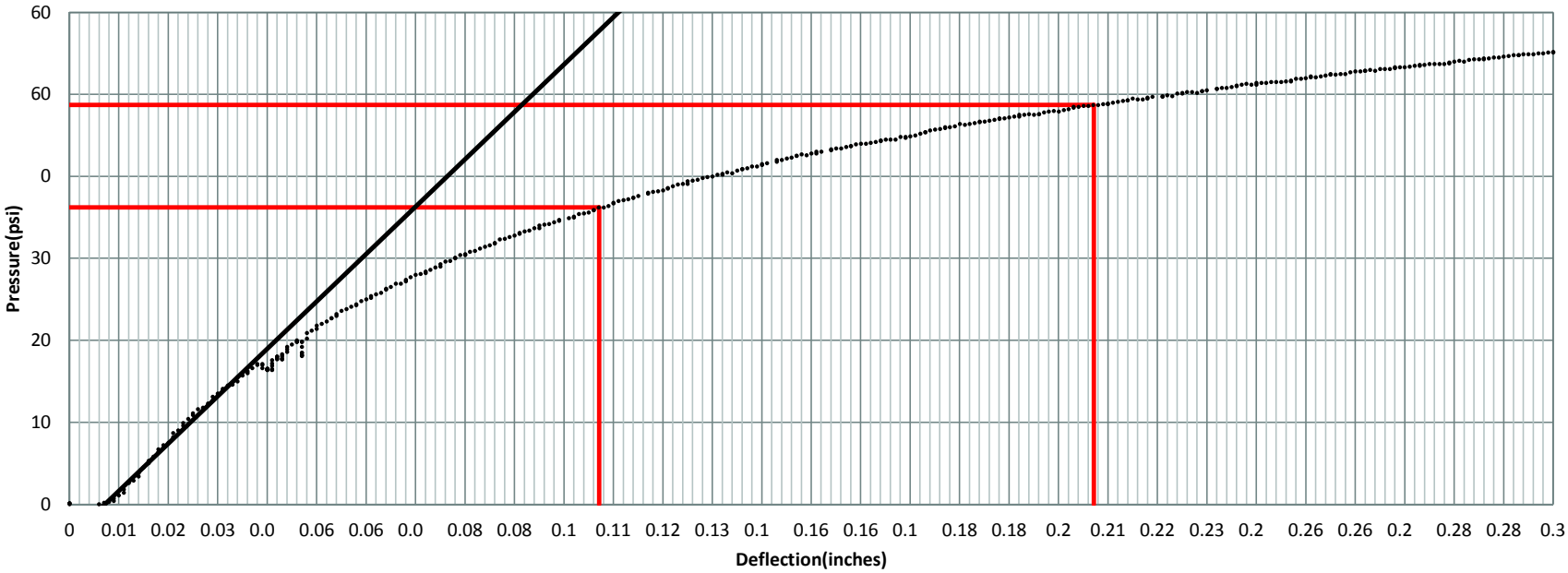
˛ e˜ ityˆ	Te t Metho˘	3 ate˙ Co˜te˜t:	Te t Metho˘ˆ
Co˙˙e˝te˘ ˛ ef°e˝tio˜ˆ	0.138		
Co˙˙e˝te˘ 4eari˜$ Ratio at 0.1i˜ 52.6 / / 7˙ 3.3		Co˙˙e˝te˘ 4eari˜$ Ratio at 0.2i˜ 56.08/ / 7˙ 3.0	

ane S˘ear ! ! 8 80 " #e˙age ! ! .3 S˘ear Stre˜$th ! ! .3 %&a

Te t &e˙fo˙/ e˘ - . ˆ	CC ' ("	Re#ie, e˘ - . ˆ	CC ') L
˛ ateˆ	8*11*201!	˛ ateˆ	8*11*201!

&o1e˝t:	CC8	¸ ate of Te t:	8*11*201
Te t Lo˝atio˜ˆ	Sta. 62 Off et -1	Mate˙ial ¸ e ˝˙i2tio˜ˆ	Sta.600 to 660
Te t ¸ e2thˆ	Lift 3		

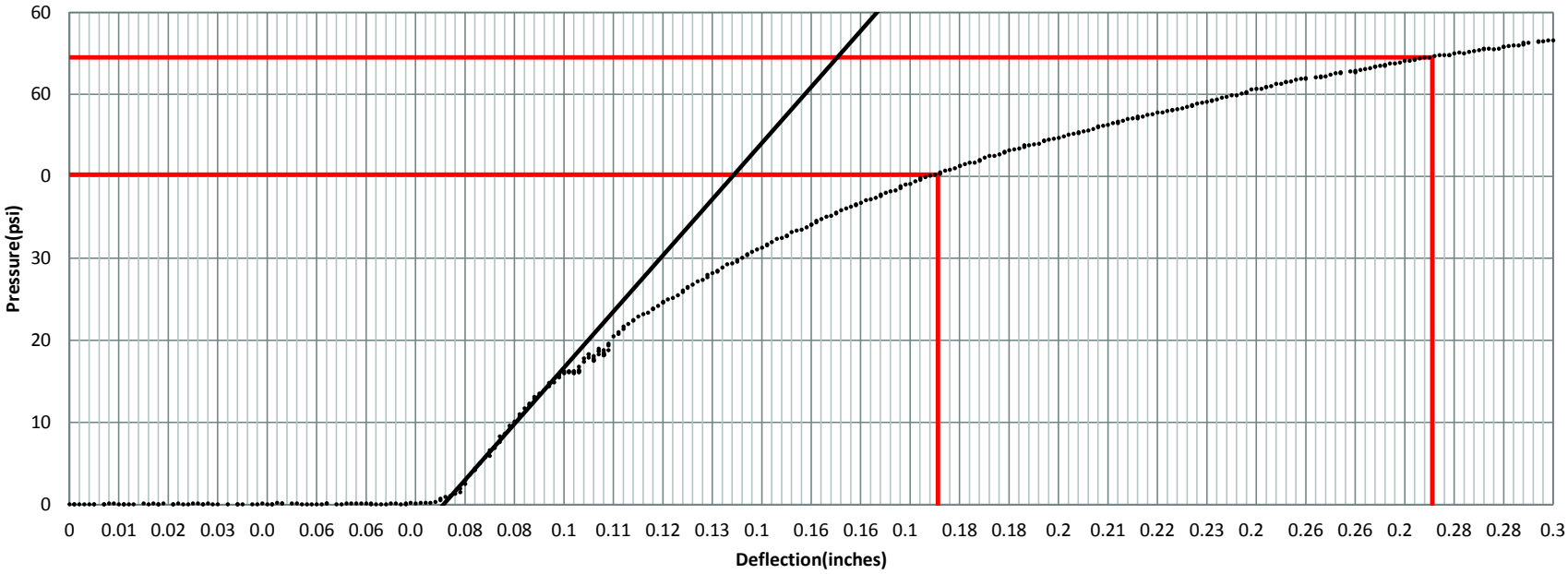
Stre -&e˜etratio˜ C0˙#e



¸ e˜ ityˆ	Te t Methoˇ	3 ate˙ Co˜te˜t:	Te t Methoˇˆ
Co˙˙e˝teˇ ¸ ef°e˝tio˜ˆ	0.00		
Co˙˙e˝teˇ 4eari˜$ Ratio at 0.1i˜ 52.6 / / 7˙ 3.6		Co˙˙e˝teˇ 4eari˜$ Ratio at 0.2i˜ 56.08/ / 7˙ 3.2	
! ane Sˇ ear	2 0	" #e˙age 2.0	Sˇ ear Stre˜$th 2.0 %&a
Te t &e˙fo˙/ eˇ - . ˆ CC ' (" ¸ ateˆ 8*11*201		Re#ie, eˇ - . ˆ CC ') L ¸ ateˆ 8*11*201	

&˙o1e˝t:	CC8	¸ ate of Te t:	8*11*201
Te t Lo˝atio˜ˆ	Sta. 62 Off et -1	Mate˙ial ¸ e ˝˙i2tio˜ˆ	Sta.600 to 660
Te t ¸ e2thˆ	Lift 3		

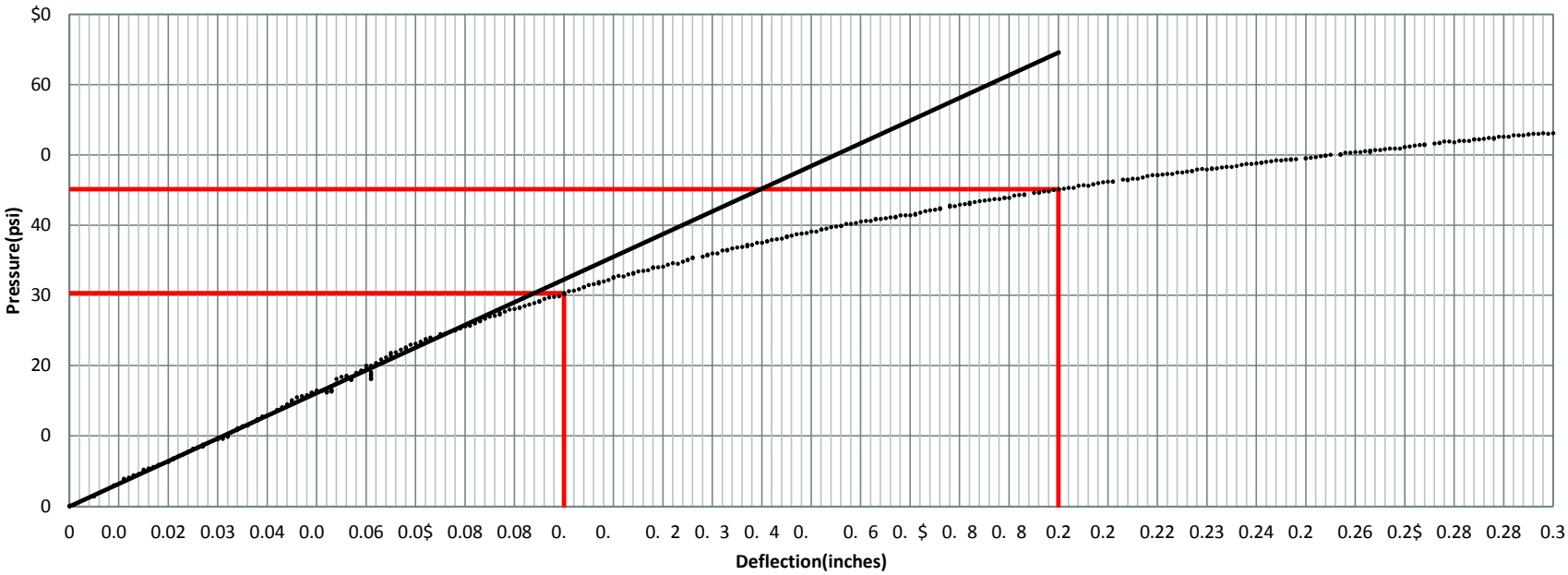
Stre -&e˜etratio˜ C0˙#e



¸ e˜ ityˆ	Te t Methoˇ	3 ate˙ Co˜te˜t:	Te t Methoˇˆ
Co˙˙e˝teˇ ¸ ef°e˝tio˜ˆ	0.0 6		
Co˙˙e˝teˇ 4eari˜$ Ratio at 0.1i˜ 52.6 / / 7˙ .0		Co˙˙e˝teˇ 4eari˜$ Ratio at 0.2i˜ 56.08/ / 7˙ 3.6	
! ane Sˇear	0 2 6	" #e˙age	2. Sˇear Stre˜$th 2. %&a
Te t &e˙fo˙/ eˇ - . ˆ ¸ ateˆ	CC ' (" 8*11*201	Re#ie, eˇ - . ˆ ¸ ateˆ	CC ') L 8*11*201

&ˆo2e˙ t:	CC8	˝ ate of Te t:	8* *20 $
Te t Lo˙ atio°ˇ	Sta. 63 Off et 24	Mateˆial ˝ e ˙ ˆi3tio°ˇ	Sta.600 to 660
Te t ˝ e3thˇ	Lift 3		

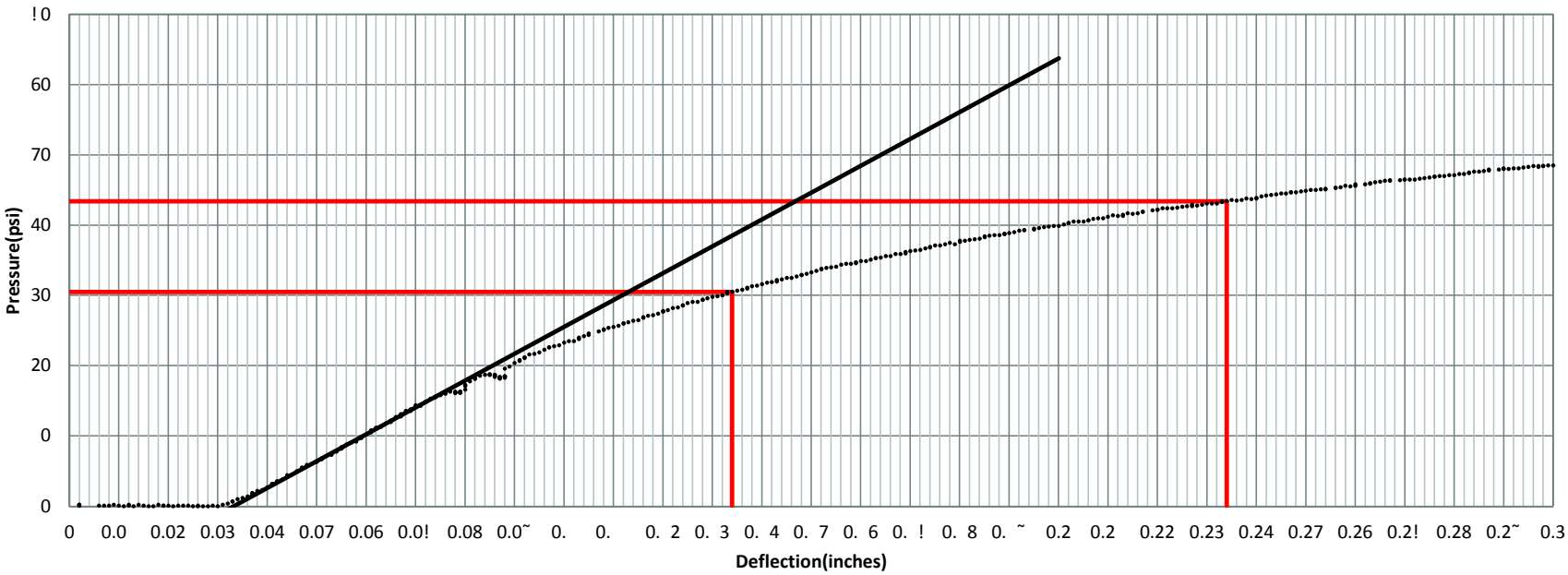
Stre 0&e° etratio° C1ˆ"e



˝ e° ityˇ	Te t Methoˇ	4 ateˆ Co° te° t:	Te t Methoˇˇ
Coˆˆe˙ teˇ ˝ ef¸e˙ tio°ˇ	0		
Coˆˆe˙ teˇ 5eari° # Ratio at 0. i° 62. 4/ / 7 3.0		Coˆˆe˙ teˇ 5eari° # Ratio at 0.2i° 6 .08/ / 7 3.0	
˜ane Shear	8 64 60	! "eˆage 60.$	Shear Stre° #th 60.$ %&a
Te t &eˆfoˆ/ eˇ - .ˇ ˝ateˇ 8* *20 $	CC ' (!	Re"ie, eˇ - .ˇ ˝ateˇ 8* *20 $	CC') L

&ˆoje˙ t:	CC8	˝ ate of Te t:	8* *20 !
Te t Lo˙ atio° ˇ	Sta. 63 Off et 24	Mateˆial ˝ e ˙ ˆi3tio° ˇ	Sta.600 to 660
Te t ˝ e3thˇ	Lift 3		

Stre 0&e° etratio° C1ˆ#e



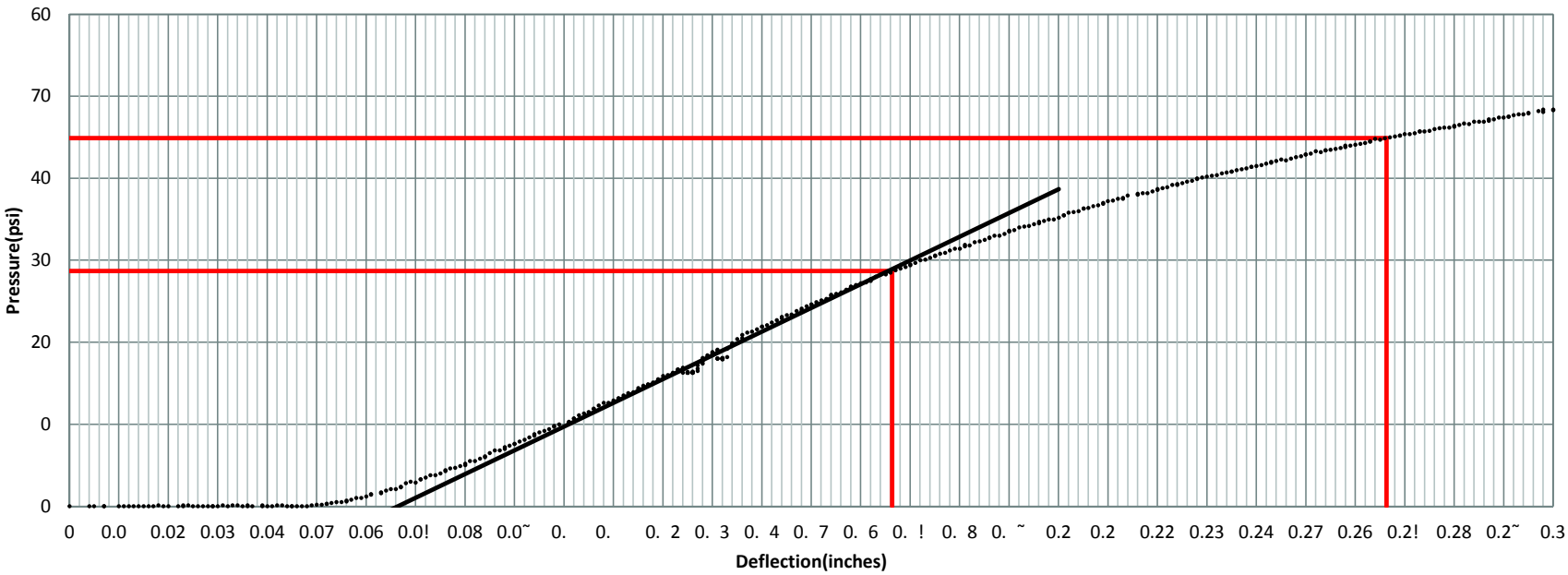
˝ e° ityˇ	Te t Methoˇ	4 ateˆ Co° te° t:	Te t Methoˇˇ
Coˆˆe˙ teˇ ˝ ef¸e˙ tio° ˇ	0.034		
Coˆˆe˙ teˇ 5eari° $ Ratio at 0. i° 62.74/ / 8˝ 3.		Coˆˆe˙ teˇ 5eari° $ Ratio at 0.2i° 67.08/ / 8˝ 2.˜	

ane Shear 68 66 ! 2 " #eˆage 68.! Shear Stre° $th 68.! %&a

Te t &eˆfoˆ/ eˇ - . ˇ	CC ' ("	Re#ie, eˇ - . ˇ	CC') L
˝ ateˇ	8* *20 !	˝ ateˇ	8* *20 !

&ˆo2e˙ t:	CC8	˝ ate of Te t:	8* *20 !
Te t Lo˙ atio°˘	Sta. 63 Off et 24	Mateˆial ˝ e ˙ ˆi3tio°˘	Sta.600 to 660
Te t ˝ e3th˘	Lift 3		

Stre 0&e° etratio° C1ˆ#e



˝ e° ity˘	Te t Metho˘	4 ateˆ Co° te° t:	Te t Metho˘˘
Coˆˆe˙ te˘ ˝ ef¸e˙ tio°˘	0.066		
Coˆˆe˙ te˘ 5eari° $ Ratio at 0. i° 62.74/ / 8˝ 2.˜		Coˆˆe˙ te˘ 5eari° $ Ratio at 0.2i° 67.08/ / 8˝ 3.0	

ane Shear	80	! 6	! 2	" #eˆage	! 6.0	Shear Stre° $th	! 6.0 %&a

Te t &eˆfoˆ/ e˘ - . ˘	CC ' ("	Re#ie, e˘ - . ˘	CC ') L
˝ ate˘	8* *20 !	˝ ate˘	8* *20 !

Dynamic Cone Penetrometer Test
ASTM D6951

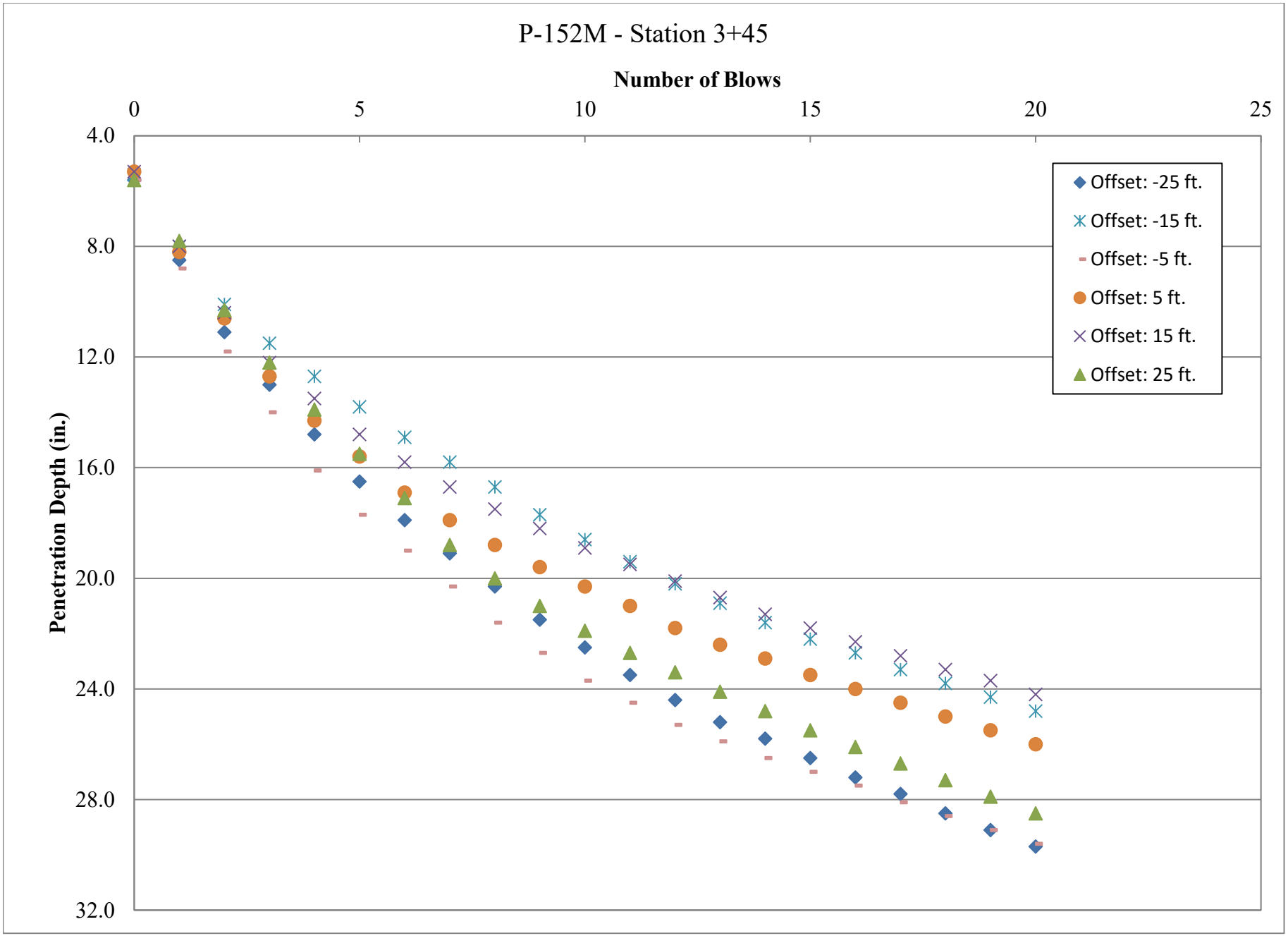
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/6/2015**

Technician: CC/QL | **Location: Station 3+45**

Material: P-152M | **Surface Depth: Top of P-152M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.6	5.4	5.6	5.3	5.3	5.6	
1	8.5	8.0	8.8	8.2	8.0	7.8	
2	11.1	10.1	11.8	10.6	10.4	10.3	
3	13.0	11.5	14.0	12.7	12.2	12.2	
4	14.8	12.7	16.1	14.3	13.5	13.9	
5	16.5	13.8	17.7	15.6	14.8	15.5	
6	17.9	14.9	19.0	16.9	15.8	17.1	
7	19.1	15.8	20.3	17.9	16.7	18.8	
8	20.3	16.7	21.6	18.8	17.5	20.0	
9	21.5	17.7	22.7	19.6	18.2	21.0	
10	22.5	18.6	23.7	20.3	18.9	21.9	
11	23.5	19.4	24.5	21.0	19.5	22.7	
12	24.4	20.2	25.3	21.8	20.1	23.4	
13	25.2	20.9	25.9	22.4	20.7	24.1	
14	25.8	21.6	26.5	22.9	21.3	24.8	
15	26.5	22.2	27.0	23.5	21.8	25.5	
16	27.2	22.7	27.5	24.0	22.3	26.1	
17	27.8	23.3	28.1	24.5	22.8	26.7	
18	28.5	23.8	28.6	25.0	23.3	27.3	
19	29.1	24.3	29.1	25.5	23.7	27.9	
20	29.7	24.8	29.6	26.0	24.2	28.5	


P-152M - Station 3+45
Number of Blows
0
5
10
15
20
25
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Penetration Depth (in.)
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

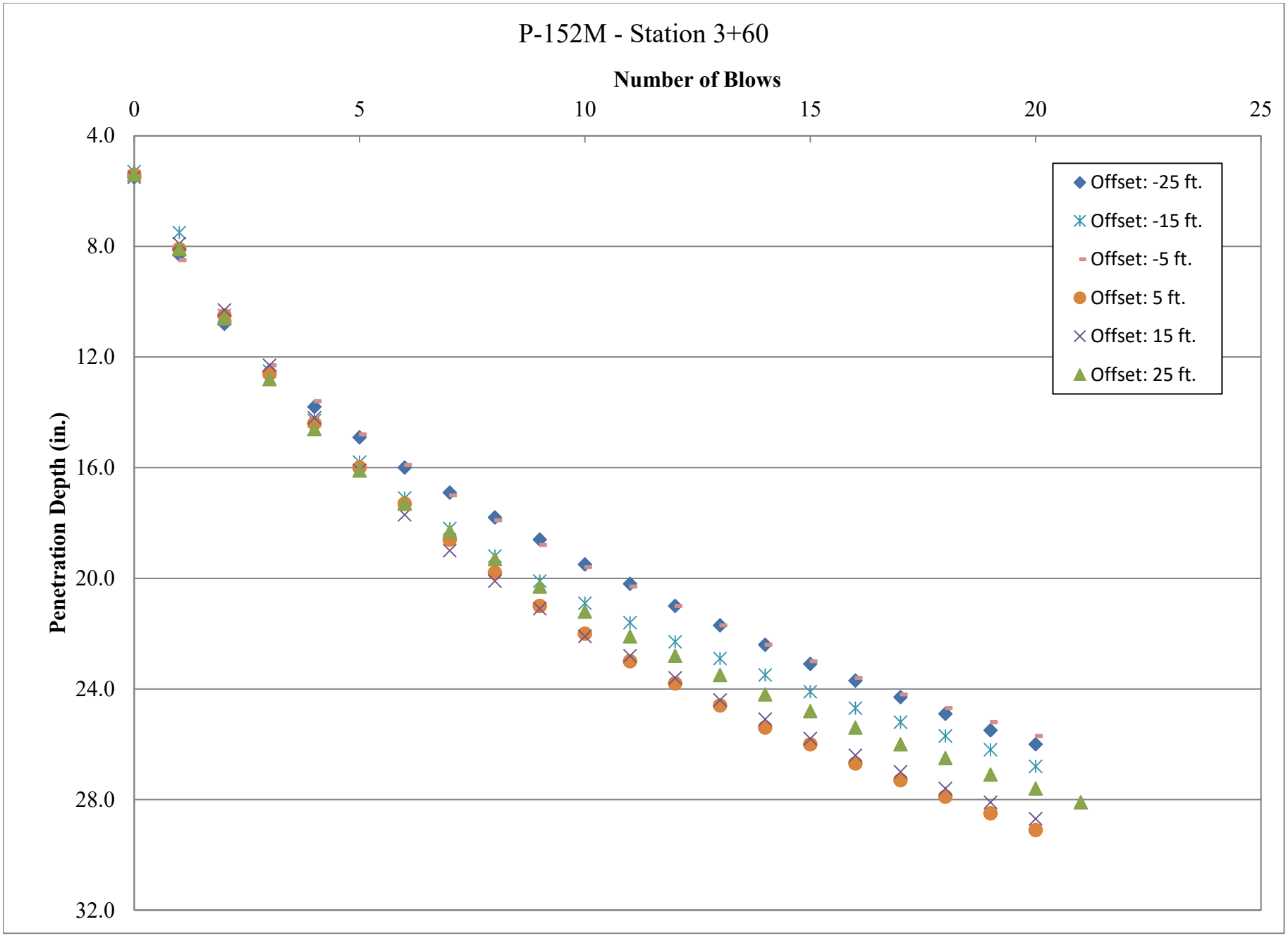
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/6/2015**

Technician: CC/QL | **Location: Station 3+60**

Material: P-152M | **Surface Depth: Top of P-152M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.5	5.3	5.5	5.4	5.5	5.4	
1	8.3	7.5	8.5	8.1	7.9	8.1	
2	10.8	10.5	10.7	10.5	10.3	10.6	
3	12.5	12.5	12.3	12.6	12.3	12.8	
4	13.8	14.3	13.6	14.4	14.2	14.6	
5	14.9	15.8	14.8	16.0	16.1	16.1	
6	16.0	17.1	15.9	17.3	17.7	17.3	
7	16.9	18.2	17.0	18.6	19.0	18.3	
8	17.8	19.2	17.9	19.8	20.1	19.3	
9	18.6	20.1	18.8	21.0	21.1	20.3	
10	19.5	20.9	19.6	22.0	22.1	21.2	
11	20.2	21.6	20.3	23.0	22.8	22.1	
12	21.0	22.3	21.0	23.8	23.6	22.8	
13	21.7	22.9	21.7	24.6	24.4	23.5	
14	22.4	23.5	22.4	25.4	25.1	24.2	
15	23.1	24.1	23.0	26.0	25.8	24.8	
16	23.7	24.7	23.6	26.7	26.4	25.4	
17	24.3	25.2	24.2	27.3	27.0	26.0	
18	24.9	25.7	24.7	27.9	27.6	26.5	
19	25.5	26.2	25.2	28.5	28.1	27.1	
20	26.0	26.8	25.7	29.1	28.7	27.6	
21						28.1	


P-152M - Station 3+60
Number of Blows
0
5
10
15
20
25
Penetration Depth (in.)
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

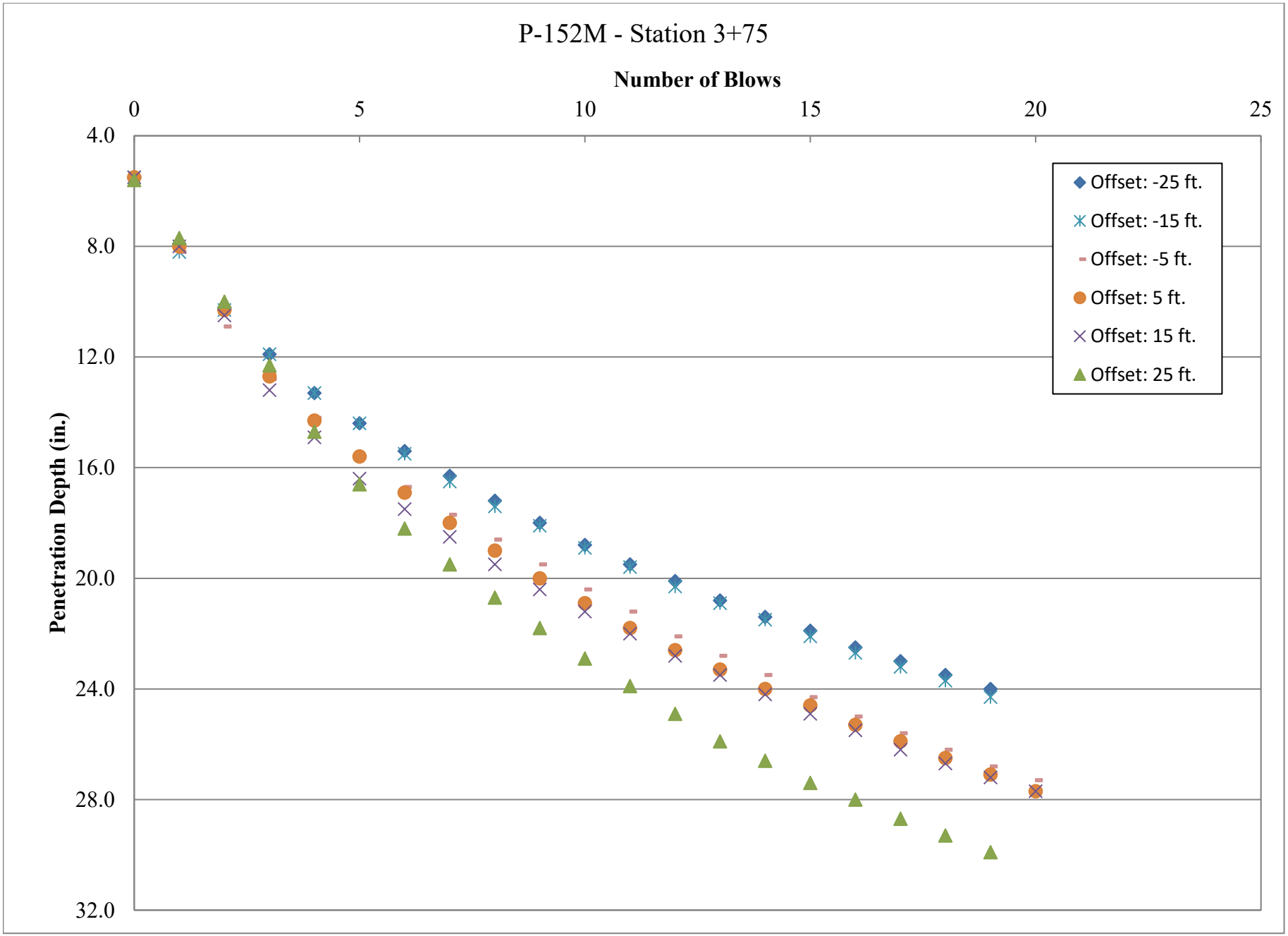
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/6/2015**

Technician: CC/QL | **Location: Station 3+75**

Material: P-152M | **Surface Depth: Top of P-152M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.5	5.5	5.5	5.5	5.5	5.6	
1	7.9	8.2	8.2	8.0	8.0	7.7	
2	10.2	10.3	10.9	10.3	10.5	10.0	
3	11.9	11.9	12.8	12.7	13.2	12.3	
4	13.3	13.3	14.2	14.3	14.9	14.7	
5	14.4	14.4	15.6	15.6	16.4	16.6	
6	15.4	15.5	16.7	16.9	17.5	18.2	
7	16.3	16.5	17.7	18.0	18.5	19.5	
8	17.2	17.4	18.6	19.0	19.5	20.7	
9	18.0	18.1	19.5	20.0	20.4	21.8	
10	18.8	18.9	20.4	20.9	21.2	22.9	
11	19.5	19.6	21.2	21.8	22.0	23.9	
12	20.1	20.3	22.1	22.6	22.8	24.9	
13	20.8	20.9	22.8	23.3	23.5	25.9	
14	21.4	21.5	23.5	24.0	24.2	26.6	
15	21.9	22.1	24.3	24.6	24.9	27.4	
16	22.5	22.7	25.0	25.3	25.5	28.0	
17	23.0	23.2	25.6	25.9	26.2	28.7	
18	23.5	23.7	26.2	26.5	26.7	29.3	
19	24.0	24.3	26.8	27.1	27.2	29.9	
20			27.3	27.7	27.7		


P-152M - Station 3+75
Number of Blows
0
5
10
15
20
25
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Penetration Depth (in.)
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

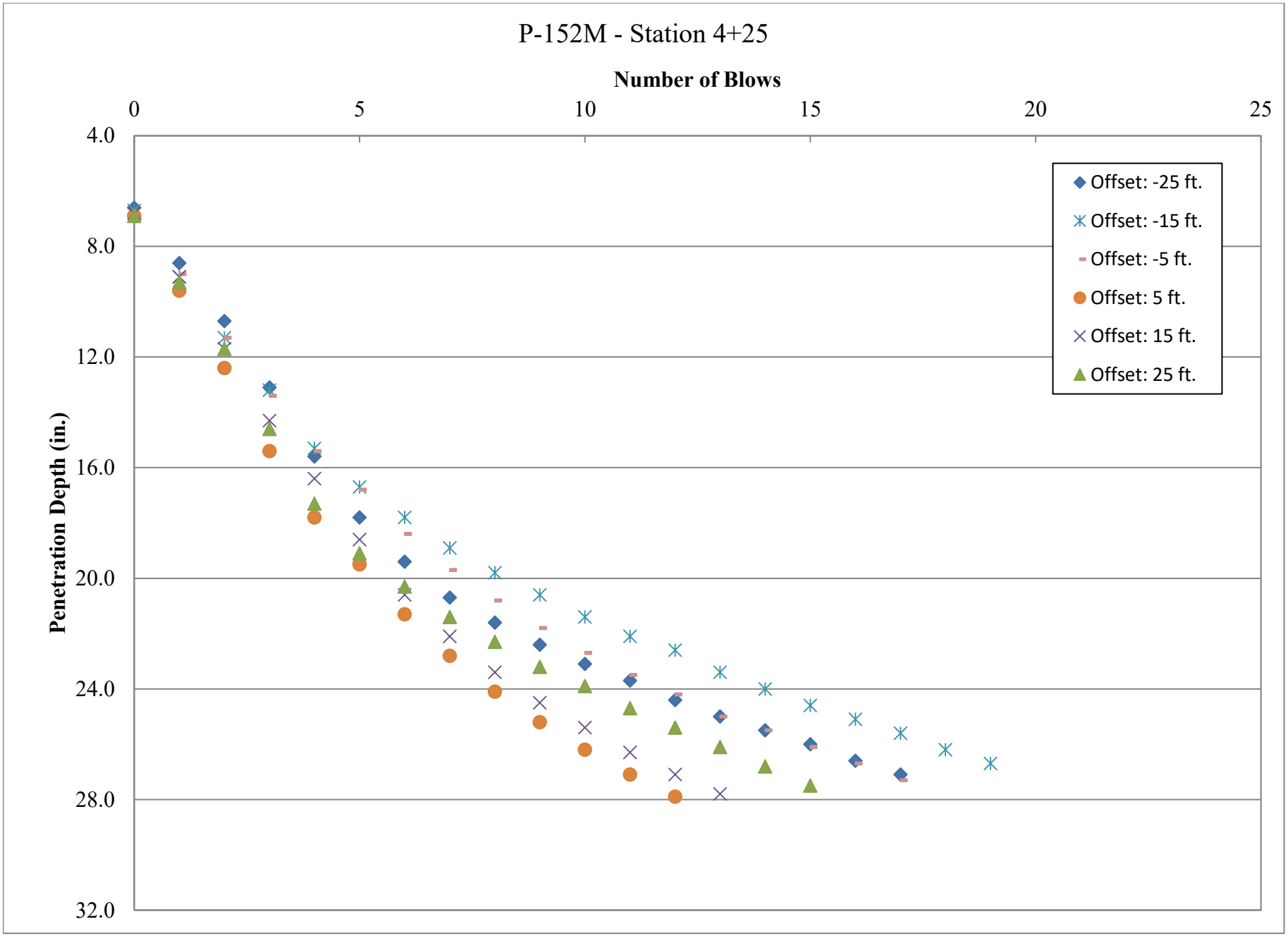
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/1/2017**

Technician: CR | **Location: Station 4+25**

Material: P-152M | **Surface Depth: Top of P-152M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	6.6	6.7	7.0	6.9	6.8	6.9	
1	8.6	9.1	9.0	9.6	9.1	9.3	
2	10.7	11.3	11.3	12.4	11.7	11.7	
3	13.1	13.2	13.4	15.4	14.3	14.6	
4	15.6	15.3	15.4	17.8	16.4	17.3	
5	17.8	16.7	16.8	19.5	18.6	19.1	
6	19.4	17.8	18.4	21.3	20.6	20.3	
7	20.7	18.9	19.7	22.8	22.1	21.4	
8	21.6	19.8	20.8	24.1	23.4	22.3	
9	22.4	20.6	21.8	25.2	24.5	23.2	
10	23.1	21.4	22.7	26.2	25.4	23.9	
11	23.7	22.1	23.5	27.1	26.3	24.7	
12	24.4	22.6	24.2	27.9	27.1	25.4	
13	25.0	23.4	25.0		27.8	26.1	
14	25.5	24.0	25.5			26.8	
15	26.0	24.6	26.1			27.5	
16	26.6	25.1	26.7				
17	27.1	25.6	27.3				
18		26.2					
19		26.7					


P-152M - Station 4+25
Number of Blows
0
5
10
15
20
25
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Penetration Depth (in.)
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

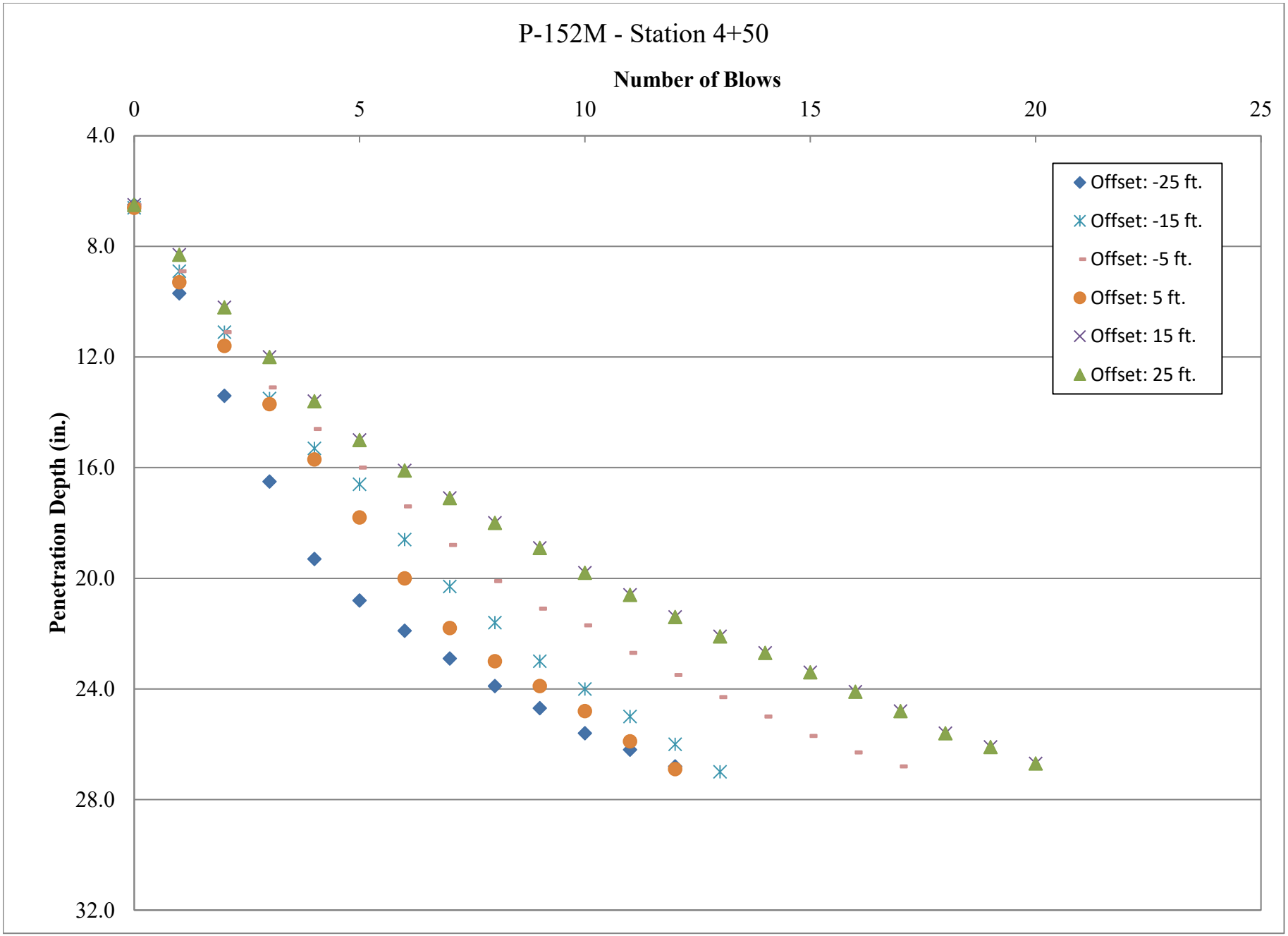
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/1/2017**

Technician: CR | **Location: Station 4+50**

Material: P-152M | **Surface Depth: Top of P-152M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	6.5	6.6	6.5	6.6	6.5	6.5	
1	9.7	8.9	8.9	9.3	8.3	8.3	
2	13.4	11.1	11.1	11.6	10.2	10.2	
3	16.5	13.5	13.1	13.7	12.0	12.0	
4	19.3	15.3	14.6	15.7	13.6	13.6	
5	20.8	16.6	16.0	17.8	15.0	15.0	
6	21.9	18.6	17.4	20.0	16.1	16.1	
7	22.9	20.3	18.8	21.8	17.1	17.1	
8	23.9	21.6	20.1	23.0	18.0	18.0	
9	24.7	23.0	21.1	23.9	18.9	18.9	
10	25.6	24.0	21.7	24.8	19.8	19.8	
11	26.2	25.0	22.7	25.9	20.6	20.6	
12	26.8	26.0	23.5	26.9	21.4	21.4	
13		27.0	24.3		22.1	22.1	
14			25.0		22.7	22.7	
15			25.7		23.4	23.4	
16			26.3		24.1	24.1	
17			26.8		24.8	24.8	
18					25.6	25.6	
19					26.1	26.1	
20					26.7	26.7	


P-152M - Station 4+50
Number of Blows
0
5
10
15
20
25
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Penetration Depth (in.)
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

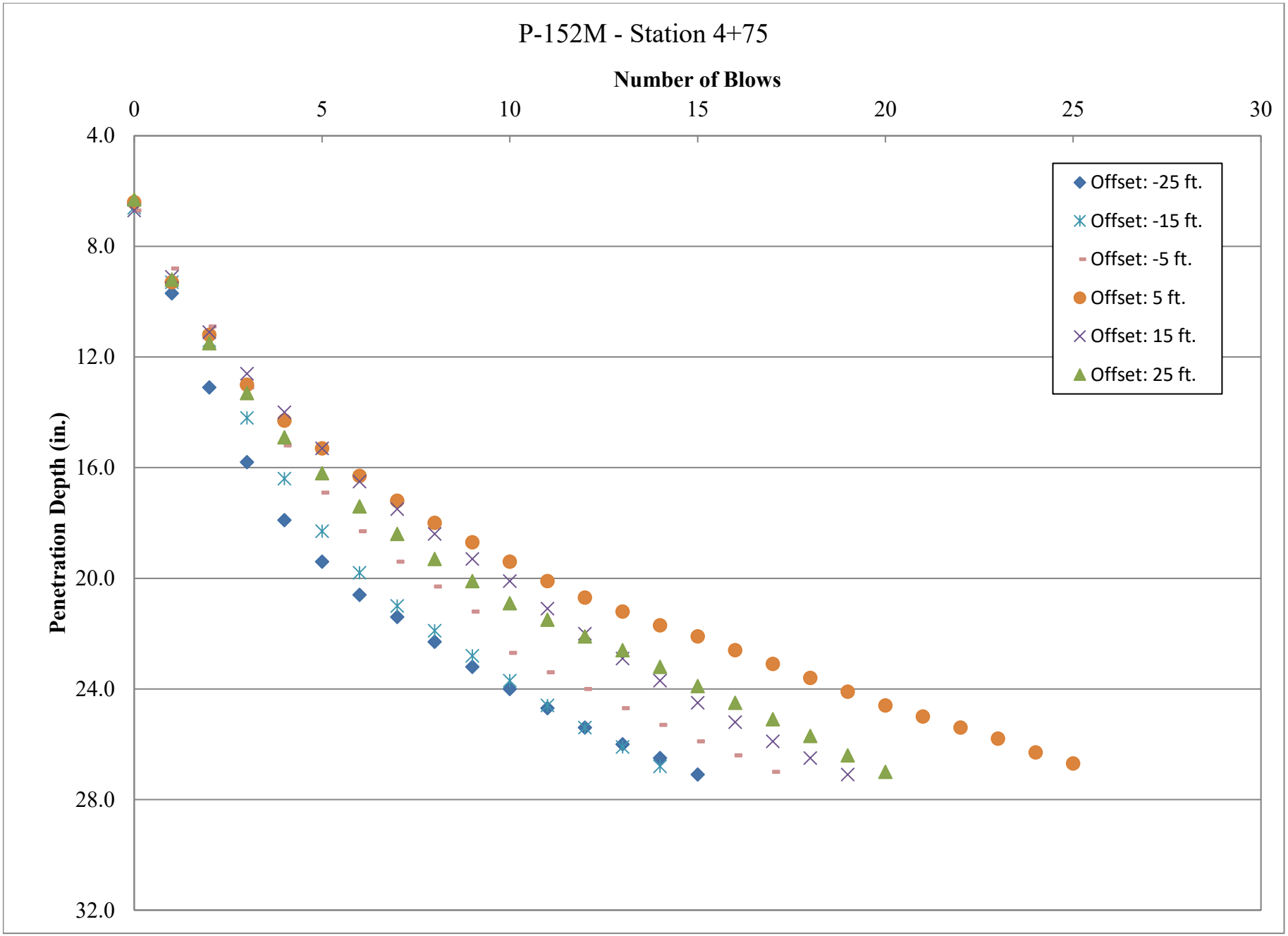
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/1/2017**

Technician: CR | **Location: Station 4+75**

Material: P-152M | **Surface Depth: Top of P-152M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	6.5	6.6	6.7	6.4	6.7	6.3	
1	9.7	9.3	8.8	9.3	9.1	9.2	
2	13.1	11.4	10.9	11.2	11.1	11.5	
3	15.8	14.2	13.1	13.0	12.6	13.3	
4	17.9	16.4	15.2	14.3	14.0	14.9	
5	19.4	18.3	16.9	15.3	15.3	16.2	
6	20.6	19.8	18.3	16.3	16.5	17.4	
7	21.4	21.0	19.4	17.2	17.5	18.4	
8	22.3	21.9	20.3	18.0	18.4	19.3	
9	23.2	22.8	21.2	18.7	19.3	20.1	
10	24.0	23.7	22.7	19.4	20.1	20.9	
11	24.7	24.6	23.4	20.1	21.1	21.5	
12	25.4	25.4	24.0	20.7	22.0	22.1	
13	26.0	26.1	24.7	21.2	22.9	22.6	
14	26.5	26.8	25.3	21.7	23.7	23.2	
15	27.1		25.9	22.1	24.5	23.9	
16			26.4	22.6	25.2	24.5	
17			27.0	23.1	25.9	25.1	
18				23.6	26.5	25.7	
19				24.1	27.1	26.4	
20				24.6		27.0	
21				25.0			
22				25.4			
23				25.8			
24				26.3			
25				26.7			


P-152M - Station 4+75
Number of Blows
0
5
10
15
20
25
30
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Penetration Depth (in.)
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

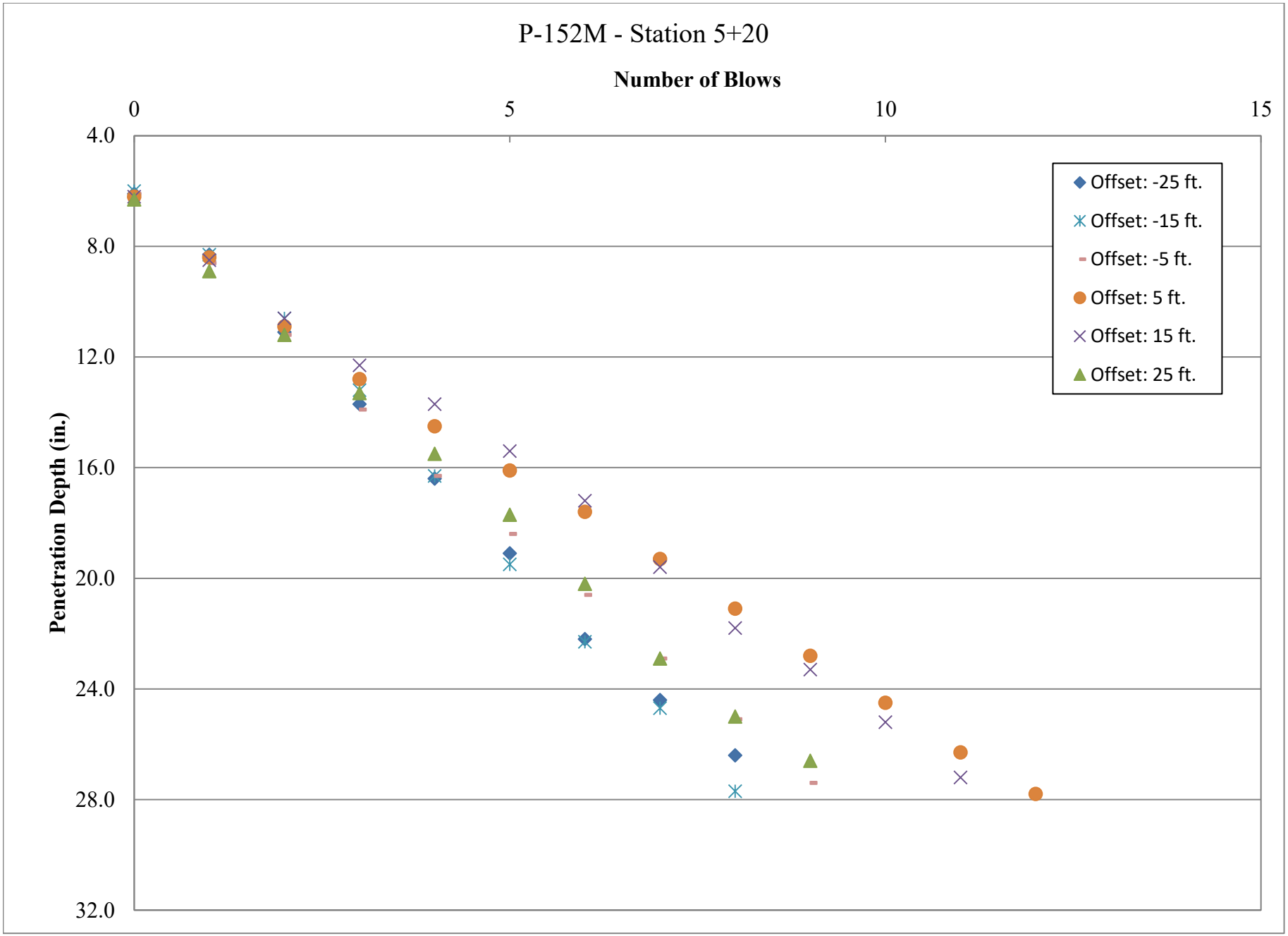
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 3/2/2017**

Technician: CR | **Location: Station 5+20**

Material: P-152M | **Surface Depth: Top of P-152M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	6.1	6.0	6.1	6.2	6.2	6.3	
1	8.3	8.3	8.6	8.4	8.5	8.9	
2	11.1	10.6	11.2	10.9	10.6	11.2	
3	13.7	13.2	13.9	12.8	12.3	13.3	
4	16.4	16.3	16.3	14.5	13.7	15.5	
5	19.1	19.5	18.4	16.1	15.4	17.7	
6	22.2	22.3	20.6	17.6	17.2	20.2	
7	24.4	24.7	22.9	19.3	19.6	22.9	
8	26.4	27.7	25.1	21.1	21.8	25.0	
9			27.4	22.8	23.3	26.6	
10				24.5	25.2		
11				26.3	27.2		
12				27.8			


P-152M - Station 5+20
Number of Blows
0
5
10
15
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Penetration Depth (in.)
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

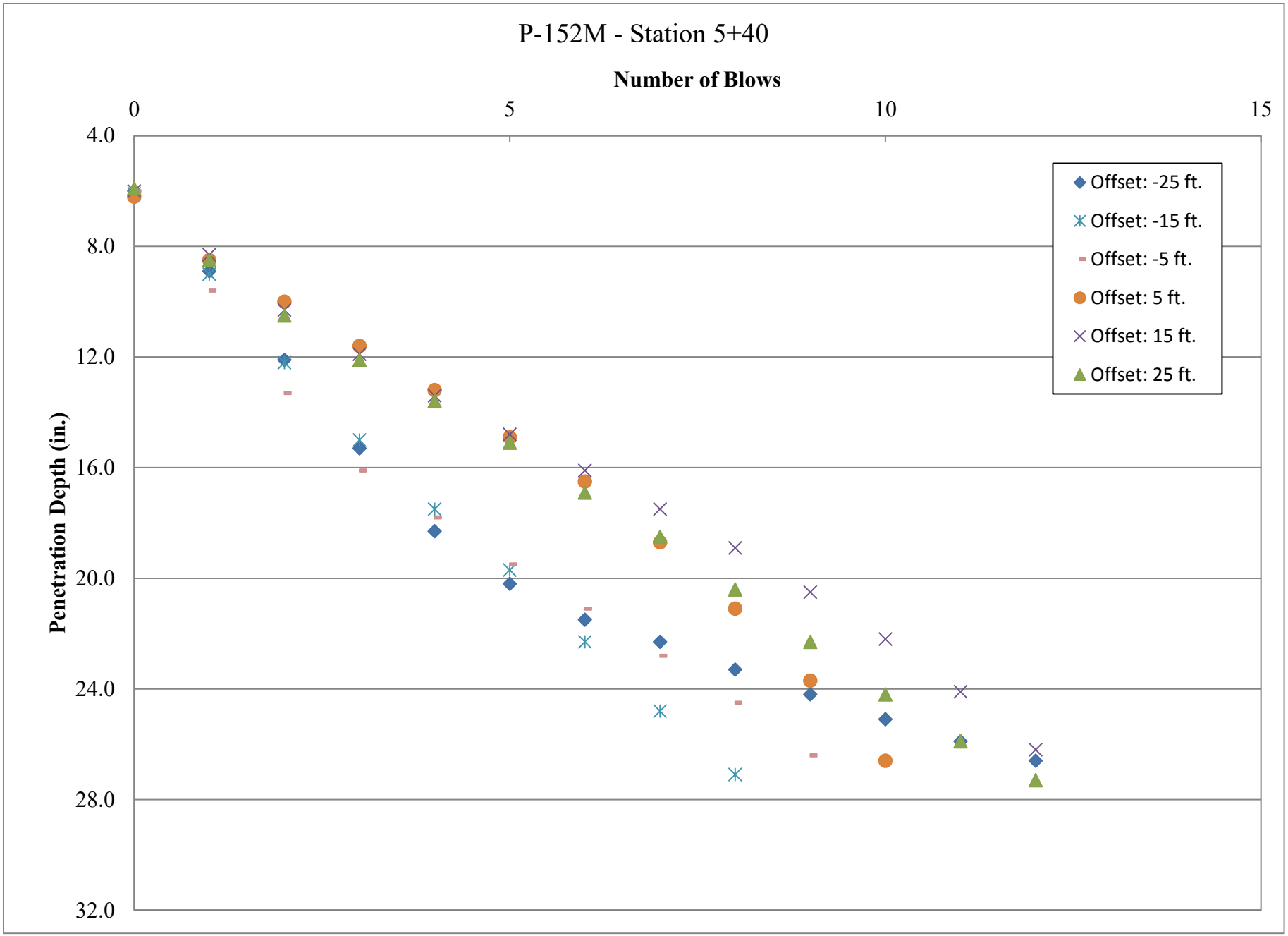
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 3/2/2017**

Technician: CR | **Location: Station 5+40**

Material: P-152M | **Surface Depth: Top of P-152M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	6.0	6.1	6.0	6.2	6.0	5.9	
1	8.9	9.0	9.6	8.5	8.3	8.5	
2	12.1	12.2	13.3	10.0	10.3	10.5	
3	15.3	15.0	16.1	11.6	11.9	12.1	
4	18.3	17.5	17.8	13.2	13.4	13.6	
5	20.2	19.7	19.5	14.9	14.8	15.1	
6	21.5	22.3	21.1	16.5	16.1	16.9	
7	22.3	24.8	22.8	18.7	17.5	18.5	
8	23.3	27.1	24.5	21.1	18.9	20.4	
9	24.2		26.4	23.7	20.5	22.3	
10	25.1			26.6	22.2	24.2	
11	25.9				24.1	25.9	
12	26.6				26.2	27.3	


P-152M - Station 5+40
Number of Blows
0
5
10
15
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Penetration Depth (in.)
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

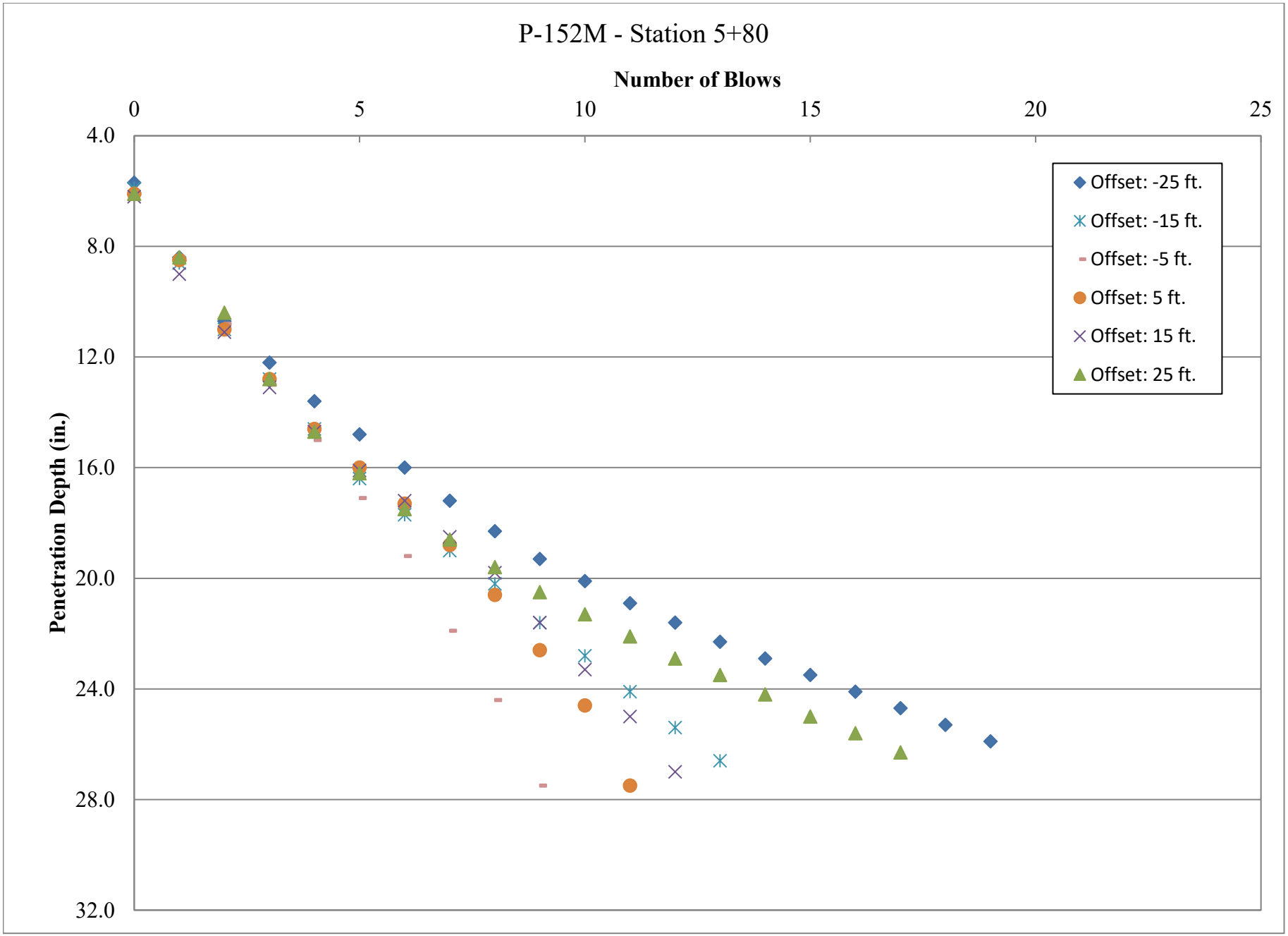
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/6/2017**

Technician: CR | **Location: Station 5+80**

Material: P-152M | **Surface Depth: 20 in.**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.7	5.9	6.1	6.1	6.2	6.1	
1	8.4	8.6	8.5	8.5	9.0	8.4	
2	10.7	11.0	10.8	11.0	11.1	10.4	
3	12.2	12.8	13.0	12.8	13.1	12.8	
4	13.6	14.6	15.0	14.6	14.7	14.7	
5	14.8	16.4	17.1	16.0	16.1	16.2	
6	16.0	17.7	19.2	17.3	17.2	17.5	
7	17.2	19.0	21.9	18.8	18.5	18.6	
8	18.3	20.2	24.4	20.6	19.8	19.6	
9	19.3	21.6	27.5	22.6	21.6	20.5	
10	20.1	22.8		24.6	23.3	21.3	
11	20.9	24.1		27.5	25.0	22.1	
12	21.6	25.4			27.0	22.9	
13	22.3	26.6				23.5	
14	22.9					24.2	
15	23.5					25.0	
16	24.1					25.6	
17	24.7					26.3	
18	25.3						
19	25.9						


P-152M - Station 5+80
Number of Blows
0
5
10
15
20
25
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Penetration Depth (in.)
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

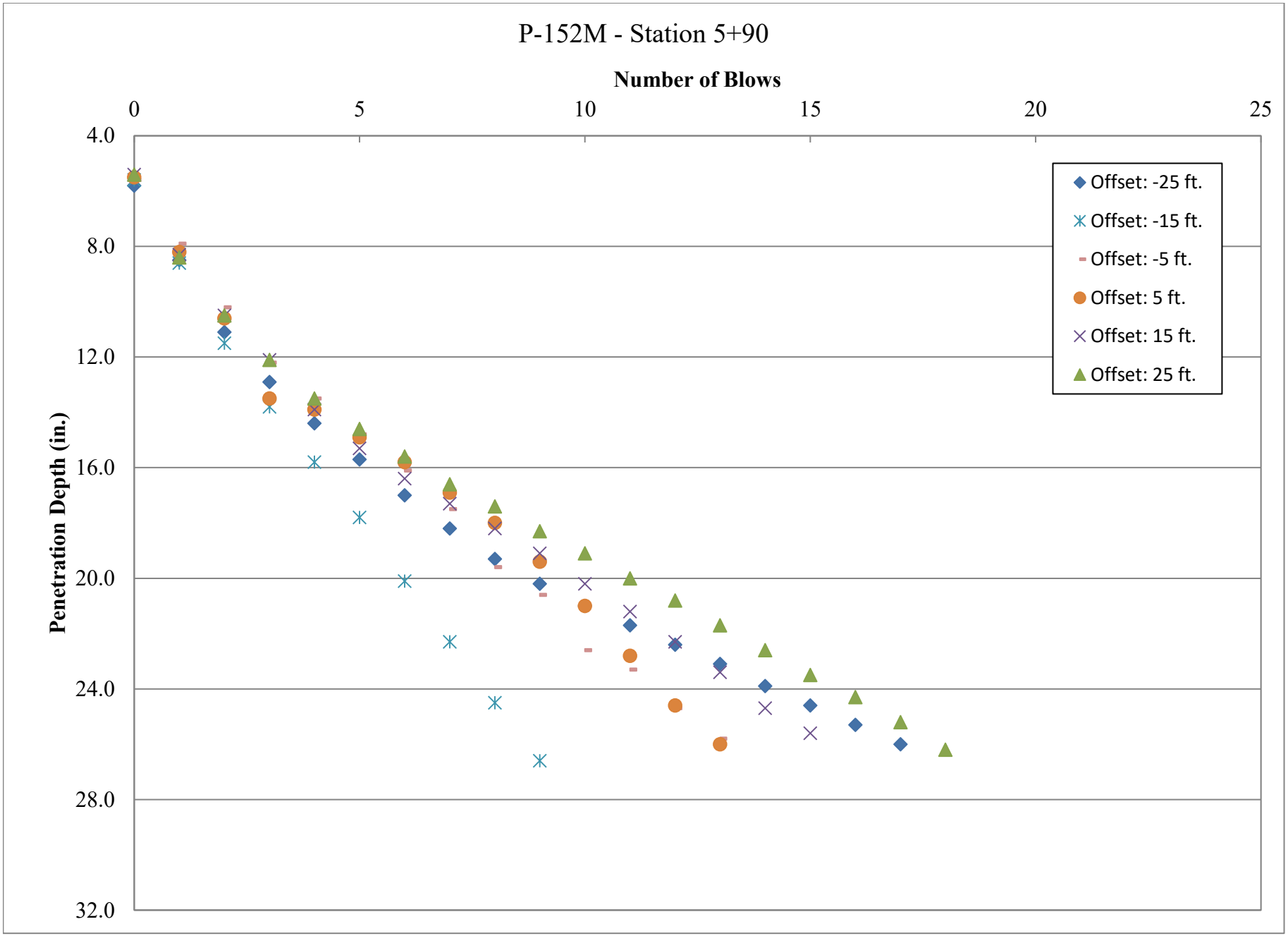
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/6/2017**

Technician: CR | **Location: Station 5+90**

Material: P-152M | **Surface Depth: 20 in.**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.8	5.6	5.6	5.5	5.4	5.4	
1	8.5	8.6	7.9	8.2	8.3	8.4	
2	11.1	11.5	10.2	10.6	10.5	10.5	
3	12.9	13.8	12.2	13.5	12.1	12.1	
4	14.4	15.8	13.5	13.9	13.9	13.5	
5	15.7	17.8	14.8	14.9	15.3	14.6	
6	17.0	20.1	16.1	15.8	16.4	15.6	
7	18.2	22.3	17.5	16.9	17.3	16.6	
8	19.3	24.5	19.6	18.0	18.2	17.4	
9	20.2	26.6	20.6	19.4	19.1	18.3	
10	21.0		22.6	21.0	20.2	19.1	
11	21.7		23.3	22.8	21.2	20.0	
12	22.4		24.7	24.6	22.3	20.8	
13	23.1		25.8	26.0	23.4	21.7	
14	23.9				24.7	22.6	
15	24.6				25.6	23.5	
16	25.3					24.3	
17	26.0					25.2	
18						26.2	


P-152M - Station 5+90
Number of Blows
0
5
10
15
20
25
Penetration Depth (in.)
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

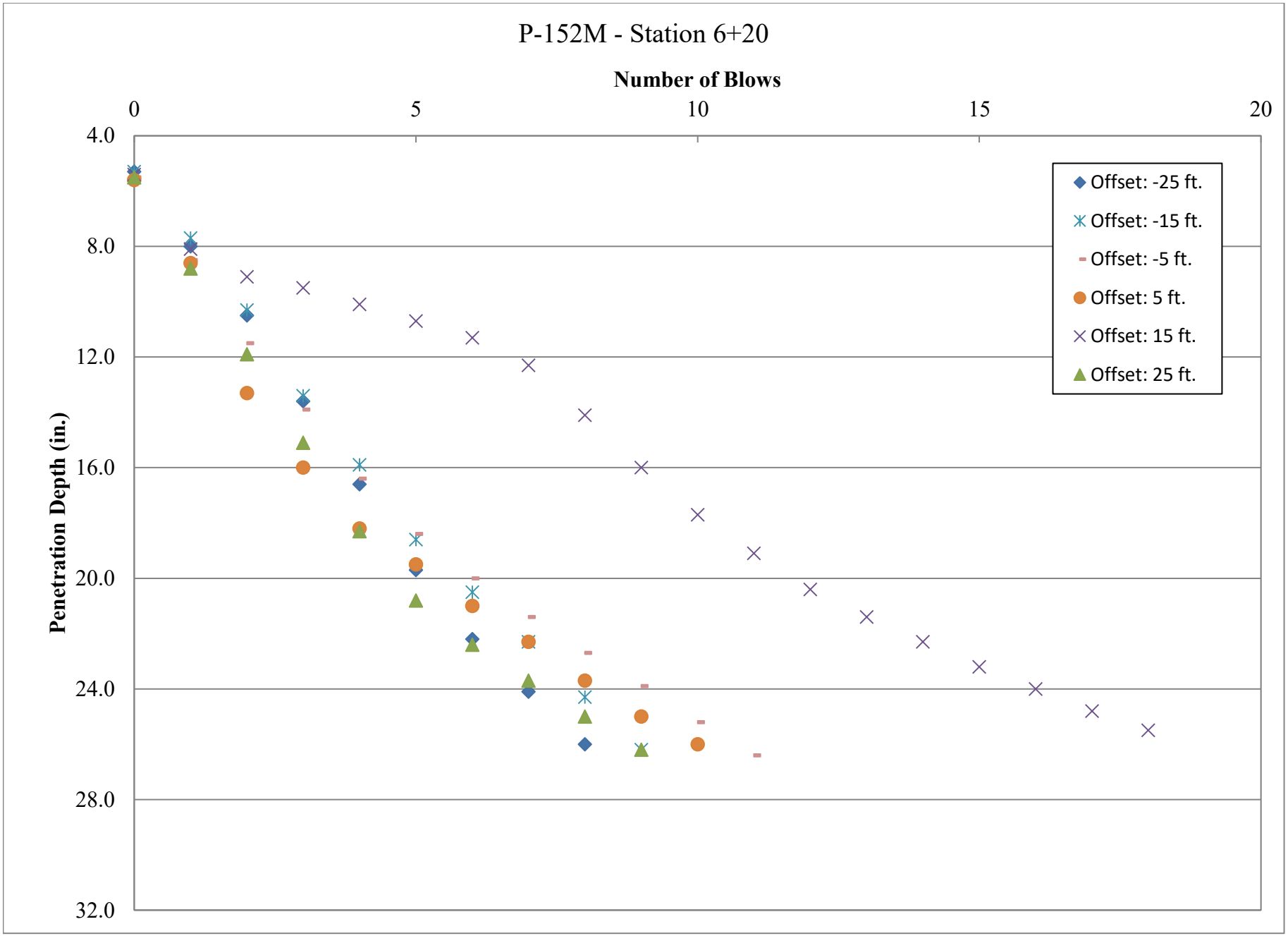
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/6/2017**

Technician: CR | **Location: Station 6+20**

Material: P-152M | **Surface Depth: 20 in.**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.3	5.3	5.5	5.6	5.4	5.5	
1	8.0	7.7	8.5	8.6	8.1	8.8	
2	10.5	10.3	11.5	13.3	9.1	11.9	
3	13.6	13.4	13.9	16.0	9.5	15.1	
4	16.6	15.9	16.4	18.2	10.1	18.3	
5	19.7	18.6	18.4	19.5	10.7	20.8	
6	22.2	20.5	20.0	21.0	11.3	22.4	
7	24.1	22.3	21.4	22.3	12.3	23.7	
8	26.0	24.3	22.7	23.7	14.1	25.0	
9		26.2	23.9	25.0	16.0	26.2	
10			25.2	26.0	17.7		
11			26.4		19.1		
12					20.4		
13					21.4		
14					22.3		
15					23.2		
16					24.0		
17					24.8		
18					25.5		


P-152M - Station 6+20
Number of Blows
0
5
10
15
20
Penetration Depth (in.)
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

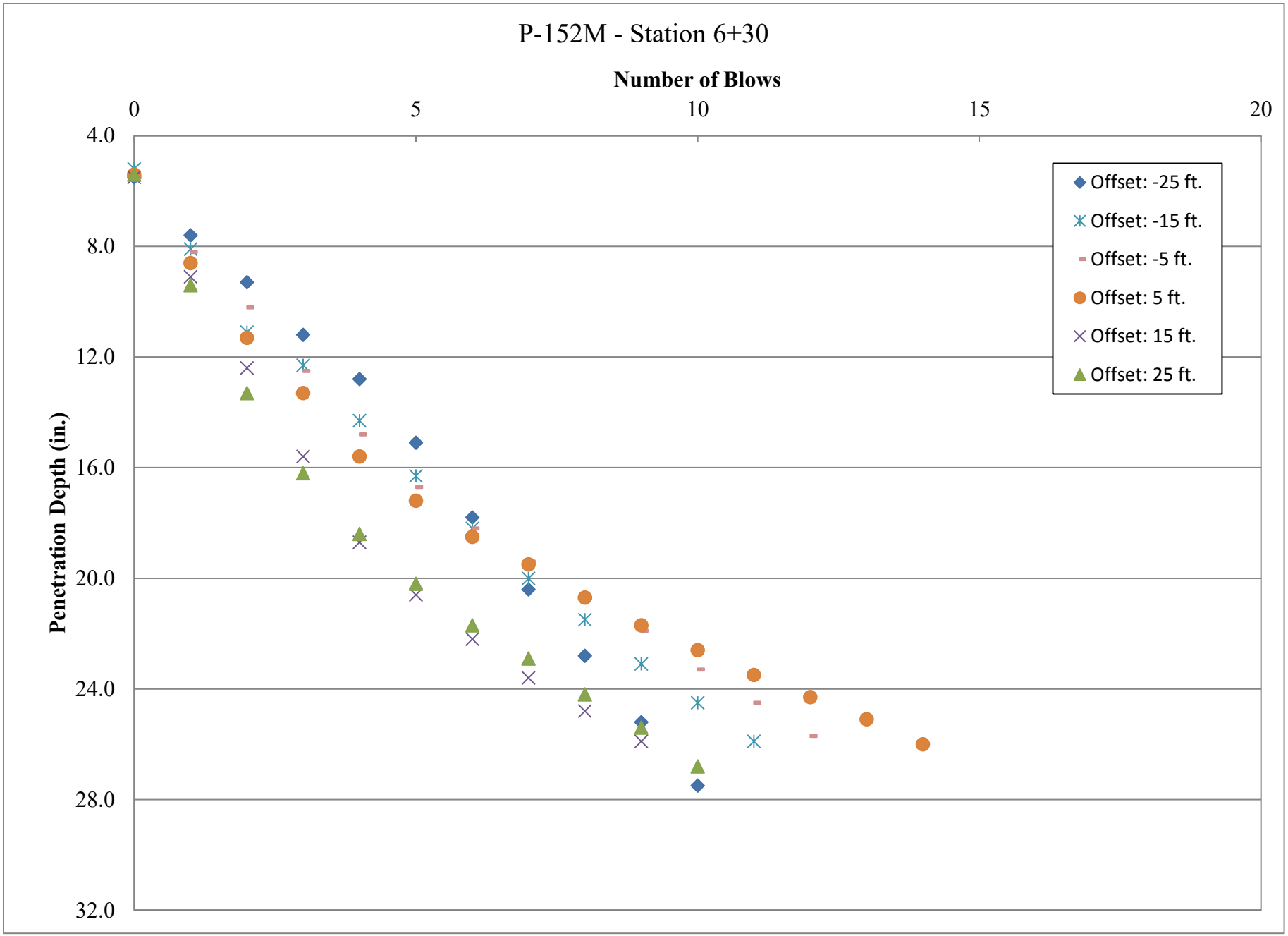
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/6/2017**

Technician: CR | **Location: Station 6+30**

Material: P-152M | **Surface Depth: 20 in.**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.5	5.2	5.5	5.4	5.5	5.4	
1	7.6	8.1	8.2	8.6	9.1	9.4	
2	9.3	11.1	10.2	11.3	12.4	13.3	
3	11.2	12.3	12.5	13.3	15.6	16.2	
4	12.8	14.3	14.8	15.6	18.7	18.4	
5	15.1	16.3	16.7	17.2	20.6	20.2	
6	17.8	18.2	18.2	18.5	22.2	21.7	
7	20.4	20.0	19.4	19.5	23.6	22.9	
8	22.8	21.5	20.7	20.7	24.8	24.2	
9	25.2	23.1	21.9	21.7	25.9	25.4	
10	27.5	24.5	23.3	22.6		26.8	
11		25.9	24.5	23.5			
12			25.7	24.3			
13				25.1			
14				26.0			


P-152M - Station 6+30
Number of Blows
0
5
10
15
20
Penetration Depth (in.)
4.0
8.0
12.0
16.0
20.0
24.0
28.0
32.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Construction Cycle 08 - P152 Subgrade - DPSPA Results

Phase I

Station	Offset	Direction	Date & Time	Seismic Modulus, ksi	Poison's Ratio	Temperature, F	Corrected Seismic Modulus for in-situ Density (94.5 pcf), psi	Average Seismic Modulus,psi
345	-25	L	5/6/2015 15:20	36.00	0.35	70	27,216	**26,964**
345	-25	L	5/6/2015 15:20	35.00	0.35	70	26,460	
345	-25	L	5/6/2015 15:21	36.00	0.35	68	27,216	
345	-25	T	5/6/2015 15:21	31.00	0.35	68	23,436	**23,436**
345	-25	T	5/6/2015 15:22	31.00	0.35	68	23,436	
345	-25	T	5/6/2015 15:22	31.00	0.35	68	23,436	
345	-15	L	5/6/2015 15:23	30.00	0.35	68	22,680	**22,932**
345	-15	L	5/6/2015 15:24	31.00	0.35	68	23,436	
345	-15	L	5/6/2015 15:24	30.00	0.35	68	22,680	
345	-15	T	5/6/2015 15:25	30.00	0.35	68	22,680	**22,932**
345	-15	T	5/6/2015 15:25	31.00	0.35	68	23,436	
345	-15	T	5/6/2015 15:25	30.00	0.35	68	22,680	
345	-5	L	5/6/2015 15:27	32.00	0.35	68	24,192	**23,814**
345	-5	L	5/6/2015 15:27	31.00	0.35	66	23,436	
345	-5	L	5/6/2015 15:27	31.50	0.35	66	23,814	
345	-5	T	5/6/2015 15:27	32.50	0.35	68	24,570	**24,759**
345	-5	T	5/6/2015 15:28	33.00	0.35	68	24,948	
345	-5	T	5/6/2015 15:28	32.75	0.35	68	24,759	
345	5	L	5/6/2015 15:29	27.00	0.35	68	20,412	**20,412**
345	5	L	5/6/2015 15:29	27.00	0.35	68	20,412	
345	5	T	5/6/2015 15:30	28.00	0.35	68	21,168	**21,168**
345	5	T	5/6/2015 15:30	28.00	0.35	68	21,168	
345	15	L	5/6/2015 15:31	33.00	0.35	68	24,948	**24,948**
345	15	L	5/6/2015 15:32	33.00	0.35	68	24,948	
345	15	T	5/6/2015 15:32	33.00	0.35	68	24,948	**24,192**
345	15	T	5/6/2015 15:33	31.00	0.35	68	23,436	
345	25	L	5/6/2015 15:34	28.00	0.35	66	21,168	**21,168**
345	25	L	5/6/2015 15:35	28.00	0.35	66	21,168	
345	25	T	5/6/2015 15:35	30.00	0.35	68	22,680	**22,680**
345	25	T	5/6/2015 15:36	30.00	0.35	68	22,680	
360	25	L	5/6/2015 15:37	22.00	0.35	66	16,632	**17,010**
360	25	L	5/6/2015 15:38	23.00	0.35	68	17,388	
360	25	T	5/6/2015 15:39	31.00	0.35	68	23,436	**23,436**
360	25	T	5/6/2015 15:39	31.00	0.35	66	23,436	
360	15	L	5/6/2015 15:40	37.00	0.35	66	27,972	**27,594**
360	15	L	5/6/2015 15:41	36.00	0.35	66	27,216	
360	15	T	5/6/2015 15:41	32.00	0.35	68	24,192	**24,192**
360	15	T	5/6/2015 15:42	32.00	0.35	68	24,192	
360	5	L	5/6/2015 15:43	29.00	0.35	66	21,924	**21,924**
360	5	L	5/6/2015 15:43	29.00	0.35	66	21,924	
360	5	T	5/6/2015 15:43	27.00	0.35	66	20,412	**20,412**
360	5	T	5/6/2015 15:44	27.00	0.35	66	20,412	
360	-5	L	5/6/2015 15:45	30.00	0.35	68	22,680	**23,058**
360	-5	L	5/6/2015 15:45	31.00	0.35	68	23,436	
360	-5	T	5/6/2015 15:45	28.00	0.35	68	21,168	**20,790**
360	-5	T	5/6/2015 15:46	27.00	0.35	66	20,412	
360	-15	L	5/6/2015 15:47	30.00	0.35	66	22,680	**22,302**
360	-15	L	5/6/2015 15:47	29.00	0.35	66	21,924	
360	-15	T	5/6/2015 15:48	30.00	0.35	68	22,680	**22,680**
360	-15	T	5/6/2015 15:48	30.00	0.35	66	22,680	
360	-25	L	5/6/2015 15:49	27.00	0.35	68	20,412	**20,412**
360	-25	L	5/6/2015 15:50	27.00	0.35	68	20,412	
360	-25	T	5/6/2015 15:50	28.00	0.35	68	21,168	**21,168**
360	-25	T	5/6/2015 15:51	28.00	0.35	68	21,168	
375	-25	L	5/6/2015 15:51	33.00	0.35	68	24,948	**24,948**
375	-25	L	5/6/2015 15:52	33.00	0.35	66	24,948	
375	-25	T	5/6/2015 15:53	33.00	0.35	68	24,948	**24,948**
375	-25	T	5/6/2015 15:53	33.00	0.35	66	24,948	
375	-15	L	5/6/2015 15:54	36.00	0.35	66	27,216	**27,216**
375	-15	L	5/6/2015 15:55	36.00	0.35	66	27,216	
375	-15	T	5/6/2015 15:55	34.00	0.35	66	25,704	**25,704**
375	-15	T	5/6/2015 15:56	34.00	0.35	66	25,704	
375	-5	L	5/6/2015 15:56	31.00	0.35	66	23,436	**23,436**
375	-5	L	5/6/2015 15:57	31.00	0.35	66	23,436	
375	-5	T	5/6/2015 15:57	30.00	0.35	66	22,680	**22,680**
375	-5	T	5/6/2015 15:58	30.00	0.35	66	22,680	
375	5	L	5/6/2015 15:59	29.00	0.35	66	21,924	**22,176**
375	5	L	5/6/2015 15:59	29.00	0.35	66	21,924	
375	5	L	5/6/2015 16:00	30.00	0.35	66	22,680	
375	5	T	5/6/2015 16:00	27.00	0.35	66	20,412	**20,790**
375	5	T	5/6/2015 16:01	28.00	0.35	66	21,168	
375	15	L	5/6/2015 16:02	30.00	0.35	66	22,680	**22,680**
375	15	L	5/6/2015 16:02	30.00	0.35	68	22,680	
375	15	T	5/6/2015 16:03	28.00	0.35	68	21,168	**21,546**
375	15	T	5/6/2015 16:03	29.00	0.35	66	21,924	
375	25	L	5/6/2015 16:05	31.00	0.35	68	23,436	**23,814**
375	25	L	5/6/2015 16:05	32.00	0.35	66	24,192	
375	25	T	5/6/2015 16:06	31.00	0.35	68	23,436	**23,814**
375	25	T	5/6/2015 16:06	32.00	0.35	68	24,192	

Construction Cycle 08 - P152 Subgrade - DPSPA Results

Phase II

Station	Offset	Direction	Date & Time	Seismic Modulus, ksi	Poison's Ratio	Temperature, F	Corrected Elastic Modulus for in-situ Density (94.5 pcf), psi	Average Elastic Modulus,psi
425	25	L	3/2/2017 15:12	22	0.35	50	8,316	**8,316**
425	25	L	3/2/2017 15:12	22	0.35	50	8,316	
425	25	L	3/2/2017 15:13	22	0.35	50	8,316	
425	25	T	3/2/2017 15:15	20	0.35	50	7,560	**7,560**
425	25	T	3/2/2017 15:15	20	0.35	50	7,560	
425	25	T	3/2/2017 15:15	20	0.35	50	7,560	
425	15	L	3/2/2017 15:17	22	0.35	52	8,316	**8,316**
425	15	L	3/2/2017 15:17	22	0.35	52	8,316	
425	15	L	3/2/2017 15:17	22	0.35	52	8,316	
425	15	T	3/2/2017 15:18	24	0.35	50	9,072	**9,072**
425	15	T	3/2/2017 15:18	24	0.35	52	9,072	
425	15	T	3/2/2017 15:18	24	0.35	50	9,072	
425	5	L	3/2/2017 15:19	24	0.35	50	9,072	**9,072**
425	5	L	3/2/2017 15:19	24	0.35	50	9,072	
425	5	L	3/2/2017 15:19	24	0.35	50	9,072	
425	5	T	3/2/2017 15:24	22	0.35	50	8,316	**8,568**
425	5	T	3/2/2017 15:24	23	0.35	50	8,694	
425	5	T	3/2/2017 15:24	23	0.35	50	8,694	
450	-25	L	3/2/2017 14:53	18	0.35	50	6,804	**6,804**
450	-25	L	3/2/2017 14:53	18	0.35	50	6,804	
450	-25	L	3/2/2017 14:53	18	0.35	50	6,804	
450	-25	T	3/2/2017 14:55	19	0.35	50	7,182	**7,182**
450	-25	T	3/2/2017 14:55	19	0.35	50	7,182	
450	-25	T	3/2/2017 14:56	19	0.35	50	7,182	
450	-15	L	3/2/2017 14:56	23	0.35	50	8,694	**8,946**
450	-15	L	3/2/2017 14:57	24	0.35	50	9,072	
450	-15	L	3/2/2017 14:57	24	0.35	50	9,072	
450	-15	T	3/2/2017 14:57	18	0.35	50	6,804	**6,804**
450	-15	T	3/2/2017 14:58	18	0.35	50	6,804	
450	-15	T	3/2/2017 14:58	18	0.35	50	6,804	
450	-5	L	3/2/2017 14:59	23	0.35	50	8,694	**8,568**
450	-5	L	3/2/2017 14:59	22	0.35	50	8,316	
450	-5	L	3/2/2017 14:59	23	0.35	50	8,694	
450	-5	T	3/2/2017 15:00	23	0.35	50	8,694	**8,694**
450	-5	T	3/2/2017 15:00	23	0.35	50	8,694	
450	-5	T	3/2/2017 15:00	23	0.35	50	8,694	
450	5	L	3/2/2017 15:01	24	0.35	50	9,072	**9,198**
450	5	L	3/2/2017 15:02	25	0.35	50	9,450	
450	5	L	3/2/2017 15:02	24	0.35	50	9,072	
450	5	T	3/2/2017 15:03	21	0.35	50	7,938	**7,938**
450	5	T	3/2/2017 15:03	21	0.35	52	7,938	
450	5	T	3/2/2017 15:03	21	0.35	50	7,938	
450	15	L	3/2/2017 15:04	25	0.35	50	9,450	**9,450**
450	15	L	3/2/2017 15:04	25	0.35	50	9,450	
450	15	L	3/2/2017 15:05	25	0.35	50	9,450	
450	15	T	3/2/2017 15:05	27	0.35	50	10,206	**10,206**
450	15	T	3/2/2017 15:06	27	0.35	50	10,206	
450	15	T	3/2/2017 15:06	27	0.35	52	10,206	
450	25	L	3/2/2017 15:07	22	0.35	52	8,316	**8,316**
450	25	L	3/2/2017 15:08	22	0.35	50	8,316	
450	25	L	3/2/2017 15:08	22	0.35	50	8,316	
450	25	T	3/2/2017 15:09	23	0.35	50	8,694	**8,694**
450	25	T	3/2/2017 15:09	23	0.35	50	8,694	
450	25	T	3/2/2017 15:09	23	0.35	50	8,694	
475	25	L	3/2/2017 14:33	20	0.35	48	7,560	**7,686**
475	25	L	3/2/2017 14:33	21	0.35	48	7,938	
475	25	L	3/2/2017 14:34	20	0.35	48	7,560	
475	25	T	3/2/2017 14:34	22	0.35	48	8,316	**8,316**
475	25	T	3/2/2017 14:34	22	0.35	48	8,316	
475	25	T	3/2/2017 14:35	22	0.35	50	8,316	
475	5	L	3/2/2017 14:38	25	0.35	48	9,450	**9,450**
475	5	L	3/2/2017 14:38	25	0.35	50	9,450	
475	5	L	3/2/2017 14:39	25	0.35	50	9,450	
475	5	T	3/2/2017 14:39	18	0.35	50	6,804	**6,804**
475	5	T	3/2/2017 14:40	18	0.35	50	6,804	
475	5	T	3/2/2017 14:40	18	0.35	50	6,804	
475	-5	L	3/2/2017 14:40	23	0.35	50	8,694	**8,568**
475	-5	L	3/2/2017 14:41	23	0.35	50	8,694	
475	-5	L	3/2/2017 14:41	22	0.35	50	8,316	
475	-5	T	3/2/2017 14:42	25	0.35	50	9,450	**14,868**
475	-5	T	3/2/2017 14:42	68	0.35	50	25,704	
475	-5	T	3/2/2017 14:42	25	0.35	50	9,450	
475	-15	L	3/2/2017 14:44	22	0.35	50	8,316	**8,442**
475	-15	L	3/2/2017 14:44	23	0.35	50	8,694	
475	-15	L	3/2/2017 14:44	22	0.35	50	8,316	
475	-15	T	3/2/2017 14:45	29	0.35	50	10,962	**10,962**
475	-15	T	3/2/2017 14:45	29	0.35	50	10,962	
475	-15	T	3/2/2017 14:46	29	0.35	50	10,962	

475	-25	L	3/2/2017 14:47	19	0.35	50	7,182	
475	-25	L	3/2/2017 14:48	23	0.35	50	8,694	**7,686**
475	-25	L	3/2/2017 14:48	19	0.35	50	7,182	
475	-25	T	3/2/2017 14:49	22	0.35	50	8,316	
475	-25	T	3/2/2017 14:49	23	0.35	50	8,694	**8,442**
475	-25	T	3/2/2017 14:49	22	0.35	50	8,316	
520	25	L	3/2/2017 13:52	25	0.35	48	9,450	
520	25	L	3/2/2017 13:52	25	0.35	48	9,450	**9,450**
520	25	L	3/2/2017 13:52	25	0.35	48	9,450	
520	25	T	3/2/2017 13:53	20	0.35	48	7,560	
520	25	T	3/2/2017 13:53	20	0.35	48	7,560	**7,560**
520	25	T	3/2/2017 13:53	20	0.35	48	7,560	
520	15	L	3/2/2017 13:54	23	0.35	48	8,694	
520	15	L	3/2/2017 13:54	23	0.35	48	8,694	**8,694**
520	15	L	3/2/2017 13:55	23	0.35	48	8,694	
520	15	T	3/2/2017 13:57	20	0.35	48	7,560	
520	15	T	3/2/2017 13:57	21	0.35	48	7,938	**7,686**
520	15	T	3/2/2017 13:57	20	0.35	48	7,560	
520	5	L	3/2/2017 13:57	20	0.35	48	7,560	
520	5	L	3/2/2017 13:57	20	0.35	48	7,560	**7,560**
520	5	L	3/2/2017 13:57	20	0.35	48	7,560	
520	5	T	3/2/2017 13:57	20	0.35	48	7,560	
520	5	T	3/2/2017 13:57	20	0.35	48	7,560	**7,560**
520	5	T	3/2/2017 13:57	20	0.35	48	7,560	
520	-5	L	3/2/2017 13:57	20	0.35	48	7,560	
520	-5	L	3/2/2017 13:57	20	0.35	48	7,560	**7,560**
520	-5	L	3/2/2017 13:57	20	0.35	48	7,560	
520	-5	T	3/2/2017 13:57	20	0.35	48	7,560	
520	-5	T	3/2/2017 13:57	20	0.35	48	7,560	**7,560**
520	-5	T	3/2/2017 13:57	20	0.35	48	7,560	
520	-15	L	3/2/2017 13:57	20	0.35	48	7,560	
520	-15	L	3/2/2017 13:57	20	0.35	48	7,560	**7,560**
520	-15	L	3/2/2017 13:57	20	0.35	48	7,560	
520	-15	T	3/2/2017 13:57	20	0.35	48	7,560	
520	-15	T	3/2/2017 13:57	20	0.35	48	7,560	**7,560**
520	-15	T	3/2/2017 13:57	20	0.35	48	7,560	
520	-25	L	3/2/2017 14:14	15	0.35	48	5,670	
520	-25	L	3/2/2017 14:15	15	0.35	48	5,670	**5,670**
520	-25	L	3/2/2017 14:15	15	0.35	48	5,670	
520	-25	T	3/2/2017 14:16	19	0.35	48	7,182	
520	-25	T	3/2/2017 14:18	18	0.35	48	6,804	**6,804**
520	-25	T	3/2/2017 14:18	17	0.35	48	6,426	
520	-15	L	3/2/2017 14:23	20	0.35	48	7,560	
520	-15	L	3/2/2017 14:23	21	0.35	48	7,938	**7,812**
520	-15	L	3/2/2017 14:23	21	0.35	48	7,938	
520	-15	T	3/2/2017 14:24	24	0.35	48	9,072	
520	-15	T	3/2/2017 14:24	24	0.35	48	9,072	**8,946**
520	-15	T	3/2/2017 14:24	23	0.35	48	8,694	
520	-5	L	3/2/2017 14:25	23	0.35	48	8,694	
520	-5	L	3/2/2017 14:25	23	0.35	48	8,694	**8,694**
520	-5	L	3/2/2017 14:26	23	0.35	48	8,694	
520	-5	T	3/2/2017 14:26	23	0.35	48	8,694	
520	-5	T	3/2/2017 14:26	24	0.35	48	9,072	**8,820**
520	-5	T	3/2/2017 14:29	23	0.35	48	8,694	
520	5	L	3/2/2017 14:30	22	0.35	48	8,316	
520	5	L	3/2/2017 14:30	22	0.35	48	8,316	**8,316**
520	5	L	3/2/2017 14:30	22	0.35	48	8,316	
520	5	T	3/2/2017 14:31	19	0.35	48	7,182	
520	5	T	3/2/2017 14:31	19	0.35	48	7,182	**7,308**
520	5	T	3/2/2017 14:31	20	0.35	48	7,560	
540	-25	L	3/2/2017 13:36	16	0.35	48	6,048	
540	-25	L	3/2/2017 13:36	16	0.35	48	6,048	**6,048**
540	-25	L	3/2/2017 13:36	16	0.35	48	6,048	
540	-25	T	3/2/2017 13:37	18	0.35	48	6,804	
540	-25	T	3/2/2017 13:37	18	0.35	48	6,804	**6,804**
540	-25	T	3/2/2017 13:38	18	0.35	48	6,804	
540	-15	L	3/2/2017 13:38	20	0.35	48	7,560	
540	-15	L	3/2/2017 13:39	19	0.35	48	7,182	**7,434**
540	-15	L	3/2/2017 13:39	20	0.35	48	7,560	
540	-15	T	3/2/2017 13:40	19	0.35	48	7,182	
540	-15	T	3/2/2017 13:40	19	0.35	48	7,182	**7,182**
540	-15	T	3/2/2017 13:40	19	0.35	48	7,182	
540	-5	L	3/2/2017 13:41	20	0.35	48	7,560	
540	-5	L	3/2/2017 13:41	25	0.35	48	9,450	**8,316**
540	-5	L	3/2/2017 13:41	21	0.35	48	7,938	
540	-5	T	3/2/2017 13:42	18	0.35	48	6,804	
540	-5	T	3/2/2017 13:42	18	0.35	48	6,804	**6,804**
540	-5	T	3/2/2017 13:42	18	0.35	48	6,804	
540	5	L	3/2/2017 13:43	22	0.35	48	8,316	
540	5	L	3/2/2017 13:43	22	0.35	48	8,316	**8,316**
540	5	L	3/2/2017 13:44	22	0.35	48	8,316	
540	5	T	3/2/2017 13:44	17	0.35	48	6,426	
540	5	T	3/2/2017 13:44	17	0.35	48	6,426	**6,426**
540	5	T	3/2/2017 13:45	17	0.35	48	6,426	
540	15	L	3/2/2017 13:46	18	0.35	48	6,804	
540	15	L	3/2/2017 13:46	18	0.35	46	6,804	**6,804**
540	15	L	3/2/2017 13:46	18	0.35	48	6,804	

540	15	T	3/2/2017 13:47	22	0.35	48	8,316	
540	15	T	3/2/2017 13:47	23	0.35	48	8,694	**8,442**
540	15	T	3/2/2017 13:47	22	0.35	48	8,316	
540	25	L	3/2/2017 13:49	24	0.35	48	9,072	
540	25	L	3/2/2017 13:49	23	0.35	48	8,694	**8,946**
540	25	L	3/2/2017 13:49	24	0.35	48	9,072	
540	25	T	3/2/2017 13:50	20	0.35	48	7,560	
540	25	T	3/2/2017 13:50	20	0.35	48	7,560	**7,560**
540	25	T	3/2/2017 13:50	20	0.35	48	7,560	
580	25	L	9/1/2017 12:03	40	0.35	70	15,120	
580	25	L	9/1/2017 12:03	40	0.35	70	15,120	**15,120**
580	25	L	9/1/2017 12:04	40	0.35	70	15,120	
580	25	L	9/1/2017 10:24	27	0.35	66	10,206	
580	25	L	9/1/2017 10:25	27	0.35	66	10,206	**10,332**
580	25	L	9/1/2017 10:25	28	0.35	66	10,584	
580	25	T	9/1/2017 10:26	36	0.35	64	13,608	
580	25	T	9/1/2017 10:26	36	0.35	66	13,608	**13,608**
580	25	T	9/1/2017 10:26	36	0.35	64	13,608	
580	15	L	9/1/2017 10:27	25	0.35	64	9,450	
580	15	L	9/1/2017 10:27	25	0.35	66	9,450	**9,576**
580	15	L	9/1/2017 10:27	26	0.35	66	9,828	
580	15	T	9/1/2017 10:28	22	0.35	64	8,316	
580	15	T	9/1/2017 10:28	22	0.35	66	8,316	**8,316**
580	15	T	9/1/2017 10:29	22	0.35	66	8,316	
580	5	L	9/1/2017 10:31	33	0.35	66	12,474	
580	5	L	9/1/2017 10:31	33	0.35	66	12,474	**12,474**
580	5	L	9/1/2017 10:31	33	0.35	64	12,474	
580	5	T	9/1/2017 10:33	36	0.35	64	13,608	
580	5	T	9/1/2017 10:33	35	0.35	64	13,230	**13,356**
580	5	T	9/1/2017 10:33	35	0.35	64	13,230	
580	-5	L	9/1/2017 10:34	33	0.35	64	12,474	
580	-5	L	9/1/2017 10:35	32	0.35	64	12,096	**12,348**
580	-5	L	9/1/2017 10:35	33	0.35	66	12,474	
580	-5	T	9/1/2017 10:37	38	0.35	64	14,364	
580	-5	T	9/1/2017 10:37	38	0.35	64	14,364	**14,364**
580	-5	T	9/1/2017 10:37	38	0.35	64	14,364	
580	-15	L	9/1/2017 10:38	24	0.35	64	9,072	
580	-15	L	9/1/2017 10:38	24	0.35	64	9,072	**9,072**
580	-15	L	9/1/2017 10:38	24	0.35	64	9,072	
580	-15	T	9/1/2017 10:39	22	0.35	64	8,316	
580	-15	T	9/1/2017 10:39	21	0.35	64	7,938	**8,190**
580	-15	T	9/1/2017 10:39	22	0.35	64	8,316	
580	-25	L	9/1/2017 10:40	30	0.35	64	11,340	
580	-25	L	9/1/2017 10:40	30	0.35	64	11,340	**11,340**
580	-25	L	9/1/2017 10:40	30	0.35	64	11,340	
580	-25	T	9/1/2017 10:41	26	0.35	64	9,828	
580	-25	T	9/1/2017 10:41	26	0.35	64	9,828	**9,828**
580	-25	T	9/1/2017 10:41	26	0.35	64	9,828	
590	-25	L	9/1/2017 10:50	30	0.35	64	11,340	
590	-25	L	9/1/2017 10:51	30	0.35	64	11,340	**11,214**
590	-25	L	9/1/2017 10:51	29	0.35	64	10,962	
590	-25	T	9/1/2017 10:52	31	0.35	64	11,718	
590	-25	T	9/1/2017 10:52	31	0.35	64	11,718	**11,592**
590	-25	T	9/1/2017 10:52	30	0.35	64	11,340	
590	-15	L	9/1/2017 10:56	26	0.35	64	9,828	
590	-15	L	9/1/2017 10:56	26	0.35	64	9,828	**9,954**
590	-15	L	9/1/2017 10:57	27	0.35	64	10,206	
590	-15	T	9/1/2017 10:57	26	0.35	64	9,828	
590	-15	T	9/1/2017 10:57	26	0.35	64	9,828	**9,828**
590	-15	T	9/1/2017 10:58	26	0.35	64	9,828	
590	-5	L	9/1/2017 10:58	30	0.35	64	11,340	
590	-5	L	9/1/2017 10:58	30	0.35	64	11,340	**11,466**
590	-5	L	9/1/2017 10:59	31	0.35	64	11,718	
590	-5	T	9/1/2017 11:00	29	0.35	64	10,962	
590	-5	T	9/1/2017 11:00	29	0.35	64	10,962	**10,962**
590	-5	T	9/1/2017 11:00	29	0.35	64	10,962	
590	5	L	9/1/2017 11:01	22	0.35	64	8,316	
590	5	L	9/1/2017 11:01	22	0.35	64	8,316	**8,316**
590	5	L	9/1/2017 11:01	22	0.35	64	8,316	
590	5	T	9/1/2017 11:02	22	0.35	64	8,316	
590	5	T	9/1/2017 11:02	22	0.35	64	8,316	**8,316**
590	5	T	9/1/2017 11:02	22	0.35	64	8,316	
590	15	L	9/1/2017 11:03	29	0.35	64	10,962	
590	15	L	9/1/2017 11:03	29	0.35	64	10,962	**11,214**
590	15	L	9/1/2017 11:04	31	0.35	64	11,718	
590	15	T	9/1/2017 11:04	24	0.35	64	9,072	
590	15	T	9/1/2017 11:04	24	0.35	64	9,072	**9,072**
590	15	T	9/1/2017 11:05	24	0.35	64	9,072	
590	25	L	9/1/2017 11:06	22	0.35	64	8,316	
590	25	L	9/1/2017 11:07	22	0.35	66	8,316	**8,316**
590	25	L	9/1/2017 11:07	22	0.35	64	8,316	
590	25	T	9/1/2017 11:07	39	0.35	66	14,742	
590	25	T	9/1/2017 11:08	39	0.35	66	14,742	**14,742**
590	25	T	9/1/2017 11:08	39	0.35	64	14,742	
620	25	L	9/1/2017 11:11	29	0.35	66	10,962	
620	25	L	9/1/2017 11:11	28	0.35	66	10,584	**10,710**
620	25	L	9/1/2017 11:12	28	0.35	66	10,584	

620	25	T	9/1/2017 11:13	26	0.35	66	9,828	
620	25	T	9/1/2017 11:14	26	0.35	66	9,828	**9,828**
620	25	T	9/1/2017 11:14	26	0.35	66	9,828	
620	15	L	9/1/2017 11:15	26	0.35	66	9,828	
620	15	L	9/1/2017 11:15	26	0.35	66	9,828	**9,828**
620	15	L	9/1/2017 11:15	26	0.35	66	9,828	
620	15	T	9/1/2017 11:17	15	0.35	66	5,670	
620	15	T	9/1/2017 11:17	15	0.35	66	5,670	**5,670**
620	15	T	9/1/2017 11:17	15	0.35	66	5,670	
620	5	L	9/1/2017 11:18	27	0.35	66	10,206	
620	5	L	9/1/2017 11:18	27	0.35	66	10,206	**10,206**
620	5	L	9/1/2017 11:18	27	0.35	66	10,206	
620	5	T	9/1/2017 11:19	29	0.35	68	10,962	
620	5	T	9/1/2017 11:19	29	0.35	68	10,962	**10,962**
620	5	T	9/1/2017 11:19	29	0.35	66	10,962	
620	-5	L	9/1/2017 11:21	31	0.35	66	11,718	
620	-5	L	9/1/2017 11:22	31	0.35	68	11,718	**11,466**
620	-5	L	9/1/2017 11:22	29	0.35	68	10,962	
620	-5	T	9/1/2017 11:22	23	0.35	68	8,694	
620	-5	T	9/1/2017 11:23	23	0.35	68	8,694	**8,694**
620	-5	T	9/1/2017 11:23	23	0.35	68	8,694	
620	-15	L	9/1/2017 11:24	35	0.35	68	13,230	
620	-15	L	9/1/2017 11:24	35	0.35	68	13,230	**13,230**
620	-15	L	9/1/2017 11:25	35	0.35	68	13,230	
620	-15	T	9/1/2017 11:26	30	0.35	68	11,340	
620	-15	T	9/1/2017 11:26	29	0.35	68	10,962	**11,340**
620	-15	T	9/1/2017 11:26	31	0.35	68	11,718	
620	-25	L	9/1/2017 11:27	31	0.35	68	11,718	
620	-25	L	9/1/2017 11:28	32	0.35	68	12,096	**11,970**
620	-25	L	9/1/2017 11:28	32	0.35	68	12,096	
620	-25	T	9/1/2017 11:29	26	0.35	68	9,828	
620	-25	T	9/1/2017 11:29	25	0.35	68	9,450	**9,702**
620	-25	T	9/1/2017 11:30	26	0.35	68	9,828	
630	-25	L	9/1/2017 11:30	26	0.35	68	9,828	
630	-25	L	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	-25	L	9/1/2017 11:30	26	0.35	68	9,828	
630	-25	T	9/1/2017 11:30	26	0.35	68	9,828	
630	-25	T	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	-25	T	9/1/2017 11:30	26	0.35	68	9,828	
630	-15	L	9/1/2017 11:30	26	0.35	68	9,828	
630	-15	L	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	-15	L	9/1/2017 11:30	26	0.35	68	9,828	
630	-15	T	9/1/2017 11:30	26	0.35	68	9,828	
630	-15	T	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	-15	T	9/1/2017 11:30	26	0.35	68	9,828	
630	15	L	9/1/2017 11:30	26	0.35	68	9,828	
630	15	L	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	15	L	9/1/2017 11:30	26	0.35	68	9,828	
630	15	T	9/1/2017 11:30	26	0.35	68	9,828	
630	15	T	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	15	T	9/1/2017 11:30	26	0.35	68	9,828	
630	25	L	9/1/2017 11:30	26	0.35	68	9,828	
630	25	L	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	25	L	9/1/2017 11:30	26	0.35	68	9,828	
630	25	T	9/1/2017 11:30	26	0.35	68	9,828	
630	25	T	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	25	T	9/1/2017 11:30	26	0.35	68	9,828	
630	5	L	9/1/2017 11:30	26	0.35	68	9,828	
630	5	L	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	5	L	9/1/2017 11:30	26	0.35	68	9,828	
630	5	T	9/1/2017 11:30	26	0.35	68	9,828	
630	5	T	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	5	T	9/1/2017 11:30	26	0.35	68	9,828	
630	-5	L	9/1/2017 11:30	26	0.35	68	9,828	
630	-5	L	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	-5	L	9/1/2017 11:30	26	0.35	68	9,828	
630	-5	T	9/1/2017 11:30	26	0.35	68	9,828	
630	-5	T	9/1/2017 11:30	26	0.35	68	9,828	**9,828**
630	-5	T	9/1/2017 11:30	26	0.35	68	9,828	

Construction Cycle 08 - P152 Subgrade - LWD Results

Phase I

Location	Drop No.	Radius (in)	Load (lbf)	Pressure (psi)	Deflection (mils)	Modulus (ksi)
Sta.345, offset25	1	6	594.3	5.3	1.6	23.1
Sta.345, offset25	2	6	770.9	6.8	2.1	22.8
Sta.345, offset25	3	6	940	8.3	2.7	21.6
Sta.345, offset25	4	6	1256.3	11.1	3.9	20.0
Sta.345, offset15	1	6	612.2	5.4	2.2	17.3
Sta.345, offset15	2	6	777.7	6.9	3.0	16.1
Sta.345, offset15	3	6	941	8.3	3.9	15.0
Sta.345, offset15	4	6	1274.1	11.3	5.7	13.9
Sta.345, offset5	1	6	608	5.4	3.1	12.2
Sta.345, offset5	2	6	773.9	6.8	4.3	11.2
Sta.345, offset5	3	6	957.2	8.5	5.6	10.6
Sta.345, offset5	4	6	1272.4	11.3	7.8	10.1
Sta.345, offset-5	1	6	611.8	5.4	2.9	13.1
Sta.345, offset-5	2	6	781.6	6.9	3.8	12.8
Sta.345, offset-5	3	6	951.9	8.4	4.9	12.1
Sta.345, offset-5	4	6	1269.5	11.2	7.0	11.3
Sta.345, offset-15	1	6	605	5.3	2.4	15.6
Sta.345, offset-15	2	6	777.3	6.9	3.2	15.1
Sta.345, offset-15	3	6	950.3	8.4	4.0	14.7
Sta.345, offset-15	4	6	1262.2	11.2	5.4	14.5
Sta.345, offset-25	1	6	605.6	5.4	4.2	8.9
Sta.345, offset-25	2	6	769.7	6.8	5.5	8.7
Sta.345, offset-25	3	6	951.3	8.4	6.9	8.6
Sta.345, offset-25	4	6	1268.7	11.2	9.4	8.4
Sta.360, offset-25	1	6	602.5	5.3	2.4	15.6
Sta.360, offset-25	2	6	777.5	6.9	3.2	15.1
Sta.360, offset-25	3	6	946.7	8.4	4.1	14.3
Sta.360, offset-25	4	6	1263.9	11.2	5.9	13.3
Sta.360, offset-15	1	6	608.6	5.4	1.4	27.0
Sta.360, offset-15	2	6	781.5	6.9	2.0	24.3
Sta.360, offset-15	3	6	948.9	8.4	2.5	23.6
Sta.360, offset-15	4	6	1247.5	11.0	3.7	20.9
Sta.360, offset-5	1	6	599.3	5.3	2.7	13.8
Sta.360, offset-5	2	6	772.6	6.8	3.7	13.0
Sta.360, offset-5	3	6	946.6	8.4	4.6	12.8
Sta.360, offset-5	4	6	1265.7	11.2	6.3	12.5
Sta.360, offset5	1	6	598.4	5.3	1.7	21.8
Sta.360, offset5	2	6	778.5	6.9	2.3	21.0
Sta.360, offset5	3	6	958.5	8.5	3.0	19.8
Sta.360, offset5	4	6	1262.9	11.2	4.2	18.7
Sta.360, offset15	1	6	607.9	5.4	2.0	18.9
Sta.360, offset15	2	6	774.6	6.8	2.7	17.8
Sta.360, offset15	3	6	948.9	8.4	3.4	17.3
Sta.360, offset15	4	6	1250.5	11.1	4.7	16.5
Sta.360, offset25	1	6	602.3	5.3	2.4	15.6
Sta.360, offset25	2	6	774.4	6.8	3.2	15.0
Sta.360, offset25	3	6	948	8.4	4.0	14.7
Sta.360, offset25	4	6	1260.2	11.1	5.6	14.0
Sta.375, offset25	1	6	610.9	5.4	3.8	10.0
Sta.375, offset25	2	6	779.2	6.9	5.1	9.5

Sta.375, offset25	3	6	951.3	8.4	6.4	9.2
Sta.375, offset25	4	6	1271.5	11.2	9.0	8.8
Sta.375, offset15	1	6	617.2	5.5	1.5	25.5
Sta.375, offset15	2	6	783	6.9	2.0	24.3
Sta.375, offset15	3	6	968.5	8.6	2.6	23.1
Sta.375, offset15	4	6	1279.8	11.3	3.5	22.7
Sta.375, offset5	1	6	610.9	5.4	1.4	27.1
Sta.375, offset5	2	6	777	6.9	1.8	26.8
Sta.375, offset5	3	6	947.7	8.4	2.3	25.6
Sta.375, offset5	4	6	1266.1	11.2	3.3	23.8
Sta.375, offset-5	1	6	602.7	5.3	2.6	14.4
Sta.375, offset-5	2	6	780.9	6.9	3.6	13.5
Sta.375, offset-5	3	6	965.3	8.5	4.8	12.5
Sta.375, offset-5	4	6	1263.7	11.2	6.7	11.7
Sta.375, offset-15	1	6	611.8	5.4	2.5	15.2
Sta.375, offset-15	2	6	773.4	6.8	3.4	14.1
Sta.375, offset-15	3	6	955	8.4	4.3	13.8
Sta.375, offset-15	4	6	1269.5	11.2	6.2	12.7
Sta.375, offset-25	1	6	609.3	5.4	3.3	11.5
Sta.375, offset-25	2	6	776.2	6.9	4.4	10.9
Sta.375, offset-25	3	6	952.7	8.4	5.5	10.8
Sta.375, offset-25	4	6	1268.4	11.2	7.6	10.4

Construction Cycle 08 - P152 Subgrade - LWD Results

Phase II

Station	Offset	Drop No.	Radius (mm)	Load (kN)	Pressure (kPa)	Deflection (Micron)	Modulus (MPa)	Modulus (ksi)
425	-25	1	150	2.6	36.8	104.0	62.1	9.0
425	-25	2	150	3.3	46.7	139.0	58.9	8.5
425	-25	3	150	4.1	58.0	180.0	56.6	8.2
425	-25	4	150	5.3	75.0	246.0	53.5	7.8
425	-15	1	150	2.6	36.8	46.0	140.3	20.4
425	-15	2	150	3.3	46.7	63.0	130.1	18.9
425	-15	3	150	4.1	58.0	82.0	124.1	18.0
425	-15	4	150	5.3	75.0	114.0	115.4	16.7
425	-5	1	150	2.6	36.8	56.0	115.3	16.7
425	-5	2	150	3.3	46.7	77.0	106.4	15.4
425	-5	3	150	4.1	58.0	101.0	100.8	14.6
425	-5	4	150	5.3	75.0	143.0	92.0	13.3
425	5	1	150	2.6	36.8	75.0	86.1	12.5
425	5	2	150	3.3	46.7	101.0	81.1	11.8
425	5	3	150	4.1	58.0	132.0	77.1	11.2
425	5	4	150	5.3	75.0	191.0	68.9	10.0
425	15	1	150	2.6	36.8	75.0	86.1	12.5
425	15	2	150	3.3	46.7	109.0	75.2	10.9
425	15	3	150	4.1	58.0	149.0	68.3	9.9
425	15	4	150	5.3	75.0	227.0	58.0	8.4
425	25	1	150	2.5	35.4	70.0	88.7	12.9
425	25	2	150	3.3	46.7	104.0	78.8	11.4
425	25	3	150	4	56.6	138.0	72.0	10.4
425	25	4	150	5.3	75.0	215.0	61.2	8.9
450	25	1	150	2.5	35.4	91.0	68.2	9.9
450	25	2	150	3.3	46.7	129.0	63.5	9.2
450	25	3	150	4	56.6	174.0	57.1	8.3
450	25	4	150	5.3	75.0	265.0	49.7	7.2
450	15	1	150	2.5	35.4	56.0	110.8	16.1
450	15	2	150	3.3	46.7	74.0	110.7	16.1
450	15	3	150	4	56.6	91.0	109.1	15.8
450	15	4	150	5.4	76.4	131.0	102.3	14.8
450	15	1	150	2.6	36.8	53.0	121.8	17.7
450	15	2	150	3.3	46.7	74.0	110.7	16.1
450	15	3	150	4.1	58.0	99.0	102.8	14.9
450	15	4	150	5.4	76.4	145.0	92.5	13.4
450	5	1	150	2.6	36.8	36.0	179.3	26.0
450	5	2	150	3.3	46.7	49.0	167.2	24.3
450	5	3	150	4.1	58.0	63.0	161.6	23.4
450	5	4	150	5.3	75.0	95.0	138.5	20.1
450	-5	1	150	2.6	36.8	161.0	40.1	5.8
450	-5	2	150	3.4	48.1	213.0	39.6	5.7
450	-5	3	150	4.1	58.0	280.0	36.4	5.3
450	-5	4	150	5.3	75.0	377.0	34.9	5.1
450	-15	1	150	2.6	36.8	218.0	29.6	4.3
450	-15	2	150	3.3	46.7	289.0	28.4	4.1
450	-15	3	150	4.1	58.0	346.0	29.4	4.3
450	-15	4	150	5.5	77.8	458.0	29.8	4.3
450	-25	1	150	2.6	36.8	302.0	21.4	3.1

450	-25	2	150	3.3	46.7	423.0	19.4	2.8
450	-25	3	150	4.1	58.0	550.0	18.5	2.7
450	-25	4	150	5.3	75.0	762.0	17.3	2.5
475	-25	1	150	2.6	36.8	353.0	18.3	2.7
475	-25	2	150	3.3	46.7	459.0	17.9	2.6
475	-25	3	150	4	56.6	572.0	17.4	2.5
475	-25	4	150	5.3	75.0	778.0	16.9	2.5
475	-15	1	150	2.6	36.8	214.0	30.2	4.4
475	-15	2	150	3.3	46.7	269.0	30.5	4.4
475	-15	3	150	4.1	58.0	325.0	31.3	4.5
475	-15	4	150	5.4	76.4	423.0	31.7	4.6
475	-5	1	150	2.6	36.8	112.0	57.6	8.4
475	-5	2	150	3.3	46.7	141.0	58.1	8.4
475	-5	3	150	4	56.6	174.0	57.1	8.3
475	-5	4	150	5.4	76.4	238.0	56.3	8.2
475	5	1	150	2.6	36.8	34.0	189.9	27.5
475	5	2	150	3.3	46.7	45.0	182.1	26.4
475	5	3	150	4.1	58.0	58.0	175.5	25.5
475	5	4	150	5.4	76.4	83.0	161.5	23.4
475	15	1	150	2.6	36.8	58.0	111.3	16.1
475	15	2	150	3.3	46.7	79.0	103.7	15.0
475	15	3	150	4.1	58.0	100.0	101.8	14.8
475	15	4	150	5.3	75.0	139.0	94.7	13.7
475	25	1	150	2.6	36.8	62.0	104.1	15.1
475	25	2	150	3.3	46.7	82.0	99.9	14.5
475	25	3	150	4.1	58.0	104.0	97.9	14.2
475	25	4	150	5.4	76.4	142.0	94.4	13.7
520	-25	1	150	2.6	36.8	109.0	59.2	8.6
520	-25	2	150	3.3	46.7	145.0	56.5	8.2
520	-25	3	150	4	56.6	182.0	54.6	7.9
520	-25	4	150	5.1	72.2	235.0	53.9	7.8
520	-15	1	150	2.6	36.8	61.0	105.8	15.3
520	-15	2	150	3.3	46.7	85.0	96.4	14.0
520	-15	3	150	4	56.6	112.0	88.7	12.9
520	-15	4	150	5.2	73.6	169.0	76.4	11.1
520	-5	1	150	2.6	36.8	136.0	47.5	6.9
520	-5	2	150	3.3	46.7	177.0	46.3	6.7
520	-5	3	150	4	56.6	226.0	43.9	6.4
520	-5	4	150	5.3	75.0	322.0	40.9	5.9
520	5	1	150	2.7	38.2	72.0	93.1	13.5
520	5	2	150	3.3	46.7	97.0	84.5	12.3
520	5	3	150	4.1	58.0	123.0	82.8	12.0
520	5	4	150	5.3	75.0	189.0	69.6	10.1
520	15	1	150	2.6	36.8	170.0	38.0	5.5
520	15	2	150	3.3	46.7	205.0	40.0	5.8
520	15	3	150	4.1	58.0	241.0	42.2	6.1
520	15	4	150	5.3	75.0	315.0	41.8	6.1
520	25	1	150	2.6	36.8	53.0	121.8	17.7
520	25	2	150	3.3	46.7	72.0	113.8	16.5
520	25	3	150	4.1	58.0	94.0	108.3	15.7
520	25	4	150	5.4	76.4	141.0	95.1	13.8
540	25	1	150	2.7	38.2	55.0	121.9	17.7
540	25	2	150	3.4	48.1	77.0	109.6	15.9
540	25	3	150	4	56.6	99.0	100.3	14.5
540	25	4	150	5.3	75.0	146.0	90.1	13.1

540	15	1	150	2.6	36.8	41.0	157.4	22.8
540	15	2	150	3.3	46.7	57.0	143.7	20.8
540	15	3	150	4.1	58.0	74.0	137.6	20.0
540	15	4	150	5.3	75.0	110.0	119.6	17.4
540	15	1	150	2.6	36.8	332.0	19.4	2.8
540	15	2	150	3.3	46.7	383.0	21.4	3.1
540	15	3	150	4	56.6	488.0	20.4	3.0
540	15	4	150	5.2	73.6	573.0	22.5	3.3
540	5	1	150	2.6	36.8	64.0	100.9	14.6
540	5	2	150	3.3	46.7	88.0	93.1	13.5
540	5	3	150	4	56.6	111.0	89.5	13.0
540	5	4	150	5.3	75.0	155.0	84.9	12.3
540	-5	1	150	2.7	38.2	66.0	101.6	14.7
540	-5	2	150	3.4	48.1	86.0	98.2	14.2
540	-5	3	150	4.1	58.0	110.0	92.5	13.4
540	-5	4	150	5.3	75.0	155.0	84.9	12.3
540	-15	1	150	2.6	36.8	163.0	39.6	5.7
540	-15	2	150	3.4	48.1	224.0	37.7	5.5
540	-15	3	150	4	56.6	288.0	34.5	5.0
540	-15	4	150	5.2	73.6	405.0	31.9	4.6
540	-25	1	150	2.6	36.8	78.0	82.8	12.0
540	-25	2	150	3.3	46.7	105.0	78.0	11.3
540	-25	3	150	4	56.6	137.0	72.5	10.5
540	-25	4	150	5.3	75.0	206.0	63.9	9.3
580	25	1	150	2.7	38.2	46.0	145.7	21.1
580	25	2	150	3.3	46.7	59.0	138.9	20.1
580	25	3	150	4	56.6	75.0	132.4	19.2
580	25	4	150	5.2	73.6	103.0	125.3	18.2
580	15	1	150	2.6	36.8	72.0	89.7	13.0
580	15	2	150	3.2	45.3	95.0	83.6	12.1
580	15	3	150	4.1	58.0	123.0	82.8	12.0
580	15	4	150	5.4	76.4	173.0	77.5	11.2
580	5	1	150	2.6	36.8	57.0	113.3	16.4
580	5	2	150	3.3	46.7	76.0	107.8	15.6
580	5	3	150	4.1	58.0	97.0	104.9	15.2
580	5	4	150	5.4	76.4	136.0	98.6	14.3
580	-5	1	150	2.1	29.7	27.0	193.1	28.0
580	-5	2	150	3.3	46.7	43.0	190.5	27.6
580	-5	3	150	4.1	58.0	56.0	181.8	26.4
580	-5	4	150	5.4	76.4	75.0	178.8	25.9
580	-15	1	150	2.2	31.1	40.0	136.6	19.8
580	-15	2	150	3.3	46.7	73.0	112.2	16.3
580	-15	3	150	4	56.6	97.0	102.4	14.8
580	-15	4	150	5.3	75.0	146.0	90.1	13.1
580	-25	1	150	2.6	36.8	90.0	71.7	10.4
580	-25	2	150	3.3	46.7	124.0	66.1	9.6
580	-25	3	150	4	56.6	157.0	63.3	9.2
580	-25	4	150	5.3	75.0	229.0	57.5	8.3
590	-25	1	150	2.6	36.8	62.0	104.1	15.1
590	-25	2	150	3.3	46.7	82.0	99.9	14.5
590	-25	3	150	4	56.6	105.0	94.6	13.7
590	-25	4	150	5.3	75.0	151.0	87.1	12.6
590	-15	1	150	2.6	36.8	65.0	99.3	14.4
590	-15	2	150	3.3	46.7	88.0	93.1	13.5
590	-15	3	150	4	56.6	116.0	85.6	12.4

590	-15	4	150	5.3	75.0	171.0	77.0	11.2
590	-5	1	150	2.6	36.8	88.0	73.4	10.6
590	-5	2	150	3.3	46.7	118.0	69.4	10.1
590	-5	3	150	4	56.6	149.0	66.7	9.7
590	-5	4	150	5.3	75.0	205.0	64.2	9.3
590	5	1	150	2.6	36.8	175.0	36.9	5.4
590	5	2	150	3.3	46.7	222.0	36.9	5.4
590	5	3	150	4	56.6	275.0	36.1	5.2
590	5	4	150	5.3	75.0	342.0	38.5	5.6
590	15	1	150	2.6	36.8	52.0	124.1	18.0
590	15	2	150	3.3	46.7	71.0	115.4	16.7
590	15	3	150	4.1	58.0	94.0	108.3	15.7
590	15	4	150	5.3	75.0	133.0	98.9	14.3
590	25	1	150	2.7	38.2	45.0	149.0	21.6
590	25	2	150	3.3	46.7	57.0	143.7	20.8
590	25	3	150	4	56.6	72.0	137.9	20.0
590	25	4	150	5.3	75.0	106.0	124.1	18.0
620	25	1	150	2.6	36.8	90.0	71.7	10.4
620	25	2	150	2.6	36.8	92.0	70.2	10.2
620	25	3	150	4	56.6	147.0	67.6	9.8
620	25	4	150	5.3	75.0	200.0	65.8	9.5
620	15	1	150	2.6	36.8	102.0	63.3	9.2
620	15	2	150	3.3	46.7	133.0	61.6	8.9
620	15	3	150	4	56.6	158.0	62.9	9.1
620	15	4	150	5.3	75.0	206.0	63.9	9.3
620	5	1	150	2.7	38.2	75.0	89.4	13.0
620	5	2	150	3.3	46.7	105.0	78.0	11.3
620	5	3	150	4	56.6	127.0	78.2	11.3
620	5	4	150	5.3	75.0	186.0	70.7	10.3
620	-5	1	150	2.6	36.8	33.0	195.6	28.4
620	-5	2	150	3.4	48.1	44.0	191.9	27.8
620	-5	3	150	4	56.6	56.0	177.3	25.7
620	-5	4	150	5.3	75.0	82.0	160.5	23.3
620	-15	1	150	2.6	36.8	34.0	189.9	27.5
620	-15	2	150	3.3	46.7	46.0	178.1	25.8
620	-15	3	150	4.1	58.0	57.0	178.6	25.9
620	-15	4	150	5.3	75.0	79.0	166.6	24.2
620	-25	1	150	2.6	36.8	43.0	150.1	21.8
620	-25	2	150	3.3	46.7	60.0	136.6	19.8
620	-25	3	150	4.1	58.0	78.0	130.5	18.9
620	-25	4	150	5.4	76.4	113.0	118.6	17.2
630	-25	1	150	2.5	35.4	48.0	129.3	18.8
630	-25	2	150	3.3	46.7	66.0	124.1	18.0
630	-25	3	150	4	56.6	85.0	116.8	16.9
630	-25	4	150	5.3	75.0	122.0	107.9	15.6
630	-15	1	150	2.5	35.4	37.0	167.8	24.3
630	-15	2	150	3.2	45.3	49.0	162.1	23.5
630	-15	3	150	4	56.6	61.0	162.8	23.6
630	-15	4	150	5.2	73.6	86.0	150.1	21.8
630	-5	1	150	2.6	36.8	40.0	161.4	23.4
630	-5	2	150	3.3	46.7	52.0	157.6	22.9
630	-5	3	150	4.1	58.0	67.0	151.9	22.0
630	-5	4	150	5.3	75.0	92.0	143.0	20.7
630	5	1	150	2.8	39.6	74.0	93.9	13.6
630	5	2	150	3.3	46.7	92.0	89.1	12.9

630	5	3	150	4	56.6	114.0	87.1	12.6
630	5	4	150	5.2	73.6	158.0	81.7	11.9
630	15	1	150	2.6	36.8	63.0	102.5	14.9
630	15	2	150	3.2	45.3	81.0	98.1	14.2
630	15	3	150	4	56.6	111.0	89.5	13.0
630	15	4	150	5.3	75.0	163.0	80.7	11.7
630	25	1	150	2.6	36.8	57.0	113.3	16.4
630	25	2	150	3.3	46.7	74.0	110.7	16.1
630	25	3	150	4.2	59.4	98.0	106.4	15.4
630	25	4	150	5.3	75.0	127.0	103.6	15.0

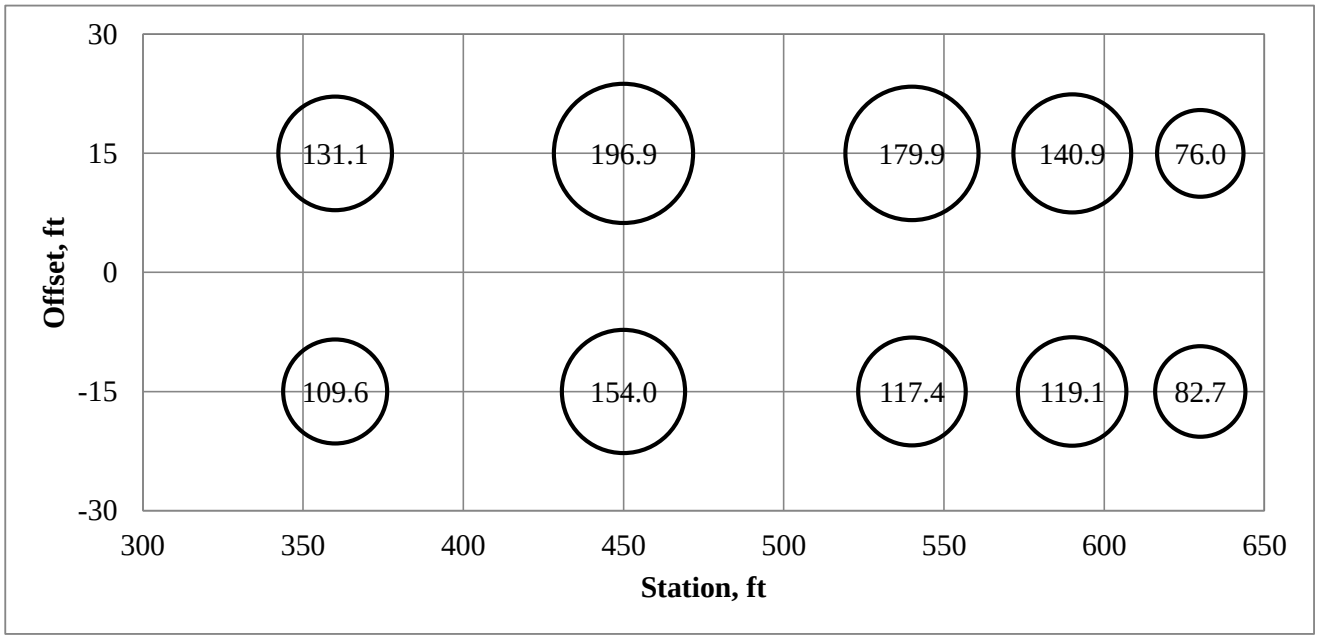
CC8 Construction Plate Load Test

PLATE LOAD TEST ON CC8 SUBGRADE-DUPONT CLAY (CBR= 7 to 8)

Station	Offset, feet	k Value (psi/in)
360	15	131.1
360	-15	109.6
450	15	196.9
450	-15	154.0
540	15	179.9
540	-15	117.4
590	15	140.9
590	-15	119.1
	Minimum:	**109.6**
	Maximum:	**196.9**
	Difference:	**87.3**
	Mean:	**143.6**
	Std. Dev.:	**31.329**
	COV:	**21.8%**

PLATE LOAD TEST ON CC8 SUBGRADE-DUPONT CLAY (CBR= 3 to 4)

Station	Offset, feet	k Value (psi/in)
630	15	76.0
630	-15	82.7
	Minimum:	**76.0**
	Maximum:	**82.7**
	Difference:	**6.7**
	Mean:	**79.3**
	Std. Dev.:	**4.721**
	COV:	**6.0%**



Construction Cycle 08 - P152 Subgrade - Vane Shear Results

Phase I

Station	Offset	Reading #1	Reading #2	Reading #3	Average	Shear Strength, kPa
345	-25	180	192	186	186.0	372.0
345	-15	184	186	180	183.3	366.7
345	-5	168	178	164	170.0	340.0
345	5	145	135	140	140.0	280.0
345	15	173	182	148	167.7	335.3
345	25	164	162	164	163.3	326.7
360	25	162	164	158	161.3	322.7
360	15	162	135	158	151.7	303.3
360	5	140	152	142	144.7	289.3
360	-5	164	156	174	164.7	329.3
360	-15	174	160	158	164.0	328.0
360	-25	172	180	175	175.7	351.3
375	-25	186	173	190	183.0	366.0
375	-15	180	183	179	180.7	361.3
375	-5	180	177	182	179.7	359.3
375	5	164	164	152	160.0	320.0
375	15	162	152	164	159.3	318.7
375	25	158	154	158	156.7	313.3

Construction Cycle 08 - P152 Subgrade - Vane Shear Results

Phase II

Station	Offset	Reading #1	Reading #2	Reading #3	Average	Shear Strength, kPa
425	-25	143	138	128	136.3	272.7
425	-15	92	94	98	94.7	189.3
425	-5	106	104	100	103.3	206.7
425	5	88	92	90	90.0	180.0
425	15	106	98	116	106.7	213.3
425	25	88	96	90	91.3	182.7
450	-25	82	86	88	85.3	170.7
450	-15	112	113	122	115.7	231.3
450	-5	94	106	100	100.0	200.0
450	5	92	88	94	91.3	182.7
450	15	112	114	112	112.7	225.3
450	25	90	88	88	88.7	177.3
475	-25	90	79	90	86.3	172.7
475	-15	96	106	94	98.7	197.3
475	-5	106	109	108	107.7	215.3
475	5	88	94	96	92.7	185.3
475	15	100	94	96	96.7	193.3
475	25	84	84	82	83.3	166.7
520	-25	102	110	98	103.3	206.7
520	-15	98	100	98	98.7	197.3
520	-5	100	100	102	100.7	201.3
520	5	94	96	92	94.0	188.0
520	15	104	102	103	103.0	206.0
520	25	86	78	84	82.7	165.3
540	-25	98	104	98	100.0	200.0
540	-15	86	94	80	86.7	173.3
540	-5	72	74	70	72.0	144.0
540	5	106	100	102	102.7	205.3
540	15	100	98	100	99.3	198.7
540	25	90	94	100	94.7	189.3
580	25	156	154	160	156.7	313.3
580	15	144	140	136	140.0	280.0
580	5	152	148	156	152.0	304.0
580	-5	160	166	156	160.7	321.3
580	-15	140	136	140	138.7	277.3
580	-25	144	140	136	140.0	280.0
590	-25	148	144	136	142.7	285.3
590	-15	112	123	120	118.3	236.7
590	-5	124	109	130	121.0	242.0
590	5	125	108	104	112.3	224.7
590	15	110	100	100	103.3	206.7
590	25	110	104	96	103.3	206.7
620	25	110	96	94	100.0	100.0
620	15	106	98	106	103.3	103.3
620	5	110	116	106	110.7	110.7
620	-5	104	96	104	101.3	101.3
620	-15	120	100	104	108.0	108.0
620	-25	107	114	110	110.3	110.3
630	-25	144	152	100	132.0	132.0
630	-15	124	128	118	123.3	123.3
630	-5	112	112	112	112.0	112.0
630	5	112	113	114	113.0	113.0
630	15	98	97	94	96.3	96.3
630	25	91	82	90	87.7	87.7

P-152 SUBGRADE

CC8 – TRIAXIAL TESTING SUMMARY

Specimen	Compaction Condition			Resilient Modulus						Quick Shear	
ID	ρ_{wet} (pcf)	w (%)	ρ_{dry} (pcf)	M_R (psi)	k_1	k_2	k_3	S_e/S_y	R^2_{Adj}	σ_3 (psi)	$\sigma_{v\text{-}max}$ (psi)
Sta565N-25	123.3	25.2	98.5	10,410	960	0.503	-2.399	0.366	0.84	4	38.3
Sta565S25	116.3	29.9	89.5	10,912	888	0.395	-1.649	0.254	0.92	4	35.6
Sta 495 North -25	123.2	25.9	97.9	NA	NA	NA	NA	NA	NA	0	36.1
Sta 495 South 25	97.4	29.3	75.3	NA	NA	NA	NA	NA	NA	0	36.3

Note: modulus estimated for σ_3=6 psi and σ_{cyclic}=9 psi

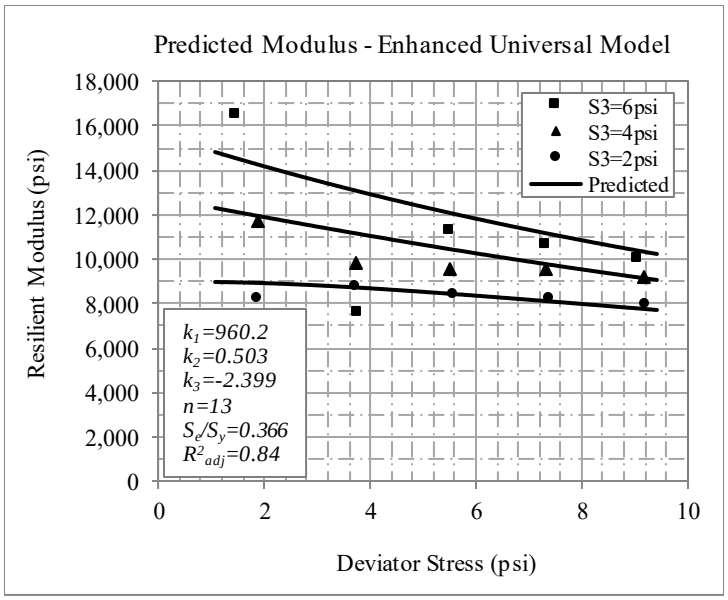
SPECIMEN: STA565N-25

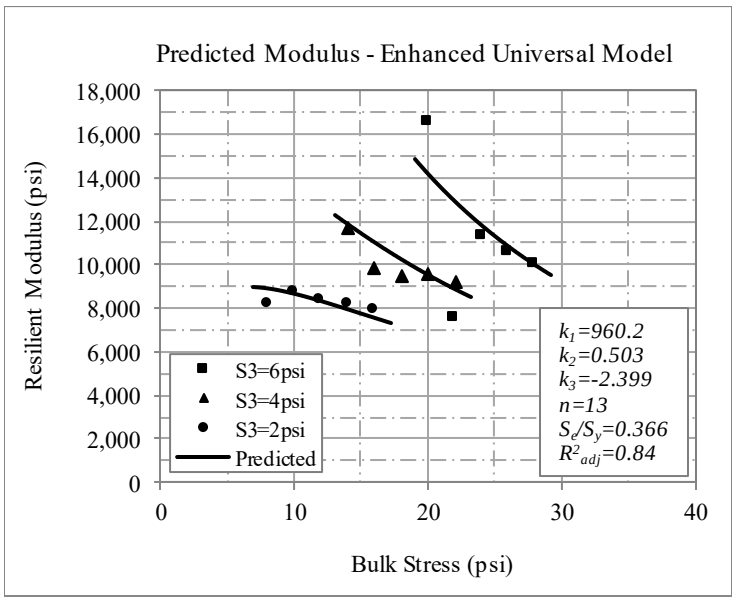
Resilient Modulus

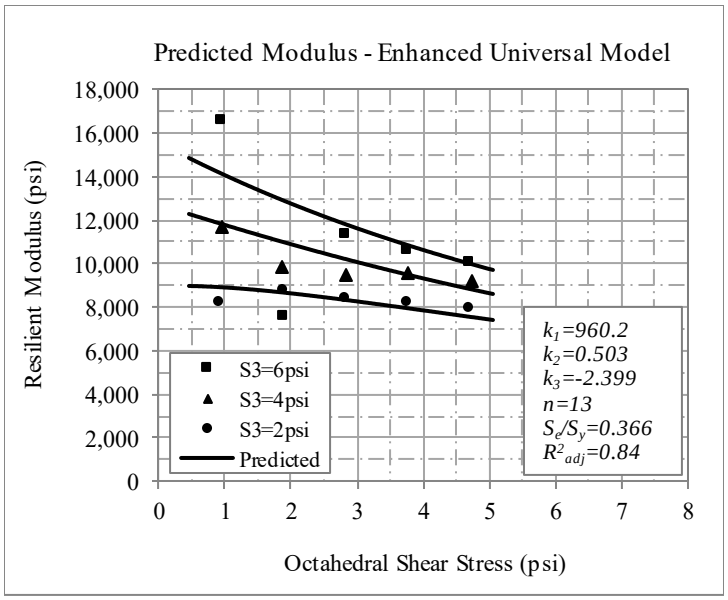
Project	NAPTF-CC8 Construction
Sample Number	Sta565N-25
Material Type	P152
Test Date	2/2/2018
Test Standard	AASHTO T307
Moisture Content (%)	25.2
Dry Density (pcf)	98.5
Reported By	RN/MW
Analyzed By	CCary

Sequence	Chamber Confining Pressure	Applied Cyclic Stress	Bulk Stress	Octahedral Shear Stress	Measured Resilient Modulus	Predicted Resilient Modulus
Designation	S_3	S_{cyclic}	θ	τ_{oct}	M_{r-m}	M_{r-p}
Unit	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)
1	6.00	1.46	20.03	0.95	16,505	14,188
2	6.00	3.77	22.02	1.89	7,542	12,943
3	6.00	5.50	24.00	2.82	11,284	11,849
4	6.00	7.31	26.02	3.77	10,602	10,871
5	6.00	9.05	28.01	4.71	10,022	10,019
6	4.00	1.89	14.04	0.96	11,676	11,853
7	4.00	3.74	15.98	1.87	9,834	11,039
8	4.00	5.50	18.01	2.83	9,514	10,246
9	4.00	7.31	20.02	3.77	9,529	9,527
10	4.00	9.17	22.06	4.74	9,195	8,855
11	2.00	1.89	7.99	0.94	8,195	8,955
12	2.00	3.74	10.04	1.90	8,746	8,700
13	2.00	5.57	12.01	2.83	8,383	8,355
14	2.00	7.38	14.00	3.77	8,224	7,965
15	2.00	9.21	16.00	4.71	7,934	7,559

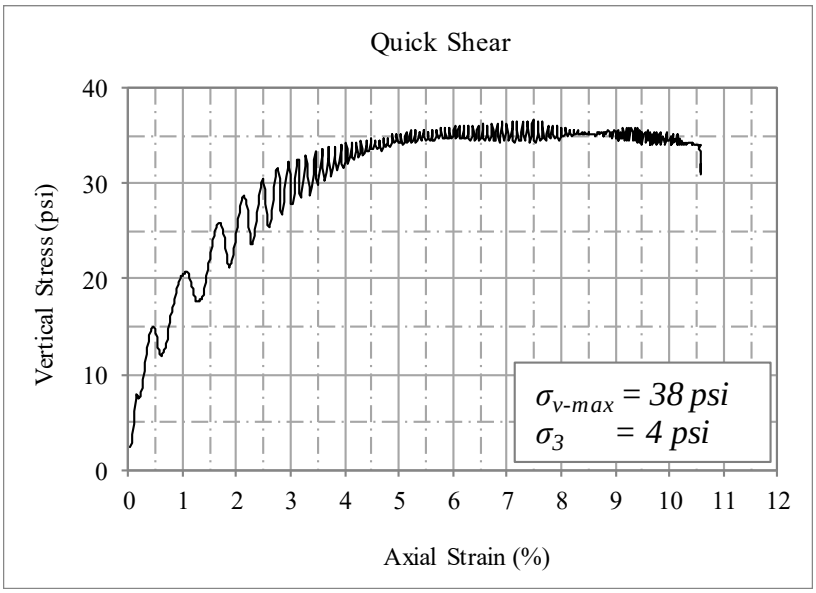
* Data not considered for determination of non-linear parameters


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
Deviator Stress (psi)
S3=6psi
S3=4psi
S3=2psi
Predicted
k_1=960.2
k_2=0.503
k_3=-2.399
n=13
S_e/S_y=0.366
R^2_{adj}=0.84


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
Bulk Stress (psi)
S3=6psi
S3=4psi
S3=2psi
Predicted
k_1=960.2
k_2=0.503
k_3=-2.399
n=13
S_e/S_y=0.366
R^2_{adj}=0.84


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
0 1 2 3 4 5 6 7 8
Octahedral Shear Stress (psi)
S3=6psi
S3=4psi
S3=2psi
Predicted
k1=960.2
k2=0.503
k3=-2.399
n=13
Se/Sy=0.366
R2adj=0.84

Quick Shear


Quick Shear
Vertical Stress (psi)
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12
Axial Strain (%)
σv-max = 38 psi
σ3 = 4 psi

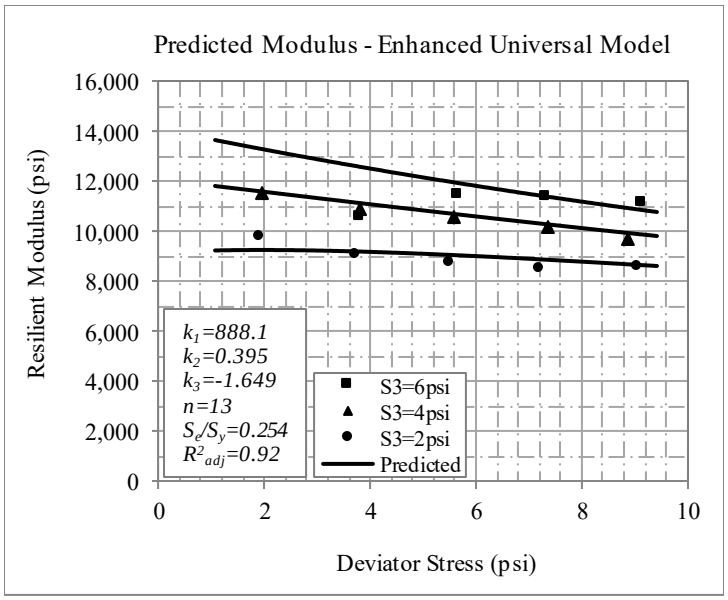
SPECIMEN: STA565S25

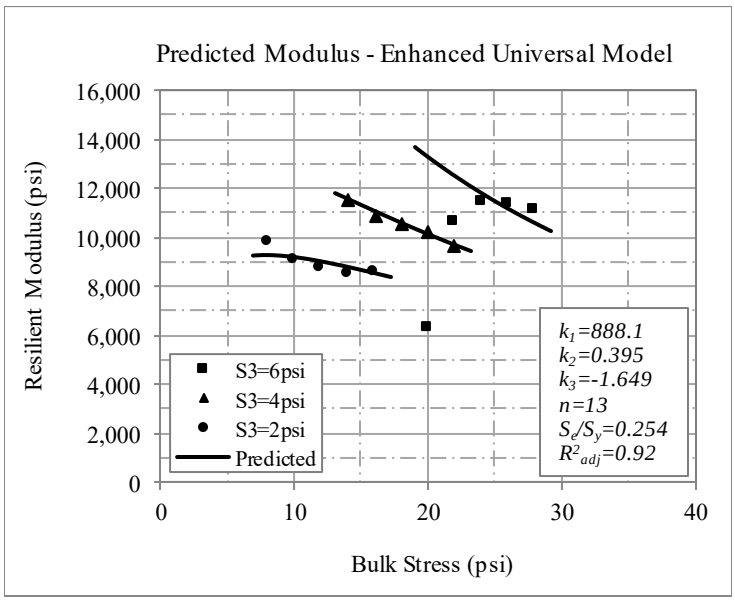
Resilient Modulus

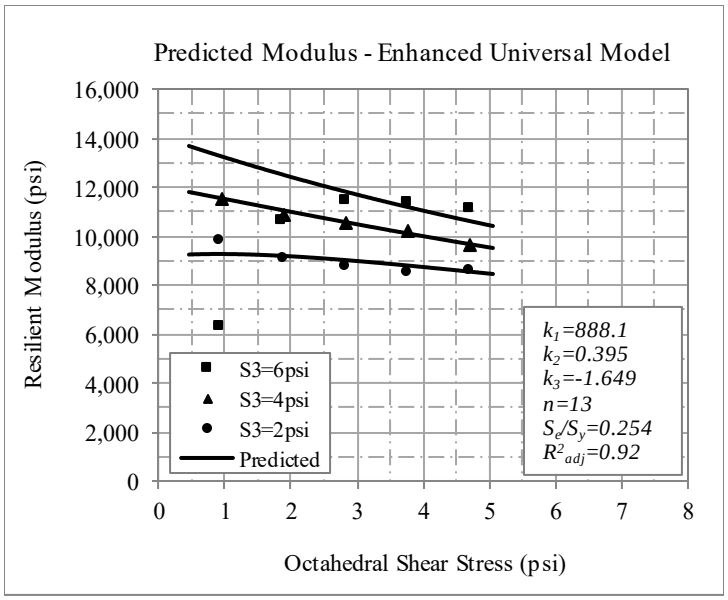
Project	NAPTF-CC8 Construction
Sample Number	Sta565S25
Material Type	P152
Test Date	2/6/2018
Test Standard	AASHTO T307
Moisture Content (%)	29.9
Dry Density (pcf)	89.5
Reported By	RN/JA
Analyzed By	CCary

Sequence	Chamber Confining Pressure	Applied Cyclic Stress	Bulk Stress	Octahedral Shear Stress	Measured Resilient Modulus	Predicted Resilient Modulus
Designation	S_3	S_{cyclic}	θ	τ_{oct}	M_{r-m}	M_{r-p}
Unit	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)
1	6.00	1.91	20.00	0.94	6,266	13,314
2	6.00	3.81	22.00	1.88	10,602	12,552
3	6.00	5.64	24.05	2.84	11,458	11,843
4	6.00	7.34	26.01	3.77	11,385	11,225
5	6.00	9.12	27.98	4.70	11,110	10,655
6	4.00	1.96	14.01	0.94	11,502	11,559
7	4.00	3.81	16.06	1.91	10,907	11,053
8	4.00	5.57	18.00	2.82	10,588	10,583
9	4.00	7.37	20.02	3.77	10,211	10,116
10	4.00	8.89	21.99	4.70	9,674	9,682
11	2.00	1.90	7.98	0.93	9,790	9,266
12	2.00	3.74	10.01	1.89	9,050	9,188
13	2.00	5.53	12.01	2.83	8,775	9,013
14	2.00	7.22	14.01	3.77	8,514	8,786
15	2.00	9.05	16.01	4.72	8,572	8,531

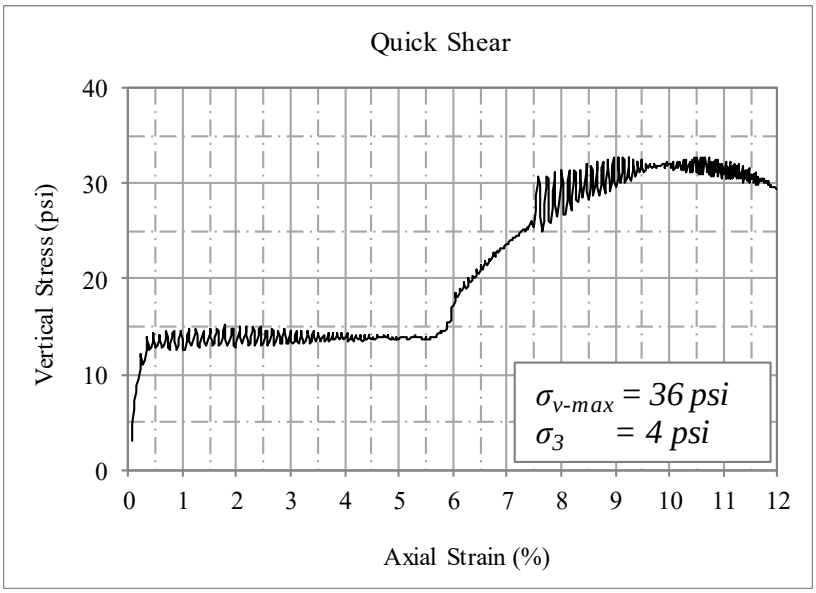
* Data not considered for determination of non-linear parameters


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
0
2
4
6
8
10
Deviator Stress (psi)
k1=888.1
k2=0.395
k3=-1.649
n=13
Se/Sy=0.254
R2adj=0.92
S3=6psi
S3=4psi
S3=2psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
0
10
20
30
40
Bulk Stress (psi)
S3=6psi
S3=4psi
S3=2psi
Predicted
k1=888.1
k2=0.395
k3=-1.649
n=13
Se/Sy=0.254
R2adj=0.92


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
0 1 2 3 4 5 6 7 8
Octahedral Shear Stress (psi)
S3=6psi
S3=4psi
S3=2psi
Predicted
k1=888.1
k2=0.395
k3=-1.649
n=13
Se/Sy=0.254
R2adj=0.92

Quick Shear


Quick Shear
Vertical Stress (psi)
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12
Axial Strain (%)
σv-max = 36 psi
σ3 = 4 psi

P-154 Subbase

Acceptance and Characterization Data

Station	Offset	Lift	M.C. (Sand Cone)	Compaction (Sand Cone)
	ft		*%*	*%*
3+43	-20	2	7.1	100.9
3+45	17	2	6.6	102.3
3+48	14	1	7.1	96.8
3+50	-14	1	6.8	100.8
3+65	-14	1	6.3	99.2
3+77	15	2	6.9	102.8
4+38	-18	1	5.2	98.0
4+45	18	1	5.3	96.7
4+50	-17	2	7.0	101.0
4+50	15	2	6.4	100.7
4+63	18	2	5.6	106.0
4+85	15	2	7.5	94.3
4+85	16	2	7.0	101.3
5+25	20	1	5.1	98.2
5+29	-15	2	6.9	100.7
5+30	7	2	4.8	105.4
5+30	13	2	4.7	96.9
5+30	22	2	7.0	103.3
5+32	-15	1	5.8	97.1
5+32	16	2	5.9	98.7
5+75	-20	2	6.2	103.1
5+75	6	1	5.3	87.4
5+85	-14	1	5.6	90.5
5+85	5	2	6.4	102.4
5+95	-10	2	7.3	101.3
5+95	20	1	5.6	88.7
6+25	-10	1	6.2	93.6
6+25	15	2	6.0	101.8
6+35	-19	1	5.1	96.7
6+35	20	2	6.4	98.0

Station	Offset	Lift	M.C. (Nuclear Gauge)	Compaction (Nuclear Gauge)	PL k-value	LWD Modulus 1	LWD Modulus 2	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus
	ft		*%*	*%*	*psi/in*	*psi*	*psi*	*psi*	*psi*	*psi*
3+45	-25	2	N/T	N/T	N/T	18300	20200	21900	22900	20825
3+45	-15	1	7.3	97.0	N/T	N/T	N/T	N/T	N/T	N/T
3+45	-15	2	7.8	101.4	N/T	19600	21200	22700	23700	21800
3+45	-5	2	N/T	N/T	N/T	18900	20500	22000	22700	21025
3+45	5	2	N/T	N/T	N/T	18500	20500	22300	22700	21000
3+45	15	1	6.7	96.3	N/T	N/T	N/T	N/T	N/T	N/T
3+45	15	2	8.2	101.4	N/T	20600	23000	25100	26100	23700
3+45	25	2	N/T	N/T	N/T	17300	19000	21000	22100	19850
3+60	-25	2	N/T	N/T	N/T	20000	21900	23200	25500	22650
3+60	-15	1	7.1	96.2	N/T	N/T	N/T	N/T	N/T	N/T
3+60	-15	2	8.4	100.0	216	20000	21600	22700	24200	22125
3+60	-5	2	N/T	N/T	N/T	22200	23600	24400	26000	24050
3+60	5	2	N/T	N/T	N/T	23100	24400	26100	27800	25350
3+60	15	1	8.3	97.8	N/T	N/T	N/T	N/T	N/T	N/T
3+60	15	2	7.2	99.9	272	22900	24400	26500	27700	25375
3+60	25	2	N/T	N/T	N/T	22100	23600	25200	26400	24325
3+75	-25	2	N/T	N/T	N/T	19900	20600	21800	22000	21075
3+75	-15	1	7.9	99.6	N/T	N/T	N/T	N/T	N/T	N/T
3+75	-15	2	8.0	101.2	N/T	21300	23200	24400	25400	23575
3+75	-5	2	N/T	N/T	N/T	26700	27100	27800	28700	27575
3+75	5	2	N/T	N/T	N/T	20800	22400	23900	25300	23100
3+75	15	1	7.5	95.0	N/T	N/T	N/T	N/T	N/T	N/T
3+75	15	2	6.8	103.5	N/T	24000	25900	26500	28200	26150
3+75	25	2	N/T	N/T	N/T	20600	22500	24300	26100	23375
4+20	-15	2	5.1	97.6	N/T	N/T	N/T	N/T	N/T	N/T
4+20	15	2	5.3	98.8	N/T	N/T	N/T	N/T	N/T	N/T
4+25	-25	2	N/T	N/T	N/T	18200	19800	21700	23600	20825
4+25	-15	1	4.4	99.5	N/T	N/T	N/T	N/T	N/T	N/T
4+25	-15	2	N/T	N/T	N/T	19500	21300	22800	24400	22000
4+25	-5	2	N/T	N/T	N/T	18100	20000	21700	23900	20925
4+25	5	2	N/T	N/T	N/T	20600	22300	23900	26300	23275
4+25	15	1	5.1	97.0	N/T	N/T	N/T	N/T	N/T	N/T
4+25	15	2	N/T	N/T	N/T	20800	22400	22700	25400	22825
4+25	25	2	N/T	N/T	N/T	19200	21200	22100	24300	21700
4+50	-25	2	N/T	N/T	N/T	16600	18500	20200	21600	19225
4+50	-15	1	4.8	100.2	N/T	N/T	N/T	N/T	N/T	N/T
4+50	-15	2	N/T	N/T	154	16000	18700	19900	22300	19225
4+50	-5	2	N/T	N/T	N/T	16600	19600	21400	23500	20275
4+50	5	2	N/T	N/T	N/T	16600	18500	20500	22300	19475
4+50	15	1	5.2	99.9	N/T	N/T	N/T	N/T	N/T	N/T
4+50	15	2	N/T	N/T	197	18400	20200	22900	24800	21575
4+50	25	2	N/T	N/T	N/T	18700	20400	22400	24500	21500

Station	Offset	Lift	M.C. (Nuclear Gauge)	Compaction (Nuclear Gauge)	PL k-value	LWD Modulus 1	LWD Modulus 2	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus
	ft		*%*	*%*	*psi/in*	*psi*	*psi*	*psi*	*psi*	*psi*
4+60	-15	2	5.4	97.1	N/T	N/T	N/T	N/T	N/T	N/T
4+60	15	2	4.8	99.5	N/T	N/T	N/T	N/T	N/T	N/T
4+75	-25	2	N/T	N/T	N/T	18300	19900	21800	23200	20800
4+75	-15	1	3.4	98.9	N/T	N/T	N/T	N/T	N/T	N/T
4+75	-15	2	N/T	N/T	N/T	18300	19900	21400	22400	20500
4+75	-5	2	N/T	N/T	N/T	16200	18500	20200	22700	19400
4+75	5	2	N/T	N/T	N/T	16800	19100	21000	23600	20125
4+75	15	1	5.2	99.9	N/T	N/T	N/T	N/T	N/T	N/T
4+75	15	2	N/T	N/T	N/T	19300	21100	23100	26200	22425
4+75	25	2	N/T	N/T	N/T	21800	23800	25400	27300	24575
5+00	-15	2	5.0	99.4	N/T	N/T	N/T	N/T	N/T	N/T
5+00	15	2	5.6	97.5	N/T	N/T	N/T	N/T	N/T	N/T
5+20	-25	2	N/T	N/T	N/T	15400	16900	18500	20000	17700
5+20	-15	1	5.1	97.1	N/T	N/T	N/T	N/T	N/T	N/T
5+20	-15	2	N/T	N/T	N/T	14600	17200	19000	20200	17750
5+20	-5	2	N/T	N/T	N/T	17300	18900	20500	22100	19700
5+20	5	2	N/T	N/T	N/T	23500	24200	25600	27000	25075
5+20	15	1	3.4	99.0	N/T	N/T	N/T	N/T	N/T	N/T
5+20	15	2	N/T	N/T	N/T	22400	24600	26600	30300	25975
5+20	25	2	N/T	N/T	N/T	18900	20600	22900	24900	21825
5+40	-25	2	N/T	N/T	N/T	16000	16800	18400	19600	17700
5+40	-15	1	3.8	97.3	N/T	N/T	N/T	N/T	N/T	N/T
5+40	-15	2	3.9	99.0	208	15800	17400	18800	20800	18200
5+40	-5	2	N/T	N/T	N/T	15900	16900	18500	19800	17775
5+40	5	2	N/T	N/T	N/T	19100	21800	24400	26900	23050
5+40	15	1	3.4	100.3	N/T	N/T	N/T	N/T	N/T	N/T
5+40	15	2	4.4	98.1	371	24200	26100	28500	31200	27500
5+40	25	2	N/T	N/T	N/T	23900	25500	24000	30200	25900
5+75	-20 (4'')	1	5.5	87.2	N/T	N/T	N/T	N/T	N/T	N/T
5+75	-20 (6'')	1	5.4	88.4	N/T	N/T	N/T	N/T	N/T	N/T
5+75	-20 (8'')	1	6.3	84.9	N/T	N/T	N/T	N/T	N/T	N/T
5+75	-20 (10'')	1	6.0	85.3	N/T	N/T	N/T	N/T	N/T	N/T
5+75	-20	2	5.8	96.4	N/T	N/T	N/T	N/T	N/T	N/T
5+75	-20 (4'')	2	5.8	96.4	N/T	N/T	N/T	N/T	N/T	N/T
5+75	-20 (6'')	2	7.9	92.6	N/T	N/T	N/T	N/T	N/T	N/T
5+75	-20 (8'')	2	6.8	92.0	N/T	N/T	N/T	N/T	N/T	N/T
5+75	-20 (10'')	2	5.8	93.5	N/T	N/T	N/T	N/T	N/T	N/T
5+75	13 (4'')	1	5.3	87.5	N/T	N/T	N/T	N/T	N/T	N/T
5+75	13 (6'')	1	5.4	88.3	N/T	N/T	N/T	N/T	N/T	N/T
5+75	13 (8'')	1	5.8	86.4	N/T	N/T	N/T	N/T	N/T	N/T
5+75	13 (10'')	1	5.3	86.8	N/T	N/T	N/T	N/T	N/T	N/T
5+75	15	2	6.8	90.9	N/T	N/T	N/T	N/T	N/T	N/T

Station	Offset	Lift	M.C. (Nuclear Gauge)	Compaction (Nuclear Gauge)	PL k-value	LWD Modulus 1	LWD Modulus 2	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus
	ft		*%*	*%*	*psi/in*	*psi*	*psi*	*psi*	*psi*	*psi*
5+75	15 (4'')	2	6.8	90.9	N/T	N/T	N/T	N/T	N/T	N/T
5+75	15 (6'')	2	6.5	89.8	N/T	N/T	N/T	N/T	N/T	N/T
5+75	15 (8'')	2	6.6	90.2	N/T	N/T	N/T	N/T	N/T	N/T
5+75	15 (10'')	2	6.3	91.7	N/T	N/T	N/T	N/T	N/T	N/T
5+80	-25	2	N/T	N/T	N/T	24500	25400	26200	28100	26050
5+80	-15	2	N/T	N/T	N/T	24600	25500	26800	28600	26375
5+80	-5	2	N/T	N/T	N/T	22100	23900	25800	28200	25000
5+80	5	2	N/T	N/T	N/T	26300	27400	29200	31600	28625
5+80	15	2	N/T	N/T	N/T	31000	31600	32100	34500	32300
5+80	25	2	N/T	N/T	N/T	22200	24100	26400	28700	25350
5+85	-15	2	7.4	94.9	N/T	N/T	N/T	N/T	N/T	N/T
5+85	-15 (4'')	2	7.4	94.9	N/T	N/T	N/T	N/T	N/T	N/T
5+85	-15 (6'')	2	7.4	92.5	N/T	N/T	N/T	N/T	N/T	N/T
5+85	-15 (8'')	2	7.2	91.3	N/T	N/T	N/T	N/T	N/T	N/T
5+85	-15 (10'')	2	6.3	92.9	N/T	N/T	N/T	N/T	N/T	N/T
5+85	-13 (4'')	1	5.4	95.3	N/T	N/T	N/T	N/T	N/T	N/T
5+85	-13 (6'')	1	6.0	93.4	N/T	N/T	N/T	N/T	N/T	N/T
5+85	-13 (8'')	1	5.1	92.5	N/T	N/T	N/T	N/T	N/T	N/T
5+85	-13 (10'')	1	6.0	90.8	N/T	N/T	N/T	N/T	N/T	N/T
5+85	5	2	6.2	97.9	N/T	N/T	N/T	N/T	N/T	N/T
5+85	5 (4'')	2	6.2	97.9	N/T	N/T	N/T	N/T	N/T	N/T
5+85	5 (6'')	2	6.9	94.6	N/T	N/T	N/T	N/T	N/T	N/T
5+85	5 (8'')	2	6.8	94.4	N/T	N/T	N/T	N/T	N/T	N/T
5+85	5 (10'')	2	6.9	93.2	N/T	N/T	N/T	N/T	N/T	N/T
5+86	-2 (4'')	1	5.3	91.9	N/T	N/T	N/T	N/T	N/T	N/T
5+86	-2 (6'')	1	5.7	92.5	N/T	N/T	N/T	N/T	N/T	N/T
5+86	-2 (8'')	1	5.6	91.4	N/T	N/T	N/T	N/T	N/T	N/T
5+86	-2 (10'')	1	6.5	89.4	N/T	N/T	N/T	N/T	N/T	N/T
5+88	14 (4'')	1	6.3	87.2	N/T	N/T	N/T	N/T	N/T	N/T
5+88	14 (6'')	1	5.1	89.9	N/T	N/T	N/T	N/T	N/T	N/T
5+88	14 (8'')	1	5.8	87.7	N/T	N/T	N/T	N/T	N/T	N/T
5+88	14 (10'')	1	5.8	88.9	N/T	N/T	N/T	N/T	N/T	N/T
5+90	-25	2	N/T	N/T	N/T	21600	22900	24900	26600	24000
5+90	-15	2	N/T	N/T	324	27000	27400	28400	30300	28275
5+90	-5	2	N/T	N/T	N/T	24900	24900	26100	27900	25950
5+90	5	2	N/T	N/T	N/T	26300	27700	27700	30800	28125
5+90	15	2	N/T	N/T	357	24700	27100	28500	31200	27875
5+90	25	2	N/T	N/T	N/T	25800	27500	29300	30700	28325
5+92	10 (4'')	1	6.2	87.2	N/T	N/T	N/T	N/T	N/T	N/T
5+92	10 (6'')	1	5.9	89.4	N/T	N/T	N/T	N/T	N/T	N/T
5+92	10 (8'')	1	7.1	86.9	N/T	N/T	N/T	N/T	N/T	N/T
5+92	10 (10'')	1	5.8	87.9	N/T	N/T	N/T	N/T	N/T	N/T

Station	Offset	Lift	M.C. (Nuclear Gauge)	Compaction (Nuclear Gauge)	PL k-value	LWD Modulus 1	LWD Modulus 2	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus
	ft		*%*	*%*	*psi/in*	*psi*	*psi*	*psi*	*psi*	*psi*
5+94	18	1	5.4	89.3	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-10	2	7.2	98.1	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-10 (4")	2	7.2	98.1	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-10 (6")	2	7.0	96.7	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-10 (8")	2	7.0	95.4	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-10 (10")	2	7.6	94.1	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-2 (4")	1	5.7	89.4	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-2 (6")	1	5.8	89.4	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-2 (8")	1	6.1	88.2	N/T	N/T	N/T	N/T	N/T	N/T
5+95	-2 (10")	1	6.0	87.8	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25 (4")	1	5.8	89.5	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25 (6")	1	6.0	89.0	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25 (8")	1	6.0	87.2	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25 (10")	1	5.7	87.9	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25	2	6.9	96.8	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25 (4")	2	6.9	96.8	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25 (6")	2	6.4	96.5	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25 (8")	2	5.9	95.6	N/T	N/T	N/T	N/T	N/T	N/T
5+95	25 (10")	2	7.5	93.2	N/T	N/T	N/T	N/T	N/T	N/T
6+04	-17 (4")	1	6.2	91.6	N/T	N/T	N/T	N/T	N/T	N/T
6+04	-17 (4")	1	5.7	90.4	N/T	N/T	N/T	N/T	N/T	N/T
6+04	-17 (6")	1	6.1	90.7	N/T	N/T	N/T	N/T	N/T	N/T
6+04	-17 (6")	1	5.4	91.8	N/T	N/T	N/T	N/T	N/T	N/T
6+04	-17 (8")	1	6.4	91.6	N/T	N/T	N/T	N/T	N/T	N/T
6+04	-17 (8")	1	6.7	89.8	N/T	N/T	N/T	N/T	N/T	N/T
6+04	-17 (10")	1	6.2	85.9	N/T	N/T	N/T	N/T	N/T	N/T
6+04	-17 (10")	1	6.3	88.1	N/T	N/T	N/T	N/T	N/T	N/T
6+04	8 (4")	1	5.9	87.5	N/T	N/T	N/T	N/T	N/T	N/T
6+04	8 (6")	1	5.9	88.2	N/T	N/T	N/T	N/T	N/T	N/T
6+04	8 (8")	1	7.0	88.5	N/T	N/T	N/T	N/T	N/T	N/T
6+04	8 (10")	1	6.4	86.2	N/T	N/T	N/T	N/T	N/T	N/T
6+05	-20 (10")	2	8.5	90.2	N/T	N/T	N/T	N/T	N/T	N/T
6+05	7	1	6.0	88.9	N/T	N/T	N/T	N/T	N/T	N/T
6+10	-10 (4")	2	8.4	95.8	N/T	N/T	N/T	N/T	N/T	N/T
6+10	-10 (6")	2	8.6	92.2	N/T	N/T	N/T	N/T	N/T	N/T
6+10	-10 (8")	2	8.0	91.3	N/T	N/T	N/T	N/T	N/T	N/T
6+10	-10 (10")	2	7.8	92.2	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-25	2	7.2	98.0	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-25 (4")	2	7.2	98.0	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-25 (6")	2	7.3	95.8	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-25 (8")	2	7.7	93.7	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-25 (10")	2	7.7	91.7	N/T	N/T	N/T	N/T	N/T	N/T

Station	Offset	Lift	M.C. (Nuclear Gauge)	Compaction (Nuclear Gauge)	PL k-value	LWD Modulus 1	LWD Modulus 2	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus
	ft		*%*	*%*	*psi/in*	*psi*	*psi*	*psi*	*psi*	*psi*
6+15	-12 (4'')	1	6.0	93.2	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-12 (6'')	1	5.9	91.9	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-12 (8'')	1	6.0	91.5	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-12 (10'')	1	6.2	88.9	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-3 (4'')	1	6.1	88.7	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-3 (6'')	1	7.1	88.1	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-3 (8'')	1	6.3	89.5	N/T	N/T	N/T	N/T	N/T	N/T
6+15	-3 (10'')	1	6.3	87.8	N/T	N/T	N/T	N/T	N/T	N/T
6+15	10	2	6.4	97.4	N/T	N/T	N/T	N/T	N/T	N/T
6+15	10 (4'')	2	6.4	97.4	N/T	N/T	N/T	N/T	N/T	N/T
6+15	10 (6'')	2	7.3	94.7	N/T	N/T	N/T	N/T	N/T	N/T
6+15	10 (8'')	2	6.1	95.9	N/T	N/T	N/T	N/T	N/T	N/T
6+15	10 (10'')	2	6.9	93.9	N/T	N/T	N/T	N/T	N/T	N/T
6+15	11 (4'')	1	6.5	89.3	N/T	N/T	N/T	N/T	N/T	N/T
6+15	11 (6'')	1	6.0	90.7	N/T	N/T	N/T	N/T	N/T	N/T
6+15	11 (8'')	1	6.3	89.5	N/T	N/T	N/T	N/T	N/T	N/T
6+15	11 (10'')	1	7.0	88.1	N/T	N/T	N/T	N/T	N/T	N/T
6+20	-25	2	N/T	N/T	N/T	24400	25100	25600	28200	25825
6+20	-15	2	N/T	N/T	N/T	23500	24400	26100	27500	25375
6+20	-5	2	N/T	N/T	N/T	23000	24300	25500	27500	25075
6+20	5	2	N/T	N/T	N/T	25200	25800	26700	29100	26700
6+20	15	2	N/T	N/T	N/T	27900	29200	30200	31200	29625
6+20	25	2	N/T	N/T	N/T	25300	25700	27200	29700	26975
6+25	-5	2	7.6	95.9	N/T	N/T	N/T	N/T	N/T	N/T
6+25	15	2	5.6	97.5	N/T	N/T	N/T	N/T	N/T	N/T
6+25	-10 (4'')	2	5.6	88.6	N/T	N/T	N/T	N/T	N/T	N/T
6+25	-10 (6'')	2	5.5	94.3	N/T	N/T	N/T	N/T	N/T	N/T
6+25	-10 (8'')	2	5.4	91.8	N/T	N/T	N/T	N/T	N/T	N/T
6+25	-10 (10'')	1	7.1	89.6	N/T	N/T	N/T	N/T	N/T	N/T
6+25	10 (4'')	2	7.2	94.9	N/T	N/T	N/T	N/T	N/T	N/T
6+25	10 (6'')	2	7.1	93.2	N/T	N/T	N/T	N/T	N/T	N/T
6+25	10 (8'')	2	6.9	93.0	N/T	N/T	N/T	N/T	N/T	N/T
6+25	10 (10'')	2	7.7	92.0	N/T	N/T	N/T	N/T	N/T	N/T
6+25	15 (4'')	2	5.6	97.5	N/T	N/T	N/T	N/T	N/T	N/T
6+25	15 (6'')	2	5.5	95.8	N/T	N/T	N/T	N/T	N/T	N/T
6+25	15 (8'')	2	5.7	94.5	N/T	N/T	N/T	N/T	N/T	N/T
6+25	15 (10'')	2	4.9	94.5	N/T	N/T	N/T	N/T	N/T	N/T
6+25	3 (4'')	1	6.0	90.9	N/T	N/T	N/T	N/T	N/T	N/T
6+25	3 (6'')	1	5.9	91.1	N/T	N/T	N/T	N/T	N/T	N/T
6+25	3 (8'')	1	6.1	91.1	N/T	N/T	N/T	N/T	N/T	N/T
6+25	3 (10'')	1	5.9	89.3	N/T	N/T	N/T	N/T	N/T	N/T
6+25	-5 (4'')	2	7.6	95.9	N/T	N/T	N/T	N/T	N/T	N/T

Station	Offset	Lift	M.C. (Nuclear Gauge)	Compaction (Nuclear Gauge)	PL k-value	LWD Modulus 1	LWD Modulus 2	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus
	ft		*%*	*%*	*psi/in*	*psi*	*psi*	*psi*	*psi*	*psi*
6+25	-5 (6'')	2	7.2	93.0	N/T	N/T	N/T	N/T	N/T	N/T
6+25	-5 (8'')	2	7.3	92.7	N/T	N/T	N/T	N/T	N/T	N/T
6+25	-5 (10'')	2	6.4	94.2	N/T	N/T	N/T	N/T	N/T	N/T
6+30	-25	2	N/T	N/T	N/T	21700	23300	25800	26500	24325
6+30	-15	2	N/T	N/T	347	21800	23000	24700	26200	23925
6+30	-5	2	N/T	N/T	N/T	24600	26100	27000	29600	26825
6+30	5	2	N/T	N/T	N/T	24300	25300	26900	28800	26325
6+30	15	2	N/T	N/T	242	24100	24900	26300	28200	25875
6+30	25	2	N/T	N/T	N/T	23200	25200	25800	27600	25450
6+35	-15	2	6.3	96.0	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-12	1	6.2	85.7	N/T	N/T	N/T	N/T	N/T	N/T
6+35	20	2	6.3	96.0	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-15 (4'')	2	6.3	96.0	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-15 (6'')	2	5.8	94.2	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-15 (8'')	2	7.0	91.5	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-15 (10'')	2	7.5	90.1	N/T	N/T	N/T	N/T	N/T	N/T
6+35	18 (4'')	1	5.5	89.8	N/T	N/T	N/T	N/T	N/T	N/T
6+35	18 (6'')	1	5.4	90.8	N/T	N/T	N/T	N/T	N/T	N/T
6+35	18 (8'')	1	5.6	89.0	N/T	N/T	N/T	N/T	N/T	N/T
6+35	18 (10'')	1	6.0	88.2	N/T	N/T	N/T	N/T	N/T	N/T
6+35	20 (4'')	2	6.0	96.8	N/T	N/T	N/T	N/T	N/T	N/T
6+35	20 (6'')	2	6.6	93.2	N/T	N/T	N/T	N/T	N/T	N/T
6+35	20 (8'')	2	6.0	93.3	N/T	N/T	N/T	N/T	N/T	N/T
6+35	20 (10'')	2	5.9	94.4	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-23 (4'')	1	6.6	90.7	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-23 (6'')	1	6.5	89.6	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-23 (8'')	1	6.1	90.7	N/T	N/T	N/T	N/T	N/T	N/T
6+35	-23 (10'')	1	6.1	88.6	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-13	1	6.7	86.6	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-13 (4'')	1	7.2	90.2	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-13 (6'')	1	6.5	90.8	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-13 (8'')	1	7.4	89.1	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-17 (4'')	1	7.5	89.6	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-17 (6'')	1	7.1	89.3	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-17 (8'')	1	7.0	84.6	N/T	N/T	N/T	N/T	N/T	N/T
6+36	-17 (10'')	1	6.9	84.5	N/T	N/T	N/T	N/T	N/T	N/T
6+45	25 (4'')	1	6.4	88.3	N/T	N/T	N/T	N/T	N/T	N/T
6+45	25 (6'')	1	6.6	90.5	N/T	N/T	N/T	N/T	N/T	N/T
6+45	25 (8'')	1	7.1	89.8	N/T	N/T	N/T	N/T	N/T	N/T
6+45	25 (10'')	1	5.9	90.0	N/T	N/T	N/T	N/T	N/T	N/T
6+45	26 (4'')	1	5.6	91.7	N/T	N/T	N/T	N/T	N/T	N/T
6+45	26 (6'')	1	6.2	91.2	N/T	N/T	N/T	N/T	N/T	N/T

Station	Offset	Lift	M.C. (Nuclear Gauge)	Compaction (Nuclear Gauge)	PL k-value	LWD Modulus 1	LWD Modulus 2	LWD Modulus 3	LWD Modulus 4	Avg. LWD Modulus
	ft		*%*	*%*	*psi/in*	*psi*	*psi*	*psi*	*psi*	*psi*
6+45	26 (8'')	1	6.2	92.2	N/T	N/T	N/T	N/T	N/T	N/T
6+45	26 (10'')	1	4.9	91.4	N/T	N/T	N/T	N/T	N/T	N/T
6+57	-6 (8'')	2	5.1	90.8	N/T	N/T	N/T	N/T	N/T	N/T

Station	Offset	Lift	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*in/blow*	*psi*
3+45	-25	2	26433	29822	0.41	N/T
3+45	-15	1	N/T	N/T	N/T	N/T
3+45	-15	2	23496	32985	0.37	N/T
3+45	-5	2	25756	36600	0.48	N/T
3+45	5	2	29370	25304	0.47	N/T
3+45	15	1	N/T	N/T	N/T	N/T
3+45	15	2	25530	37504	0.49	N/T
3+45	25	2	32759	40667	0.50	N/T
3+60	-25	2	36148	29596	0.49	N/T
3+60	-15	1	N/T	N/T	N/T	N/T
3+60	-15	2	44056	34567	0.37	N/T
3+60	-5	2	40667	34341	0.36	N/T
3+60	5	2	25981	41796	0.39	N/T
3+60	15	1	N/T	N/T	N/T	N/T
3+60	15	2	29596	45185	0.42	N/T
3+60	25	2	28919	40667	0.42	N/T
3+75	-25	2	28241	50833	0.46	N/T
3+75	-15	1	N/T	N/T	N/T	N/T
3+75	-15	2	42926	37956	0.41	N/T
3+75	-5	2	51963	34793	0.39	N/T
3+75	5	2	37052	49704	0.38	N/T
3+75	15	1	N/T	N/T	N/T	N/T
3+75	15	2	34793	33889	0.38	N/T
3+75	25	2	29822	44056	0.33	N/T
4+20	-15	2	N/T	N/T	N/T	32107
4+20	15	2	N/T	N/T	N/T	32107
4+25	-25	2	51210	43679	0.25	32107
4+25	-15	1	N/T	N/T	N/T	32107
4+25	-15	2	39612	56481	0.26	32107
4+25	-5	2	33286	47444	0.25	32107
4+25	5	2	60247	63259	0.25	32107
4+25	15	1	N/T	N/T	N/T	32107
4+25	15	2	14007	13405	0.21	32107
4+25	25	2	48951	48951	0.20	32107
4+50	-25	2	35696	45185	0.27	32107
4+50	-15	1	N/T	N/T	N/T	32107
4+50	-15	2	48951	58741	0.26	32107
4+50	-5	2	37956	52415	0.27	32107
4+50	5	2	58741	32533	0.25	32107
4+50	15	1	N/T	N/T	N/T	32107
4+50	15	2	58741	63259	0.23	32107
4+50	25	2	57235	29220	0.24	32107

Station	Offset	Lift	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*in/blow*	*psi*
4+60	-15	2	N/T	N/T	N/T	32107
4+60	15	2	N/T	N/T	N/T	32107
4+75	-25	2	33738	37504	0.27	32107
4+75	-15	1	N/T	N/T	N/T	32107
4+75	-15	2	54222	43830	0.29	32107
4+75	-5	2	42926	45185	0.29	32107
4+75	5	2	51963	32232	0.28	32107
4+75	15	1	N/T	N/T	N/T	32107
4+75	15	2	48198	51963	0.24	32107
4+75	25	2	47444	60247	0.31	32107
5+00	-15	2	N/T	N/T	N/T	32107
5+00	15	2	N/T	N/T	N/T	32107
5+20	-25	2	35094	34491	0.33	32107
5+20	-15	1	N/T	N/T	N/T	32107
5+20	-15	2	49704	35244	0.29	32107
5+20	-5	2	58741	39010	0.28	32107
5+20	5	2	40667	45938	0.29	32107
5+20	15	1	N/T	N/T	N/T	32107
5+20	15	2	70037	41420	0.25	32107
5+20	25	2	52716	67025	0.28	32107
5+40	-25	2	43679	54222	0.32	32107
5+40	-15	1	N/T	N/T	N/T	32107
5+40	-15	2	51963	51210	0.31	32107
5+40	-5	2	54222	47444	0.31	32107
5+40	5	2	44432	63259	0.23	32107
5+40	15	1	N/T	N/T	N/T	32107
5+40	15	2	18677	29069	0.21	32107
5+40	25	2	39311	38558	0.24	32107
5+75	-20 (4'')	1	N/T	N/T	N/T	37934
5+75	-20 (6'')	1	N/T	N/T	N/T	37934
5+75	-20 (8'')	1	N/T	N/T	N/T	37934
5+75	-20 (10'')	1	N/T	N/T	N/T	37934
5+75	-20	2	N/T	N/T	N/T	37934
5+75	-20 (4'')	2	N/T	N/T	N/T	37934
5+75	-20 (6'')	2	N/T	N/T	N/T	37934
5+75	-20 (8'')	2	N/T	N/T	N/T	37934
5+75	-20 (10'')	2	N/T	N/T	N/T	37934
5+75	13 (4'')	1	N/T	N/T	N/T	37934
5+75	13 (6'')	1	N/T	N/T	N/T	37934
5+75	13 (8'')	1	N/T	N/T	N/T	37934
5+75	13 (10'')	1	N/T	N/T	N/T	37934
5+75	15	2	N/T	N/T	N/T	37934

Station	Offset	Lift	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*in/blow*	*psi*
5+75	15 (4'')	2	N/T	N/T	N/T	37934
5+75	15 (6'')	2	N/T	N/T	N/T	37934
5+75	15 (8'')	2	N/T	N/T	N/T	37934
5+75	15 (10'')	2	N/T	N/T	N/T	37934
5+80	-25	2	27864	25304	0.22	37934
5+80	-15	2	28617	41420	0.20	37934
5+80	-5	2	25304	24852	0.22	37934
5+80	5	2	36600	41420	0.21	37934
5+80	15	2	33889	30123	0.20	37934
5+80	25	2	29822	35696	0.20	37934
5+85	-15	2	N/T	N/T	N/T	37934
5+85	-15 (4'')	2	N/T	N/T	N/T	37934
5+85	-15 (6'')	2	N/T	N/T	N/T	37934
5+85	-15 (8'')	2	N/T	N/T	N/T	37934
5+85	-15 (10'')	2	N/T	N/T	N/T	37934
5+85	-13 (4'')	1	N/T	N/T	N/T	37934
5+85	-13 (6'')	1	N/T	N/T	N/T	37934
5+85	-13 (8'')	1	N/T	N/T	N/T	37934
5+85	-13 (10'')	1	N/T	N/T	N/T	37934
5+85	5	2	N/T	N/T	N/T	37934
5+85	5 (4'')	2	N/T	N/T	N/T	37934
5+85	5 (6'')	2	N/T	N/T	N/T	37934
5+85	5 (8'')	2	N/T	N/T	N/T	37934
5+85	5 (10'')	2	N/T	N/T	N/T	37934
5+86	-2 (4'')	1	N/T	N/T	N/T	37934
5+86	-2 (6'')	1	N/T	N/T	N/T	37934
5+86	-2 (8'')	1	N/T	N/T	N/T	37934
5+86	-2 (10'')	1	N/T	N/T	N/T	37934
5+88	14 (4'')	1	N/T	N/T	N/T	37934
5+88	14 (6'')	1	N/T	N/T	N/T	37934
5+88	14 (8'')	1	N/T	N/T	N/T	37934
5+88	14 (10'')	1	N/T	N/T	N/T	37934
5+90	-25	2	53319	28919	0.21	37934
5+90	-15	2	34190	35094	0.21	37934
5+90	-5	2	29521	25002	0.19	37934
5+90	5	2	26810	40667	0.22	37934
5+90	15	2	27262	26207	0.19	37934
5+90	25	2	34491	35546	0.19	37934
5+92	10 (4'')	1	N/T	N/T	N/T	37934
5+92	10 (6'')	1	N/T	N/T	N/T	37934
5+92	10 (8'')	1	N/T	N/T	N/T	37934
5+92	10 (10'')	1	N/T	N/T	N/T	37934

Station	Offset	Lift	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*in/blow*	*psi*
5+94	18	1	N/T	N/T	N/T	37934
5+95	-10	2	N/T	N/T	N/T	37934
5+95	-10 (4'')	2	N/T	N/T	N/T	37934
5+95	-10 (6'')	2	N/T	N/T	N/T	37934
5+95	-10 (8'')	2	N/T	N/T	N/T	37934
5+95	-10 (10'')	2	N/T	N/T	N/T	37934
5+95	-2 (4'')	1	N/T	N/T	N/T	37934
5+95	-2 (6'')	1	N/T	N/T	N/T	37934
5+95	-2 (8'')	1	N/T	N/T	N/T	37934
5+95	-2 (10'')	1	N/T	N/T	N/T	37934
5+95	25 (4'')	1	N/T	N/T	N/T	37934
5+95	25 (6'')	1	N/T	N/T	N/T	37934
5+95	25 (8'')	1	N/T	N/T	N/T	37934
5+95	25 (10'')	1	N/T	N/T	N/T	37934
5+95	25	2	N/T	N/T	N/T	37934
5+95	25 (4'')	2	N/T	N/T	N/T	37934
5+95	25 (6'')	2	N/T	N/T	N/T	37934
5+95	25 (8'')	2	N/T	N/T	N/T	37934
5+95	25 (10'')	2	N/T	N/T	N/T	37934
6+04	-17 (4'')	1	N/T	N/T	N/T	37934
6+04	-17 (4'')	1	N/T	N/T	N/T	37934
6+04	-17 (6'')	1	N/T	N/T	N/T	37934
6+04	-17 (6'')	1	N/T	N/T	N/T	37934
6+04	-17 (8'')	1	N/T	N/T	N/T	37934
6+04	-17 (8'')	1	N/T	N/T	N/T	37934
6+04	-17 (10'')	1	N/T	N/T	N/T	37934
6+04	-17 (10'')	1	N/T	N/T	N/T	37934
6+04	8 (4'')	1	N/T	N/T	N/T	37934
6+04	8 (6'')	1	N/T	N/T	N/T	37934
6+04	8 (8'')	1	N/T	N/T	N/T	37934
6+04	8 (10'')	1	N/T	N/T	N/T	37934
6+05	-20 (10'')	2	N/T	N/T	N/T	37934
6+05	7	1	N/T	N/T	N/T	37934
6+10	-10 (4'')	2	N/T	N/T	N/T	37934
6+10	-10 (6'')	2	N/T	N/T	N/T	37934
6+10	-10 (8'')	2	N/T	N/T	N/T	37934
6+10	-10 (10'')	2	N/T	N/T	N/T	37934
6+15	-25	2	N/T	N/T	N/T	37934
6+15	-25 (4'')	2	N/T	N/T	N/T	37934
6+15	-25 (6'')	2	N/T	N/T	N/T	37934
6+15	-25 (8'')	2	N/T	N/T	N/T	37934
6+15	-25 (10'')	2	N/T	N/T	N/T	37934

Station	Offset	Lift	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*in/blow*	*psi*
6+15	-12 (4'')	1	N/T	N/T	N/T	37934
6+15	-12 (6'')	1	N/T	N/T	N/T	37934
6+15	-12 (8'')	1	N/T	N/T	N/T	37934
6+15	-12 (10'')	1	N/T	N/T	N/T	37934
6+15	-3 (4'')	1	N/T	N/T	N/T	37934
6+15	-3 (6'')	1	N/T	N/T	N/T	37934
6+15	-3 (8'')	1	N/T	N/T	N/T	37934
6+15	-3 (10'')	1	N/T	N/T	N/T	37934
6+15	10	2	N/T	N/T	N/T	37934
6+15	10 (4'')	2	N/T	N/T	N/T	37934
6+15	10 (6'')	2	N/T	N/T	N/T	37934
6+15	10 (8'')	2	N/T	N/T	N/T	37934
6+15	10 (10'')	2	N/T	N/T	N/T	37934
6+15	11 (4'')	1	N/T	N/T	N/T	37934
6+15	11 (6'')	1	N/T	N/T	N/T	37934
6+15	11 (8'')	1	N/T	N/T	N/T	37934
6+15	11 (10'')	1	N/T	N/T	N/T	37934
6+20	-25	2	29822	30877	0.21	37934
6+20	-15	2	26960	30123	0.22	37934
6+20	-5	2	28015	31931	0.21	37934
6+20	5	2	21990	24852	0.21	37934
6+20	15	2	24551	28768	0.20	37934
6+20	25	2	29521	28165	0.21	37934
6+25	-5	2	N/T	N/T	N/T	37934
6+25	15	2	N/T	N/T	N/T	37934
6+25	-10 (4'')	2	N/T	N/T	N/T	37934
6+25	-10 (6'')	2	N/T	N/T	N/T	37934
6+25	-10 (8'')	2	N/T	N/T	N/T	37934
6+25	-10 (10'')	1	N/T	N/T	N/T	37934
6+25	10 (4'')	2	N/T	N/T	N/T	37934
6+25	10 (6'')	2	N/T	N/T	N/T	37934
6+25	10 (8'')	2	N/T	N/T	N/T	37934
6+25	10 (10'')	2	N/T	N/T	N/T	37934
6+25	15 (4'')	2	N/T	N/T	N/T	37934
6+25	15 (6'')	2	N/T	N/T	N/T	37934
6+25	15 (8'')	2	N/T	N/T	N/T	37934
6+25	15 (10'')	2	N/T	N/T	N/T	37934
6+25	3 (4'')	1	N/T	N/T	N/T	37934
6+25	3 (6'')	1	N/T	N/T	N/T	37934
6+25	3 (8'')	1	N/T	N/T	N/T	37934
6+25	3 (10'')	1	N/T	N/T	N/T	37934
6+25	-5 (4'')	2	N/T	N/T	N/T	37934

Station	Offset	Lift	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*in/blow*	*psi*
6+25	-5 (6'')	2	N/T	N/T	N/T	37934
6+25	-5 (8'')	2	N/T	N/T	N/T	37934
6+25	-5 (10'')	2	N/T	N/T	N/T	37934
6+30	-25	2	24400	28015	0.23	37934
6+30	-15	2	34491	38558	0.23	37934
6+30	-5	2	22141	26509	0.22	37934
6+30	5	2	34341	20785	0.22	37934
6+30	15	2	24701	24701	0.20	37934
6+30	25	2	28015	29672	0.23	37934
6+35	-15	2	N/T	N/T	N/T	37934
6+35	-12	1	N/T	N/T	N/T	37934
6+35	20	2	N/T	N/T	N/T	37934
6+35	-15 (4'')	2	N/T	N/T	N/T	37934
6+35	-15 (6'')	2	N/T	N/T	N/T	37934
6+35	-15 (8'')	2	N/T	N/T	N/T	37934
6+35	-15 (10'')	2	N/T	N/T	N/T	37934
6+35	18 (4'')	1	N/T	N/T	N/T	37934
6+35	18 (6'')	1	N/T	N/T	N/T	37934
6+35	18 (8'')	1	N/T	N/T	N/T	37934
6+35	18 (10'')	1	N/T	N/T	N/T	37934
6+35	20 (4'')	2	N/T	N/T	N/T	37934
6+35	20 (6'')	2	N/T	N/T	N/T	37934
6+35	20 (8'')	2	N/T	N/T	N/T	37934
6+35	20 (10'')	2	N/T	N/T	N/T	37934
6+35	-23 (4'')	1	N/T	N/T	N/T	37934
6+35	-23 (6'')	1	N/T	N/T	N/T	37934
6+35	-23 (8'')	1	N/T	N/T	N/T	37934
6+35	-23 (10'')	1	N/T	N/T	N/T	37934
6+36	-13	1	N/T	N/T	N/T	37934
6+36	-13 (4'')	1	N/T	N/T	N/T	37934
6+36	-13 (6'')	1	N/T	N/T	N/T	37934
6+36	-13 (8'')	1	N/T	N/T	N/T	37934
6+36	-17 (4'')	1	N/T	N/T	N/T	37934
6+36	-17 (6'')	1	N/T	N/T	N/T	37934
6+36	-17 (8'')	1	N/T	N/T	N/T	37934
6+36	-17 (10'')	1	N/T	N/T	N/T	37934
6+45	25 (4'')	1	N/T	N/T	N/T	37934
6+45	25 (6'')	1	N/T	N/T	N/T	37934
6+45	25 (8'')	1	N/T	N/T	N/T	37934
6+45	25 (10'')	1	N/T	N/T	N/T	37934
6+45	26 (4'')	1	N/T	N/T	N/T	37934
6+45	26 (6'')	1	N/T	N/T	N/T	37934

Station	Offset	Lift	Seismic Modulus (L)	Seismic Modulus (T)	DCP	Resilient Modulus
	ft		*psi*	*psi*	*in/blow*	*psi*
6+45	26 (8'')	1	N/T	N/T	N/T	37934
6+45	26 (10'')	1	N/T	N/T	N/T	37934
6+57	-6 (8'')	2	N/T	N/T	N/T	N/T

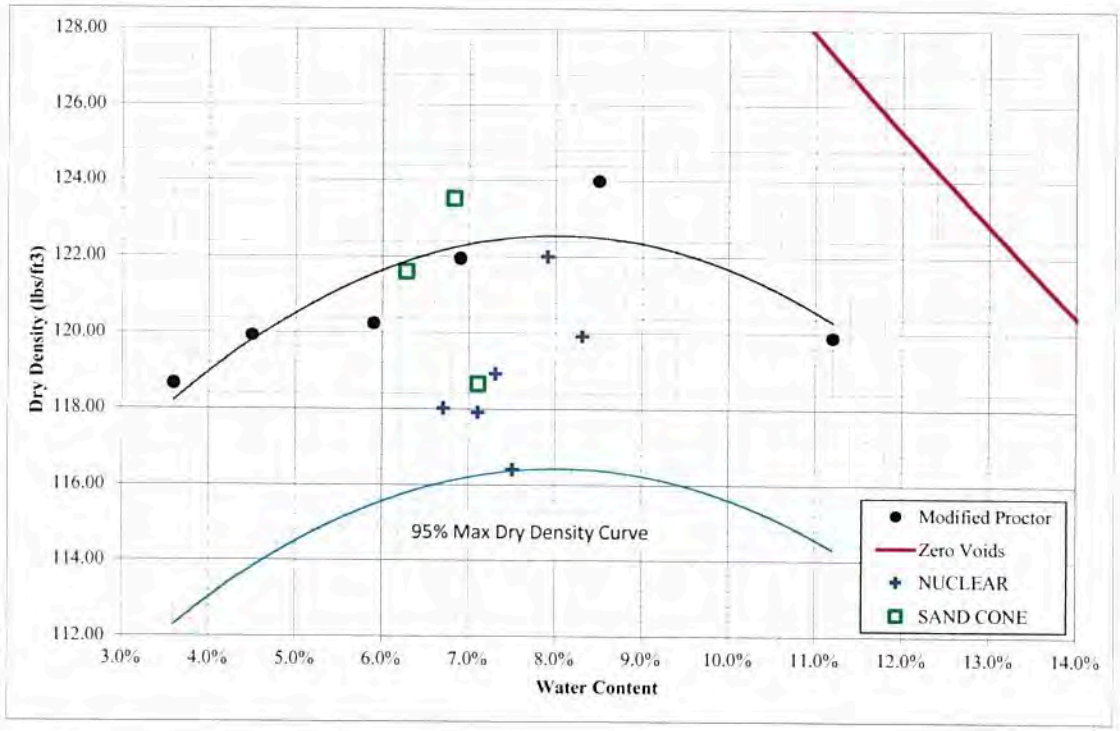
CC7
5/13/2015

NUCLEAR DENSITY GAUGE ON CC8 P154 LIFT 1

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density pcf	Percent Compaction
345	-15(N)	118.9	7.3%	122.5	97.0%
360	-15(N)	117.9	7.1%	122.5	96.2%
375	-15(N)	122.0	7.9%	122.5	99.6%
345	15(S)	118.0	6.7%	122.5	96.3%
360	15(S)	119.9	8.3%	122.5	97.8%
375	15(S)	116.4	7.5%	122.5	95.0%

SAND CONE ON CC8 P154 LIFT 1

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density pcf	Percent Compaction
348	14(S)	118.6	7.1%	122.5	96.8%
365	-14(N)	121.6	6.3%	122.5	99.2%
350	-14(N)	123.5	6.8%	122.5	100.8%



SRA RECOMMENDATION:
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

FAA's On-Site Engineer

5/13/15
Date

Density of Soil In Place by Sand Cone Method
ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8	Section		Date:	5/12/2015
Technician:	QL/CB/RN	Location:	Facility		

Test No.	1	2	3				
Station	3+50	3+65	3+48				
Offset (ft.)	-14'	-14'	14'				
Depth/Elevation (ft.)	1st Lift of P-154	1st Lift of P-154	1st Lift of P-154				
Mass of soil removed (g)	1880.3	1589.0	1721.7				
Mass of jar and sand before test (g)	6931.5	6165.6	6211.0				
Mass of jar and sand after test (g)	4059.4	3471.0	3402.7				
Mass of sand lost in hole and cone (g)	2872.1	2694.6	2808.3				
Mass of sand in cone (g)	1578.2	1578.2	1578.2				
Mass of sand in hole only (g)	1293.9	1116.4	1230.1				
Sand density (g/cm^3)	1.4543	1.4543	1.4543				
Volume of Hole (cm^3)	889.7349194	767.6791592	845.8636095				
Moisture sample can ID	12	15	16				
Moisture sample can mass (g)	927.0	923.5	916.7				
Mass of wet soil + can (g)	2807.3	2512.5	2638.4				
Mass of dry soil + can (g)	2687.3	2418.8	2524.2				
Mass of dry soil (g)	1760.3	1495.3	1607.5				

Mass of water loss (g)	**120.0**	**93.7**	**114.2**				
Moisture content (%)	**6.82%**	**6.27%**	**7.10%**				
Wet soil density (g/cm^3)	**2.113326069**	**2.069875131**	**2.035434532**				
Dry soil density (g/cm^3)	**1.978454438**	**1.947818932**	**1.900424586**				
Wet soil unit weight (lb/ft^3)	**131.9**	**129.2**	**127.1**				
Dry soil unit weight (lb/ft^3)	**123.5**	**121.6**	**118.6**				

Created: 3/8/2013

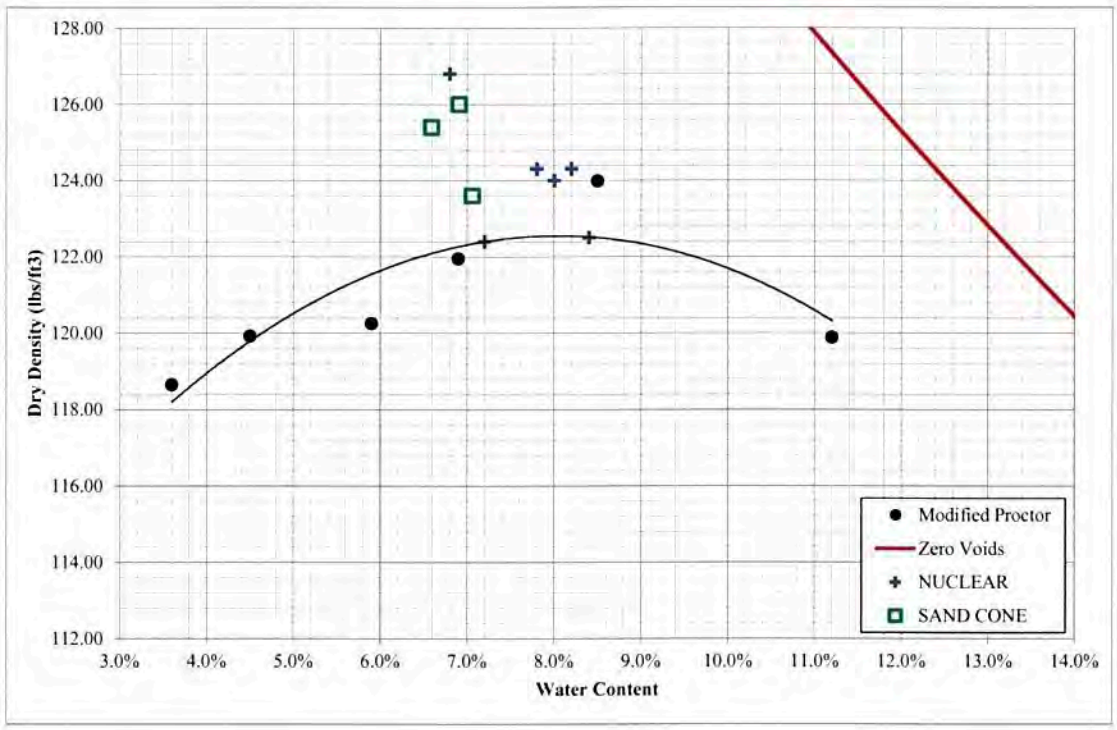
CC7
5/20/2015

NUCLEAR DENSITY GAUGE ON CC8 P154 LIFT 2

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density pcf	Percent Compaction
345	-15(N)	124.3	7.8%	122.5	101.4%
360	-15(N)	122.5	8.4%	122.5	100.0%
375	-15(N)	124.0	8.0%	122.5	101.2%
345	15(S)	124.3	8.2%	122.5	101.4%
360	15(S)	122.4	7.2%	122.5	99.9%
375	15(S)	126.8	6.8%	122.5	103.5%

SAND CONE ON CC8 P154 LIFT 2

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density pcf	Percent Compaction
343	-20(N)	123.6	7.1%	122.5	100.9%
345	17(S)	125.4	6.6%	122.5	102.3%
377	15(S)	126.0	6.9%	122.5	102.8%



SRA RECOMMENDATION:
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

Murphy Flynn
FAA's On-Site Engineer

5/22/15
Date

Density of Soil In Place by Sand Cone Method
ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8	Section		Date:	5/20/2015
Technician:	QL/CB/RN	Location:	Facility		

Test No.	1	2	3				
Station	3+43	3+45	3+77				
Offset (ft.)	-20'	17'	15'				
Depth/Elevation (ft.)	Top of P-154	Top of P-154	Top of P-154				
Mass of soil removed (g)	1481	1333.4	1415.6				
Mass of jar and sand before test (g)	6324.1	6221.2	6310.3				
Mass of jar and sand after test (g)	3729.5	3737.6	3777.8				
Mass of sand lost in hole and cone (g)	2594.6	2483.6	2532.5				
Mass of sand in cone (g)	1578.2	1578.2	1578.2				
Mass of sand in hole only (g)	1016.4	905.4	954.3				
Sand density (g/cm^3)	1.4543	1.4543	1.4543				
Volume of Hole (cm^3)	698.8929382	622.5675583	656.1919824				
Moisture sample can ID	15	12	18				
Moisture sample can mass (g)	923.5	927.0	932.7				
Mass of wet soil + can (g)	2404.5	2260.4	2348.3				
Mass of dry soil + can (g)	2306.8	2178	2256.8				
Mass of dry soil (g)	1383.3	1251.0	1324.1				

Mass of water loss (g)	**97.7**	**82.4**	**91.5**				
Moisture content (%)	**7.06%**	**6.59%**	**6.91%**				
Wet soil density (g/cm^3)	**2.119**	**2.142**	**2.157**				
Dry soil density (g/cm^3)	**1.979**	**2.009**	**2.018**				
Wet soil unit weight (lb/ft^3)	**132.3**	**133.7**	**134.7**				
Dry soil unit weight (lb/ft^3)	**123.6**	**125.4**	**126.0**				

Created: 3/8/2013

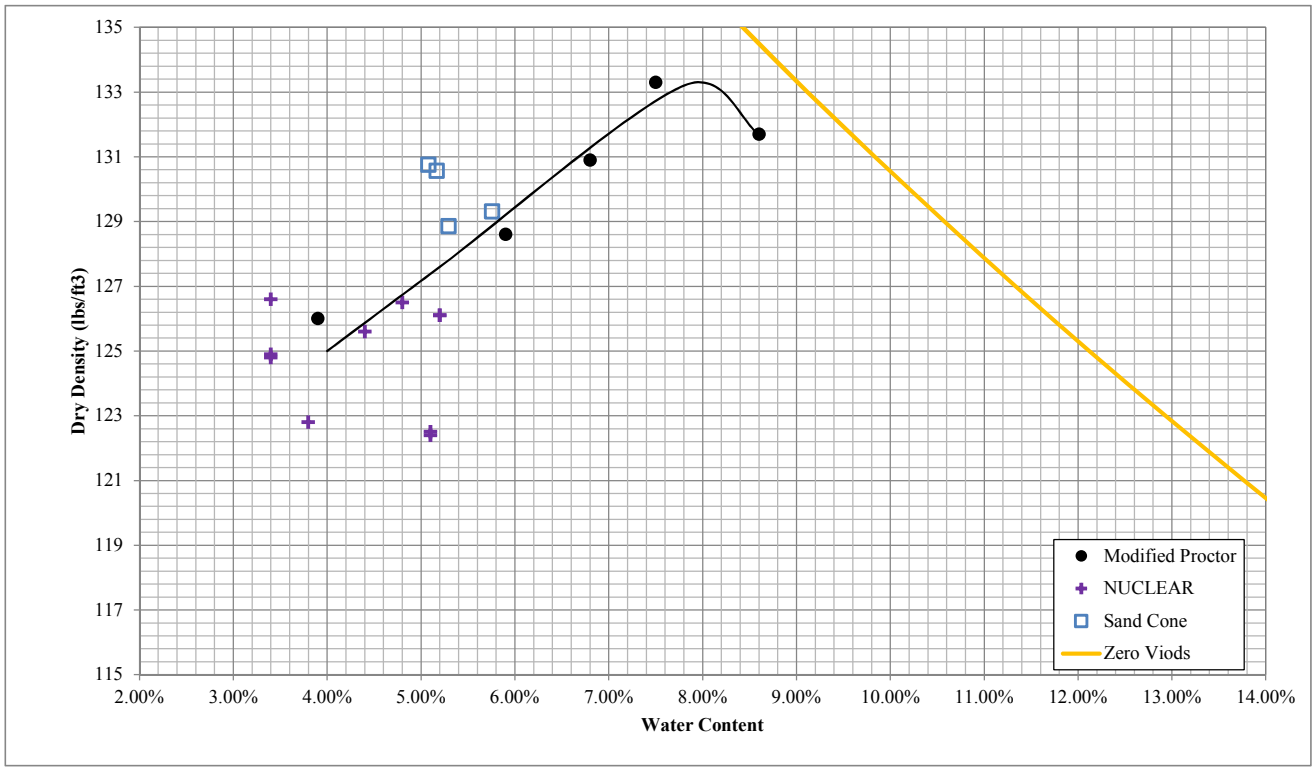
CC8
Test Date: 03/08/2017 **Report Date: 03/14/2017**

NUCLEAR DENSITY GAUGE ON CC8 P154 LIFT 1 (The results were used only compaction guidance)

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density	Percent Compaction
425	-15(N)	125.6	4.4%	133.2	94.3%
425	+15(S)	122.4	5.1%	133.2	91.9%
450	-15(N)	126.5	4.8%	133.2	95.0%
450	+15(S)	126.1	5.2%	133.2	94.7%
475	-15(N)	124.8	3.4%	133.2	93.7%
475	+15(S)	126.1	5.2%	133.2	94.7%
520	-15(N)	122.5	5.1%	133.2	92.0%
520	+15(S)	124.9	3.4%	133.2	93.8%
540	-15(N)	122.8	3.8%	133.2	92.2%
540	+15(S)	126.6	3.4%	133.2	95.0%

SAND CONE ON CC8 P154 LIFT 1

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density	Percent Compaction
525	+20(S)	130.8	5.1%	133.2	98.2%
445	+18(S)	128.9	5.3%	133.2	96.7%
438	-18(N)	130.6	5.2%	133.2	98.0%
532	-15(N)	129.3	5.8%	133.2	97.1%



SRA RECOMMENDATION:
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

FAA's On-Site Engineer

Date

Density of Soil In Place by Sand Cone Method

ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8	Section	First lift of P-154	Date:	3/8/2017
Technician:	CR&QL	Location:	First lift of P-154		

Test No.	1	2	3	4			
Station	525	445	438	532			
Offset (ft.)	20	18	-18	-15			
Mass of soil removed (g)	1817	1689.8	1175	1561.4			
Mass of jar and sand before test (g)	7191.4	7223.8	7227.9	4845.6			
Mass of jar and sand after test (g)	4368.8	4473.8	4845.6	2193.5			
Mass of sand lost in hole and cone (g)	2822.6	2750	2382.3	2652.1			
Mass of sand in cone (g)	1575.0	1575.0	1575.0	1575.0			
Mass of sand in hole only (g)	1247.6	1175.0	807.3	1077.1			
Sand density (g/cm^3)	1.511	1.511	1.511	1.511			
Volume of Hole (cm^3)	825.6	777.5	534.2	712.7			
Moisture sample can ID	2	1	3	4			
Moisture sample can mass (g)	773.1	767.7	774.1	767.7			
Mass of wet soil + can (g)	2590.1	2457.5	1949.1	2329.1			
Mass of dry soil + can (g)	2502.3	2372.6	1891.4	2244.1			
Mass of dry soil (g)	1729.2	1604.9	1117.3	1476.4			
Mass of water loss (g)	87.8	84.9	57.7	85			
Moisture content (%)	5.08%	5.29%	5.16%	5.76%			
Wet soil density (g/cm^3)	2.201	2.173	2.200	2.191			
Dry soil density (g/cm^3)	2.095	2.064	2.092	2.071			
Wet soil unit weight (lb/ft^3)	137.4	135.7	137.3	136.8			
Dry soil unit weight (lb/ft^3)	130.8	128.9	130.6	129.3			

Created: 3/8/2013

	Correction for Mass of Sand in Cone (ASTM D1556)	**NextGen Pavement Materials Laboratory William J. Hughes Technical Center Atlantic City Int. Airport, NJ 08405**

Date: 3/10/2017

Verified By: Qiang Li

Verification Frequency: 6 months or when new sand is used

Previous Verification: 11/24/2015

Verification Equipment Used: Ohaus Explorer 1119343040

Purpose: Measurement of dimensions and mass of sand contained in the funnel and base plate of the sand-cone apparatus

Inspection Equipment Required: Sand as outlined in ASTM D1556 (6.2), Balance with a 5.0 g or better readability

Tolerance: The sand-cone apparatus shall meet the dimensions set forth in ASTM D1556

Procedure: Method A

1. Fill apparatus with sand that is dried and determine mass
2. Place base plate on clean and level surface. Invert apparatus and seat funnel
3. Mark and ID the apparatus and base plate so same pieces are used together and seated in same position
4. Open valve fully until sand flow stops. Do not jar or move apparatus.
5. Close valve sharply and determine mass
6. Repeat at least 2 more times
7. Average will be subtracted from sand mass to dermine sand in hole

Initial Mass - Apparatus & Sand (g)	Mass After Test w/ Remaining Sand (g)	Difference (g)	Average (g)	Variation % - Average & Determination
4760.5	3186.3	1574.2		-0.05%
4760.4	3186.2	1574.2		-0.05%
4760.4	3183.8	1576.6		0.10%
			1575.0	

Created 1/14/13

	Calibration of Density Sand	**NextGen Pavement Materials Laboratory William J. Hughes Technical Center Atlantic City Int. Airport, NJ 08405**

Date: 3/10/2017

Verified By: Qiang Li

Verification Frequency: 6 months or when new sand is used

Previous Verification: 11/24/2015

Verification Equipment Used: Ohaus Explorer 119343040, 6" Proctor Mold, Cone, Straightedge

Purpose: Determination of the bulk-density of sand for use in ASTM D1556

Inspection Equipment Required: Balance with a minimum capacity of 50 lb and meeting ASTM D4753, 6" compaction mold, sand-cone apparatus, metal straightedge

Tolerance: The sand shall meet the requirements as set forth in ASTM D1556 6.2

Procedure: Method B

1. Fill assembled apparatus with dried sand
2. Determine mass of calibration container when empty
3. Invert and support apparatus over calibration container with valve closed so that the sand falls approximately the same distance as in the field test.
4. Fully open the valve
5. Fill container until it just overflows and close valve
6. Strike off excess to smooth and level surface. Careful not to jar or densify sand and use minimum number of strokes
7. Clean any sand from the outside of the calibration container
8. Determine the mass of calibration container and sand $\rho_1 = M_5/V_1$
9. Repeat at least 2 more times
10. Average will be used in test calculations

Initial Mass Container (g)	Mass Container & Sand (g)	Difference (g)	Average(M_5)	Variation % - Average & Determination	Bulk Density of Sand (g/cm^3)
5549.9	8767.6	3217.7		0.15%	
5550.9	8761.9	3211.0		-0.06%	
5551.9	8762	3210.1		-0.09%	
Volume of Calibration Container (V_1) (cm^3) (See ASTM D698 Calibration Sheet)		2126.1	3212.9		1.511

Created 1/14/13

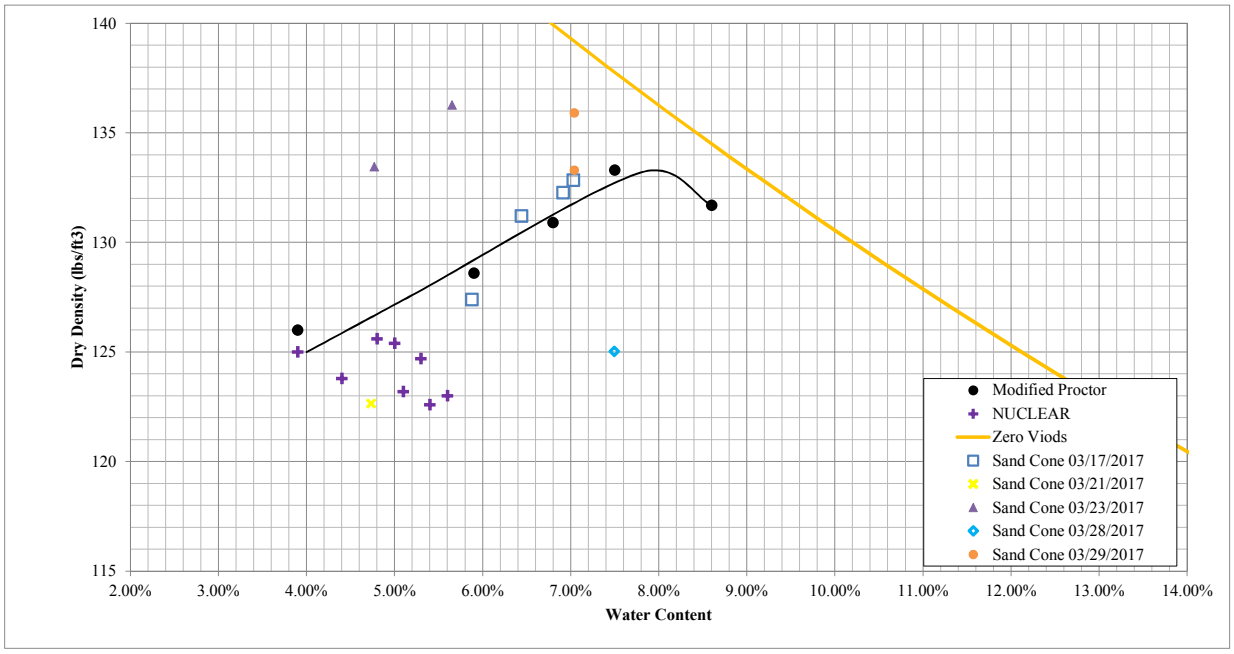
CC8
Report Date: 03/30/2017

NUCLEAR DENSITY GAUGE ON CC8 P154 LIFT 2 (The results were used only compaction guidance)

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density pcf	Percent Compaction	Test Date
420	-15(N)	123.2	5.1%	127.4	96.7%	03/17/2017
420	+15(S)	124.7	5.3%	127.8	97.6%	03/17/2017
460	+15(N)	125.6	4.8%	126.7	99.1%	03/17/2017
460	-15(S)	122.6	5.4%	128.0	95.8%	03/17/2017
500	-15(N)	125.4	5.0%	127.2	98.6%	03/17/2017
500	+15(S)	123.0	5.6%	128.5	95.8%	03/17/2017
540	+15(N)	123.8	4.4%	125.9	98.4%	03/17/2017
540	-15(S)	125.0	3.9%	124.8	100.2%	03/17/2017

SAND CONE ON CC8 P154 LIFT 2

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density @ insitu MC pcf	Percent Compaction	Test Date
532	16 (S)	127.4	5.9%	129.0	98.7%	03/17/2017
529	-15 (N)	132.3	6.9%	131.3	100.7%	03/17/2017
450	-17 (N)	132.9	7.0%	131.5	101.0%	03/17/2017
450	15 (S)	131.2	6.4%	130.3	100.7%	03/17/2017
530	13 (S)	122.7	4.7%	126.6	96.9%	03/21/2017
463	18 (S)	136.3	5.6%	128.6	106.0%	03/23/2017
530	7 (S)	133.5	4.8%	126.7	105.4%	03/23/2017
485	15 (S)	125.0	7.5%	132.5	94.3%	03/28/2017
485	16 (S)	133.3	7.0%	131.6	101.3%	03/29/2017
530	22 (S)	135.9	7.0%	131.6	103.3%	03/29/2017



SRA RECOMMENDATION:
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

FAA's On-Site Engineer

Date

Density of Soil In Place by Sand Cone Method
ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8		Section	Lift #2 of P-154		Date:	3/17/2017
Technician:	CR&QL		Location:	Lift #2 of P-154			
Test No.	1	2	3	4			
Station	532	529	450	450			
Offset (ft.)	16	-15	-17	15			
Mass of soil removed (g)	1537.4	1528	1606.6	1662.8			
Mass of jar and sand before test (g)	6631.7	7275.4	7063.8	6490.7			
Mass of jar and sand after test (g)	3985.5	4685.0	4426.9	3796.7			
Mass of sand lost in hole and cone (g)	2646.2	2590.4	2636.9	2694			
Mass of sand in cone (g)	1573.2	1573.2	1573.2	1573.2			
Mass of sand in hole only (g)	1073.0	1017.2	1063.7	1120.8			
Sand density (g/cm^3)	1.508	1.508	1.508	1.508			
Volume of Hole (cm^3)	711.5	674.5	705.4	743.2			
Moisture sample can ID	1	Old	2	178			
Moisture sample can mass (g)	767.5	1642.7	773.4	1148.1			
Mass of wet soil + can (g)	2304.9	3170.7	2380.0	2810.9			
Mass of dry soil + can (g)	2219.6	3071.9	2274.5	2710.3			
Mass of dry soil (g)	1452.1	1429.2	1501.1	1562.2			
Mass of water loss (g)	85.3	98.8	105.5	100.6			
Moisture content (%)	5.87%	6.91%	7.03%	6.44%			
Wet soil density (g/cm^3)	2.161	2.265	2.278	2.237			
Dry soil density (g/cm^3)	2.041	2.119	2.128	2.102			
Wet soil unit weight (lb/ft^3)	134.9	141.4	142.2	139.7			
Dry soil unit weight (lb/ft^3)	127.4	132.3	132.9	131.2			

Created: 3/8/2013

Density of Soil In Place by Sand Cone Method
ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8		Section	Lift #2 of P-154		Date:	3/21/2017
Technician:	CR&QL		Location:	Lift #2 of P-154			
Test No.	1						
Station	530						
Offset (ft.)	13						
Mass of soil removed (g)	1531.9						
Mass of jar and sand before test (g)	5074.9						
Mass of jar and sand after test (g)	2379						
Mass of sand lost in hole and cone (g)	2695.9						
Mass of sand in cone (g)	1573.2						
Mass of sand in hole only (g)	1122.7						
Sand density (g/cm^3)	1.508						
Volume of Hole (cm^3)	744.5						
Moisture sample can ID	3						
Moisture sample can mass (g)	774						
Mass of wet soil + can (g)	2305.9						
Mass of dry soil + can (g)	2236.7						
Mass of dry soil (g)	1462.7						
Mass of water loss (g)	69.2						
Moisture content (%)	4.73%						
Wet soil density (g/cm^3)	2.058						
Dry soil density (g/cm^3)	1.965						
Wet soil unit weight (lb/ft^3)	128.5						
Dry soil unit weight (lb/ft^3)	122.7						

Created: 3/8/2013

Density of Soil In Place by Sand Cone Method
ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8		Section	Lift #2 of P-154		Date:	3/23/2017
Technician:	CR&QL		Location:	Lift #2 of P-154			
Test No.	1	2					
Station	463	530					
Offset (ft.)	18	7					
Mass of soil removed (g)	1739.3	1456.5					
Mass of jar and sand before test (g)	6899.5	6889.1					
Mass of jar and sand after test (g)	4189.0	4335.3					
Mass of sand lost in hole and cone (g)	2710.5	2553.8					
Mass of sand in cone (g)	1573.2	1573.2					
Mass of sand in hole only (g)	1137.3	980.6					
Sand density (g/cm^3)	1.508	1.508					
Volume of Hole (cm^3)	754.2	650.3					
Moisture sample can ID	#1	old					
Moisture sample can mass (g)	767.7	1642.9					
Mass of wet soil + can (g)	2507	3099.4					
Mass of dry soil + can (g)	2414	3033.1					
Mass of dry soil (g)	1646.3	1390.2					
Mass of water loss (g)	93	66.3					
Moisture content (%)	5.65%	4.77%					
Wet soil density (g/cm^3)	2.306	2.240					
Dry soil density (g/cm^3)	2.183	2.138					
Wet soil unit weight (lb/ft^3)	144.0	139.8					
Dry soil unit weight (lb/ft^3)	136.3	133.5					

Created: 3/8/2013

Density of Soil In Place by Sand Cone Method
ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8		Section	Lift #2 of P-154		Date:	3/28/2017
Technician:	CR&QL		Location:	Lift #2 of P-154			
Test No.	1						
Station	485						
Offset (ft.)	15						
Mass of soil removed (g)	1328.3						
Mass of jar and sand before test (g)	6317.2						
Mass of jar and sand after test (g)	3780.4						
Mass of sand lost in hole and cone (g)	2536.8						
Mass of sand in cone (g)	1591.6						
Mass of sand in hole only (g)	945.2						
Sand density (g/cm^3)	1.532						
Volume of Hole (cm^3)	616.9						
Moisture sample can ID	#178						
Moisture sample can mass (g)	1148						
Mass of wet soil + can (g)	2476.3						
Mass of dry soil + can (g)	2383.7						
Mass of dry soil (g)	1235.7						
Mass of water loss (g)	92.6						
Moisture content (%)	7.49%						
Wet soil density (g/cm^3)	2.153						
Dry soil density (g/cm^3)	2.003						
Wet soil unit weight (lb/ft^3)	134.4						
Dry soil unit weight (lb/ft^3)	125.0						

Created: 3/8/2013

Density of Soil In Place by Sand Cone Method
ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

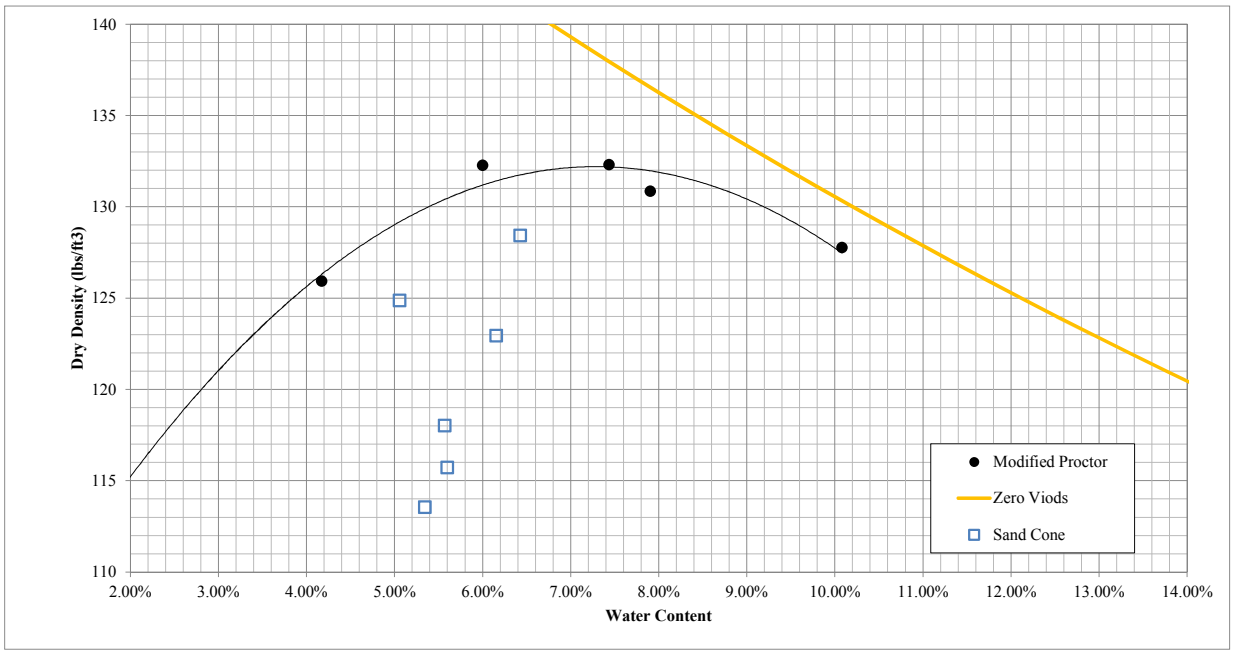
Project:	CC-8		Section	Lift #2 of P-154		Date:	3/29/2017
Technician:	CR&QL		Location:	Lift #2 of P-154			
Test No.	1						
Station	485	530					
Offset (ft.)	15	22					
Mass of soil removed (g)	1370	1293.8					
Mass of jar and sand before test (g)	6289.3	5466.4					
Mass of jar and sand after test (g)	3779.3	3024.2					
Mass of sand lost in hole and cone (g)	2510	2442.2					
Mass of sand in cone (g)	1591.6	1591.6					
Mass of sand in hole only (g)	918.4	850.6					
Sand density (g/cm^3)	1.532	1.532					
Volume of Hole (cm^3)	599.4	555.2					
Moisture sample can ID	#1	old					
Moisture sample can mass (g)	767.7	1642.9					
Mass of wet soil + can (g)	2137.7	2936.7					
Mass of dry soil + can (g)	2047.6	2851.6					
Mass of dry soil (g)	1279.9	1208.7					
Mass of water loss (g)	90.1	85.1					
Moisture content (%)	7.04%	7.04%					
Wet soil density (g/cm^3)	2.285	2.330					
Dry soil density (g/cm^3)	2.135	2.177					
Wet soil unit weight (lb/ft^3)	142.7	145.5					
Dry soil unit weight (lb/ft^3)	133.3	135.9					

Created: 3/8/2013

CC8
Report Date: 09/14/2017 **Test Date: 09/12/2017&09/13/2017**

SAND CONE ON CC8 P154 LIFT 1

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density @ insitu MC pcf	Percent Compaction	Test Date
6+25	-10	123.0	6.2%	131.4	93.6%	9/12/17 & 9/13/17
5+75	6	113.6	5.3%	129.9	87.4%	9/12/17 & 9/13/17
5+85	-14	118.0	5.6%	130.4	90.5%	9/12/17 & 9/13/17
5+95	20	115.7	5.6%	130.5	88.7%	9/12/17 & 9/13/17
6+15	10	128.4	6.4%	131.8	97.5%	9/12/17 & 9/13/17
6+35	-19	124.9	5.1%	129.2	96.7%	9/12/17 & 9/13/17



SRA RECOMMENDATION:
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

FAA's On-Site Engineer

Date

Density of Soil In Place by Sand Cone Method

ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8 Acceptance	Location:	See Below	Material Type:	P-154
Technician:	JA (Testing)/RN (Data)	Engineer:	QL	Date	9/12/2017 & 9/13/17

Test No.	1	2	3	4	5	6	
Station	6+25	5+75	5+85	5+95	6+15	6+35	
Offset (ft.)	-10	6	-14	20	10	-19	
Depth/Elevation (ft.)	-	-	-	-	-	-	
Mass of soil removed (g)	2435.7	2049	2229	2136	2382	2316	
Mass of jar and sand before test (g)	6751.7	7195.0	6985	7241	7004	7051	
Mass of jar and sand after test (g)	3359.2	3949	3665	3960	3729	3754	
Mass of sand lost in hole and cone (g)	3392.5	3246	3320	3281	3276	3297	
Mass of sand in cone (g)	1614.3	1614.3	1614.3	1614.3	1614.3	1614.3	
Mass of sand in hole only (g)	1778.2	1632	1706	1666	1661	1683	
Sand density (g/cm^3)	1.527	1.527	1.527	1.527	1.527	1.527	
Volume of Hole (cm^3)	1165.0	1069	1117	1091	1088	1102	
Moisture sample can ID	2	2	17b	g3	yao	lbj	
Moisture sample can mass (g)	772.8	177.4	181.7	180.6	1317.5	1316.9	
Mass of wet soil + can (g)	3208.5	2225.9	2411.1	2316.3	3699.6	3632.9	
Mass of dry soil + can (g)	3067.3	2122	2293.5	2203.1	3555.8	3521.5	
Mass of dry soil (g)	2294.5	1944.6	2111.8	2022.5	2238.3	2204.6	

Mass of water loss (g)	141.2	103.9	117.6	113.2	143.8	111.4	
Moisture content (%)	**6.2%**	**5.3%**	**5.6%**	**5.6%**	**6.4%**	**5.1%**	
Wet soil density (g/cm^3)	2.091	1.92	2.00	1.96	2.19	2.10	
Dry soil density (g/cm^3)	1.970	1.82	1.89	1.85	2.06	2.00	
Wet soil unit weight (lb/ft^3)	130.5	119.6	124.6	122.2	136.7	131.2	
Dry soil unit weight (lb/ft^3)	**123.0**	**113.6**	**118.0**	**115.7**	**128.4**	**124.9**	

Created: 3/8/2013

CC8
Report Date: 09/19/2017 **Test Date: 09/18/2017**

SAND CONE ON CC8 P154 LIFT 2

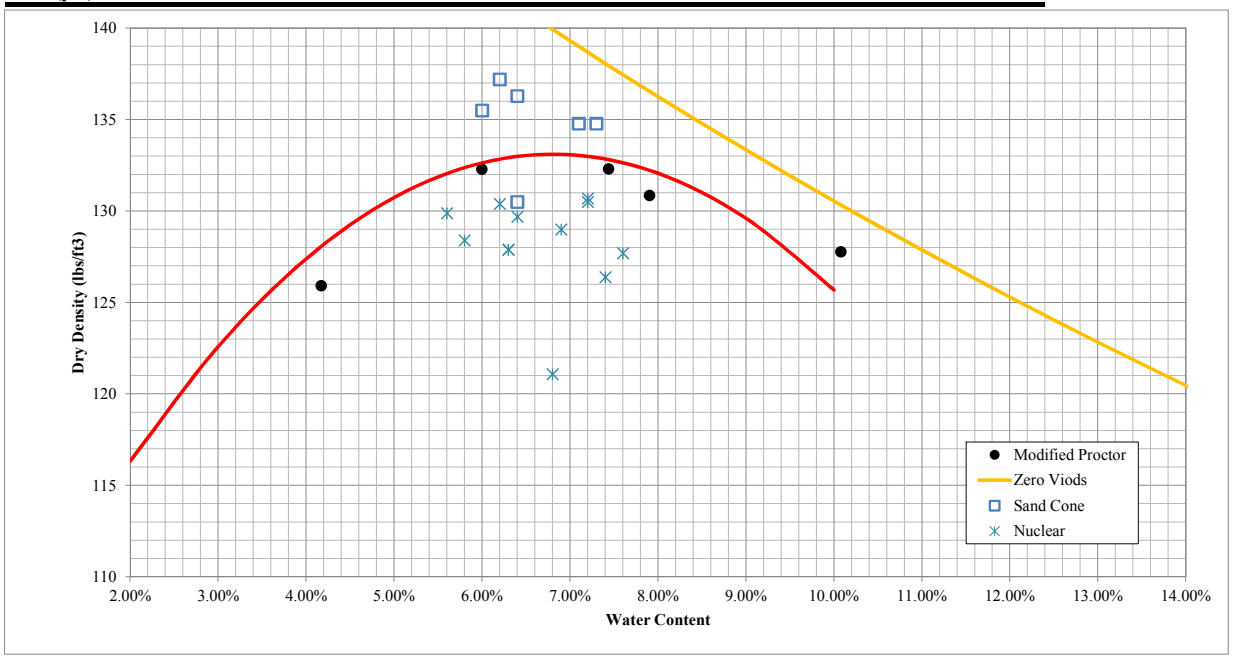
Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density @ insitu MC pcf	Percent Compaction @ insitu MC	Percent Compaction @OMC
6+15	-25	134.8	7.1%	133.0	101.3%	101.3%
5+85	5	136.3	6.4%	133.0	102.5%	102.4%
5+95	-10	134.8	7.3%	132.9	101.4%	101.3%
5+75	-20	137.2	6.2%	132.8	103.3%	103.1%
6+25	15	135.5	6.0%	132.6	102.2%	101.8%
6+35	20	130.5	6.4%	133.0	98.1%	98.0%

NUCLEAR DENSITY GAUGE ON CC8 P154 LIFT 2 (The results were used only compaction guidance)

Station feet	Offset feet	Dry Density pcf	Moisture Content	Maximum Dry Density @ insitu MC pcf	Percent Compaction @ insitu MC	Percent Compaction @OMC
5+75	15	121.1	6.8%	133.1	91.0%	91.0%
5+85	5	130.4	6.2%	132.8	98.2%	98.0%
5+95	25	129.0	6.9%	133.1	96.9%	96.9%
6+15	10	129.7	6.4%	133.0	97.5%	97.4%
6+25	15	129.9	5.6%	132.1	98.4%	97.6%
6+35	20	127.9	6.3%	132.9	96.2%	96.1%
5+75	-20	128.4	5.8%	132.4	97.0%	96.5%
5+85	-15	126.4	7.4%	132.9	95.1%	95.0%
5+95	-10	130.7	7.2%	133.0	98.3%	98.2%
6+15	-25	130.5	7.2%	133.0	98.1%	98.0%
6+25	-5	127.7	7.6%	132.6	96.3%	95.9%
6+35	-15	127.9	6.3%	132.9	96.2%	96.1%

LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

Water Content	4.2%	6.0%	7.9%	7.4%	10.1%
Dry Density(pcf)	125.9	132.3	130.9	132.3	127.8
OWC	6.8%				
MDD(pcf)	133.1				



SRA RECOMMENDATION:
Lift is accepted since it meets acceptance criteria.

ACCEPTED / REJECTED

FAA's On-Site Engineer

Date

Density of Soil In Place by Sand Cone Method
ASTM D1556

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City NJ 08405

Project:	CC-8 Acceptance	**Location:**	See Below	**Material Type:**	P-154
Technician:	JK, HF (Testing)/RN (Data)	**Engineer:**	QL	**Date**	9/18/2017

Test No.	**1**	**Nuke Follow**	**2**	**3**	**4**	**5**	
Station	6+15	5+85	5+95	5+75	6+25	6+35	
Offset (ft.)	-25	5	-10	-20	15	20	
Depth/Elevation (ft.)	-	-	-	-	-	-	
Mass of soil removed (g)	1704.1	1963.1	1596.1	1721.5	1626.1	1637.3	
Mass of jar and sand before test (g)	5926.9	5511.9	6343.9	6834.1	6533.7	6710.3	
Mass of jar and sand after test (g)	3187.1	2607.7	3677.7	4094.3	3839.3	3971.9	
Mass of sand lost in hole and cone (g)	2739.8	2904.2	2666.2	2739.8	2694.4	2738.4	
Mass of sand in cone (g)	1614.3	1614.3	1614.3	1614.3	1614.3	1614.3	
Mass of sand in hole only (g)	1125.5	1289.9	1051.9	1125.5	1080.1	1124.1	
Sand density (g/cm^3)	1.527	1.527	1.527	1.527	1.527	1.527	
Volume of Hole (cm^3)	737	845	689	737	707	736	
Moisture sample can ID	124	1	yao	mj	Or	a	
Moisture sample can mass (g)	1316.5	767.8	1317.6	1316.9	917.5	923.9	
Mass of wet soil + can (g)	3020.6	2730.9	2913.7	3038.4	2543.6	2561.2	
Mass of dry soil + can (g)	2908.2	2613.1	2805.0	2937.2	2452.1	2462.3	
Mass of dry soil (g)	1591.7	1845.3	1487.4	1620.3	1534.6	1538.4	
Mass of water loss (g)	112.4	117.8	108.7	101.2	91.5	98.9	
Moisture content (%)	**7.1%**	**6.4%**	**7.3%**	**6.2%**	**6.0%**	**6.4%**	
Wet soil density (g/cm^3)	2.312	2.32	2.32	2.34	2.30	2.22	
Dry soil density (g/cm^3)	2.160	2.18	2.16	2.20	2.17	2.09	
Wet soil unit weight (lb/ft^3)	144.3	145.0	144.6	145.8	143.6	138.9	
Dry soil unit weight (lb/ft^3)	**134.8**	**136.3**	**134.8**	**137.2**	**135.5**	**130.5**	

Created: 3/8/2013

Construction Cycle 08 - P154 Subbase - Nuke Gauge Results

Phase I

Location		Dry Density (pcf)	Percent Moisture	Proctor (pcf) ASTM D1557	Percent Compaction
1	Station 3+45 - Off -25	122.7	5.5	122.0	100.6%
2	Station 3+45 - Off -15	123.2	5.2	122.0	101.0%
3	Station 3+45 - Off -5	125.2	4.8	122.0	102.6%
4	Station 3+45 - Off +5	124.4	5.4	122.0	102.0%
5	Station 3+45 - Off +15	122.8	4.5	122.0	100.7%
6	Station 3+45 - Off +25	122.9	4.9	122.0	100.7%
7	Station 3+60 - Off +25	122.1	5.6	122.0	100.1%
8	Station 3+60 - Off +15	123.5	5.3	122.0	101.2%
9	Station 3+60 - Off +5	124.9	5.8	122.0	102.4%
10	Station 3+60 - Off -5	122.0	5.7	122.0	100.0%
11	Station 3+60 - Off -15	123.4	5.2	122.0	101.1%
12	Station 3+60- Off -25	125.6	5.2	122.0	103.0%
13	Station 3+75 - Off -25	125.8	5.2	122.0	103.1%
14	Station 3+75 - Off -15	124.7	5.7	122.0	102.2%
15	Station 3+75 - Off -5	122.1	5.5	122.0	100.1%
16	Station 3+75 - Off +5	123.9	5.1	122.0	101.6%
17	Station 3+75 - Off +15	122.4	4.6	122.0	100.3%
18	Station 3+75- Off +25	123.1	5.3	122.0	100.9%

CRAIG TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc

PROJECT NO.: 511060-2

PROJECT: CC8 Project William J. Hughes Technical Center
Atlantic City International Airport
Atlantic City, New Jersey, P.O. No. 9162681

REPORT NO.: FD-3

INSPECTED BY: J Landy Jr

DATE INSPECTED: 5/20/2015

GEOTECHNICAL REPORT BY: NA

DATED: NA

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☐ Other: _____
☐ Utility Trench ☐ Sub-Grade ☑ Pavement Sub-Base Compactor Model: _____

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf) ASTM D1557	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
1	Station 3+75 - Offset -15' (4" Depth)	124.3	7.8	122.0	NA	100.0	101.9%
2	Station 3+75 - Offset -15' (2" Depth)	125.7	8.0	122.0	NA	100.0	103.0%
3	Station 3+75 - Offset +15' (4" Depth)	124.3	8.2	122.0	NA	100.0	101.9%
4	Station 3+75 - Offset +15' (2" Depth)	125.5	7.9	122.0	NA	100.0	102.9%
5	Station 3+60 - Offset +15' (4" Depth)	122.4	7.2	122.0	NA	100.0	100.3%
6	Station 3+60 - Offset +15' (2" Depth)	123.0	6.7	122.0	NA	100.0	100.8%
7	Station 3+60 - Offset -15' (4" Depth)	122.5	8.4	122.0	NA	100.0	100.4%
8	Station 3+60 - Offset -15' (2" Depth)	124.0	7.1	122.0	NA	100.0	101.6%
9	Station 3+45 - Offset -15' (4" Depth)	124.0	8.0	122.0	NA	100.0	101.6%
10	Station 3+45 - Offset -15' (2" Depth)	123.3	8.4	122.0	NA	100.0	101.1%

Fill Placement: ☐ Controlled ☑ Uncontrolled **Loose Lift Thickness (in.):** NA

Continued on following page . . .

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc

PROJECT NO.: 511060-2

PROJECT: CC8 Project William J. Hughes Technical Center
Atlantic City International Airport
Atlantic City, New Jersey, P.O. No. 9162681

REPORT NO.: FD-3

INSPECTED BY: J Landy Jr

DATE INSPECTED: 5/20/15

GEOTECHNICAL REPORT BY: NA

DATED:

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☐ Other:
☐ Utility Trench ☐ Sub-Grade ☑ Pavement Sub-Base Compactor Model:

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf) ASTM D1557	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
11	Station 3 +45 - Offset - +15 - (4" Depth)	126.8	6.8	122.0	NA	100.0	103.9%
12	Station 3 +45 - Offset - +15 - (2" Depth)	123.8	6.8	122.0	NA	100.0	101.5%
13							
14							
15							
16							
17							
18							
19							
20							

Gauge Serial No.: 31746 Gauge Standard Counts: MS: 586 DS: 2092

Fill Placement: ☐ Controlled ☑ Uncontrolled **Loose Lift Thickness (in.):** NA

☐ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 8:15-4:00
☐ Work Above is in Progress and Requires Further Inspection
☐ Work is in Substantial Compliance with: ☐ Project Specifications ☐ Geotechnical Recommendations
☐ ***Inspection done without approved documentation available***
☐ ***Work Deviates from Approved Documents, See NCR No.***

Remarks:

Reported to: Project Distribution Reviewed By: Ian Craig

REV 2/25/11

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc

PROJECT NO.: 511060-2

PROJECT: CC8 Project William J. Hughes Technical Center
Atlantic City International Airport
Atlantic City, New Jersey, P.O. No. 9162681

REPORT NO.: FD-3

INSPECTED BY: J Landy Jr

DATE INSPECTED: 5/29/42

GEOTECHNICAL REPORT BY: NA

DATED: NA

EARTHWORK FIELD INSPECTION REPORT

Location: P 154 - Material

Remarks:

J Landy Jr arrived on site as requested by client. The purpose of this inspection was to provide information to the client utilizing a moisture density gauge during the wetting and compaction of the P -154 material. Moisture test were performed at various depths during the morning hours and the information was recorded by the client. The material was then compacted. Density test results were from the final compaction process. Proctor was provided by client.

☐ Not Ready for inspection; Cancelled On-Site

Hours on Site: 8:15-4:00

☐ Work Above is in Progress and Requires Further Inspection

☐ Work is in Substantial Compliance with: ☐ Project Specifications ☐ Geotechnical Recommendations

☐ ***Inspection done without approved documentation available***

☐ ***Work Deviates from Approved Documents, See NCR No.*** _____

Reported to: Project Distribution

Reviewed By: Ian Craig

REV 5/12/10

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc.

PROJECT NO.: 511060-7

PROJECT: CC8 Project, William J. Hughes Technical Center
Atlantic City International Airport
Atlantic City, New Jersey, P.O. No. 9162681

REPORT NO.: FD-9

INSPECTED BY: A. Napoli

DATE INSPECTED: 3/23/17

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☐ Other:
☐ Utility Trench ☐ Sub-Grade ☑ Pavement Sub-Base Compactor Model: *

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf) ASTM D1557	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
1	Station 4+25 test pad offset -25	129.3	4.6	133.2	7.8	100.0	97.1%
2	Station 4+25 test pad offset -15	128.9	4.0	133.2	7.8	100.0	96.8%
3	Station 4+25 test pad offset -5	130.5	3.8	133.2	7.8	100.0	98.0%
4	Station 4+25 test pad offset +5	128.2	4.6	133.2	7.8	100.0	96.2%
5	Station 4+25 test pad offset +15	130.7	3.7	133.2	7.8	100.0	98.1%
6	Station 4+25 test pad offset +25	132.4	4.5	133.2	7.8	100.0	99.4%
7	Station 4+50 test pad offset +25	128.3	4.9	133.2	7.8	100.0	96.3%
8	Station 4+50 test pad offset +25	130.8	4.8	133.2	7.8	100.0	98.2%
9	Station 4+50 test pad offset +25	128.7	5.1	133.2	7.8	100.0	96.6%
10	Station 4+50 test pad offset +25	132.4	4.9	133.2	7.8	100.0	99.4%

Fill Placement: ☑ Controlled ☐ Uncontrolled **Loose Lift Thickness (in.):** 8:45-5:15

Continued on following page . . .

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CLIENT: SRA International, Inc.

PROJECT NO.: 511060-7

PROJECT: CC8 Project, William J. Hughes Technical Center
Atlantic City International Airport
Atlantic City, New Jersey, P.O. No. 9162681

REPORT NO.: FD-9

INSPECTED BY: A. Napoli

DATE INSPECTED: 3/23/17

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☐ Other:
☐ Utility Trench ☐ Sub-Grade ☑ Pavement Sub-Base Compactor Model: *

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf) ASTM D1557	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
11	Station 4+50 test pad offset +15	129.0	4.4	133.2	7.8	100.0	96.8%
12	Station 4+50 test pad offset +15	128.2	4.3	133.2	7.8	100.0	96.2%
13	Station 4+50 test pad offset +5	130.5	5.0	133.2	7.8	100.0	98.0%
14	Station 4+50 test pad offset -5	130.6	4.6	133.2	7.8	100.0	98.0%
15	Station 4+50 test pad offset -15	127.7	4.5	133.2	7.8	100.0	95.9%
16	Station 4+50 test pad offset -25	128.4	4.7	133.2	7.8	100.0	96.4%
17	Station 4+75 test pad offset -25	127.0	3.8	133.2	7.8	100.0	95.3%
18	Station 4+75 test pad offset -15	128.7	4.8	133.2	7.8	100.0	96.6%
19	Station 4+75 test pad offset -5	127.2	5.0	133.2	7.8	100.0	95.5%
20	Station 4+75 test pad offset +5	127.8	4.6	133.2	7.8	100.0	95.9%

Gauge Serial No.: 27888 Gauge Standard Counts: MS: 636 DS: 1923

Fill Placement: ☐ Controlled ☐ Uncontrolled **Loose Lift Thickness (in.):** **

☑ Report for Information Only **Hours on Site:** 8:45-5:15
☐ Work Above is in Progress and Requires Further Inspection
☐ Work is in Substantial Compliance with: ☐ Project Specifications ☐ Geotechnical Recommendations
☐ ***Inspection done without approved documentation available***
☐ ***Work Deviates from Approved Documents, See NCR No.***

Remarks: Compaction requirement and proctor for tests referenced above were provided by Qiang Li with SRA. *Compactor Model: PS300C CB 334E DS-100D; ** Lift Thickness: 3" added to complete 7" lift.

Reported to: Project Distribution Reviewed By: Ian Craig

REV 2/25/11

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc.

PROJECT NO.: 511060-7

PROJECT: CC8 Project, William J. Hughes Technical Center
Atlantic City International Airport
Atlantic City, New Jersey, P.O. No. 9162681

REPORT NO.: FD-9

INSPECTED BY: A. Napoli

DATE INSPECTED: 3/23/17

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☐ Other:
☐ Utility Trench ☐ Sub-Grade ☑ Pavement Sub-Base Compactor Model: *

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf) ASTM D1557	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
21	Station 4+75 test pad offset +15	132.6	5.1	133.2	7.8	100.0	99.5%
22	Station 4+75 test pad offset +25	129.9	5.2	133.2	7.8	100.0	97.5%
23	Station 5+20 test pad offset +25	132.0	6.8	133.2	7.8	100.0	99.1%
24	Station 5+20 test pad offset +15	129.0	4.5	133.2	7.8	100.0	96.9%
25	Station 5+20 test pad offset +15	127.8	5.0	133.2	7.8	100.0	96.0%
26	Station 5+20 test pad offset +15	129.7	4.7	133.2	7.8	100.0	97.4%
27	Station 5+20 test pad offset +5	131.6	6.4	133.2	7.8	100.0	98.8%
28	Station 5+20 test pad offset -5	126.3	3.3	133.2	7.8	100.0	94.9%
29	Station 5+20 test pad offset -15	127.7	4.1	133.2	7.8	100.0	95.8%
30	Station 5+20 test pad offset -25	126.6	4.5	133.2	7.8	100.0	95.1%

Fill Placement: ☑ Controlled ☐ Uncontrolled **Loose Lift Thickness (in.):** 8:45-5:15

Continued on following page . . .

CRAIG
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CLIENT: SRA International, Inc.

PROJECT NO.: 511060-7

PROJECT: CC8 Project, William J. Hughes Technical Center
Atlantic City International Airport
Atlantic City, New Jersey, P.O. No. 9162681

REPORT NO.: FD-9

INSPECTED BY: A. Napoli

DATE INSPECTED: 3/23/17

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☐ Other:
☐ Utility Trench ☐ Sub-Grade ☑ Pavement Sub-Base Compactor Model: *

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf) ASTM D1557	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
31	Station 5+40 test pad offset -25	125.9	4.3	133.2	7.8	100.0	94.5%
32	Station 5+40 test pad offset -15	126.3	4.0	133.2	7.8	100.0	94.9%
33	Station 5+40 test pad offset -5	129.0	4.5	133.2	7.8	100.0	96.9%
34	Station 5+40 test pad offset +5	130.1	4.6	133.2	7.8	100.0	97.7%
35	Station 5+40 test pad offset +15	129.0	4.6	133.2	7.8	100.0	96.8%
36	Station 5+40 test pad offset +15	130.2	4.4	133.2	7.8	100.0	97.7%
37	Station 5+40 test pad offset +25	130.3	6.0	133.2	7.8	100.0	97.8%
38	Station 5+40 test pad offset +25	131.6	5.6	133.2	7.8	100.0	98.8%
39	Station 5+40 test pad offset +25	132.8	5.7	133.2	7.8	100.0	99.7%
40							

Gauge Serial No.: 27888 Gauge Standard Counts: MS: 636 DS: 1923

Fill Placement: ☐ Controlled ☐ Uncontrolled **Loose Lift Thickness (in.):** **

☑ Report for Information Only **Hours on Site:** 8:45-5:15
☐ Work Above is in Progress and Requires Further Inspection
☐ Work is in Substantial Compliance with: ☐ Project Specifications ☐ Geotechnical Recommendations
☐ ***Inspection done without approved documentation available***
☐ ***Work Deviates from Approved Documents, See NCR No.***

Remarks: Compaction requirement and proctor for tests referenced above were provided by Qiang Li with SRA. *Compactor Model: PS300C CB 334E DS-100D; ** Lift Thickness: 3" added to complete 7" lift.

Reported to: Project Distribution Reviewed By: Ian Craig

REV 2/25/11

CRAIG
TESTING LABORATORIES, INC.
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CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-32

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☑ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model: _____

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
1	5+80 -25 10in test	128.2	5.0				
2	5+80 -25 8in test	126.4	5.5				
3	5+80 -25 6in test	125.7	4.8				
4	5+80 -25 4in test	126.3	5.6				
5	5+80 -15 10in test	124.4	5.3				
6	5+80 -15 8in test	123.6	6.4				
7	5+80 -15 6in test	125.7	5.6				
8	5+80 -15 4in test	130.3	4.7				
9	5+80 -5 10in test	126.2	5.6				
10	5+80 -5 8in test	122.8	6.1				

Loose Lift Thickness (in.): _____

Fill Placement: ☐ Controlled ☑ Uncontrolled

Continued on following page . . .

CRAIG TESTING LABORATORIES, INC.
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CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-32

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☐ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model:

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
11	5+80 -5 6in test	125.9	5.3				
12	5+80 -5 4in test	127.3	5.6				
13	5+80 +5 10in test	125.4	5.7				
14	5+80 +5 8in test	126.7	6.0				
15	5+80 +5 6in test	127.6	6.1				
16	5+80 +5 4in test	129.4	5.6				
17	5+80 +15 10in test	125.6	6.8				
18	5+80 +15 8in test	127.9	6.0				
19	5+80 +15 6in test	129.8	6.0				
20	5+80 +15 4in test	131.8	5.8				

Gauge Serial No.: 31745 Gauge Standard Counts: MS: 581 DS: 2058

Fill Placement: ☐ Controlled ☑ Uncontrolled **Loose Lift Thickness (in.):**

Hours on Site: 8:00 AM - 1:40 PM

Inspection Findings

Report for Informational Purposes Only

Remarks:

Reported to:
Project Distribution

Reviewed By: Ian Craig

REV 4/17

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-33

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☑ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model: _____

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
1	5+80 +25 10in test	130.0	5.3				
2	5+80 +25 8in test	131.0	5.3				
3	5+80 +25 6in test	129.4	5.8				
4	5+80 +25 4in test	131.6	5.2				
5	5+90 +25 10in test	128.5	6.7				
6	5+90 +25 8in test	128.7	7.1				
7	5+90 +25 6in test	132.7	5.8				
8	5+90 +25 4in test	135.5	5.3				
9	5+90 +15 10in test	127.0	5.1				
10	5+90 +15 8in test	124.1	5.5				

Loose Lift Thickness (in.): _____

Fill Placement: ☐ Controlled ☑ Uncontrolled

Continued on following page . . .

CRAIG TESTING LABORATORIES, INC.
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CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-33

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☑ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model:

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
11	5+90 +15 6in test	125.4	5.4				
12	5+90 +15 4in test	129.8	5.0				
13	5+90 +5 10in test	124.8	5.4				
14	5+90 +5 8in test	127.2	5.3				
15	5+90 +5 6in test	126.7	6.2				
16	5+90 +5 4in test	129.2	5.7				
17	5+90 -5 10in test	126.2	5.4				
18	5+90 -5 8in test	125.8	5.9				
19	5+90 -5 6in test	124.5	6.8				
20	5+90 -5 4in test	130.2	6.0				

Gauge Serial No.: 31745 Gauge Standard Counts: MS: 581 DS: 2058

Fill Placement: ☐ Controlled ☑ Uncontrolled **Loose Lift Thickness (in.):**

Hours on Site: 8:00 AM - 1:40 PM

Inspection Findings

Report for Informational Purposes Only

Remarks:

Reported to:
Project Distribution

Reviewed By: Ian Craig

REV 4/17

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-34

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☑ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model:

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
1	5+90 -15 10in test	124.1	5.5				
2	5+90 -15 8in test	125.2	6.0				
3	5+90 -15 6in test	126.6	5.6				
4	5+90 -15 4in test	128.8	6.3				
5	5+90 -25 10in test	120.4	5.6				
6	5+90 -25 8in test	121.4	5.6				
7	5+90 -25 6in test	121.9	5.7				
8	5+90 -25 4in test	124.5	5.4				
9	6+20 -25 10in test	122.6	5.9				
10	6+20 -25 8in test	120.5	6.5				

Loose Lift Thickness (in.):

Fill Placement: ☐ Controlled ☑ Uncontrolled

Continued on following page . . .

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CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-34

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☑ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model:

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
11	6+20 -25 6in test	121.6	6.0				
12	6+20 -25 4in test	125.3	6.5				
13	6+20 -15 10in test	121.6	5.4				
14	6+20 -15 8in test	119.4	6.7				
15	6+20 -15 6in test	123.4	6.7				
16	6+20 -15 4in test	126.6	5.0				
17	6+20 -5 10in test	121.4	5.8				
18	6+20 -5 8in test	122.6	6.0				
19	6+20 -5 6in test	124.6	5.2				
20	6+20 -5 4in test	128.2	5.2				

Gauge Serial No.: 31745 Gauge Standard Counts: MS: 581 DS: 2058

Fill Placement: ☐ Controlled ☑ Uncontrolled **Loose Lift Thickness (in.):**

Hours on Site: 8:00 AM - 1:40 PM

Inspection Findings

Report for Informational Purposes Only

Remarks:

Reported to:
Project Distribution

Reviewed By: Ian Craig

REV 4/17

CRAIG TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-35

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☑ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model: _____

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
1	6+20 +5 10in test	126.7	5.2				
2	6+20 +5 8in test	125.8	5.6				
3	6+20 +5 6in test	126.6	5.0				
4	6+20 +5 4in test	124.4	5.1				
5	6+20 +15 10in test	124.5	6.6				
6	6+20 +15 8in test	124.9	5.9				
7	6+20 +15 6in test	126.5	5.3				
8	6+20 +15 4in test	130.1	4.3				
9	6+20 +25 10in test	125.7	5.2				
10	6+20 +25 8in test	124.2	6.2				

Loose Lift Thickness (in.): _____

Fill Placement: ☐ Controlled ☑ Uncontrolled

Continued on following page . . .

CRAIG TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-35

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☑ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model:

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
11	6+20 +25 6in test	124.7	7.1				
12	6+20 +25 4in test	129.3	5.4				
13	6+30 +25 10in test	126.7	4.2				
14	6+30 +25 8in test	125.0	5.1				
15	6+30 +25 6in test	122.8	5.7				
16	6+30 +25 4in test	125.6	4.8				
17	6+30 +15 10in test	122.9	4.3				
18	6+30 +15 8in test	122.0	5.3				
19	6+30 +15 6in test	121.4	4.8				
20	6+30 +45 4in test	123.2	5.0				

Gauge Serial No.: 31745 Gauge Standard Counts: MS: 581 DS: 2058

Fill Placement: ☐ Controlled ☑ Uncontrolled **Loose Lift Thickness (in.):**

Hours on Site: 8:00 AM - 1:40 PM

Inspection Findings

Report for Informational Purposes Only

Remarks:

Reported to:
Project Distribution

Reviewed By: Ian Craig

REV 4/17

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: SRA International, Inc.

PROJECT NO.: 711122-3

PROJECT: CC7 Trenching, FAA ATRD15 Tech Center
NAPTF, SRA Project No. 15451.005

REPORT NO.: FD-36

INSPECTED BY: Jonathan Peacock

DATE INSPECTED: September 22, 2017

GEOTECHNICAL REPORT BY: N/A

DATED: N/A

EARTHWORK FIELD INSPECTION REPORT

Item Inspected: ☐ Building Pad ☐ Slab ☐ Foundation ☑ Other: Trenches
☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model: _____

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
1	6+30 +5 10in test	118.3	5.6				
2	6+30 +5 8in test	120.9	5.0				
3	6+30 +5 6in test	122.2	4.8				
4	6+30 +5 4in test	121.6	5.1				
5	6+30 -5 10in test	126.1	5.9				
6	6+30 -5 8in test	124.9	5.8				
7	6+30 -5 6in test	124.4	5.9				
8	6+30 -5 4in test	128.9	5.0				
9	6+30 -15 10in test	121.3	5.3				
10	6+30 -15 8in test	119.5	4.9				

Loose Lift Thickness (in.): _____

Fill Placement: ☐ Controlled ☑ Uncontrolled

Continued on following page . . .

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☐ Utility Trench ☐ Sub-Grade ☐ Pavement Sub-Base Compactor Model:

	Location	Dry Density (pcf)	Percent Moisture	Proctor (pcf)	Optimum Moisture (%)	Compaction Required (%)	Percent Compaction
11	6+30 -15 6in test	122.0	5.3				
12	6+30 -15 4in test	124.8	5.1				
13	6+30 -25 10in test	124.8	6.4				
14	6+30 -25 8in test	124.9	6.1				
15	6+30 -25 6in test	127.7	5.8				
16	6+30 -25 4in test	131.2	5.9				
17							
18							
19							
20							

Gauge Serial No.: 31745 Gauge Standard Counts: MS: 581 DS: 2058

Fill Placement: ☐ Controlled ☑ Uncontrolled **Loose Lift Thickness (in.):**

Hours on Site: 8:00 AM - 1:40 PM

Inspection Findings

Report for Informational Purposes Only

Remarks:

Reported to:
Project Distribution

Reviewed By: Ian Craig

REV 4/17

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/26/2015**

Technician: CR/QL | **Location: Station 3+45**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.4	5.4	5.5	5.4	5.4	5.4	
1	6.4	6.5	6.3	6.6	6.7	6.6	
2	7.2	7.1	6.9	7.3	7.4	7.1	
3	7.8	7.5	7.4	7.8	7.9	7.6	
4	8.4	8.0	7.8	8.2	8.2	8.1	
5	8.8	8.2	8.1	8.5	8.5	8.5	
6	9.1	8.5	8.4	9.0	8.8	8.8	
7	9.4	8.8	8.8	9.2	9.2	9.1	
8	9.7	9.2	9.1	9.5	9.4	9.6	
9	10.0	9.4	9.4	9.8	9.8	9.8	
10	10.2	9.6	9.7	10.0	10.1	10.1	
11	10.6	10.0	10.0	10.4	10.4	10.4	
12	10.8	10.3	10.3	10.8	10.7	10.7	
13	11.0	10.6	10.6	11.1	11.0	11.0	
14	11.3	10.8	10.9	11.4	11.4	11.4	
15	11.6	11.1	11.2	11.8	11.7	11.8	
16	11.8	11.4	11.5	12.1	12.0	12.1	
17	12.1	11.6	11.9	12.3	12.3	12.4	
18	12.4	11.9	12.3	12.8	12.6	12.8	
19	12.6	12.3	12.7	13.1	13.0	13.2	
20	12.9	12.5	13.1	13.4	13.3	13.5	
21	13.2	12.9	13.5	13.9	13.6	13.9	
22	13.5	13.1	14.0	14.3	14.0	14.3	
23	13.8	13.4	14.5	14.8	14.4	14.7	
24	14.1	13.8	15.1	15.3	14.8	15.2	
25	14.4	14.1	16.0	16.0	15.2	15.8	
26	14.8	14.5	17.9	17.5	15.8	16.8	
27	15.2	14.9			16.7	19.0	

Dynamic Cone Penetrometer Test
ASTM D6951

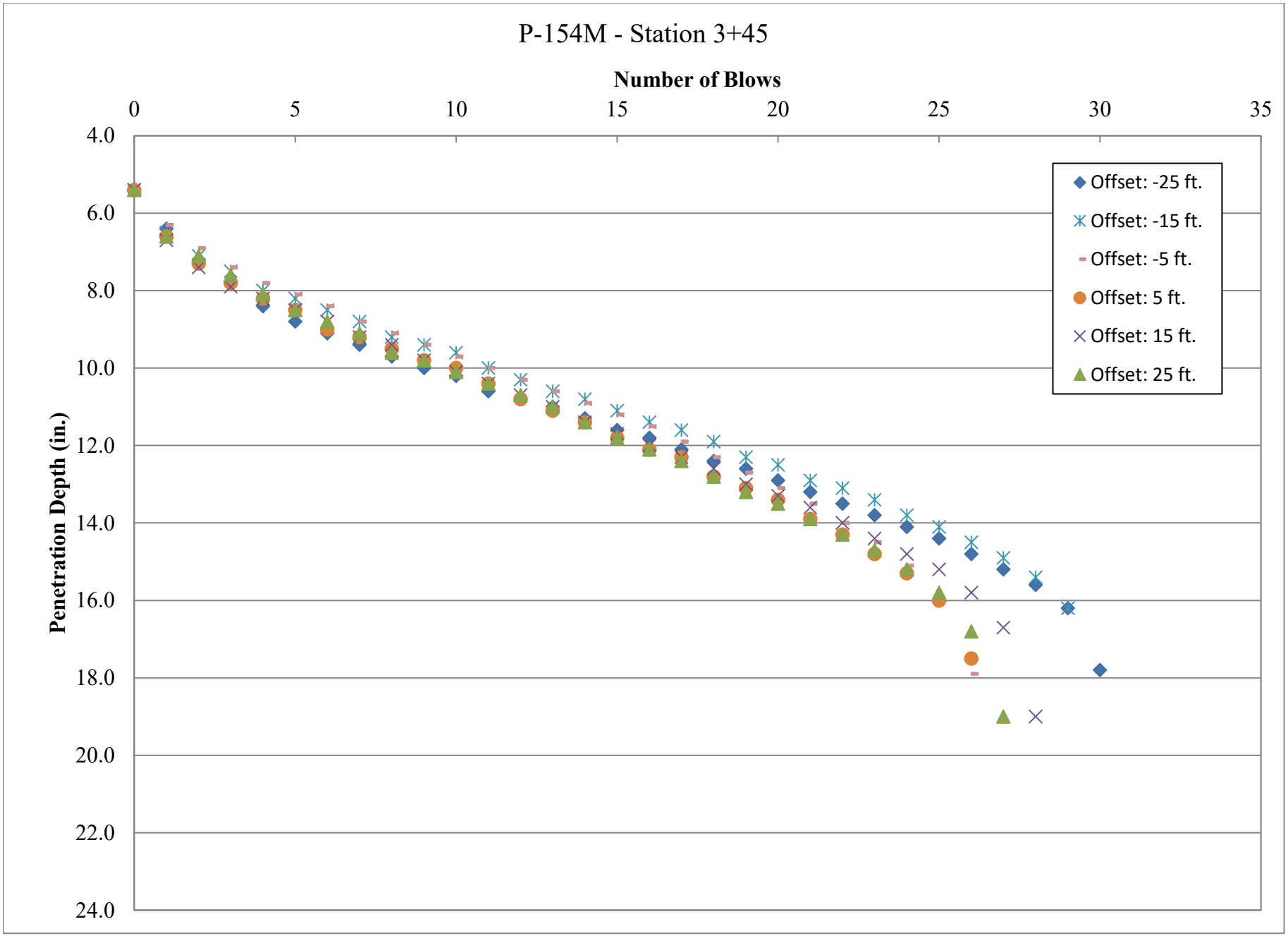
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/26/2015**

Technician: CR/QL | **Location: Station 3+45**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	15.6	15.4			19.0		
29	16.2	16.2					
30	17.8						


P-154M - Station 3+45
Number of Blows
0
5
10
15
20
25
30
35
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/26/2015**

Technician: CR/QL | **Location: Station 3+60**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.4	5.4	5.4	5.4	5.4	5.3	
1	6.4	6.2	6.1	5.9	6.4	6.3	
2	6.8	6.7	6.7	6.4	6.7	7.0	
3	7.4	7.2	7.0	6.8	7.1	7.3	
4	7.8	7.5	7.4	7.1	7.4	7.7	
5	8.2	8.0	7.7	7.5	7.7	8.1	
6	8.5	8.2	8.0	7.6	8.0	8.4	
7	8.9	8.5	8.2	7.9	8.3	8.6	
8	9.2	8.8	8.4	8.2	8.5	8.9	
9	9.5	9.0	8.7	8.4	8.8	9.2	
10	9.8	9.3	9.0	8.7	9.0	9.5	
11	10.1	9.5	9.3	9.0	9.3	9.7	
12	10.5	9.7	9.5	9.3	9.5	10.0	
13	10.7	10.0	9.8	9.5	9.8	10.3	
14	11.0	10.3	10.0	9.7	10.1	10.6	
15	11.3	10.5	10.3	10.0	10.3	10.8	
16	11.6	10.8	10.5	10.3	10.6	11.1	
17	11.9	11.1	10.7	10.5	10.9	11.4	
18	12.3	11.3	11.0	10.8	11.2	11.6	
19	12.6	11.7	11.3	11.0	11.5	11.9	
20	13.0	11.9	11.6	11.3	11.8	12.3	
21	13.4	12.2	11.9	11.6	12.2	12.5	
22	13.8	12.4	12.3	11.9	12.4	12.9	
23	14.2	12.7	12.5	12.2	12.8	13.3	
24	14.6	13.0	12.9	12.5	13.0	13.5	
25	15.0	13.4	13.2	12.9	13.5	13.9	
26	15.6	13.8	13.6	13.2	13.9	14.3	
27	16.8	14.2	14.0	13.6	14.3	14.7	

Dynamic Cone Penetrometer Test
ASTM D6951

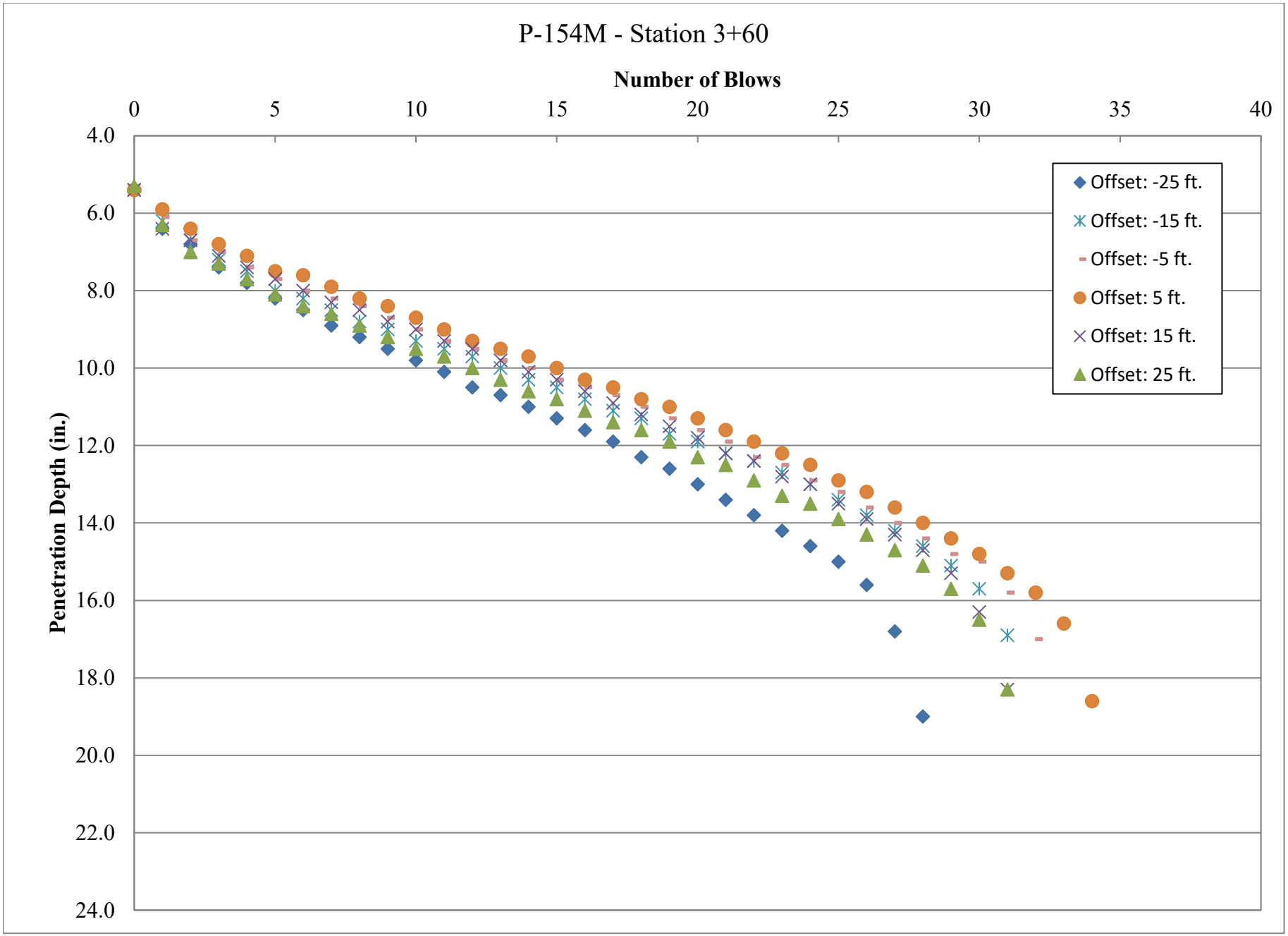
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/26/2015**

Technician: CR/QL | **Location: Station 3+60**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	19.0	14.6	14.4	14.0	14.7	15.1	
29		15.1	14.8	14.4	15.3	15.7	
30		15.7	15.0	14.8	16.3	16.5	
31		16.9	15.8	15.3	18.3	18.3	
32			17.0	15.8			
33				16.6			
34				18.6			


P-154M - Station 3+60
Number of Blows
0
5
10
15
20
25
30
35
40
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/26/2015**

Technician: CR/QL | **Location: Station 3+75**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.5	5.3	5.4	5.4	5.4	5.4	
1	6.3	6.3	6.2	6.1	6.3	6.2	
2	7.0	6.5	6.5	6.6	6.8	6.7	
3	7.5	7.1	7.0	7.0	7.3	7.3	
4	7.9	7.4	7.3	7.3	7.6	7.7	
5	8.2	7.7	7.6	7.6	7.9	8.0	
6	8.5	8.0	7.9	7.8	8.3	8.3	
7	8.7	8.3	8.2	8.1	8.5	8.5	
8	9.1	8.6	8.4	8.3	8.8	8.8	
9	9.3	8.8	8.7	8.5	9.2	9.1	
10	9.6	9.1	9.0	8.8	9.4	9.3	
11	10.0	9.3	9.3	9.0	9.6	9.6	
12	10.2	9.6	9.5	9.2	9.9	9.7	
13	10.5	9.9	9.7	9.4	10.2	10.0	
14	10.9	10.2	10.0	9.7	10.5	10.2	
15	11.1	10.5	10.2	10.0	10.7	10.4	
16	11.3	10.8	10.4	10.2	11.0	10.7	
17	11.6	11.1	10.7	10.5	11.3	11.0	
18	11.9	11.3	11.0	10.8	11.6	11.2	
19	12.2	11.6	11.3	11.1	11.9	11.4	
20	12.5	11.9	11.6	11.3	12.2	11.6	
21	12.8	12.3	12.0	11.6	12.5	11.9	
22	13.2	12.6	12.3	12.0	12.8	12.1	
23	13.5	12.9	12.6	12.2	13.2	12.5	
24	13.9	13.3	13.0	12.5	13.5	12.6	
25	14.3	13.6	13.3	12.9	13.8	12.9	
26	14.7	14.0	13.7	13.3	14.3	13.2	
27	15.2	14.4	14.2	13.7	14.7	13.5	

Dynamic Cone Penetrometer Test
ASTM D6951

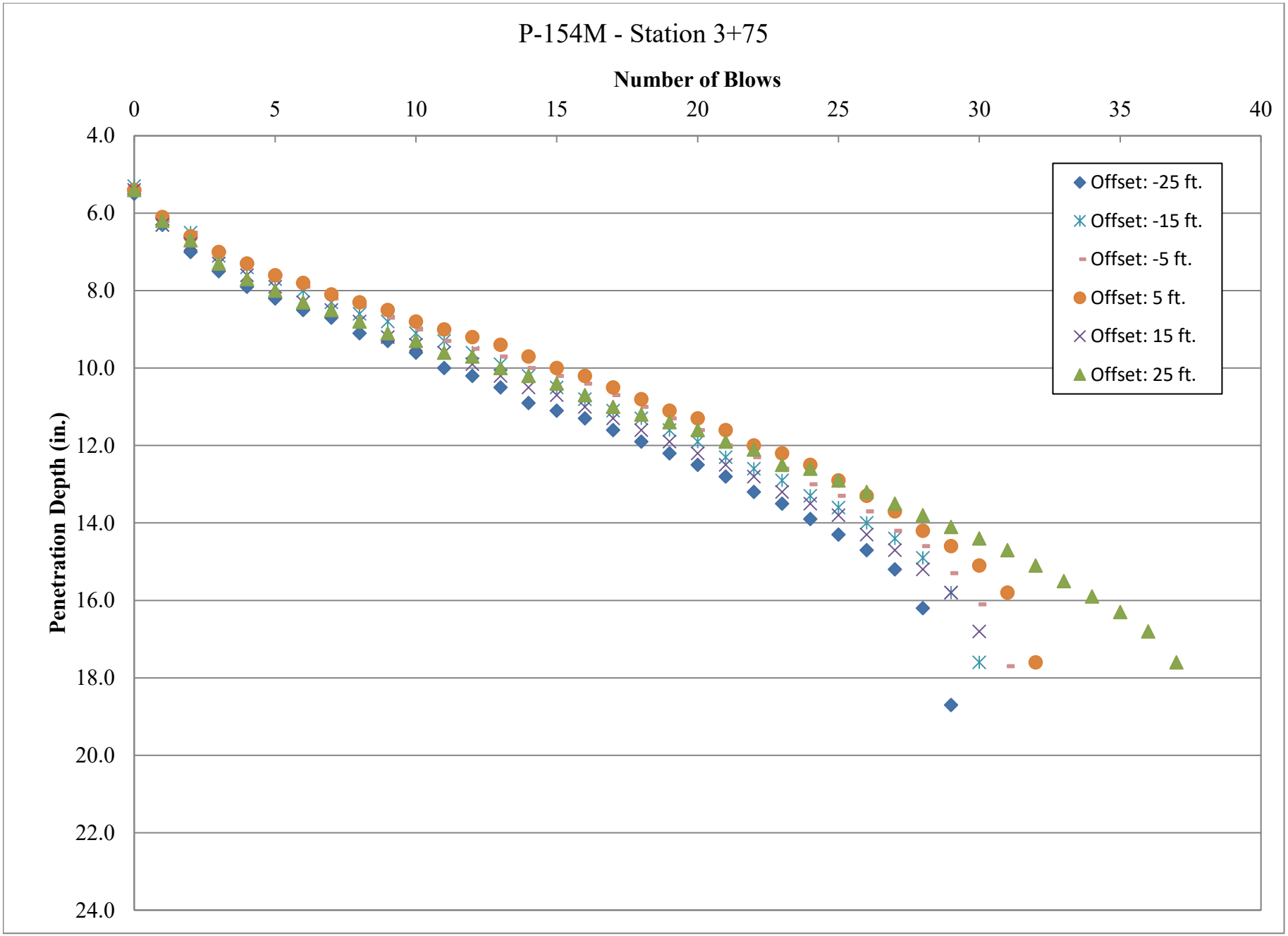
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Overload and Overlay** | **Date: 5/26/2015**

Technician: CR/QL | **Location: Station 3+75**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	16.2	14.9	14.6	14.2	15.2	13.8	
29	18.7	15.8	15.3	14.6	15.8	14.1	
30		17.6	16.1	15.1	16.8	14.4	
31			17.7	15.8		14.7	
32				17.6		15.1	
33						15.5	
34						15.9	
35						16.3	
36						16.8	
37						17.6	


P-154M - Station 3+75
Number of Blows
0
5
10
15
20
25
30
35
40
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+25**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.1	5.2	5.3	5.0	5.3	5.9	
1	5.7	5.7	6.0	5.6	5.8	6.4	
2	6.1	6.1	6.3	6.0	6.1	6.6	
3	6.3	6.3	6.6	6.2	6.4	6.9	
4	6.6	6.7	6.9	6.4	6.6	7.1	
5	6.8	6.9	7.1	6.6	6.8	7.3	
6	7.0	7.1	7.3	6.9	7.0	7.5	
7	7.3	7.4	7.5	7.1	7.2	7.7	
8	7.6	7.7	7.8	7.4	7.4	8.0	
9	7.8	8.0	8.0	7.6	7.6	8.2	
10	7.9	8.2	8.3	7.8	7.9	8.4	
11	8.1	8.4	8.5	8.1	8.1	8.6	
12	8.3	8.6	8.8	8.3	8.3	8.8	
13	8.5	8.9	9.1	8.6	8.6	9.1	
14	8.7	9.2	9.3	8.9	8.9	9.3	
15	9.0	9.5	9.6	9.1	9.1	9.5	
16	9.3	9.7	9.8	9.4	9.4	9.8	
17	9.5	10.1	10.1	9.6	9.6	10.0	
18	9.7	10.3	10.3	10.0	9.8	10.3	
19	10.0	10.5	10.6	10.2	10.0	10.4	
20	10.2	10.7	10.9	10.5	10.3	10.6	
21	10.4	10.9	11.1	10.7	10.5	10.8	
22	10.6	11.1	11.3	10.9	10.6	11.1	
23	10.9	11.3	11.6	11.1	10.9	11.4	
24	11.1	11.5	11.9	11.3	11.1	11.5	
25	11.3	11.7	12.1	11.5	11.4	11.6	
26	11.6	12.0	12.3	11.8	11.6	11.9	
27	11.8	12.2	12.5	11.9	11.7	12.1	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+25**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	12.0	12.4	12.6	12.1	12.0	12.3	
29	12.1	12.6	12.8	12.3	12.2	12.6	
30	12.3	12.8	12.9	12.4	12.3	12.5	
31	12.5	13.0	13.1	12.6	12.5	12.7	
32	12.7	13.1	13.4	12.7	12.6	12.9	
33	13.0	13.4	13.5	12.9	12.8	13.1	
34	13.1	13.5	13.7	13.1	12.9	13.2	
35	13.3	13.6	13.8	13.2	13.1	13.3	
36	13.5	13.8	14.0	13.4	13.3	13.5	
37	13.6	14.0	14.1	13.6	13.4	13.6	
38	13.8	14.1	14.3	13.8	13.6	13.8	
39	13.9	14.3	14.4	14.0	13.7	14.0	
40	14.1	14.5	14.6	14.1	13.8	14.1	
41	14.3	14.7	14.8	14.3	14.0	14.3	
42	14.5	15.0	15.0	14.5	14.2	14.4	
43	14.7	15.2	15.2	14.7	14.3	14.6	
44	14.9	15.4	15.4	14.9	14.5	14.7	
45	15.0	15.6	15.6	15.1	14.6	14.8	
46	15.3	15.8	15.8	15.3	14.8	15.0	
47	15.4	16.0	15.9	15.6	15.0	15.2	
48	15.6	16.3	16.1	15.7	15.1	15.3	
49	15.8	16.5	16.3	15.9	15.3	15.6	
50	16.0	16.7	16.6	16.1	15.5	15.7	
51	16.2	17.0	16.8	16.4	15.6	15.9	
52	16.4	17.2	17.0	16.6	15.8	16.1	
53	16.6	17.5	17.3	16.9	16.0	16.2	
54	16.9	17.8	17.5	17.2	16.2	16.4	
55	17.1	18.0	17.9	17.5	16.4	16.6	

Dynamic Cone Penetrometer Test
ASTM D6951

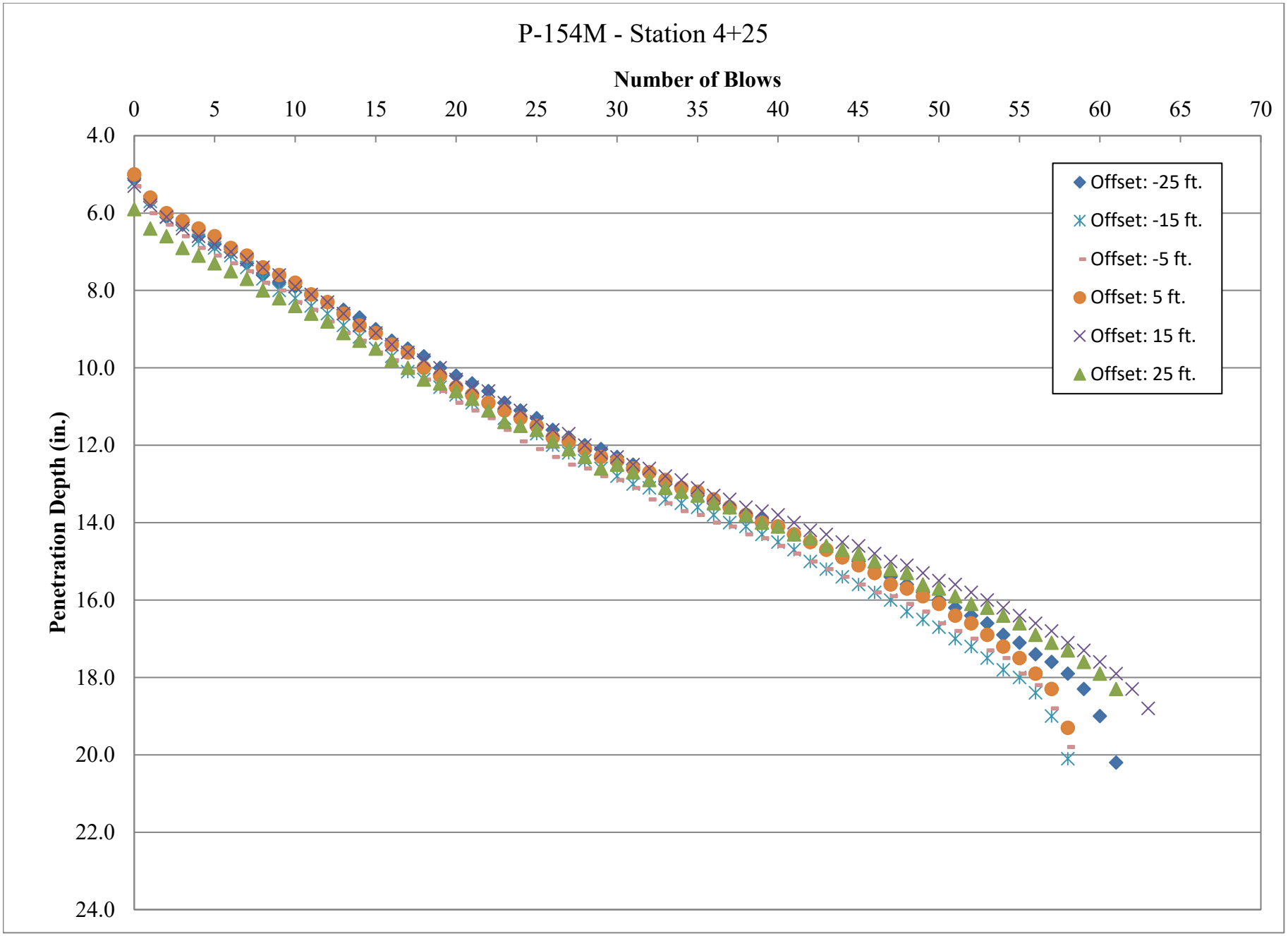
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+25**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56	17.4	18.4	18.2	17.9	16.6	16.9	
57	17.6	19.0	18.8	18.3	16.8	17.1	
58	17.9	20.1	19.8	19.3	17.1	17.3	
59	18.3				17.3	17.6	
60	19.0				17.6	17.9	
61	20.2				17.9	18.3	
62					18.3		
63					18.8		


P-154M - Station 4+25
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+50**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.3	5.1	5.1	5.4	5.2	5.2	
1	6.0	5.5	5.7	6.1	5.9	5.9	
2	6.4	5.8	6.1	6.4	6.3	6.1	
3	6.6	6.1	6.4	6.6	6.7	6.5	
4	7.0	6.4	6.7	6.9	7.0	6.7	
5	7.3	6.6	7.0	7.1	7.3	7.0	
6	7.6	6.9	7.2	7.3	7.6	7.2	
7	7.9	7.2	7.5	7.5	7.8	7.4	
8	8.2	7.5	7.9	7.7	8.1	7.6	
9	8.4	7.8	8.2	8.0	8.3	8.0	
10	8.6	8.1	8.5	8.2	8.5	8.2	
11	8.9	8.4	8.7	8.5	8.8	8.4	
12	9.0	8.7	9.0	8.7	9.1	8.6	
13	9.5	9.1	9.3	8.9	9.3	8.8	
14	9.8	9.4	9.6	9.1	9.6	9.2	
15	10.1	9.8	9.8	9.4	9.8	9.4	
16	10.4	10.0	10.1	9.7	10.1	9.6	
17	10.7	10.4	10.4	9.9	10.3	9.9	
18	11.1	10.7	10.7	10.2	10.6	10.2	
19	11.3	10.9	11.0	10.4	10.8	10.4	
20	11.6	11.2	11.3	10.6	11.0	10.7	
21	11.9	11.4	11.5	10.9	11.2	10.9	
22	12.1	11.6	11.8	11.1	11.4	11.1	
23	12.3	11.9	12.1	11.3	11.6	11.3	
24	12.6	12.1	12.3	11.5	11.7	11.6	
25	12.8	12.3	12.5	11.7	11.9	11.8	
26	13.0	12.5	12.7	12.0	12.0	12.0	
27	13.2	12.7	12.9	12.2	12.2	12.2	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+50**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	13.4	12.8	13.1	12.4	12.3	12.5	
29	13.6	12.9	13.3	12.6	12.4	12.6	
30	13.8	13.1	13.5	12.8	12.5	12.8	
31	13.9	13.3	13.8	13.0	12.7	13.0	
32	14.1	13.4	14.0	13.2	12.8	13.2	
33	14.3	13.6	14.1	13.3	13.0	13.4	
34	14.5	13.7	14.3	13.5	13.1	13.5	
35	14.7	13.9	14.5	13.7	13.3	13.7	
36	14.9	14.0	14.7	13.9	13.4	13.9	
37	15.1	14.3	14.9	14.0	13.5	14.0	
38	15.3	14.4	15.1	14.2	13.6	14.1	
39	15.4	14.6	15.3	14.4	13.9	14.3	
40	15.6	14.8	15.5	14.5	14.0	14.5	
41	15.9	15.0	15.6	14.7	14.1	14.7	
42	16.0	15.2	15.8	14.9	14.2	14.8	
43	16.3	15.4	16.0	15.1	14.4	15.0	
44	16.4	15.6	16.3	15.2	14.6	15.1	
45	16.7	15.8	16.5	15.4	14.7	15.3	
46	17.0	16.1	16.7	15.6	14.8	15.5	
47	17.2	16.3	16.9	15.8	15.0	15.7	
48	17.6	16.5	17.2	16.0	15.2	15.9	
49	17.9	16.8	17.4	16.2	15.3	16.1	
50	18.4	17.1	17.7	16.4	15.5	16.3	
51	19.3	17.4	18.0	16.6	15.7	16.5	
52		17.7	18.3	16.8	15.8	16.7	
53		18.2	18.6	17.1	16.0	16.9	
54		18.9	19.0	17.4	16.2	17.1	
55			19.5	17.6	16.4	17.3	

Dynamic Cone Penetrometer Test
ASTM D6951

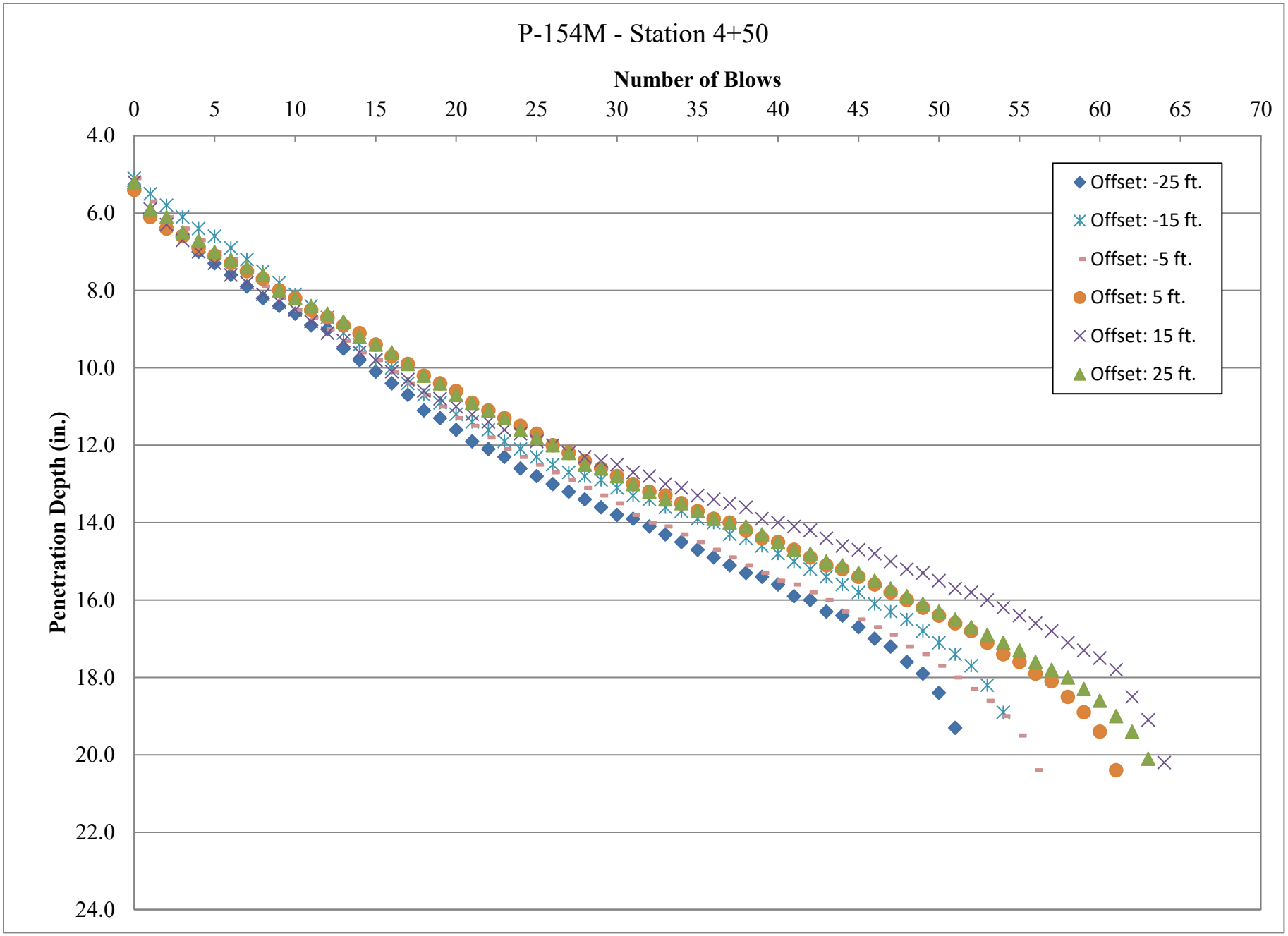
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+50**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56			20.4	17.9	16.6	17.6	
57				18.1	16.8	17.8	
58				18.5	17.1	18.0	
59				18.9	17.3	18.3	
60				19.4	17.5	18.6	
61				20.4	17.8	19.0	
62					18.5	19.4	
63					19.1	20.1	
64					20.2		


P-154M - Station 4+50
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+75**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.4	5.3	5.1	5.1	5.0	5.5	
1	6.0	5.8	5.5	5.8	5.8	6.1	
2	6.3	6.1	5.9	6.1	6.0	6.3	
3	6.5	6.5	6.2	6.3	6.4	6.8	
4	6.8	6.9	6.4	6.6	6.5	7.1	
5	7.0	7.2	6.8	6.8	6.8	7.5	
6	7.5	7.5	7.1	6.8	7.1	7.8	
7	7.8	7.8	7.3	7.1	7.3	8.1	
8	8.1	8.2	7.6	7.4	7.6	8.5	
9	8.4	8.5	7.9	7.6	7.8	8.9	
10	8.7	8.7	8.1	7.8	8.2	9.1	
11	9.0	9.0	8.5	7.9	8.4	9.5	
12	9.2	9.3	8.8	8.2	8.7	9.8	
13	9.5	9.7	9.1	8.6	9.0	10.2	
14	9.8	10.0	9.4	8.8	9.2	10.6	
15	10.1	10.2	9.7	9.1	9.5	10.9	
16	10.3	10.5	9.9	9.5	9.7	11.2	
17	10.6	10.9	10.2	9.8	9.9	11.5	
18	10.9	11.1	10.5	10.1	10.1	11.8	
19	11.1	11.4	10.8	10.4	10.4	12.3	
20	11.3	11.7	11.0	10.5	10.5	12.5	
21	11.5	11.8	11.3	10.9	10.7	12.8	
22	11.7	12.0	11.6	11.2	10.9	13.0	
23	11.9	12.2	11.8	11.5	11.1	13.3	
24	12.1	12.4	12.0	11.7	11.3	13.5	
25	12.3	12.6	12.3	11.9	11.5	13.8	
26	12.4	12.7	12.5	12.1	11.7	14.0	
27	12.7	12.9	12.7	12.3	11.8	14.2	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+75**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	12.9	13.1	12.9	12.5	12.0	14.4	
29	13.1	13.3	13.1	12.7	12.2	14.6	
30	13.2	13.5	13.3	12.9	12.4	14.8	
31	13.3	13.7	13.5	13.1	12.5	15.1	
32	13.6	13.9	13.7	13.3	12.7	15.3	
33	13.7	14.1	13.9	13.5	12.8	15.4	
34	13.9	14.2	14.1	13.6	13.0	15.7	
35	14.1	14.4	14.2	13.8	13.2	15.9	
36	14.3	14.6	14.4	14.0	13.3	16.1	
37	14.4	14.8	14.6	14.2	13.5	16.4	
38	14.6	15.1	14.8	14.4	13.6	16.6	
39	14.8	15.3	15.0	14.6	13.8	16.9	
40	15.0	15.6	15.1	14.8	13.9	17.1	
41	15.1	15.8	15.3	15.0	14.1	17.4	
42	15.3	16.0	15.5	15.2	14.3	17.7	
43	15.5	16.3	15.7	15.4	14.4	18.1	
44	15.7	16.5	15.9	15.6	14.6	18.6	
45	15.9	16.7	16.1	15.9	14.8	19.4	
46	16.2	17.0	16.4	16.1	14.9		
47	16.4	17.3	16.6	16.3	15.1		
48	16.6	17.7	16.8	16.6	15.2		
49	16.8	18.3	17.1	16.9	15.4		
50	17.1	19.6	17.4	17.1	15.6		
51	17.3		17.7	17.4	15.8		
52	17.7		18.1	17.8	16.0		
53	17.9		18.5	18.2	16.2		
54	18.2		19.4	18.9	16.4		
55	18.7		20.8	20.4	16.6		

Dynamic Cone Penetrometer Test
ASTM D6951

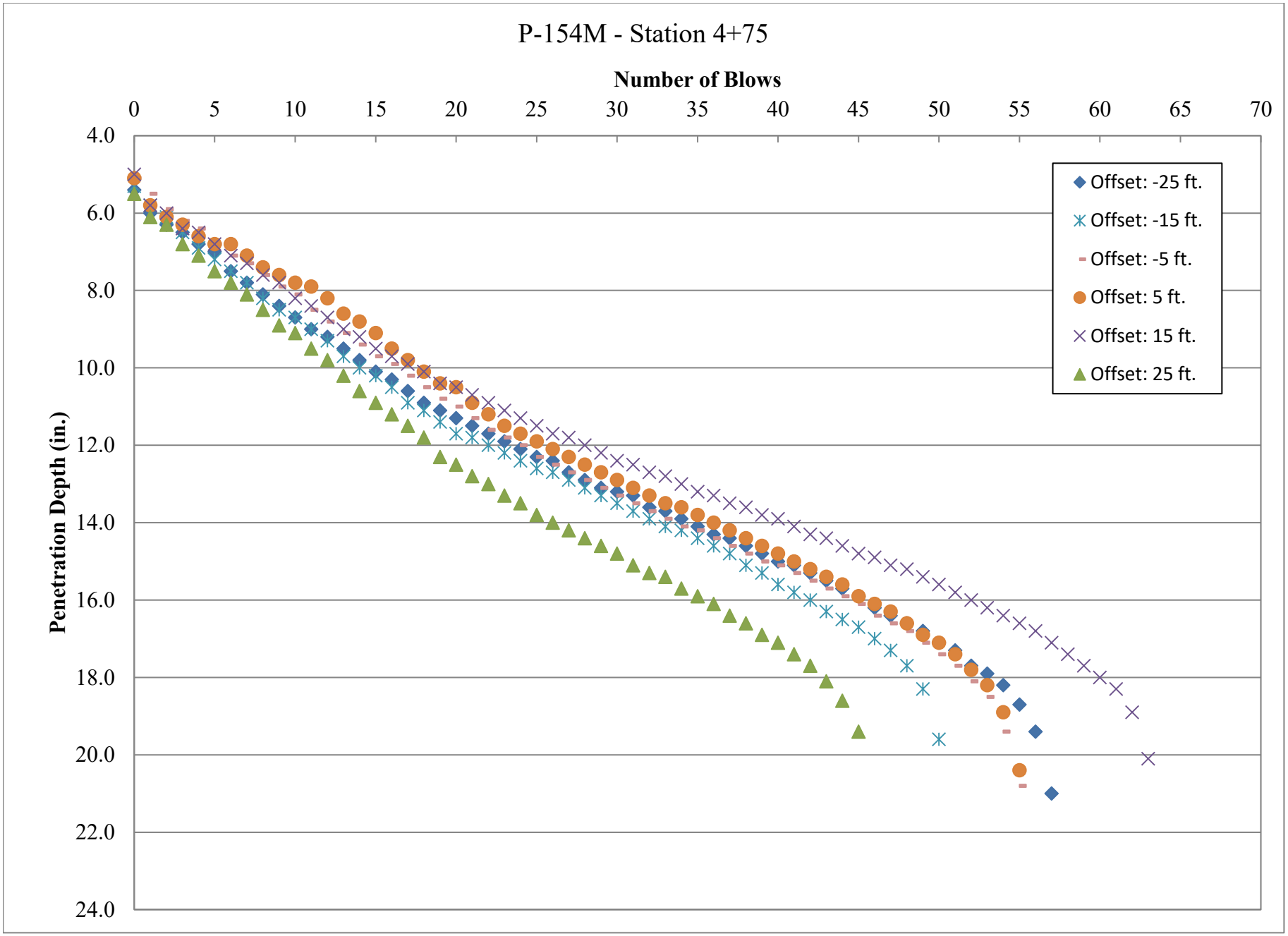
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Joint Comparison** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 4+75**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56	19.4				16.8		
57	21.0				17.1		
58					17.4		
59					17.7		
60					18.0		
61					18.3		
62					18.9		
63					20.1		


P-154M - Station 4+75
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 5+20**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.2	5.4	5.2	5.1	5.0	5.1	
1	6.0	6.4	6.1	5.8	5.5	5.8	
2	6.6	6.9	6.5	6.2	5.9	6.1	
3	6.9	7.3	6.8	6.6	6.3	6.6	
4	7.2	7.6	7.2	6.8	6.6	6.8	
5	7.5	7.9	7.6	7.1	6.8	7.1	
6	7.9	8.2	7.8	7.3	7.0	7.5	
7	8.2	8.6	8.1	7.6	7.3	7.8	
8	8.5	9.0	8.4	7.8	7.7	8.1	
9	8.9	9.3	8.7	8.0	7.8	8.4	
10	9.2	9.6	9.1	8.3	8.1	8.8	
11	9.6	10.0	9.3	8.5	8.4	9.1	
12	9.9	10.3	9.6	8.8	8.6	9.3	
13	10.2	10.6	9.9	9.0	8.8	9.6	
14	10.5	11.0	10.2	9.2	9.1	9.9	
15	10.8	11.3	10.4	9.6	9.4	10.1	
16	11.2	11.5	10.7	9.8	9.6	10.4	
17	11.5	11.8	11.0	10.0	9.8	10.6	
18	11.8	12.0	11.3	10.2	10.1	10.9	
19	12.0	12.2	11.5	10.5	10.3	11.1	
20	12.3	12.4	11.7	10.6	10.6	11.3	
21	12.5	12.6	11.9	10.8	10.8	11.5	
22	12.7	12.9	12.0	11.1	11.0	11.7	
23	13.0	13.1	12.2	11.2	11.1	11.9	
24	13.2	13.2	12.4	11.4	11.4	12.1	
25	13.4	13.4	12.6	11.6	11.6	12.2	
26	13.6	13.6	12.7	11.9	11.7	12.4	
27	13.8	13.8	12.9	12.0	11.8	12.6	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 5+20**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	14.0	13.9	13.1	12.2	12.0	12.8	
29	14.1	14.1	13.3	12.4	12.2	13.0	
30	14.3	14.3	13.6	12.6	12.4	13.2	
31	14.5	14.5	13.7	12.8	12.6	13.2	
32	14.9	14.7	13.9	13.0	12.8	13.6	
33	15.1	14.9	14.1	13.2	13.0	13.7	
34	15.3	15.1	14.3	13.5	13.1	13.9	
35	15.6	15.3	14.5	13.7	13.2	14.0	
36	15.8	15.5	14.6	13.9	13.4	14.1	
37	15.9	15.7	14.8	14.1	13.6	14.3	
38	16.2	15.9	15.0	14.3	13.8	14.5	
39	16.4	16.1	15.2	14.6	14.0	14.8	
40	16.7	16.3	15.5	14.8	14.1	14.9	
41	16.9	16.7	15.7	15.0	14.3	15.1	
42	17.2	16.8	16.0	15.3	14.5	15.3	
43	17.5	17.1	16.2	15.9	14.7	15.5	
44	17.9	17.4	16.4	15.9	14.9	15.7	
45	18.3	17.7	16.7	16.1	15.1	15.9	
46	19.1	18.0	17.0	16.4	15.3	16.1	
47	20.5	18.4	17.4	16.7	15.5	16.3	
48		18.9	17.7	17.0	15.7	16.6	
49		19.8	18.0	17.3	15.9	16.8	
50			18.4	17.7	16.2	17.2	
51			19.0	18.0	16.5	17.4	
52			20.0	18.4	16.7	17.8	
53				18.9	17.0	18.2	
54				19.6	17.3	18.9	
55				21.0	17.6	20.3	

Dynamic Cone Penetrometer Test
ASTM D6951

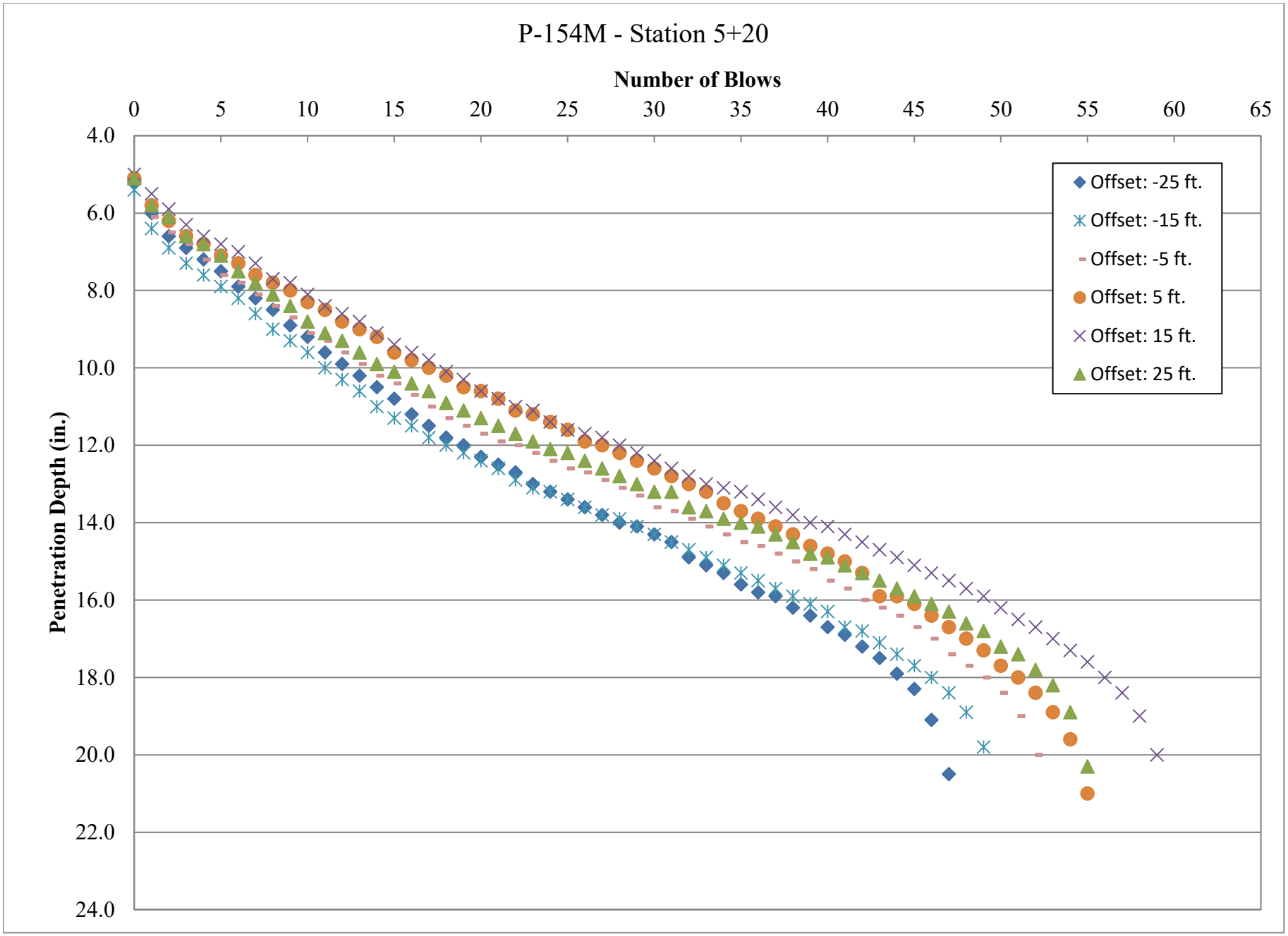
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 5+20**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56					18.0		
57					18.4		
58					19.0		
59					20.0		


P-154M - Station 5+20
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 5+40**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.1	5.4	5.2	5.1	5.1	5.1	
1	6.2	6.0	6.3	5.6	5.6	5.5	
2	6.5	6.4	6.8	5.9	5.9	5.8	
3	6.9	7.0	7.2	6.2	6.3	6.0	
4	7.3	7.4	7.5	6.3	6.5	6.4	
5	7.6	7.8	7.6	6.6	6.7	6.6	
6	8.0	8.2	7.9	6.8	7.0	6.8	
7	8.3	8.5	8.3	7.1	7.2	7.1	
8	8.7	8.8	8.6	7.3	7.4	7.2	
9	9.1	9.2	8.8	7.4	7.5	7.4	
10	9.4	9.6	9.1	7.7	7.9	7.6	
11	9.7	9.9	9.5	7.9	8.0	7.8	
12	10.0	10.2	9.7	8.2	8.2	8.1	
13	10.3	10.5	10.1	8.5	8.4	8.4	
14	10.7	10.9	10.4	8.7	8.6	8.6	
15	11.0	11.3	10.7	8.9	8.9	9.0	
16	11.3	11.7	11.0	9.1	9.2	9.2	
17	11.6	11.9	11.3	9.3	9.4	9.5	
18	11.8	12.2	11.6	9.5	9.6	9.7	
19	12.0	12.4	11.8	9.7	9.8	10.0	
20	12.2	12.7	12.0	9.8	10.0	10.2	
21	12.5	12.8	12.2	10.1	10.2	10.5	
22	12.7	13.1	12.5	10.3	10.4	10.7	
23	12.9	13.2	12.7	10.5	10.7	10.9	
24	13.1	13.5	12.9	10.7	10.8	11.1	
25	13.3	13.7	13.2	10.9	11.0	11.3	
26	13.5	13.9	13.4	11.1	11.2	11.5	
27	13.6	14.1	13.5	11.3	11.2	11.7	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 5+40**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	13.8	14.3	13.8	11.4	11.3	11.9	
29	14.0	14.4	14.0	11.6	11.6	12.0	
30	14.2	14.7	14.1	11.7	11.7	12.1	
31	14.3	14.9	14.3	11.9	11.8	12.3	
32	14.5	15.1	14.5	12.0	12.0	12.4	
33	14.7	15.3	14.7	12.2	12.1	12.6	
34	14.9	15.5	14.9	12.4	12.2	12.8	
35	15.1	15.7	15.1	12.6	12.4	12.9	
36	15.3	15.9	15.3	12.7	12.5	13.1	
37	15.5	16.1	15.6	12.9	12.7	13.2	
38	15.6	16.3	15.8	13.1	12.8	13.4	
39	15.8	16.5	16.0	13.3	12.9	13.5	
40	16.1	16.8	16.2	13.4	13.0	13.7	
41	16.3	17.1	16.4	13.6	13.1	13.8	
42	16.5	17.3	16.7	13.8	13.2	14.0	
43	16.7	17.6	17.0	14.0	13.4	14.2	
44	16.9	17.9	17.3	14.1	13.5	14.3	
45	17.2	18.3	17.6	14.4	13.7	14.5	
46	17.4	18.7	17.9	14.5	13.8	14.6	
47	17.8	19.2	18.2	14.7	14.0	14.8	
48	18.3	20.3	18.9	15.0	14.2	15.0	
49	19.1		20.4	15.2	14.3	15.2	
50	21.1			15.4	14.5	15.3	
51				15.6	14.6	15.6	
52				15.9	14.8	15.8	
53				16.1	14.9	16.0	
54				16.3	15.0	16.2	
55				16.6	15.2	16.4	

Dynamic Cone Penetrometer Test
ASTM D6951

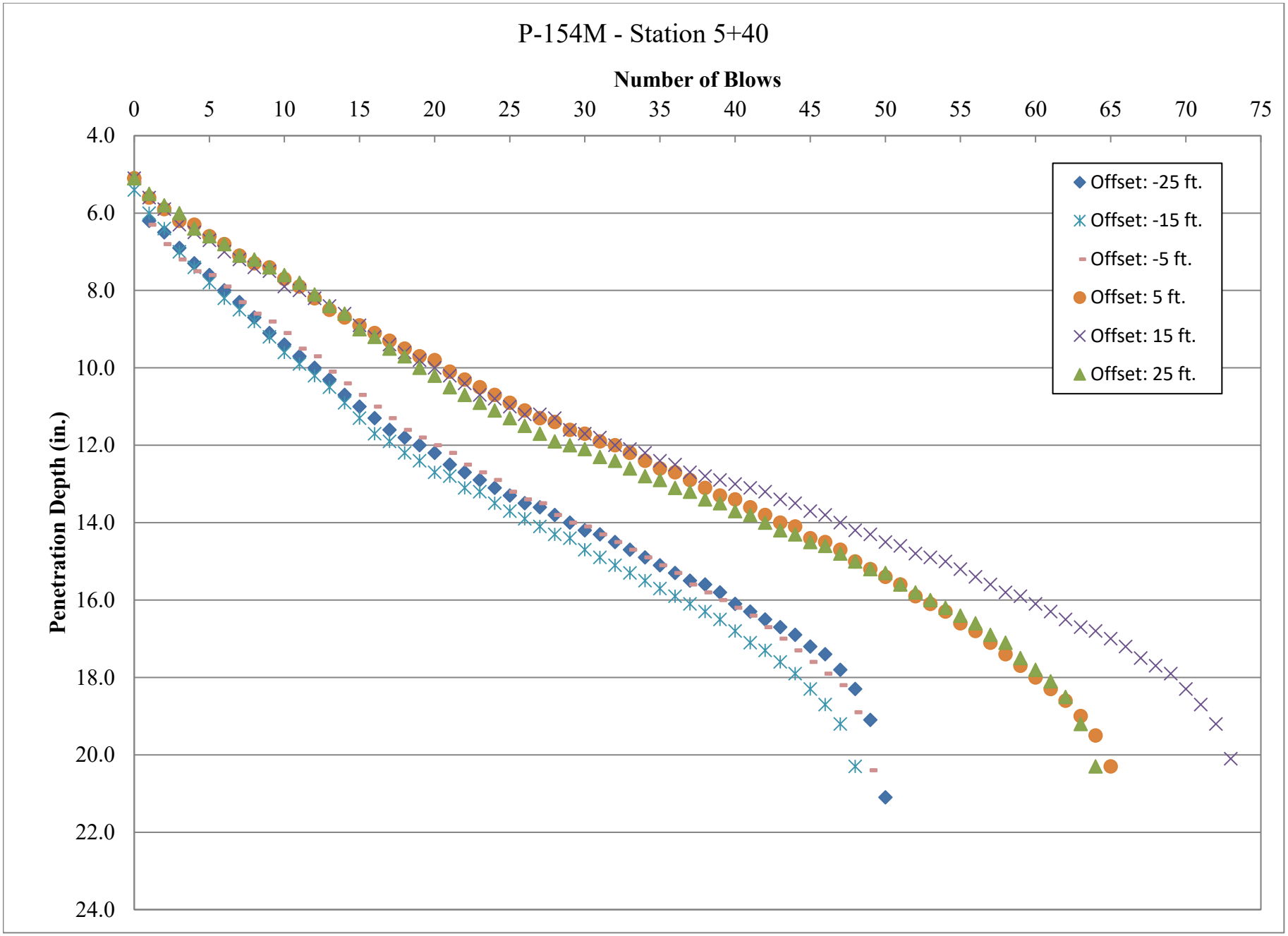
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 3/27/2017**

Technician: CR/MD | **Location: Station 5+40**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56				16.8	15.4	16.6	
57				17.1	15.6	16.9	
58				17.4	15.8	17.1	
59				17.7	15.9	17.5	
60				18.0	16.1	17.8	
61				18.3	16.3	18.1	
62				18.6	16.5	18.5	
63				19.0	16.7	19.2	
64				19.5	16.8	20.3	
65				20.3	17.0		
66					17.2		
67					17.5		
68					17.7		
69					17.9		
70					18.3		
71					18.7		
72					19.2		
73					20.1		


P-154M - Station 5+40
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/JA | **Location: Station 5+80**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.4	5.3	5.1	5.1	5.2	5.0	
1	5.7	5.5	5.6	5.5	5.7	5.4	
2	5.9	5.7	5.7	5.7	6.0	5.6	
3	6.1	6.0	6.1	5.9	6.2	5.8	
4	6.4	6.1	6.3	6.1	6.4	5.9	
5	6.5	6.2	6.5	6.3	6.6	6.1	
6	6.7	6.4	6.7	6.4	6.7	6.3	
7	7.0	6.5	6.8	6.7	6.9	6.4	
8	7.2	6.7	7.0	6.8	7.1	6.5	
9	7.4	6.8	7.1	7.0	7.3	6.7	
10	7.6	6.9	7.3	7.1	7.5	6.9	
11	7.9	7.0	7.5	7.4	7.7	7.0	
12	8.0	7.3	7.6	7.5	7.8	7.1	
13	8.3	7.6	7.9	7.8	8.0	7.4	
14	8.5	7.8	8.0	7.9	8.2	7.6	
15	8.7	8.0	8.1	8.1	8.4	7.8	
16	8.9	8.2	8.3	8.2	8.6	8.0	
17	9.1	8.3	8.4	8.4	8.7	8.2	
18	9.3	8.5	8.7	8.6	9.0	8.4	
19	9.6	8.6	8.9	8.8	9.2	8.5	
20	9.8	8.8	9.2	9.0	9.4	8.7	
21	10.1	9.1	9.4	9.2	9.5	8.8	
22	10.3	9.2	9.6	9.4	9.7	9.1	
23	10.5	9.4	9.8	9.5	9.9	9.3	
24	10.7	9.7	10.1	9.7	10.1	9.5	
25	10.8	9.8	10.3	10.0	10.2	9.7	
26	11.0	10.0	10.5	10.1	10.5	9.8	
27	11.1	10.2	10.8	10.3	10.6	10.0	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/JA | **Location: Station 5+80**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	11.3	10.3	11.0	10.5	10.9	10.2	
29	11.4	10.5	11.2	10.7	11.1	10.3	
30	11.6	10.7	11.5	10.9	11.3	10.6	
31	11.7	11.0	11.7	11.1	11.4	10.8	
32	11.8	11.1	11.9	11.2	11.6	11.0	
33	12.0	11.3	12.1	11.4	11.8	11.2	
34	12.2	11.5	12.3	11.7	12.0	11.3	
35	12.3	11.7	12.5	11.9	12.1	11.6	
36	12.5	11.9	12.7	12.1	12.3	11.8	
37	12.6	12.1	12.9	12.2	12.5	12.0	
38	12.8	12.3	13.1	12.5	12.7	12.2	
39	13.0	12.6	13.3	12.7	12.9	12.3	
40	13.2	12.8	13.5	12.9	13.1	12.5	
41	13.4	13.0	13.7	13.1	13.3	12.7	
42	13.6	13.2	13.8	13.3	13.5	12.9	
43	13.7	13.4	14.0	13.5	13.6	13.1	
44	13.9	13.6	14.2	13.7	13.8	13.3	
45	14.1	13.8	14.4	13.9	14.0	13.5	
46	14.3	14.0	14.5	14.1	14.3	13.7	
47	14.4	14.2	14.9	14.3	14.4	13.9	
48	14.6	14.3	15.0	14.5	14.6	14.0	
49	14.8	14.5	15.2	14.6	14.7	14.2	
50	14.9	14.7	15.4	14.8	14.9	14.3	
51	15.1	14.8	15.6	15.0	15.1	14.6	
52	15.3	15.0	15.8	15.1	15.2	14.7	
53	15.5	15.1	16.0	15.3	15.3	14.8	
54	15.7	15.3	16.2	15.4	15.5	15.0	
55	15.9	15.5	16.3	15.6	15.7	15.2	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/JA | **Location: Station 5+80**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56	16.0	15.6	16.5	15.8	15.8	15.3	
57	16.2	15.7	16.7	16.0	15.9	15.6	
58	16.4	16.0	16.9	16.1	16.1	15.7	
59	16.6	16.1	17.0	16.3	16.2	15.8	
60	16.8	16.2	17.2	16.4	16.4	16.0	
61	17.0	16.4	17.4	16.6	16.6	16.2	
62	17.1	16.6	17.6	16.8	16.7	16.4	
63	17.3	16.8	17.8	17.0	16.9	16.5	
64	17.5	16.9	18.0	17.2	17.0	16.7	
65	17.7	17.1	18.1	17.3	17.2	16.9	
66	18.0	17.3	18.3	17.6	17.3	17.1	
67	18.1	17.4	18.6	17.7	17.5	17.2	
68	18.3	17.8	18.8	17.9	17.7	17.4	
69	18.5	17.9	19.0	18.0	17.9	17.6	
70	18.8	18.0	19.3	18.2	18.0	17.8	
71	19.0	18.1	19.5	18.4	18.2	18.0	
72	19.2	18.3	19.8	18.6	18.4	18.2	
73	19.5	18.6	20.0	18.9	18.6	18.4	
74	19.7	18.8	20.3	19.1	18.8	18.6	
75	20.0	19.0	20.6	19.3	18.9	18.9	
76	20.3	19.3	21.0	19.6	19.2	19.1	
77	20.6	19.5	21.3	19.9	19.4	19.3	
78	21.0	19.8	21.7	20.1	19.6	19.5	
79	21.4	20.0	22.3	20.4	19.8	19.8	
80	21.9	20.3		20.7	20.1	20.1	
81	22.9	20.6		21.2	20.3	20.4	
82		20.9		22.1	20.6	20.7	
83		21.2			21.0	21.0	

Dynamic Cone Penetrometer Test
ASTM D6951

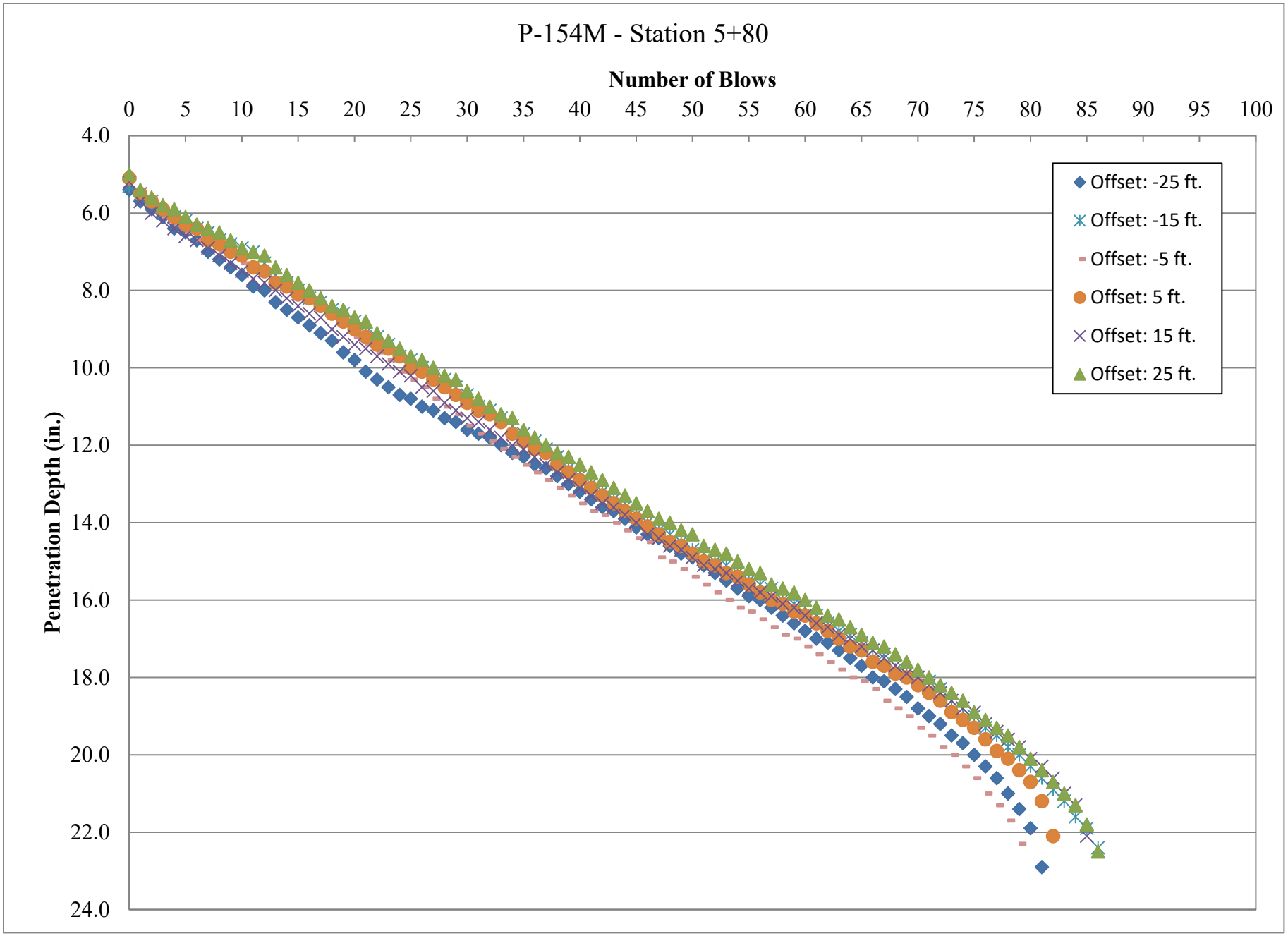
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/JA | **Location: Station 5+80**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
84		21.6			21.3	21.3	
85		21.9			22.1	21.8	
86		22.4				22.5	


P-154M - Station 5+80
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/SB | **Location: Station 5+90**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.0	5.0	5.0	5.0	5.1	5.0	
1	5.5	5.5	5.5	5.5	5.5	5.5	
2	5.8	5.8	5.7	5.8	5.8	5.6	
3	6.0	5.9	5.9	6.0	6.0	5.9	
4	6.2	6.1	6.1	6.2	6.2	6.1	
5	6.4	6.2	6.2	6.4	6.4	6.2	
6	6.6	6.4	6.4	6.6	6.6	6.4	
7	6.7	6.6	6.5	6.8	6.8	6.6	
8	6.9	6.7	6.6	7.0	7.0	6.8	
9	7.2	6.9	6.9	7.2	7.1	7.1	
10	7.4	7.1	7.0	7.4	7.2	7.2	
11	7.5	7.2	7.2	7.7	7.4	7.3	
12	7.8	7.4	7.4	7.8	7.5	7.5	
13	7.9	7.5	7.5	8.1	7.7	7.6	
14	8.2	7.7	7.7	8.3	7.9	7.7	
15	8.4	7.9	7.8	8.5	8.1	7.9	
16	8.6	8.1	8.0	8.8	8.3	8.2	
17	8.8	8.3	8.2	9.0	8.5	8.4	
18	9.0	8.5	8.3	9.2	8.7	8.5	
19	9.2	8.7	8.5	9.5	8.9	8.7	
20	9.5	8.9	8.7	9.7	9.1	9.0	
21	9.7	9.1	8.9	10.0	9.3	9.2	
22	10.0	9.4	9.0	10.2	9.5	9.4	
23	10.2	9.6	9.2	10.5	9.6	9.6	
24	10.4	9.8	9.4	10.7	9.9	9.8	
25	10.7	10.0	9.6	11.0	10.0	10.0	
26	10.9	10.3	9.7	11.2	10.2	10.2	
27	11.2	10.5	10.0	11.3	10.4	10.4	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/SB | **Location: Station 5+90**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	11.3	10.6	10.1	11.6	10.6	10.5	
29	11.5	10.9	10.3	11.8	10.7	10.7	
30	11.6	11.1	10.5	12.0	10.9	10.9	
31	11.8	11.3	10.7	12.2	11.1	11.1	
32	12.1	11.5	10.8	12.4	11.3	11.4	
33	12.2	11.7	11.0	12.6	11.5	11.5	
34	12.4	11.9	11.2	12.8	11.7	11.7	
35	12.6	12.0	11.4	13.0	11.8	11.8	
36	12.8	12.2	11.6	13.2	12.0	12.0	
37	13.0	12.5	11.7	13.4	12.2	12.2	
38	13.2	12.8	12.0	13.6	12.3	12.4	
39	13.4	13.0	12.1	13.7	12.4	12.5	
40	13.5	13.2	12.3	14.0	12.6	12.7	
41	13.6	13.4	12.5	14.1	12.9	12.8	
42	13.8	13.6	12.7	14.3	13.0	13.0	
43	14.0	13.8	12.8	14.5	13.2	13.2	
44	14.1	14.0	13.0	14.5	13.4	13.3	
45	14.3	14.1	13.2	14.8	13.6	13.4	
46	14.5	14.3	13.3	15.0	13.7	13.6	
47	14.7	14.5	13.5	15.2	13.9	13.7	
48	14.9	14.6	13.6	15.3	14.0	14.0	
49	15.0	14.8	13.7	15.4	14.2	14.1	
50	15.2	15.0	13.9	15.6	14.4	14.2	
51	15.4	15.1	14.0	15.8	14.5	14.4	
52	15.6	15.3	14.2	16.0	14.7	14.6	
53	15.7	15.6	14.3	16.1	14.8	14.7	
54	15.9	15.8	14.5	16.3	15.0	14.8	
55	16.1	15.9	14.6	16.5	15.1	15.0	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/SB | **Location: Station 5+90**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56	16.3	16.1	14.8	16.7	15.3	15.1	
57	16.5	16.3	14.9	16.8	15.4	15.2	
58	16.7	16.4	15.1	17.0	15.5	15.4	
59	16.8	16.6	15.2	17.2	15.7	15.5	
60	17.0	17.0	15.3	17.3	15.8	15.7	
61	17.2	17.1	15.4	17.5	16.0	15.8	
62	17.4	17.3	15.7	17.7	16.1	16.0	
63	17.6	17.5	15.9	17.9	16.2	16.1	
64	17.8	17.6	16.0	18.1	16.4	16.3	
65	18.0	17.8	16.1	18.3	16.5	16.4	
66	18.2	18.0	16.2	18.5	16.6	16.6	
67	18.4	18.2	16.4	18.7	16.8	16.8	
68	18.6	18.4	16.5	19.0	16.9	16.9	
69	18.8	18.5	16.7	19.1	17.1	17.0	
70	19.0	18.7	16.8	19.3	17.2	17.2	
71	19.3	19.0	17.0	19.5	17.4	17.4	
72	19.5	19.2	17.1	19.8	17.5	17.6	
73	19.8	19.4	17.2	20.0	17.6	17.7	
74	20.0	19.7	17.4	20.3	17.8	17.9	
75	20.3	20.0	17.7	20.5	17.9	18.1	
76	20.6	20.2	17.8	20.8	18.1	18.2	
77	20.9	20.6	17.9	21.1	18.2	18.4	
78	21.2	20.9	18.1	21.4	18.4	18.6	
79	21.5	21.2	18.2	21.7	18.5	18.8	
80	21.9	21.5	18.5	22.1	18.6	19.0	
81	22.4	21.9	18.6	22.4	18.8	19.2	
82		22.3	18.9	22.9	19.0	19.4	
83			19.0		19.2	19.7	

Dynamic Cone Penetrometer Test
ASTM D6951

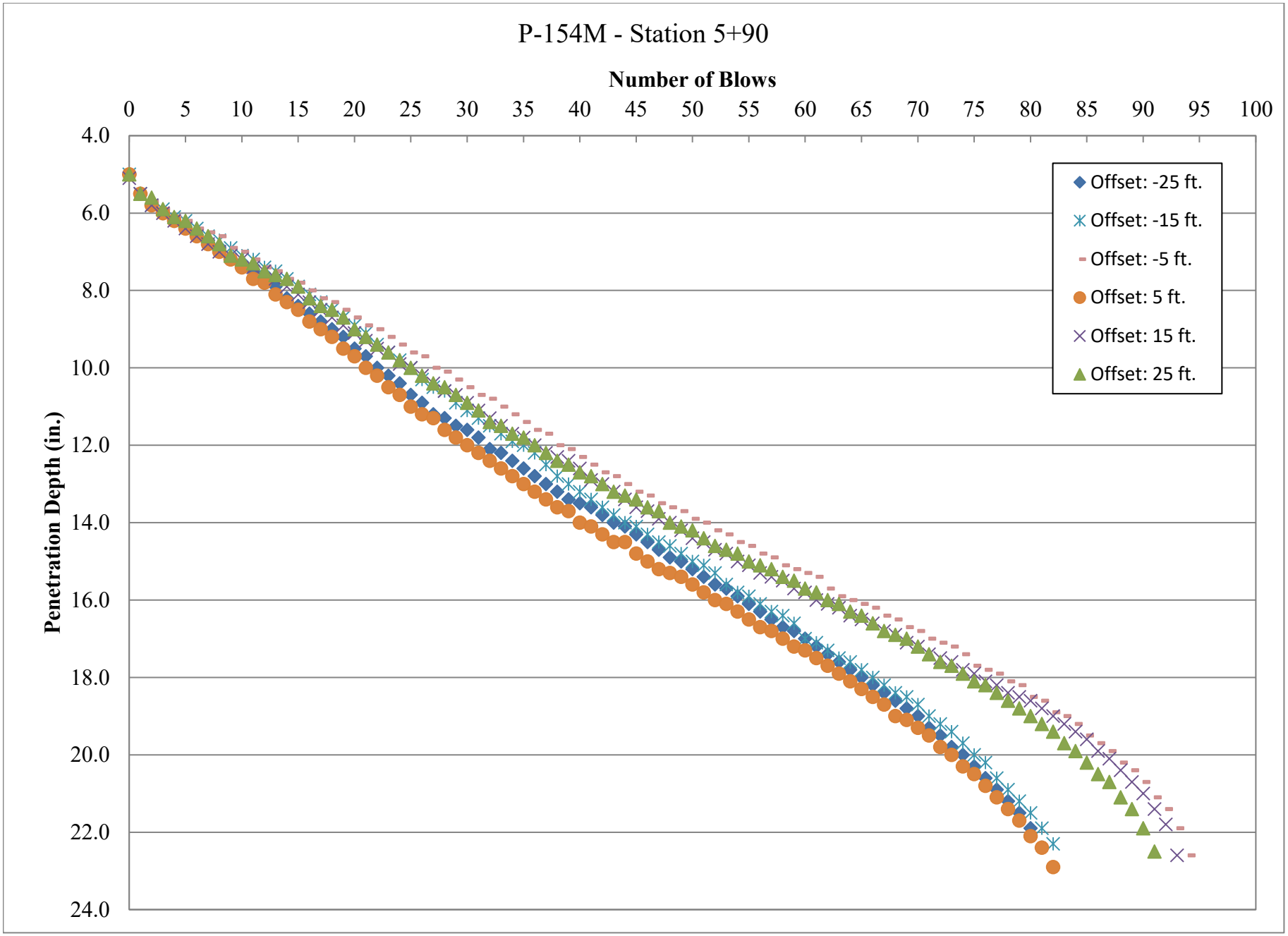
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/SB | **Location: Station 5+90**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
84			19.2		19.4	19.9	
85			19.5		19.6	20.2	
86			19.7		19.9	20.5	
87			19.9		20.1	20.7	
88			20.2		20.4	21.1	
89			20.4		20.7	21.4	
90			20.7		21.0	21.9	
91			21.1		21.4	22.5	
92			21.4		21.8		
93			21.9		22.6		
94			22.6				


P-154M - Station 5+90
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/SB | **Location: Station 6+20**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.0	5.1	5.1	5.1	5.1	5.1	
1	5.5	5.7	5.4	5.7	5.4	5.5	
2	5.7	6.0	5.9	5.9	5.8	5.9	
3	6.0	6.1	6.1	6.2	6.1	6.1	
4	6.2	6.4	6.2	6.4	6.3	6.2	
5	6.3	6.6	6.5	6.7	6.4	6.4	
6	6.5	6.8	6.7	6.9	6.6	6.6	
7	6.7	7.1	6.9	7.0	6.8	6.8	
8	6.8	7.2	7.1	7.3	7.0	7.0	
9	7.1	7.5	7.3	7.5	7.1	7.1	
10	7.3	7.7	7.6	7.7	7.3	7.3	
11	7.4	7.9	7.9	7.9	7.5	7.6	
12	7.6	8.1	8.0	8.1	7.7	7.8	
13	7.9	8.3	8.2	8.3	7.9	8.0	
14	8.0	8.6	8.4	8.5	8.1	8.1	
15	8.2	8.8	8.7	8.8	8.3	8.3	
16	8.4	9.1	8.9	9.0	8.5	8.6	
17	8.6	9.3	9.1	9.2	8.7	8.8	
18	8.8	9.6	9.3	9.5	8.8	9.0	
19	9.1	9.8	9.5	9.7	9.1	9.2	
20	9.3	10.1	9.8	9.9	9.3	9.4	
21	9.5	10.3	10.0	10.1	9.5	9.5	
22	9.8	10.6	10.2	10.3	9.6	9.8	
23	10.0	10.8	10.5	10.6	9.9	10.0	
24	10.2	11.1	10.7	10.8	10.1	10.2	
25	10.4	11.3	11.0	11.0	10.3	10.4	
26	10.7	11.5	11.2	11.2	10.5	10.6	
27	10.9	11.8	11.4	11.4	10.7	10.8	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/SB | **Location: Station 6+20**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	11.1	12.0	11.6	11.6	10.9	11.0	
29	11.3	12.2	11.8	11.8	11.1	11.2	
30	11.5	12.4	12.0	12.0	11.2	11.4	
31	11.7	12.6	12.2	12.2	11.4	11.6	
32	12.0	12.8	12.4	12.4	11.6	11.8	
33	12.1	13.0	12.6	12.5	11.7	12.0	
34	12.3	13.2	12.8	12.7	11.9	12.1	
35	12.6	13.4	13.0	12.8	12.1	12.3	
36	12.8	13.6	13.1	13.0	12.2	12.6	
37	13.0	13.8	13.3	13.2	12.4	12.8	
38	13.2	14.0	13.5	13.3	12.6	12.9	
39	13.4	14.1	13.7	13.4	12.8	13.1	
40	13.6	14.3	13.8	13.7	13.0	13.2	
41	13.7	14.4	14.0	13.8	13.1	13.4	
42	14.0	14.6	14.1	14.0	13.3	13.6	
43	14.1	14.8	14.3	14.1	13.5	13.8	
44	14.3	15.0	14.5	14.3	13.7	14.0	
45	14.4	15.1	14.7	14.4	13.8	14.1	
46	14.6	15.3	14.9	14.6	14.0	14.3	
47	14.8	15.4	15.1	14.7	14.2	14.5	
48	14.9	15.7	15.2	14.8	14.4	14.7	
49	15.1	15.8	15.4	15.0	14.6	14.9	
50	15.2	15.9	15.5	15.2	14.8	15.0	
51	15.3	16.1	15.6	15.3	15.0	15.2	
52	15.5	16.3	15.8	15.4	15.1	15.4	
53	15.6	16.4	15.9	15.6	15.3	15.5	
54	15.7	16.6	16.1	15.7	15.5	15.7	
55	15.9	16.8	16.2	15.9	15.7	15.9	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/SB | **Location: Station 6+20**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56	16.0	16.9	16.3	16.0	15.8	16.0	
57	16.1	17.1	16.5	16.1	16.0	16.2	
58	16.3	17.3	16.7	16.3	16.2	16.4	
59	16.4	17.4	16.9	16.5	16.3	16.6	
60	16.6	17.6	17.0	16.6	16.5	16.8	
61	16.8	17.8	17.1	16.8	16.7	17.0	
62	16.9	18.0	17.3	17.0	16.8	17.1	
63	17.1	18.1	17.4	17.2	17.0	17.2	
64	17.2	18.4	17.6	17.4	17.1	17.4	
65	17.3	18.6	17.7	17.5	17.3	17.6	
66	17.5	18.7	17.9	17.7	17.5	17.8	
67	17.7	19.0	18.1	17.9	17.6	18.0	
68	17.9	19.2	18.3	18.1	17.8	18.2	
69	18.0	19.4	18.6	18.4	18.0	18.4	
70	18.2	19.7	18.7	18.5	18.2	18.6	
71	18.4	19.9	19.0	18.7	18.4	18.8	
72	18.5	20.0	19.1	18.9	18.6	19.0	
73	18.7	20.4	19.3	19.1	18.8	19.2	
74	18.9	20.7	19.5	19.3	19.0	19.4	
75	19.1	21.0	19.8	19.6	19.3	19.6	
76	19.3	21.4	20.1	19.9	19.5	19.9	
77	19.6	21.8	20.4	20.1	19.8	20.1	
78	19.7	22.6	20.7	20.4	20.0	20.4	
79	20.0		21.0	20.8	20.3	20.7	
80	20.2		21.4	21.2	20.6	21.0	
81	20.5		22.0	21.5	21.0	21.3	
82	20.8			22.0	21.2	21.7	
83	21.1				21.5	22.2	

Dynamic Cone Penetrometer Test
ASTM D6951

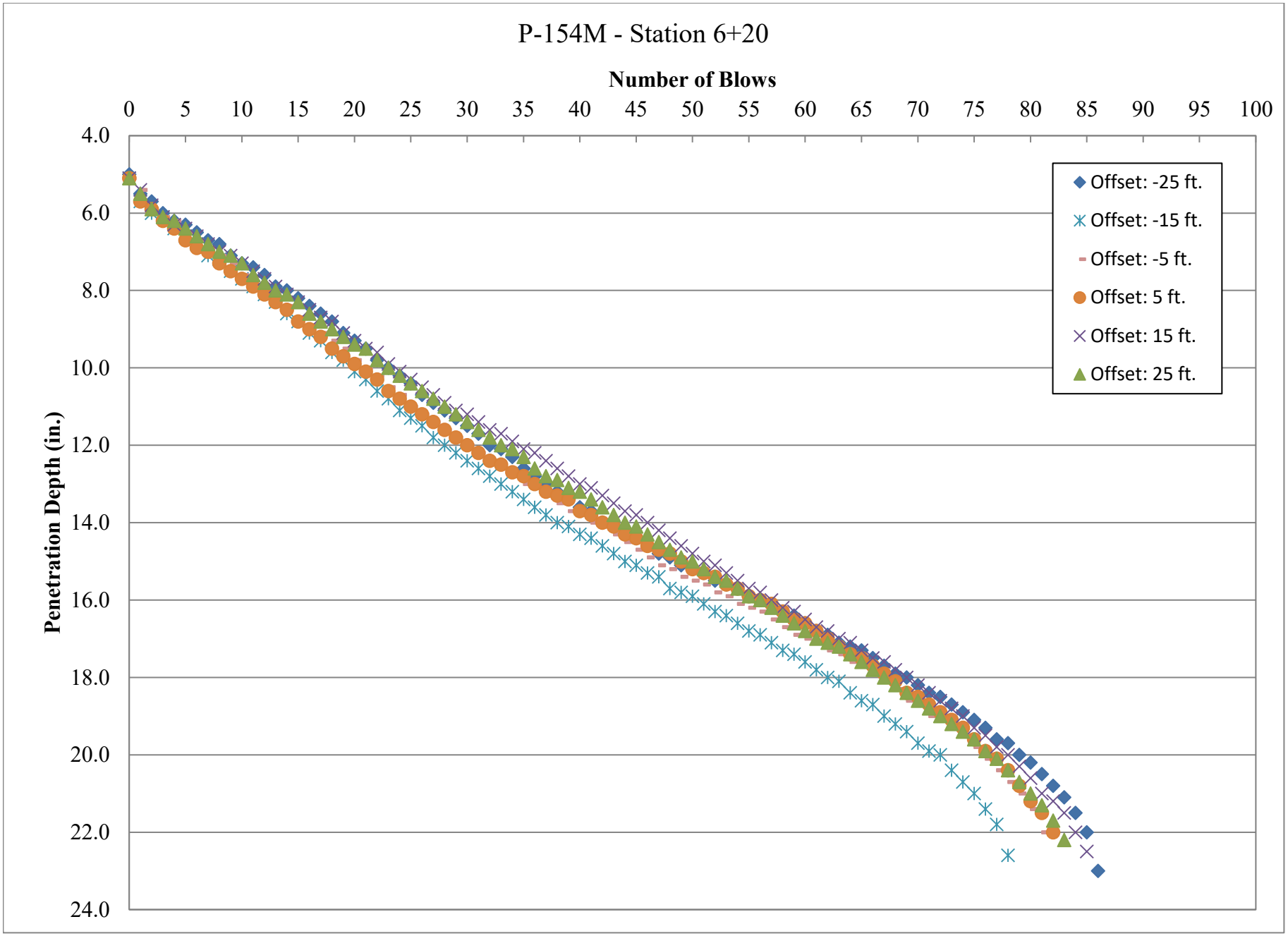
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/SB | **Location: Station 6+20**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
84	21.5				22.0		
85	22.0				22.5		
86	23.0						


P-154M - Station 6+20
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/JR | **Location: Station 6+30**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
0	5.1	5.1	4.9	5.1	5.3	5.1	
1	5.7	5.5	5.5	5.7	5.7	5.6	
2	5.9	5.8	5.6	5.9	5.9	6.0	
3	6.1	6.0	5.9	6.1	6.1	6.2	
4	6.3	6.3	6.1	6.3	6.3	6.5	
5	6.5	6.5	6.3	6.6	6.5	6.7	
6	6.7	6.8	6.5	6.8	6.6	6.9	
7	6.8	7.0	6.7	7.0	6.9	7.2	
8	7.0	7.2	6.9	7.3	7.0	7.4	
9	7.2	7.4	7.2	7.5	7.3	7.6	
10	7.4	7.6	7.4	7.7	7.4	7.8	
11	7.5	7.6	7.6	7.9	7.6	8.0	
12	7.8	8.0	7.8	8.2	7.8	8.2	
13	8.0	8.3	8.0	8.4	7.9	8.6	
14	8.2	8.6	8.2	8.5	8.1	8.7	
15	8.4	8.8	8.4	8.8	8.3	8.9	
16	8.7	8.9	8.7	9.0	8.5	9.2	
17	8.8	9.2	9.0	9.2	8.7	9.4	
18	9.0	9.5	9.2	9.3	8.9	9.7	
19	9.3	9.7	9.5	9.5	9.1	10.0	
20	9.6	10.0	9.8	9.7	9.3	10.2	
21	9.8	10.2	10.0	10.0	9.5	10.5	
22	10.0	10.5	10.3	10.3	9.7	10.7	
23	10.3	10.7	10.5	10.5	9.9	11.0	
24	10.5	11.0	10.7	10.7	10.1	11.3	
25	10.7	11.3	11.0	11.0	10.3	11.5	
26	11.0	11.5	11.2	11.2	10.6	11.7	
27	11.3	11.8	11.5	11.4	10.7	12.0	

Dynamic Cone Penetrometer Test
ASTM D6951

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/JR | **Location: Station 6+30**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
28	11.5	12.0	11.7	11.6	10.9	12.3	
29	11.7	12.2	12.0	11.9	11.1	12.5	
30	12.0	12.5	12.2	12.1	11.3	12.8	
31	12.2	12.7	12.4	12.3	11.5	12.9	
32	12.4	12.9	12.7	12.5	11.7	13.1	
33	12.6	13.1	12.9	12.7	11.9	13.5	
34	12.8	13.4	13.1	12.9	12.0	13.9	
35	13.0	13.6	13.3	13.0	12.2	13.9	
36	13.2	13.8	13.5	13.2	12.4	14.0	
37	13.4	14.1	13.7	13.3	12.6	14.2	
38	13.6	14.3	13.9	13.5	12.8	14.4	
39	13.9	14.6	14.1	13.7	13.0	14.6	
40	14.1	14.8	14.3	13.8	13.1	14.8	
41	14.3	15.0	14.5	14.0	13.3	14.9	
42	14.4	15.2	14.6	14.2	13.5	15.0	
43	14.6	15.4	14.8	14.3	13.6	15.3	
44	14.8	15.5	15.0	14.5	13.8	15.4	
45	15.0	15.7	15.1	14.7	14.0	15.5	
46	15.2	15.9	15.3	14.8	14.1	15.7	
47	15.4	16.0	15.5	15.0	14.3	15.9	
48	15.6	16.2	15.6	15.2	14.5	16.1	
49	15.8	16.4	15.8	15.3	14.6	16.2	
50	15.9	16.6	16.0	15.5	14.7	16.4	
51	16.1	16.7	16.1	15.7	14.9	16.5	
52	16.3	16.9	16.3	15.8	15.1	16.7	
53	16.5	17.1	16.5	16.0	15.3	16.9	
54	16.7	17.2	16.7	16.2	15.6	17.1	
55	16.9	17.4	16.9	16.4	15.8	17.2	

Dynamic Cone Penetrometer Test
ASTM D6951

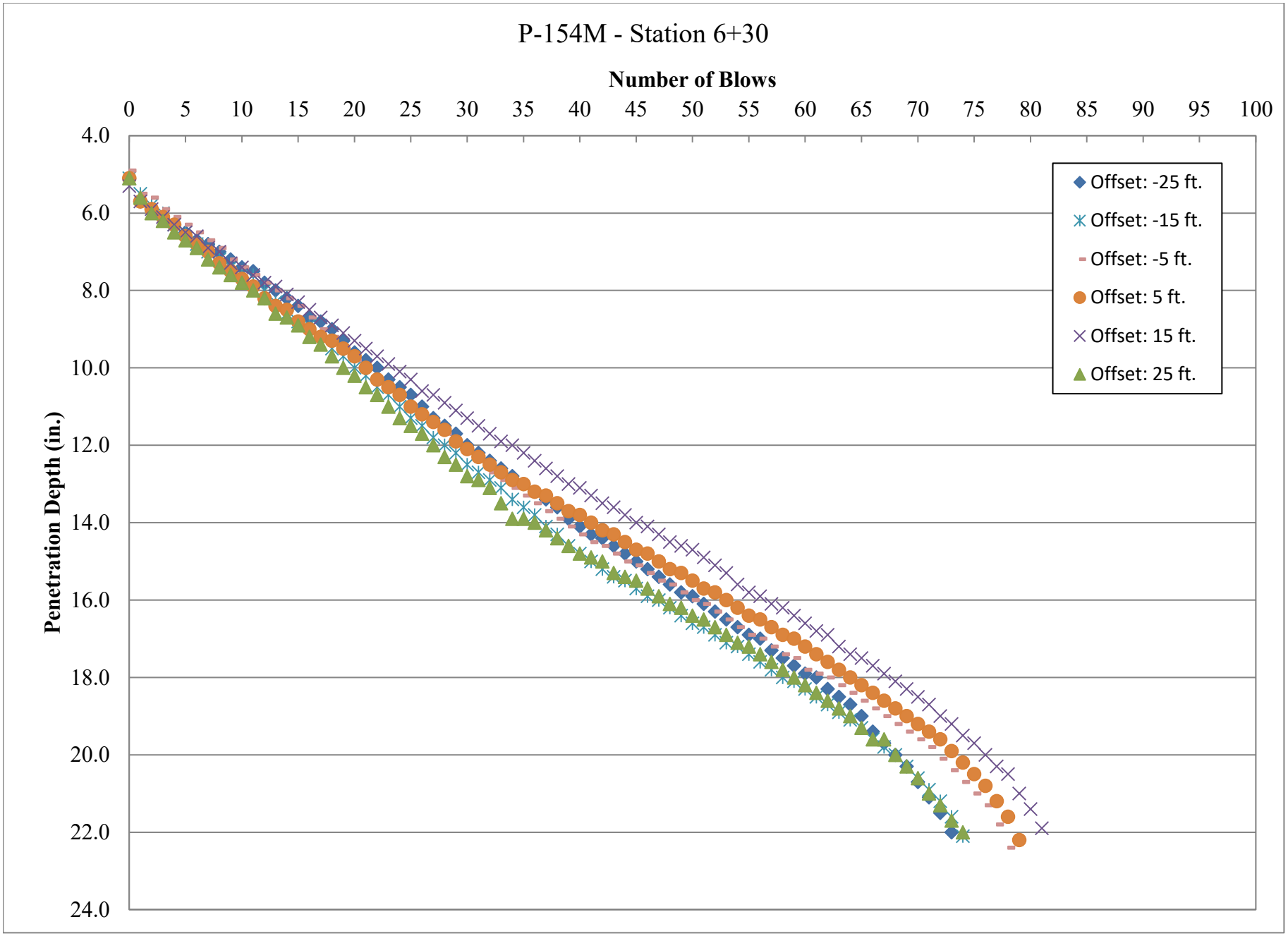
National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Construction | **Section: Strength and Fatigue** | **Date: 9/22/2017**

Technician: CR/JR | **Location: Station 6+30**

Material: P-154M | **Surface Depth: Top of P-154M**

Blow No.	Offset, ft.						
	-25	-15	-5	5	15	25	
56	17.0	17.6	17.0	16.5	15.9	17.4	
57	17.3	17.8	17.2	16.7	16.1	17.6	
58	17.5	18.0	17.4	16.9	16.2	17.8	
59	17.7	18.1	17.5	17.0	16.4	18.0	
60	17.9	18.3	17.8	17.2	16.6	18.2	
61	18.0	18.5	17.9	17.4	16.8	18.4	
62	18.3	18.7	18.0	17.6	16.9	18.6	
63	18.5	18.9	18.2	17.8	17.2	18.8	
64	18.7	19.1	18.4	18.0	17.4	19.0	
65	19.0	19.3	18.6	18.2	17.5	19.3	
66	19.4	19.6	18.8	18.4	17.7	19.6	
67	19.7	19.8	19.0	18.6	17.9	19.6	
68	20.0	20.0	19.2	18.8	18.1	20.0	
69	20.3	20.3	19.4	19.0	18.3	20.3	
70	20.7	20.6	19.6	19.2	18.5	20.6	
71	21.1	20.9	19.8	19.4	18.7	21.0	
72	21.5	21.2	20.1	19.6	19.0	21.3	
73	22.0	21.6	20.4	19.9	19.2	21.7	
74		22.1	20.7	20.2	19.5	22.0	
75			21.0	20.5	19.7		
76			21.3	20.8	20.0		
77			21.8	21.2	20.3		
78			22.4	21.6	20.5		
79				22.2	21.0		
80					21.4		
81					21.9		


P-154M - Station 6+30
Number of Blows
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Penetration Depth (in.)
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
Offset: -25 ft.
Offset: -15 ft.
Offset: -5 ft.
Offset: 5 ft.
Offset: 15 ft.
Offset: 25 ft.

Construction Cycle 08 - P154 Subgrade - DPSPA Results

Phase I

Station	Offset	Direction	Date & Time	Seismic Modulus, ksi	Poison's Ratio	Temperature, F	Corrected Elastic Modulus for in-situ Density (122 pcf), psi	Average Elastic Modulus, psi
345	25	L	5/26/2015 15:24	72	0.35	75	32,533	32,759
345	25	L	5/26/2015 15:25	73	0.35	75	32,985	
345	25	T	5/26/2015 15:26	90	0.35	75	40,667	40,667
345	25	T	5/26/2015 15:26	90	0.35	75	40,667	
345	15	L	5/26/2015 15:27	57	0.35	75	25,756	25,530
345	15	L	5/26/2015 15:28	56	0.35	75	25,304	
345	15	T	5/26/2015 15:28	83	0.35	75	37,504	37,504
345	15	T	5/26/2015 15:29	83	0.35	75	37,504	
345	5	L	5/26/2015 15:30	65	0.35	75	29,370	29,370
345	5	L	5/26/2015 15:30	65	0.35	75	29,370	
345	5	T	5/26/2015 15:31	56	0.35	75	25,304	25,304
345	5	T	5/26/2015 15:32	56	0.35	73	25,304	
345	-5	L	5/26/2015 15:33	57	0.35	73	25,756	25,756
345	-5	L	5/26/2015 15:33	57	0.35	73	25,756	
345	-5	T	5/26/2015 15:34	81	0.35	73	36,600	36,600
345	-5	T	5/26/2015 15:34	81	0.35	73	36,600	
345	-15	L	5/26/2015 15:35	52	0.35	73	23,496	23,496
345	-15	L	5/26/2015 15:35	52	0.35	75	23,496	
345	-15	T	5/26/2015 15:36	73	0.35	73	32,985	32,985
345	-15	T	5/26/2015 15:36	73	0.35	73	32,985	
345	-25	L	5/26/2015 15:38	58	0.35	73	26,207	26,433
345	-25	L	5/26/2015 15:38	59	0.35	73	26,659	
345	-25	T	5/26/2015 15:39	66	0.35	73	29,822	29,822
345	-25	T	5/26/2015 15:39	66	0.35	73	29,822	
360	-25	L	5/26/2015 15:40	80	0.35	73	36,148	36,148
360	-25	L	5/26/2015 15:41	80	0.35	73	36,148	
360	-25	T	5/26/2015 15:42	65	0.35	73	29,370	29,596
360	-25	T	5/26/2015 15:42	66	0.35	73	29,822	
360	-15	L	5/26/2015 15:45	95	0.35	73	42,926	44,056
360	-15	L	5/26/2015 15:45	100	0.35	73	45,185	
360	-15	T	5/26/2015 15:46	77	0.35	73	34,793	34,567
360	-15	T	5/26/2015 15:46	76	0.35	73	34,341	
360	-5	L	5/26/2015 15:50	90	0.35	73	40,667	40,667
360	-5	L	5/26/2015 15:50	90	0.35	73	40,667	
360	-5	T	5/26/2015 15:53	76	0.35	73	34,341	34,341
360	-5	T	5/26/2015 15:54	76	0.35	75	34,341	
360	5	L	5/26/2015 15:59	60	0.35	75	27,111	25,981
360	5	L	5/26/2015 15:59	55	0.35	75	24,852	
360	5	T	5/26/2015 16:00	95	0.35	75	42,926	41,796
360	5	T	5/26/2015 16:01	90	0.35	75	40,667	
360	15	L	5/26/2015 16:02	65	0.35	75	29,370	29,596
360	15	L	5/26/2015 16:02	66	0.35	75	29,822	
360	15	T	5/26/2015 16:03	100	0.35	75	45,185	45,185
360	15	T	5/26/2015 16:03	100	0.35	75	45,185	
360	25	L	5/26/2015 16:04	64	0.35	75	28,919	28,919
360	25	L	5/26/2015 16:05	64	0.35	75	28,919	
360	25	T	5/26/2015 16:05	90	0.35	75	40,667	40,667
360	25	T	5/26/2015 16:06	90	0.35	75	40,667	
375	25	L	5/26/2015 16:11	66	0.35	75	29,822	29,822
375	25	L	5/26/2015 16:11	66	0.35	75	29,822	
375	25	T	5/26/2015 16:12	100	0.35	75	45,185	44,056
375	25	T	5/26/2015 16:12	95	0.35	75	42,926	
375	15	L	5/26/2015 16:13	77	0.35	75	34,793	34,793
375	15	L	5/26/2015 16:13	77	0.35	75	34,793	
375	15	T	5/26/2015 16:14	75	0.35	75	33,889	33,889
375	15	T	5/26/2015 16:15	75	0.35	75	33,889	
375	5	L	5/26/2015 16:16	83	0.35	75	37,504	37,052
375	5	L	5/26/2015 16:17	81	0.35	75	36,600	
375	5	T	5/26/2015 16:17	110	0.35	75	49,704	49,704
375	5	T	5/26/2015 16:18	110	0.35	75	49,704	
375	-5	L	5/26/2015 16:19	115	0.35	75	51,963	51,963
375	-5	L	5/26/2015 16:19	115	0.35	75	51,963	
375	-5	T	5/26/2015 16:20	77	0.35	75	34,793	34,793
375	-5	T	5/26/2015 16:20	77	0.35	75	34,793	
375	-15	L	5/26/2015 16:23	95	0.35	75	42,926	42,926
375	-15	L	5/26/2015 16:24	95	0.35	75	42,926	
375	-15	T	5/26/2015 16:25	84	0.35	75	37,956	37,956
375	-15	T	5/26/2015 16:25	84	0.35	75	37,956	
375	-25	L	5/26/2015 16:26	62	0.35	75	28,015	28,241
375	-25	L	5/26/2015 16:26	63	0.35	73	28,467	
375	-25	T	5/26/2015 16:27	110	0.35	75	49,704	50,833
375	-25	T	5/26/2015 16:27	115	0.35	75	51,963	

Construction Cycle 08 - P154 Subgrade - DPSPA Results

Phase II

Station	Offset	Direction	Date & Time	Seismic Modulus, ksi	Poison's Ratio	Temperature, F	Corrected Elastic Modulus for in-situ Density (122 pcf), psi	Average Elastic Modulus, psi
425	-25	L	3/27/2017 9:47	115	0.35	50	51,963	**51,210**
425	-25	L	3/27/2017 9:47	115	0.35	50	51,963	
425	-25	L	3/27/2017 9:47	110	0.35	50	49,704	
425	-25	T	3/27/2017 9:48	100	0.35	50	45,185	**43,679**
425	-25	T	3/27/2017 9:48	95	0.35	52	42,926	
425	-25	T	3/27/2017 9:48	95	0.35	50	42,926	
425	-15	L	3/27/2017 9:50	83	0.35	50	37,504	**39,612**
425	-15	L	3/27/2017 9:50	85	0.35	50	38,407	
425	-15	L	3/27/2017 9:50	95	0.35	50	42,926	
425	-15	T	3/27/2017 9:51	125	0.35	50	56,481	**56,481**
425	-15	T	3/27/2017 9:51	125	0.35	50	56,481	
425	-15	T	3/27/2017 9:52	125	0.35	50	56,481	
425	-5	L	3/27/2017 9:52	74	0.35	48	33,437	**33,286**
425	-5	L	3/27/2017 9:53	67	0.35	50	30,274	
425	-5	L	3/27/2017 9:53	80	0.35	50	36,148	
425	-5	T	3/27/2017 9:54	105	0.35	48	47,444	**47,444**
425	-5	T	3/27/2017 9:54	105	0.35	50	47,444	
425	-5	T	3/27/2017 9:54	105	0.35	48	47,444	
425	5	L	3/27/2017 9:55	135	0.35	48	61,000	**60,247**
425	5	L	3/27/2017 9:55	130	0.35	48	58,741	
425	5	L	3/27/2017 9:55	135	0.35	48	61,000	
425	5	T	3/27/2017 9:56	140	0.35	48	63,259	**63,259**
425	5	T	3/27/2017 9:56	140	0.35	48	63,259	
425	5	T	3/27/2017 9:57	140	0.35	48	63,259	
425	15	L	3/27/2017 9:58	41	0.35	48	18,526	**17,923**
425	15	L	3/27/2017 9:59	40	0.35	48	18,074	
425	15	L	3/27/2017 9:59	38	0.35	48	17,170	
425	15	T	3/27/2017 10:00	29	0.35	48	13,104	**12,351**
425	15	T	3/27/2017 10:00	25	0.35	48	11,296	
425	15	T	3/27/2017 10:00	28	0.35	48	12,652	
425	15	L	3/27/2017 10:01	31	0.35	48	14,007	**14,007**
425	15	L	3/27/2017 10:02	31	0.35	48	14,007	
425	15	L	3/27/2017 10:02	31	0.35	48	14,007	
425	15	T	3/27/2017 10:03	27	0.35	50	12,200	**13,405**
425	15	T	3/27/2017 10:03	19	0.35	48	8,585	
425	15	T	3/27/2017 10:03	43	0.35	48	19,430	
425	25	L	3/27/2017 10:04	110	0.35	48	49,704	**48,951**
425	25	L	3/27/2017 10:05	115	0.35	48	51,963	
425	25	L	3/27/2017 10:05	100	0.35	48	45,185	
425	25	T	3/27/2017 10:07	105	0.35	48	47,444	**48,951**
425	25	T	3/27/2017 10:07	110	0.35	48	49,704	
425	25	T	3/27/2017 10:07	110	0.35	48	49,704	
450	25	L	3/27/2017 10:09	120	0.35	48	54,222	**57,235**
450	25	L	3/27/2017 10:09	130	0.35	48	58,741	
450	25	L	3/27/2017 10:09	130	0.35	48	58,741	
450	25	T	3/27/2017 10:10	65	0.35	48	29,370	**29,220**
450	25	T	3/27/2017 10:10	64	0.35	48	28,919	
450	25	T	3/27/2017 10:10	65	0.35	48	29,370	
450	15	L	3/27/2017 10:12	130	0.35	48	58,741	**58,741**
450	15	L	3/27/2017 10:12	130	0.35	48	58,741	
450	15	L	3/27/2017 10:13	130	0.35	48	58,741	
450	15	T	3/27/2017 10:13	140	0.35	48	63,259	**63,259**
450	15	T	3/27/2017 10:13	140	0.35	48	63,259	
450	15	T	3/27/2017 10:14	140	0.35	48	63,259	
450	5	L	3/27/2017 10:14	135	0.35	48	61,000	**58,741**
450	5	L	3/27/2017 10:15	130	0.35	48	58,741	
450	5	L	3/27/2017 10:15	125	0.35	48	56,481	
450	5	T	3/27/2017 10:16	72	0.35	48	32,533	**32,533**
450	5	T	3/27/2017 10:16	72	0.35	48	32,533	
450	5	T	3/27/2017 10:16	72	0.35	48	32,533	
450	-5	L	3/27/2017 10:17	85	0.35	48	38,407	**37,956**
450	-5	L	3/27/2017 10:17	83	0.35	48	37,504	
450	-5	L	3/27/2017 10:17	84	0.35	48	37,956	
450	-5	T	3/27/2017 10:18	78	0.35	48	35,244	**52,415**
450	-5	T	3/27/2017 10:18	135	0.35	48	61,000	
450	-5	T	3/27/2017 10:18	135	0.35	48	61,000	
450	-15	L	3/27/2017 10:19	110	0.35	48	49,704	**48,951**
450	-15	L	3/27/2017 10:19	100	0.35	48	45,185	
450	-15	L	3/27/2017 10:20	115	0.35	48	51,963	
450	-15	T	3/27/2017 10:20	130	0.35	48	58,741	**58,741**
450	-15	T	3/27/2017 10:20	130	0.35	48	58,741	
450	-15	T	3/27/2017 10:21	130	0.35	48	58,741	
450	-25	L	3/27/2017 10:24	78	0.35	48	35,244	**35,696**
450	-25	L	3/27/2017 10:24	79	0.35	48	35,696	
450	-25	L	3/27/2017 10:24	80	0.35	48	36,148	
450	-25	T	3/27/2017 10:26	100	0.35	48	45,185	**45,185**
450	-25	T	3/27/2017 10:26	100	0.35	48	45,185	
450	-25	T	3/27/2017 10:27	100	0.35	48	45,185	

475	-25	L	3/27/2017 10:27	74	0.35	48	33,437	
475	-25	L	3/27/2017 10:28	75	0.35	48	33,889	**33,738**
475	-25	L	3/27/2017 10:28	75	0.35	48	33,889	
475	-25	T	3/27/2017 10:29	82	0.35	48	37,052	
475	-25	T	3/27/2017 10:29	83	0.35	48	37,504	**37,504**
475	-25	T	3/27/2017 10:29	84	0.35	48	37,956	
475	-15	L	3/27/2017 10:31	140	0.35	48	63,259	
475	-15	L	3/27/2017 10:31	125	0.35	48	56,481	**54,222**
475	-15	L	3/27/2017 10:31	95	0.35	48	42,926	
475	-15	T	3/27/2017 10:33	115	0.35	48	51,963	
475	-15	T	3/27/2017 10:33	95	0.35	48	42,926	**43,830**
475	-15	T	3/27/2017 10:33	81	0.35	48	36,600	
475	-5	L	3/27/2017 10:34	95	0.35	48	42,926	
475	-5	L	3/27/2017 10:34	95	0.35	48	42,926	**42,926**
475	-5	L	3/27/2017 10:35	95	0.35	48	42,926	
475	-5	T	3/27/2017 10:35	100	0.35	48	45,185	
475	-5	T	3/27/2017 10:35	100	0.35	48	45,185	**45,185**
475	-5	T	3/27/2017 10:36	100	0.35	48	45,185	
475	5	L	3/27/2017 10:36	115	0.35	48	51,963	
475	5	L	3/27/2017 10:37	115	0.35	48	51,963	**51,963**
475	5	L	3/27/2017 10:37	115	0.35	48	51,963	
475	5	T	3/27/2017 10:38	65	0.35	48	29,370	
475	5	T	3/27/2017 10:38	74	0.35	48	33,437	**32,232**
475	5	T	3/27/2017 10:38	75	0.35	48	33,889	
475	15	L	3/27/2017 10:39	105	0.35	48	47,444	
475	15	L	3/27/2017 10:39	105	0.35	48	47,444	**48,198**
475	15	L	3/27/2017 10:39	110	0.35	48	49,704	
475	15	T	3/27/2017 10:41	125	0.35	48	56,481	
475	15	T	3/27/2017 10:42	95	0.35	48	42,926	**51,963**
475	15	T	3/27/2017 10:42	125	0.35	48	56,481	
475	25	L	3/27/2017 10:43	105	0.35	48	47,444	
475	25	L	3/27/2017 10:43	105	0.35	48	47,444	**47,444**
475	25	L	3/27/2017 10:43	105	0.35	48	47,444	
475	25	T	3/27/2017 10:45	105	0.35	48	47,444	
475	25	T	3/27/2017 10:45	150	0.35	48	67,778	**60,247**
475	25	T	3/27/2017 10:45	145	0.35	48	65,519	
520	25	L	3/27/2017 10:46	120	0.35	48	54,222	
520	25	L	3/27/2017 10:47	115	0.35	48	51,963	**52,716**
520	25	L	3/27/2017 10:47	115	0.35	48	51,963	
520	25	T	3/27/2017 10:47	150	0.35	48	67,778	
520	25	T	3/27/2017 10:48	150	0.35	48	67,778	**67,025**
520	25	T	3/27/2017 10:48	145	0.35	48	65,519	
520	15	L	3/27/2017 10:49	155	0.35	48	70,037	
520	15	L	3/27/2017 10:49	155	0.35	48	70,037	**70,037**
520	15	L	3/27/2017 10:52	155	0.35	48	70,037	
520	15	T	3/27/2017 10:52	90	0.35	48	40,667	
520	15	T	3/27/2017 10:52	95	0.35	48	42,926	**41,420**
520	15	T	3/27/2017 10:53	90	0.35	48	40,667	
520	5	L	3/27/2017 10:55	90	0.35	48	40,667	
520	5	L	3/27/2017 10:55	90	0.35	48	40,667	**40,667**
520	5	L	3/27/2017 10:55	90	0.35	48	40,667	
520	5	T	3/27/2017 10:56	105	0.35	48	47,444	
520	5	T	3/27/2017 10:56	100	0.35	48	45,185	**45,938**
520	5	T	3/27/2017 10:57	100	0.35	48	45,185	
520	-5	L	3/27/2017 10:57	135	0.35	48	61,000	
520	-5	L	3/27/2017 10:58	130	0.35	48	58,741	**58,741**
520	-5	L	3/27/2017 10:58	125	0.35	48	56,481	
520	-5	T	3/27/2017 10:59	87	0.35	48	39,311	
520	-5	T	3/27/2017 10:59	86	0.35	48	38,859	**39,010**
520	-5	T	3/27/2017 11:00	86	0.35	48	38,859	
520	-15	L	3/27/2017 11:03	110	0.35	48	49,704	
520	-15	L	3/27/2017 11:03	110	0.35	48	49,704	**49,704**
520	-15	L	3/27/2017 11:03	110	0.35	48	49,704	
520	-15	T	3/27/2017 11:04	78	0.35	48	35,244	
520	-15	T	3/27/2017 11:04	78	0.35	48	35,244	**35,244**
520	-15	T	3/27/2017 11:04	78	0.35	48	35,244	
520	-25	L	3/27/2017 11:06	78	0.35	48	35,244	
520	-25	L	3/27/2017 11:06	78	0.35	48	35,244	**35,094**
520	-25	L	3/27/2017 11:06	77	0.35	48	34,793	
520	-25	T	3/27/2017 11:07	80	0.35	48	36,148	
520	-25	T	3/27/2017 11:07	90	0.35	48	40,667	**34,491**
520	-25	T	3/27/2017 11:08	59	0.35	48	26,659	
540	-25	L	3/27/2017 11:09	95	0.35	48	42,926	
540	-25	L	3/27/2017 11:09	95	0.35	48	42,926	**43,679**
540	-25	L	3/27/2017 11:09	100	0.35	48	45,185	
540	-25	T	3/27/2017 11:10	120	0.35	48	54,222	
540	-25	T	3/27/2017 11:10	120	0.35	48	54,222	**54,222**
540	-25	T	3/27/2017 11:10	120	0.35	48	54,222	
540	-15	L	3/27/2017 11:11	115	0.35	48	51,963	
540	-15	L	3/27/2017 11:11	115	0.35	48	51,963	**51,963**
540	-15	L	3/27/2017 11:11	115	0.35	48	51,963	
540	-15	T	3/27/2017 11:12	110	0.35	48	49,704	
540	-15	T	3/27/2017 11:12	115	0.35	48	51,963	**51,210**
540	-15	T	3/27/2017 11:12	115	0.35	48	51,963	
540	-5	L	3/27/2017 11:13	120	0.35	48	54,222	
540	-5	L	3/27/2017 11:14	120	0.35	48	54,222	**54,222**
540	-5	L	3/27/2017 11:14	120	0.35	48	54,222	

540	-5	T	3/27/2017 11:14	105	0.35	48	47,444	
540	-5	T	3/27/2017 11:15	105	0.35	48	47,444	**47,444**
540	-5	T	3/27/2017 11:15	105	0.35	48	47,444	
540	5	L	3/27/2017 11:16	90	0.35	48	40,667	
540	5	L	3/27/2017 11:16	100	0.35	48	45,185	**44,432**
540	5	L	3/27/2017 11:16	105	0.35	48	47,444	
540	5	T	3/27/2017 11:20	140	0.35	46	63,259	
540	5	T	3/27/2017 11:20	140	0.35	48	63,259	**63,259**
540	5	T	3/27/2017 11:21	140	0.35	48	63,259	
540	15	L	3/27/2017 11:23	42	0.35	48	18,978	
540	15	L	3/27/2017 11:25	40	0.35	48	18,074	**18,677**
540	15	L	3/27/2017 11:25	42	0.35	48	18,978	
540	15	T	3/27/2017 11:26	54	0.35	48	24,400	
540	15	T	3/27/2017 11:26	95	0.35	48	42,926	**29,069**
540	15	T	3/27/2017 11:26	44	0.35	48	19,881	
540	25	L	3/27/2017 11:27	90	0.35	48	40,667	
540	25	L	3/27/2017 11:27	86	0.35	48	38,859	**39,311**
540	25	L	3/27/2017 11:28	85	0.35	48	38,407	
540	25	T	3/27/2017 11:28	85	0.35	48	38,407	
540	25	T	3/27/2017 11:29	85	0.35	48	38,407	**38,558**
540	25	T	3/27/2017 11:29	86	0.35	48	38,859	
580	25	L	9/21/2017 10:51	67	0.35	77	30,274	
580	25	L	9/21/2017 10:52	66	0.35	77	29,822	**29,822**
580	25	L	9/21/2017 10:52	65	0.35	77	29,370	
580	25	T	9/21/2017 10:53	80	0.35	75	36,148	
580	25	T	9/21/2017 10:53	78	0.35	77	35,244	**35,696**
580	25	T	9/21/2017 10:53	79	0.35	75	35,696	
580	15	L	9/21/2017 10:54	74	0.35	75	33,437	
580	15	L	9/21/2017 10:54	77	0.35	77	34,793	**33,889**
580	15	L	9/21/2017 10:55	74	0.35	75	33,437	
580	15	T	9/21/2017 10:57	68	0.35	75	30,726	
580	15	T	9/21/2017 10:57	66	0.35	75	29,822	**30,123**
580	15	T	9/21/2017 10:57	66	0.35	75	29,822	
580	5	L	9/21/2017 10:58	100	0.35	75	45,185	
580	5	L	9/21/2017 10:59	71	0.35	75	32,081	**36,600**
580	5	L	9/21/2017 10:59	72	0.35	75	32,533	
580	5	T	9/21/2017 11:00	90	0.35	75	40,667	
580	5	T	9/21/2017 11:00	95	0.35	75	42,926	**41,420**
580	5	T	9/21/2017 11:00	90	0.35	75	40,667	
580	-5	L	9/21/2017 11:04	56	0.35	75	25,304	
580	-5	L	9/21/2017 11:04	57	0.35	75	25,756	**25,304**
580	-5	L	9/21/2017 11:04	55	0.35	75	24,852	
580	-5	T	9/21/2017 11:04	55	0.35	75	24,852	
580	-5	T	9/21/2017 11:04	55	0.35	75	24,852	**24,852**
580	-5	T	9/21/2017 11:04	55	0.35	75	24,852	
580	-15	L	9/21/2017 11:08	63	0.35	75	28,467	
580	-15	L	9/21/2017 11:08	63	0.35	75	28,467	**28,617**
580	-15	L	9/21/2017 11:08	64	0.35	75	28,919	
580	-15	T	9/21/2017 11:09	95	0.35	75	42,926	
580	-15	T	9/21/2017 11:09	90	0.35	75	40,667	**41,420**
580	-15	T	9/21/2017 11:09	90	0.35	75	40,667	
580	-25	L	9/21/2017 11:12	62	0.35	75	28,015	
580	-25	L	9/21/2017 11:12	62	0.35	75	28,015	**27,864**
580	-25	L	9/21/2017 11:12	61	0.35	75	27,563	
580	-25	T	9/21/2017 11:14	57	0.35	75	25,756	
580	-25	T	9/21/2017 11:14	56	0.35	75	25,304	**25,304**
580	-25	T	9/21/2017 11:15	55	0.35	75	24,852	
590	-25	L	9/21/2017 11:16	59	0.35	75	26,659	
590	-25	L	9/21/2017 11:16	235	0.35	75	106,185	**53,319**
590	-25	L	9/21/2017 11:16	60	0.35	75	27,111	
590	-25	T	9/21/2017 11:17	64	0.35	75	28,919	
590	-25	T	9/21/2017 11:17	63	0.35	75	28,467	**28,919**
590	-25	T	9/21/2017 11:18	65	0.35	75	29,370	
590	-15	L	9/21/2017 11:19	77	0.35	75	34,793	
590	-15	L	9/21/2017 11:19	74	0.35	75	33,437	**34,190**
590	-15	L	9/21/2017 11:20	76	0.35	75	34,341	
590	-15	T	9/21/2017 11:20	77	0.35	75	34,793	
590	-15	T	9/21/2017 11:21	79	0.35	75	35,696	**35,094**
590	-15	T	9/21/2017 11:21	77	0.35	75	34,793	
590	-5	L	9/21/2017 11:22	66	0.35	75	29,822	
590	-5	L	9/21/2017 11:22	66	0.35	75	29,822	**29,521**
590	-5	L	9/21/2017 11:22	64	0.35	75	28,919	
590	-5	T	9/21/2017 11:24	55	0.35	75	24,852	
590	-5	T	9/21/2017 11:24	55	0.35	75	24,852	**25,002**
590	-5	T	9/21/2017 11:24	56	0.35	75	25,304	
590	5	L	9/21/2017 11:27	60	0.35	77	27,111	
590	5	L	9/21/2017 11:27	60	0.35	77	27,111	**26,810**
590	5	L	9/21/2017 11:27	58	0.35	77	26,207	
590	5	T	9/21/2017 11:28	90	0.35	75	40,667	
590	5	T	9/21/2017 11:28	90	0.35	75	40,667	**40,667**
590	5	T	9/21/2017 11:29	90	0.35	75	40,667	
590	15	L	9/21/2017 11:30	60	0.35	75	27,111	
590	15	L	9/21/2017 11:30	60	0.35	77	27,111	**27,262**
590	15	L	9/21/2017 11:30	61	0.35	77	27,563	
590	15	T	9/21/2017 11:31	60	0.35	77	27,111	
590	15	T	9/21/2017 11:31	57	0.35	77	25,756	**26,207**
590	15	T	9/21/2017 11:31	57	0.35	77	25,756	

590	25	L	9/21/2017 11:33	77	0.35	77	34,793	
590	25	L	9/21/2017 11:34	77	0.35	77	34,793	**34,491**
590	25	L	9/21/2017 11:34	75	0.35	77	33,889	
590	25	T	9/21/2017 11:35	77	0.35	77	34,793	
590	25	T	9/21/2017 11:35	79	0.35	77	35,696	**35,546**
590	25	T	9/21/2017 11:35	80	0.35	77	36,148	
620	25	L	9/21/2017 11:37	66	0.35	77	29,822	
620	25	L	9/21/2017 11:37	65	0.35	77	29,370	**29,521**
620	25	L	9/21/2017 11:37	65	0.35	77	29,370	
620	25	T	9/21/2017 11:38	62	0.35	77	28,015	
620	25	T	9/21/2017 11:38	63	0.35	77	28,467	**28,165**
620	25	T	9/21/2017 11:38	62	0.35	77	28,015	
620	15	L	9/21/2017 11:40	55	0.35	77	24,852	
620	15	L	9/21/2017 11:40	54	0.35	77	24,400	**24,551**
620	15	L	9/21/2017 11:40	54	0.35	77	24,400	
620	15	T	9/21/2017 11:41	60	0.35	77	27,111	
620	15	T	9/21/2017 11:41	68	0.35	77	30,726	**28,768**
620	15	T	9/21/2017 11:41	63	0.35	77	28,467	
620	5	L	9/21/2017 11:42	49	0.35	77	22,141	
620	5	L	9/21/2017 11:42	49	0.35	77	22,141	**21,990**
620	5	L	9/21/2017 11:43	48	0.35	77	21,689	
620	5	T	9/21/2017 11:43	54	0.35	77	24,400	
620	5	T	9/21/2017 11:44	53	0.35	77	23,948	**24,852**
620	5	T	9/21/2017 11:44	58	0.35	77	26,207	
620	-5	L	9/21/2017 11:45	62	0.35	77	28,015	
620	-5	L	9/21/2017 11:45	62	0.35	77	28,015	**28,015**
620	-5	L	9/21/2017 11:45	62	0.35	77	28,015	
620	-5	T	9/21/2017 11:46	71	0.35	77	32,081	
620	-5	T	9/21/2017 11:47	72	0.35	77	32,533	**31,931**
620	-5	T	9/21/2017 11:47	69	0.35	77	31,178	
620	-15	L	9/21/2017 11:48	59	0.35	77	26,659	
620	-15	L	9/21/2017 11:48	60	0.35	77	27,111	**26,960**
620	-15	L	9/21/2017 11:49	60	0.35	77	27,111	
620	-15	T	9/21/2017 11:49	68	0.35	77	30,726	
620	-15	T	9/21/2017 11:50	68	0.35	77	30,726	**30,123**
620	-15	T	9/21/2017 11:50	64	0.35	77	28,919	
620	-25	L	9/21/2017 11:51	67	0.35	77	30,274	
620	-25	L	9/21/2017 11:51	66	0.35	77	29,822	**29,822**
620	-25	L	9/21/2017 11:51	65	0.35	77	29,370	
620	-25	T	9/21/2017 11:52	67	0.35	77	30,274	
620	-25	T	9/21/2017 11:52	69	0.35	77	31,178	**30,877**
620	-25	T	9/21/2017 11:53	69	0.35	77	31,178	
630	-25	L	9/21/2017 11:54	54	0.35	77	24,400	
630	-25	L	9/21/2017 11:54	53	0.35	77	23,948	**24,400**
630	-25	L	9/21/2017 11:54	55	0.35	77	24,852	
630	-25	T	9/21/2017 11:55	56	0.35	77	25,304	
630	-25	T	9/21/2017 11:55	75	0.35	77	33,889	**28,015**
630	-25	T	9/21/2017 11:55	55	0.35	77	24,852	
630	-15	L	9/21/2017 11:59	76	0.35	77	34,341	
630	-15	L	9/21/2017 11:59	76	0.35	77	34,341	**34,491**
630	-15	L	9/21/2017 12:00	77	0.35	77	34,793	
630	-15	T	9/21/2017 12:00	86	0.35	77	38,859	
630	-15	T	9/21/2017 12:00	86	0.35	79	38,859	**38,558**
630	-15	T	9/21/2017 12:01	84	0.35	79	37,956	
630	-5	L	9/21/2017 12:02	48	0.35	77	21,689	
630	-5	L	9/21/2017 12:02	50	0.35	77	22,593	**22,141**
630	-5	L	9/21/2017 12:02	49	0.35	79	22,141	
630	-5	T	9/21/2017 12:03	58	0.35	79	26,207	
630	-5	T	9/21/2017 12:03	59	0.35	79	26,659	**26,509**
630	-5	T	9/21/2017 12:03	59	0.35	79	26,659	
630	5	L	9/21/2017 12:05	68	0.35	77	30,726	
630	5	L	9/21/2017 12:05	41	0.35	79	18,526	**22,593**
630	5	L	9/21/2017 12:05	41	0.35	79	18,526	
630	5	L	9/21/2017 12:07	100	0.35	79	45,185	
630	5	L	9/21/2017 12:07	84	0.35	79	37,956	**34,341**
630	5	L	9/21/2017 12:07	44	0.35	79	19,881	
630	5	T	9/21/2017 12:08	46	0.35	79	20,785	
630	5	T	9/21/2017 12:08	46	0.35	79	20,785	**20,785**
630	5	T	9/21/2017 12:09	46	0.35	79	20,785	
630	15	L	9/21/2017 12:11	55	0.35	79	24,852	
630	15	L	9/21/2017 12:11	56	0.35	79	25,304	**24,701**
630	15	L	9/21/2017 12:11	53	0.35	79	23,948	
630	15	T	9/21/2017 12:12	54	0.35	79	24,400	
630	15	T	9/21/2017 12:12	55	0.35	79	24,852	**24,701**
630	15	T	9/21/2017 12:12	55	0.35	79	24,852	
630	25	L	9/21/2017 12:13	62	0.35	79	28,015	
630	25	L	9/21/2017 12:13	62	0.35	79	28,015	**28,015**
630	25	L	9/21/2017 12:14	62	0.35	79	28,015	
630	25	T	9/21/2017 12:14	65	0.35	79	29,370	
630	25	T	9/21/2017 12:15	66	0.35	79	29,822	**29,672**
630	25	T	9/21/2017 12:15	66	0.35	79	29,822	

Construction Cycle 08 - P154 Subbase - LWD Results

Phase I

Location	Drop No.	Radius (in)	Load (lbf)	Pressure (psi)	Deflection (mils)	Modulus (ksi)
sta345 offset -25	1	3	863.4	30.5	11.7	18.3
sta345 offset -25	2	3	1294.7	45.8	15.9	20.2
sta345 offset -25	3	3	1748.4	61.8	19.8	21.9
sta345 offset -25	4	3	2561.1	90.6	27.8	22.9
sta345 offset -15	1	3	878.4	31.1	11.1	19.6
sta345 offset -15	2	3	1325.5	46.9	15.5	21.2
sta345 offset -15	3	3	1707.6	60.4	18.7	22.7
sta345 offset -15	4	3	2575.2	91.1	27.0	23.7
sta345 offset -5	1	3	875.6	31.0	11.5	18.9
sta345 offset -5	2	3	1302.5	46.1	15.8	20.5
sta345 offset -5	3	3	1736.1	61.4	19.6	22.0
sta345 offset -5	4	3	2533.6	89.6	27.7	22.7
sta345 offset 5	1	3	858.9	30.4	11.5	18.5
sta345 offset 5	2	3	1287.3	45.5	15.6	20.5
sta345 offset 5	3	3	1744.3	61.7	19.4	22.3
sta345 offset 5	4	3	2540.9	89.9	27.8	22.7
sta345 offset 15	1	3	870.1	30.8	10.5	20.6
sta345 offset 15	2	3	1251.2	44.3	13.5	23.0
sta345 offset 15	3	3	1664.8	58.9	16.5	25.1
sta345 offset 15	4	3	2563	90.6	24.4	26.1
sta345 offset 25	1	3	852.4	30.1	12.2	17.3
sta345 offset 25	2	3	1295.9	45.8	16.9	19.0
sta345 offset 25	3	3	1800.3	63.7	21.3	21.0
sta345 offset 25	4	3	2546.5	90.1	28.6	22.1
sta360 offset 25	1	3	890.2	31.5	10.0	22.1
sta360 offset 25	2	3	1275.4	45.1	13.4	23.6
sta360 offset 25	3	3	1724.4	61.0	17.0	25.2
sta360 offset 25	4	3	2547.5	90.1	24.0	26.4
sta360 offset 15	1	3	820.7	29.0	8.9	22.9
sta360 offset 15	2	3	1276	45.1	13.0	24.4
sta360 offset 15	3	3	1804.3	63.8	16.9	26.5
sta360 offset 15	4	3	2576	91.1	23.1	27.7
sta360 offset 5	1	3	856.5	30.3	9.2	23.1
sta360 offset 5	2	3	1287.7	45.5	13.1	24.4
sta360 offset 5	3	3	1703.7	60.3	16.2	26.1
sta360 offset 5	4	3	2560.8	90.6	22.9	27.8
sta360 offset -5	1	3	859.8	30.4	9.6	22.2
sta360 offset -5	2	3	1302.6	46.1	13.7	23.6
sta360 offset -5	3	3	1722.8	60.9	17.5	24.4
sta360 offset -5	4	3	2560	90.5	24.4	26.0
sta360 offset -15	1	3	887.9	31.4	11.0	20.0
sta360 offset -15	2	3	1267.7	44.8	14.6	21.6
sta360 offset -15	3	3	1738.4	61.5	19.0	22.7
sta360 offset -15	4	3	2578	91.2	26.5	24.2
sta360 offset -25	1	3	870.4	30.8	10.8	20.0
sta360 offset -25	2	3	1281.6	45.3	14.5	21.9
sta360 offset -25	3	3	1774.1	62.7	19.0	23.2
sta360 offset -25	4	3	2555.8	90.4	24.9	25.5
sta375 offset -25	1	3	1011.9	35.8	12.6	19.9
sta375 offset -25	2	3	1302.3	46.1	15.7	20.6
sta375 offset -25	3	3	1779.1	62.9	20.3	21.8

sta375 offset -25	4	3	2574.9	91.1	29.0	22.0
sta375 offset -15	1	3	848.6	30.0	9.9	21.3
sta375 offset -15	2	3	1327.8	47.0	14.2	23.2
sta375 offset -15	3	3	1775.2	62.8	18.1	24.4
sta375 offset -15	4	3	2583.3	91.4	25.3	25.4
sta375 offset -5	1	3	869.8	30.8	8.1	26.7
sta375 offset -5	2	3	1343.8	47.5	12.3	27.1
sta375 offset -5	3	3	1823.9	64.5	16.3	27.8
sta375 offset -5	4	3	2577.7	91.2	22.3	28.7
sta375 offset 5	1	3	835.9	29.6	10.0	20.8
sta375 offset 5	2	3	1288.3	45.6	14.3	22.4
sta375 offset 5	3	3	1792.2	63.4	18.6	23.9
sta375 offset 5	4	3	2555.3	90.4	25.1	25.3
sta375 offset 15	1	3	840.3	29.7	8.7	24.0
sta375 offset 15	2	3	1314.2	46.5	12.6	25.9
sta375 offset 15	3	3	1718.3	60.8	16.1	26.5
sta375 offset 15	4	3	2563.1	90.7	22.6	28.2
sta375 offset 25	1	3	870.8	30.8	10.5	20.6
sta375 offset 25	2	3	1293.9	45.8	14.3	22.5
sta375 offset 25	3	3	1750.1	61.9	17.9	24.3
sta375 offset 25	4	3	2574.5	91.1	24.5	26.1

Construction Cycle 08 - P154 Subbase - LWD Results

Phase II

Station	Offset	Drop No.	Radius (mm)	Load (kN)	Pressure (kPa)	Deflection (Micron)	Modulus (MPa)	Modulus (ksi)
425	25	1	75	3.9	220.7	292.0	132.6	19.2
425	25	2	75	5.6	316.9	381.0	146.0	21.2
425	25	3	75	7.7	435.7	501.0	152.6	22.1
425	25	4	75	11.4	645.1	676.0	167.5	24.3
425	15	1	75	3.8	215.0	263.0	143.5	20.8
425	15	2	75	5.5	311.2	354.0	154.3	22.4
425	15	3	75	7.5	424.4	476.0	156.5	22.7
425	15	4	75	11.5	650.8	652.0	175.2	25.4
425	5	1	75	3.8	215.0	266.0	141.9	20.6
425	5	2	75	5.7	322.6	369.0	153.4	22.3
425	5	3	75	7.7	435.7	464.0	164.8	23.9
425	5	4	75	11.4	645.1	624.0	181.4	26.3
425	-5	1	75	3.9	220.7	311.0	124.5	18.1
425	-5	2	75	5.6	316.9	404.0	137.7	20.0
425	-5	3	75	7.8	441.4	517.0	149.8	21.7
425	-5	4	75	11.5	650.8	694.0	164.6	23.9
425	-15	1	75	4	226.4	296.0	134.2	19.5
425	-15	2	75	5.8	328.2	392.0	146.9	21.3
425	-15	3	75	7.9	447.0	499.0	157.2	22.8
425	-15	4	75	11.6	656.4	684.0	168.4	24.4
425	-25	1	75	4	226.4	317.0	125.3	18.2
425	-25	2	75	5.8	328.2	423.0	136.2	19.8
425	-25	3	75	7.7	435.7	512.0	149.4	21.7
425	-25	4	75	11.5	650.8	703.0	162.5	23.6
450	-25	1	75	4	226.4	347.0	114.5	16.6
450	-25	2	75	5.7	322.6	445.0	127.2	18.5
450	-25	3	75	8	452.7	570.0	139.4	20.2
450	-25	4	75	11.3	639.4	755.0	148.6	21.6
450	-15	1	75	3.8	215.0	343.0	110.0	16.0
450	-15	2	75	5.8	328.2	446.0	129.2	18.7
450	-15	3	75	7.8	441.4	566.0	136.9	19.9
450	-15	4	75	11.3	639.4	731.0	153.5	22.3
450	-5	1	75	2.6	147.1	225.0	114.8	16.6
450	-5	2	75	5.8	328.2	426.0	135.2	19.6
450	-5	3	75	7.9	447.0	531.0	147.8	21.4
450	-5	4	75	11.6	656.4	711.0	162.0	23.5
450	5	1	75	3.8	215.0	330.0	114.4	16.6
450	5	2	75	5.9	333.9	459.0	127.7	18.5
450	5	3	75	7.9	447.0	555.0	141.4	20.5
450	5	4	75	11.6	656.4	748.0	154.0	22.3
450	15	1	75	3.7	209.4	290.0	126.7	18.4
450	15	2	75	5.7	322.6	406.0	139.4	20.2
450	15	3	75	7.6	430.1	477.0	158.2	22.9
450	15	4	75	11.6	656.4	673.0	171.2	24.8
450	25	1	75	4	226.4	308.0	129.0	18.7
450	25	2	75	5.7	322.6	403.0	140.5	20.4
450	25	3	75	8.1	458.4	522.0	154.1	22.4
450	25	4	75	11.7	662.1	687.0	169.1	24.5
475	25	1	75	4	226.4	264.0	150.5	21.8
475	25	2	75	5.8	328.2	351.0	164.1	23.8
475	25	3	75	7.9	447.0	448.0	175.1	25.4
475	25	4	75	11.7	662.1	618.0	188.0	27.3
475	15	1	75	3.9	220.7	291.0	133.1	19.3
475	15	2	75	5.6	316.9	382.0	145.6	21.1
475	15	3	75	7.9	447.0	492.0	159.5	23.1
475	15	4	75	11.6	656.4	638.0	180.6	26.2
475	5	1	75	3.8	215.0	325.0	116.1	16.8
475	5	2	75	5.9	333.9	446.0	131.4	19.1
475	5	3	75	7.9	447.0	541.0	145.0	21.0
475	5	4	75	11.5	650.8	703.0	162.5	23.6
475	-5	1	75	3.7	209.4	330.0	111.4	16.2
475	-5	2	75	5.8	328.2	452.0	127.4	18.5
475	-5	3	75	7.9	447.0	562.0	139.6	20.2
475	-5	4	75	11.7	662.1	743.0	156.4	22.7
475	-15	1	75	3.6	203.7	284.0	125.9	18.3

475	-15	2	75	5.8	328.2	420.0	137.1	19.9
475	-15	3	75	8	452.7	539.0	147.4	21.4
475	-15	4	75	11.5	650.8	741.0	154.1	22.4
475	-25	1	75	4	226.4	315.0	126.1	18.3
475	-25	2	75	5.8	328.2	419.0	137.5	19.9
475	-25	3	75	8	452.7	528.0	150.5	21.8
475	-25	4	75	11.6	656.4	719.0	160.2	23.2
520	-25	1	75	3.9	220.7	365.0	106.1	15.4
520	-25	2	75	5.7	322.6	487.0	116.2	16.9
520	-25	3	75	7.9	447.0	615.0	127.6	18.5
520	-25	4	75	11.5	650.8	828.0	137.9	20.0
520	-15	1	75	2.6	147.1	256.0	100.9	14.6
520	-15	2	75	5.8	328.2	486.0	118.5	17.2
520	-15	3	75	7.9	447.0	598.0	131.2	19.0
520	-15	4	75	11.5	650.8	819.0	139.5	20.2
520	-5	1	75	3.9	220.7	324.0	119.5	17.3
520	-5	2	75	5.6	316.9	426.0	130.6	18.9
520	-5	3	75	8	452.7	562.0	141.4	20.5
520	-5	4	75	11.5	650.8	751.0	152.1	22.1
520	5	1	75	3.8	215.0	233.0	162.0	23.5
520	5	2	75	5.6	316.9	333.0	167.0	24.2
520	5	3	75	7.9	447.0	444.0	176.7	25.6
520	5	4	75	11.6	656.4	619.0	186.1	27.0
520	15	1	75	4	226.4	257.0	154.6	22.4
520	15	2	75	5.9	333.9	345.0	169.8	24.6
520	15	3	75	7.9	447.0	428.0	183.3	26.6
520	15	4	75	11.7	662.1	556.0	209.0	30.3
520	25	1	75	3.9	220.7	298.0	130.0	18.9
520	25	2	75	5.6	316.9	391.0	142.2	20.6
520	25	3	75	7.9	447.0	497.0	157.9	22.9
520	25	4	75	11.7	662.1	678.0	171.4	24.9
540	25	1	75	3.9	220.7	235.0	164.8	23.9
540	25	2	75	5.7	322.6	322.0	175.8	25.5
540	25	3	75	4.9	277.3	294.0	165.5	24.0
540	25	4	75	11.8	667.7	563.0	208.2	30.2
540	15	1	75	4.1	232.0	244.0	166.9	24.2
540	15	2	75	5.9	333.9	326.0	179.7	26.1
540	15	3	75	7.8	441.4	394.0	196.6	28.5
540	15	4	75	11.7	662.1	541.0	214.8	31.2
540	5	1	75	3.8	215.0	286.0	132.0	19.1
540	5	2	75	5.7	322.6	376.0	150.6	21.8
540	5	3	75	8	452.7	473.0	168.0	24.4
540	5	4	75	11.8	667.7	633.0	185.1	26.9
540	-5	1	75	4.1	232.0	371.0	109.8	15.9
540	-5	2	75	5.7	322.6	485.0	116.7	16.9
540	-5	3	75	7.8	441.4	608.0	127.4	18.5
540	-5	4	75	11.6	656.4	846.0	136.2	19.8
540	-15	1	75	3.9	220.7	356.0	108.8	15.8
540	-15	2	75	5.5	311.2	454.0	120.3	17.4
540	-15	3	75	7.8	441.4	599.0	129.3	18.8
540	-15	4	75	11.6	656.4	805.0	143.1	20.8
540	-25	1	75	3.8	215.0	343.0	110.0	16.0
540	-25	2	75	5.5	311.2	472.0	115.7	16.8
540	-25	3	75	7.9	447.0	620.0	126.5	18.4
540	-25	4	75	11.5	650.8	847.0	134.8	19.6
580	25	1	75	3.8	215.0	247.0	152.8	22.2
580	25	2	75	5.7	322.6	341.0	166.0	24.1
580	25	3	75	7.8	441.4	426.0	181.8	26.4
580	25	4	75	11.3	639.4	567.0	197.9	28.7
580	15	1	75	3.7	209.4	172.0	213.6	31.0
580	15	2	75	5.6	316.9	255.0	218.1	31.6
580	15	3	75	7.8	441.4	350.0	221.3	32.1
580	15	4	75	11.4	645.1	476.0	237.8	34.5
580	5	1	75	3.8	215.0	208.0	181.4	26.3
580	5	2	75	5.9	333.9	310.0	189.0	27.4
580	5	3	75	7.9	447.0	390.0	201.2	29.2
580	5	4	75	11.4	645.1	520.0	217.7	31.6
580	-5	1	75	3.6	203.7	235.0	152.1	22.1
580	-5	2	75	5.6	316.9	337.0	165.0	23.9
580	-5	3	75	7.8	441.4	435.0	178.1	25.8

580	-5	4	75	11.3	639.4	577.0	194.5	28.2
580	-15	1	75	3.7	209.4	217.0	169.3	24.6
580	-15	2	75	5.9	333.9	333.0	176.0	25.5
580	-15	3	75	7.7	435.7	414.0	184.7	26.8
580	-15	4	75	11.3	639.4	569.0	197.2	28.6
580	-25	1	75	3.8	215.0	223.0	169.2	24.5
580	-25	2	75	5.9	333.9	335.0	174.9	25.4
580	-25	3	75	7.7	435.7	424.0	180.4	26.2
580	-25	4	75	11.2	633.8	574.0	193.8	28.1
590	-25	1	75	3.7	209.4	247.0	148.8	21.6
590	-25	2	75	5.6	316.9	353.0	157.5	22.9
590	-25	3	75	7.8	441.4	452.0	171.4	24.9
590	-25	4	75	11.5	650.8	623.0	183.3	26.6
590	-15	1	75	3.8	215.0	203.0	185.9	27.0
590	-15	2	75	5.9	333.9	310.0	189.0	27.4
590	-15	3	75	7.9	447.0	400.0	196.1	28.4
590	-15	4	75	11.5	650.8	546.0	209.2	30.3
590	-5	1	75	3.8	215.0	220.0	171.5	24.9
590	-5	2	75	5.9	333.9	341.0	171.8	24.9
590	-5	3	75	7.8	441.4	430.0	180.1	26.1
590	-5	4	75	11.5	650.8	594.0	192.3	27.9
590	5	1	75	3.8	215.0	208.0	181.4	26.3
590	5	2	75	5.7	322.6	296.0	191.2	27.7
590	5	3	75	7.8	441.4	405.0	191.3	27.7
590	5	4	75	11.4	645.1	533.0	212.4	30.8
590	15	1	75	3.8	215.0	222.0	170.0	24.7
590	15	2	75	5.7	322.6	303.0	186.8	27.1
590	15	3	75	7.8	441.4	394.0	196.6	28.5
590	15	4	75	11.6	656.4	536.0	214.9	31.2
590	25	1	75	3.8	215.0	212.0	178.0	25.8
590	25	2	75	5.9	333.9	309.0	189.6	27.5
590	25	3	75	7.8	441.4	383.0	202.3	29.3
590	25	4	75	11.3	639.4	531.0	211.3	30.7
620	25	1	75	3.7	209.4	211.0	174.2	25.3
620	25	2	75	5.9	333.9	331.0	177.0	25.7
620	25	3	75	7.8	441.4	413.0	187.6	27.2
620	25	4	75	11.6	656.4	562.0	205.0	29.7
620	15	1	75	3.8	215.0	196.0	192.5	27.9
620	15	2	75	5.8	328.2	286.0	201.4	29.2
620	15	3	75	7.8	441.4	372.0	208.2	30.2
620	15	4	75	11.2	633.8	517.0	215.1	31.2
620	5	1	75	3.9	220.7	223.0	173.7	25.2
620	5	2	75	5.7	322.6	318.0	178.0	25.8
620	5	3	75	7.5	424.4	404.0	184.4	26.7
620	5	4	75	11.5	650.8	569.0	200.7	29.1
620	-5	1	75	3.7	209.4	232.0	158.4	23.0
620	-5	2	75	5.7	322.6	338.0	167.5	24.3
620	-5	3	75	7.6	430.1	429.0	175.9	25.5
620	-5	4	75	11.4	645.1	598.0	189.3	27.5
620	-15	1	75	3.7	209.4	227.0	161.9	23.5
620	-15	2	75	5.6	316.9	330.0	168.5	24.4
620	-15	3	75	7.6	430.1	419.0	180.1	26.1
620	-15	4	75	11.2	633.8	586.0	189.8	27.5
620	-25	1	75	3.7	209.4	218.0	168.6	24.4
620	-25	2	75	5.6	316.9	322.0	172.7	25.1
620	-25	3	75	7.6	430.1	427.0	176.8	25.6
620	-25	4	75	11.2	633.8	572.0	194.5	28.2
630	-25	1	75	3.8	215.0	252.0	149.8	21.7
630	-25	2	75	5.6	316.9	346.0	160.7	23.3
630	-25	3	75	7.8	441.4	436.0	177.7	25.8
630	-25	4	75	11.2	633.8	609.0	182.6	26.5
630	-15	1	75	3.7	209.4	244.0	150.6	21.8
630	-15	2	75	5.9	333.9	369.0	158.8	23.0
630	-15	3	75	7.9	447.0	460.0	170.6	24.7
630	-15	4	75	11.1	628.1	610.0	180.7	26.2
630	-5	1	75	3.9	220.7	228.0	169.9	24.6
630	-5	2	75	5.9	333.9	326.0	179.7	26.1
630	-5	3	75	7.9	447.0	421.0	186.4	27.0
630	-5	4	75	11.5	650.8	560.0	203.9	29.6
630	5	1	75	3.8	215.0	225.0	167.7	24.3

630	5	2	75	5.8	328.2	330.0	174.5	25.3
630	5	3	75	7.9	447.0	423.0	185.5	26.9
630	5	4	75	11.4	645.1	570.0	198.6	28.8
630	15	1	75	3.9	220.7	233.0	166.2	24.1
630	15	2	75	5.8	328.2	335.0	171.9	24.9
630	15	3	75	7.8	441.4	428.0	181.0	26.3
630	15	4	75	11.5	650.8	587.0	194.6	28.2
630	25	1	75	3.8	215.0	236.0	159.9	23.2
630	25	2	75	5.8	328.2	332.0	173.5	25.2
630	25	3	75	7.9	447.0	441.0	177.9	25.8
630	25	4	75	11.4	645.1	594.0	190.6	27.6

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase I

Station 3+60 - Offset 15' North

Actual Pressure (psi)	Actual Deflection (in)
0	0
3.807693594	0.017
7.882908964	0.035
12.0311234	0.05
16.193202	0.066
20.24054757	0.083
24.26483336	0.101
28.48067096	0.118
32.55234956	0.139

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected	0	0	239.4888389
239	216	33.28894861	0.139	

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase I

Station 3+60 - Offset 15' South

Actual Pressure (psi)	Actual Deflection (in)
0	0
4.491281759	0.019
8.230220417	0.032
12.34816005	0.045
16.30043706	0.057
20.37551096	0.068
24.56305435	0.082
28.75526629	0.096
32.8962657	0.111

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected			
316	272	0	0	315.5346629
		35.02434758	0.111	

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase II

Station 4+50 - Offset 15' North

Actual Pressure (psi)	Actual Deflection (in)
0	0
3.345	0.028
7.317	0.054
10.626	0.076
14.779	0.097
18.936	0.121
22.244	0.147
26.858	0.177

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected	0	0	160.0101433
160	154	28.32179537	0.177	

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase II

Station 4+50 - Offset 15' South

Actual Pressure (psi)	Actual Deflection (in)
0	0
6.738	0.03
10.711	0.048
14.507	0.065
19.167	0.087
23.081	0.104
27.222	0.126
31.37	0.144
35.135	0.174

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected	0	0	214.9518056
215	197	37.40161417	0.174	

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase II

Station 5+40 - Offset 15' North

Actual Pressure (psi)	Actual Deflection (in)
0	0
6.81	0.029
9.99	0.051
13.75	0.062
17.69	0.077
21.71	0.096
24.33	0.109
27.86	0.122
31.2	0.143

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected	0	0	229.0304805
229	208	32.75135871	0.143	

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase II

Station 5+40 - Offset 15' South

Actual Pressure (psi)	Actual Deflection (in)	k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
		Uncorrected	Corrected			
0	0	456	371	0	0	455.9924884
6.97	0.033			42.86329391	0.094	
11.14	0.044	44				
13.8	0.051	51				
16.78	0.057	57				
20.79	0.066	66				
25.03	0.075	75				
27.8	0.081	81				
30.82	0.087	87				
33.45	0.094	94				

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase II

Station 5+90 - Offset 15' North

Actual Pressure (psi)	Actual Deflection (in)
0	0
7.027	0.0329
11.136	0.0458
13.967	0.0522
16.7	0.0594
20.824	0.0694
23.808	0.0774
26.54	0.0843
29.125	0.0926

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected	0	0	387.2711049
387	324	35.86130431	0.0926	

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase II

Station 5+90 - Offset 15' South

Actual Pressure (psi)	Actual Deflection (in)
0	0
6.666	0.015
11.123	0.024
13.967	0.031
16.548	0.037
20.689	0.046
23.852	0.052
26.455	0.06
29.16	0.066

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected	0	0	435.3562919
435	357	28.73351526	0.066	

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase II

Station 6+30 - Offset 15' North

Actual Pressure (psi)	Actual Deflection (in)
0	0
6.982	0.0284
11.102	0.0402
14.135	0.0482
16.745	0.053
20.877	0.0618
23.476	0.0692
26.806	0.0755
29.252	0.085

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected	0	0	420.0434825
420	347	35.70369602	0.085	

Construction Cycle 08 - P154 Subbase - Plate Load Results

Phase II

Station 6+30 - Offset 15' South

Actual Pressure (psi)	Actual Deflection (in)
0	0
6.178	0.046
11.002	0.0637
13.83	0.074
16.427	0.084
20.409	0.099
23.319	0.108
26.15	0.119
28.836	0.129

k Value (psi/in)		Corrected Pressure (psi)	Corrected Deflection (psi)	Slope of Straight Line Portion
Uncorrected	Corrected			
274	242	0	0	274.3023244
		35.38499985	0.129	

P-154 SUBBASE MATERIAL

CC8 – TRIAXIAL TESTING SUMMARY

Specimen	Compaction Condition			Resilient Modulus						Quick Shear	
ID	ρ_{wet} (pcf)	w (%)	ρ_{dry} (pcf)	M_R (psi)	k_1	k_2	k_3	S_e/S_y	R^2_{Adj}	σ_3 (psi)	$\sigma_{v\text{-}max}$ (psi)
Mar17 Mix Bucket 3	140.4	6.0	132.4	33,196	1003	0.544	-0.085	0.205	0.95	4	188
Mar17 Mix Bucket 4	143.0	6.0	134.9	31,017	779	0.627	-0.001	0.164	0.97	4	205
Sep17 Trim Lift2 6.1MC	137.0	6.1	129.1	36,135	988	0.574	-0.001	0.179	0.96	4	203
Sep17 Trim Lift2 6.3MC	130.7	6.3	123.0	39,732	1387	0.522	-0.261	0.141	0.98	4	244

Note: modulus estimated for σ_3=15 psi and σ_{cyclic}=27 psi

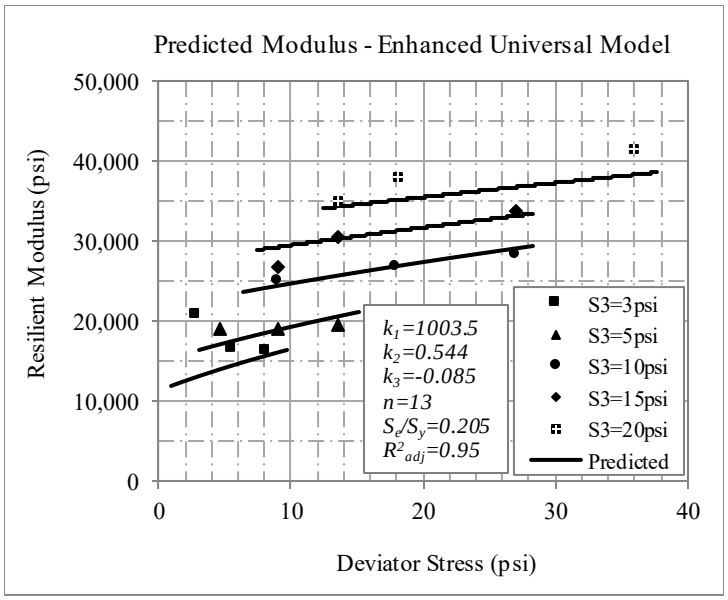
SPECIMEN: MAR17 MIX BUCKET 3

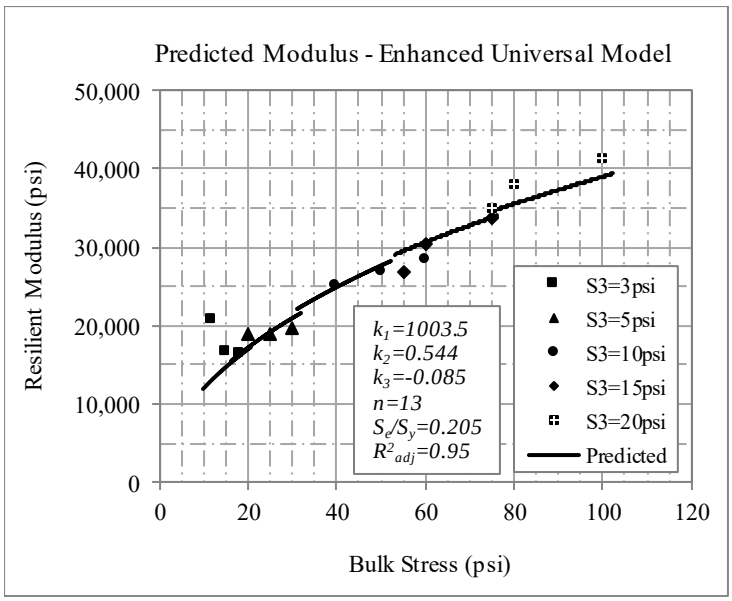
Resilient Modulus

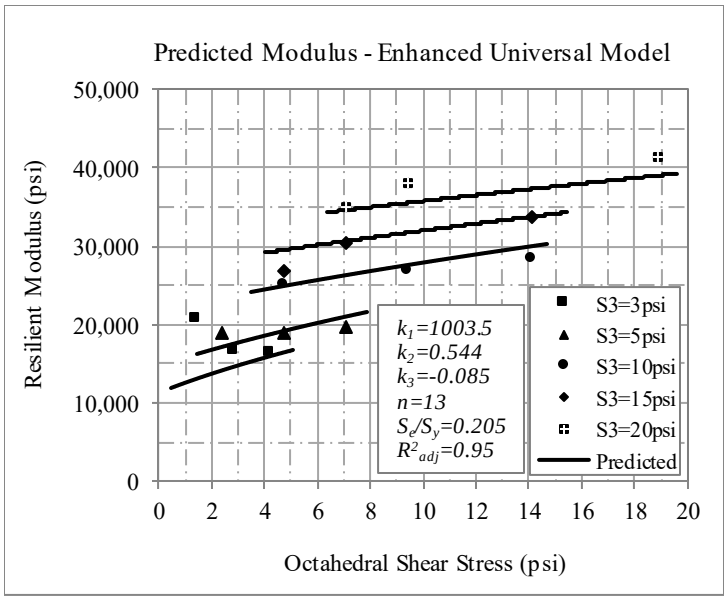
Project	NAPTF-CC8 Construction
Sample Number	Mar17 Mix Bucket 3
Material Type	P-154
Test Date	2/7/2018
Test Standard	AASHTO T307
Moisture Content (%)	6
Dry Density (pcf)	132.4
Tested By	RN-JA
Analyzed By	CCary

Sequence	Chamber Confining Pressure	Applied Cyclic Stress	Bulk Stress	Octahedral Shear Stress	Measured Resilient Modulus	Predicted Resilient Modulus
Designation	S_3	S_{cyclic}	θ	τ_{oct}	$M_{r\text{-}m}$	$M_{r\text{-}p}$
Unit	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)
1	3.00	2.76	12.01	1.42	20,740	13,110
2	3.00	5.48	15.04	2.84	16,636	14,710
3	3.00	8.15	18.00	4.24	16,302	16,115
4	5.00	4.57	20.02	2.36	19,029	17,226
5	5.00	9.04	25.02	4.72	18,956	19,235
6	5.00	13.55	30.02	7.08	19,624	21,034
7	9.99	9.01	39.97	4.71	25,150	24,820
8	9.99	17.97	49.99	9.44	26,731	27,517
9	9.99	26.95	59.96	14.13	28,282	29,920
10	15.00	9.04	54.97	4.70	26,876	29,518
11	15.00	13.53	60.02	7.08	30,501	30,659
12	15.00	27.01	75.00	14.15	33,808	33,792
13	20.00	13.59	74.98	7.06	35,114	34,610
14	20.00	18.09	80.02	9.44	38,014	35,540
15	20.00	36.01	100.00	18.86	41,495	39,012

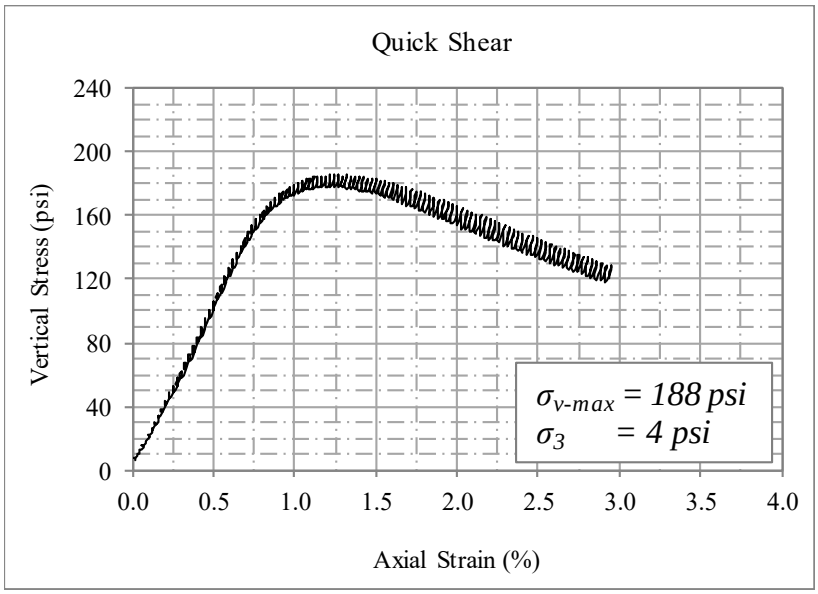
* Data not considered for determination of non-linear parameters


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
50,000
40,000
30,000
20,000
10,000
0
0
10
20
30
40
Deviator Stress (psi)
k1=1003.5
k2=0.544
k3=-0.085
n=13
Se/Sy=0.205
R2adj=0.95
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
50,000
40,000
30,000
20,000
10,000
0
0
20
40
60
80
100
120
Bulk Stress (psi)
k1=1003.5
k2=0.544
k3=-0.085
n=13
Se/Sy=0.205
R2adj=0.95
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
50,000
40,000
30,000
20,000
10,000
0
0 2 4 6 8 10 12 14 16 18 20
Octahedral Shear Stress (psi)
k1=1003.5
k2=0.544
k3=-0.085
n=13
Se/Sy=0.205
R2adj=0.95
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted

Quick Shear

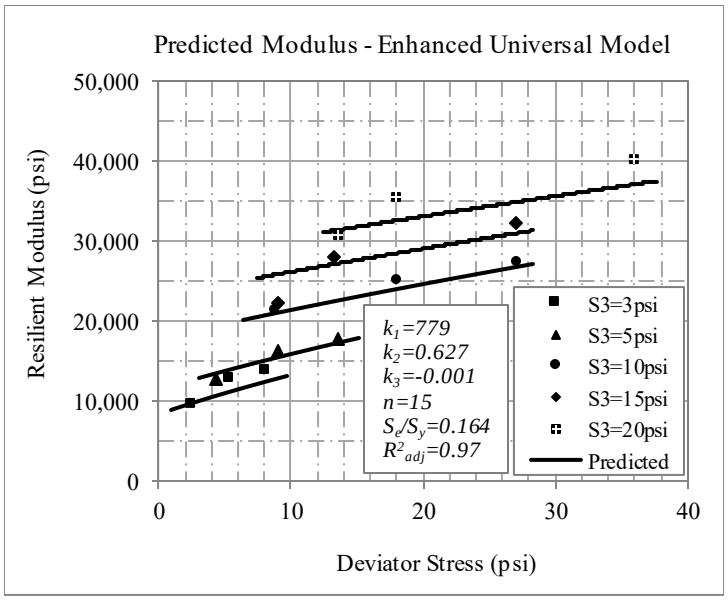

Quick Shear
Vertical Stress (psi)
240
200
160
120
80
40
0
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Axial Strain (%)
σv-max = 188 psi
σ3 = 4 psi

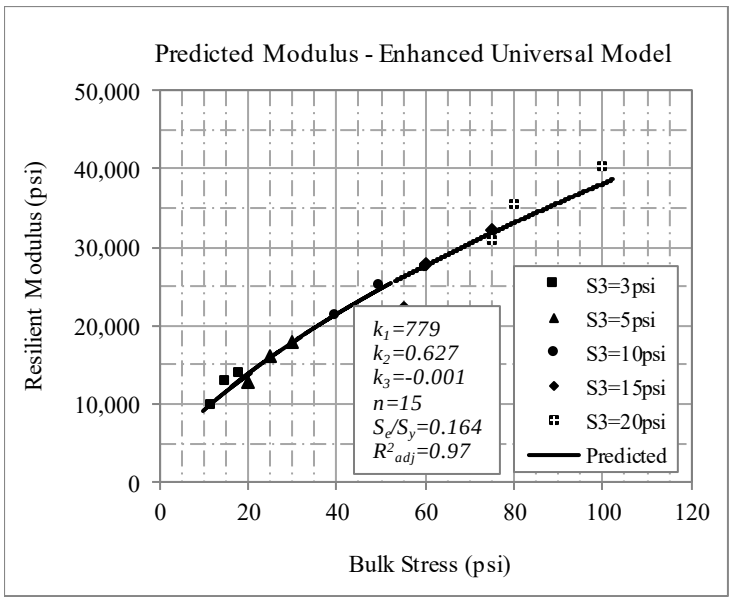
SPECIMEN: MAR17 MIX BUCKET 4

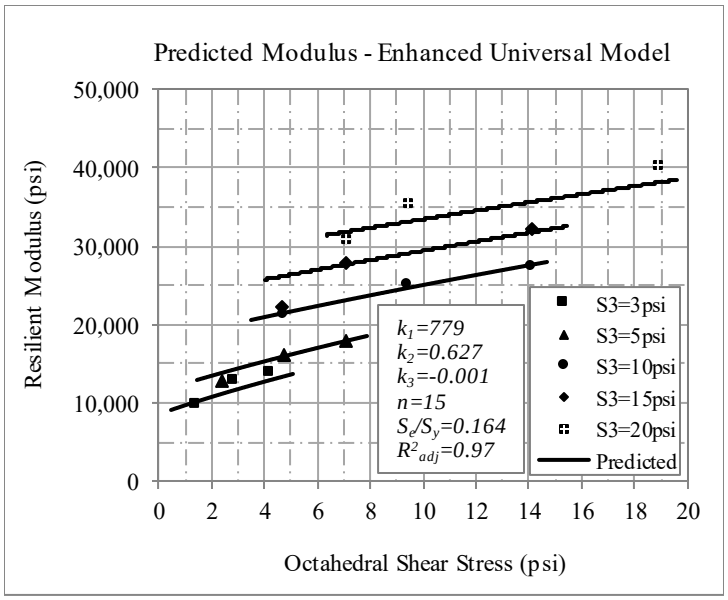
Resilient Modulus

Project	NAPTF-CC8 Construction
Sample Number	Mar17 Mix Bucket 4
Material Type	P-154
Test Date	2/8/2018
Test Standard	AASHTO T307
Moisture Content (%)	6
Dry Density (pcf)	134.9
Tested By	RN-JA
Analyzed By	CCary

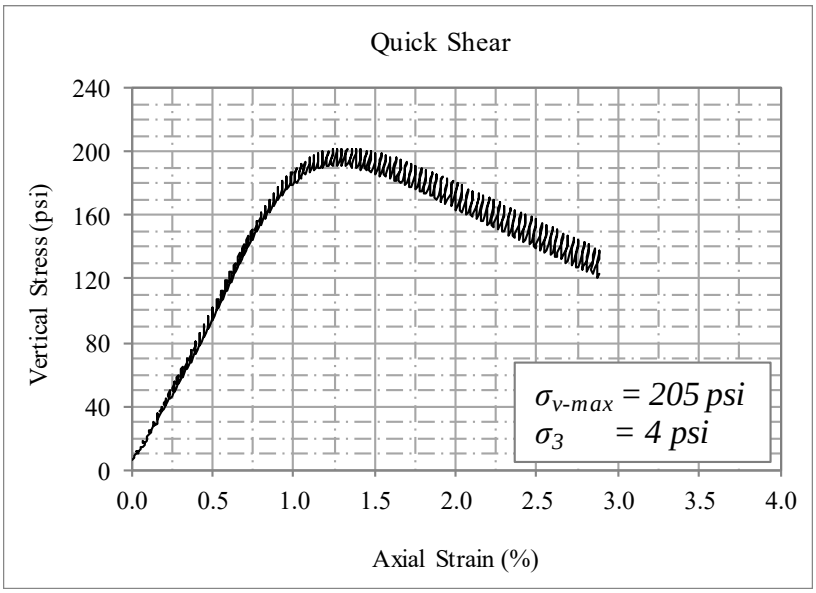
Sequence	Chamber Confining Pressure	Applied Cyclic Stress	Bulk Stress	Octahedral Shear Stress	Measured Resilient Modulus	Predicted Resilient Modulus
Designation	S_3	S_{cyclic}	θ	τ_{oct}	$M_{r\text{-}m}$	$M_{r\text{-}p}$
Unit	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)
1	3.00	2.57	11.99	1.41	9,645	10,078
2	3.00	5.35	15.01	2.83	12,836	11,600
3	3.00	8.12	18.00	4.24	13,735	12,999
4	5.00	4.32	20.02	2.36	12,821	13,895
5	5.00	8.98	24.99	4.70	16,230	15,970
6	5.00	13.62	30.01	7.07	17,825	17,911
7	9.99	8.82	39.97	4.71	21,321	21,445
8	9.99	18.04	49.97	9.42	25,179	24,662
9	9.99	27.11	59.99	14.15	27,224	27,655
10	15.00	9.06	54.95	4.70	22,205	26,186
11	15.00	13.33	59.99	7.07	27,978	27,663
12	15.00	26.95	75.00	14.15	32,314	31,815
13	20.00	13.58	75.01	7.08	30,864	31,828
14	20.00	17.88	80.03	9.44	35,563	33,145
15	20.00	35.98	100.00	18.86	40,292	38,105


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
50,000
40,000
30,000
20,000
10,000
0
0
10
20
30
40
Deviator Stress (psi)
k_1=779
k_2=0.627
k_3=-0.001
n=15
S_e/S_y=0.164
R^2_{adj}=0.97
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
50,000
40,000
30,000
20,000
10,000
0
0
20
40
60
80
100
120
Bulk Stress (psi)
k_1=779
k_2=0.627
k_3=-0.001
n=15
S_e/S_y=0.164
R^2_{adj}=0.97
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
Octahedral Shear Stress (psi)
50,000
40,000
30,000
20,000
10,000
0
0
2
4
6
8
10
12
14
16
18
20
k_1=779
k_2=0.627
k_3=-0.001
n=15
S_e/S_y=0.164
R^2_{adj}=0.97
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted

Quick Shear

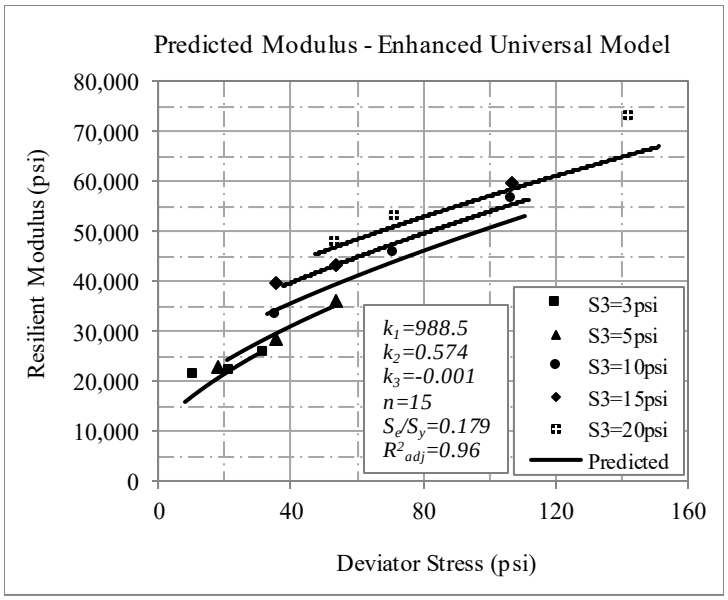

Quick Shear
Vertical Stress (psi)
Axial Strain (%)
240
200
160
120
80
40
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
$\sigma_{v\text{-}max}$ = 205 psi
σ_3 = 4 psi

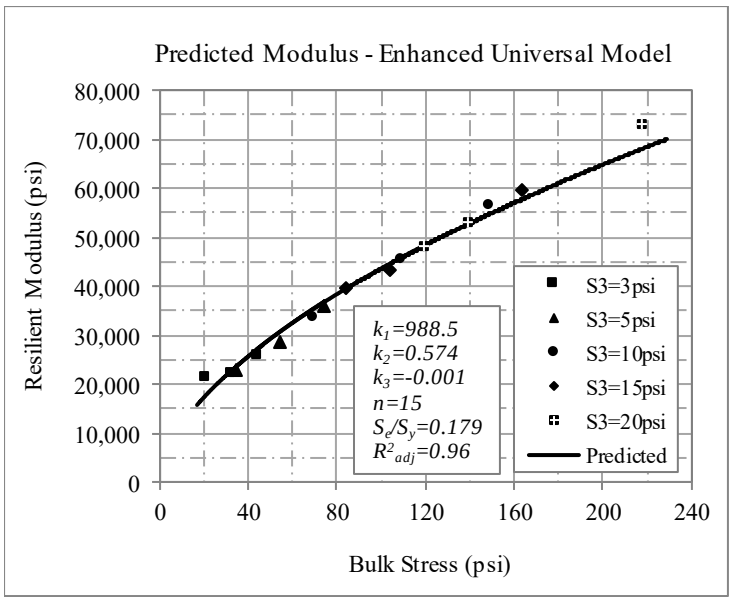
SPECIMEN: SEP17 TRIM LIFT2 6.1MC

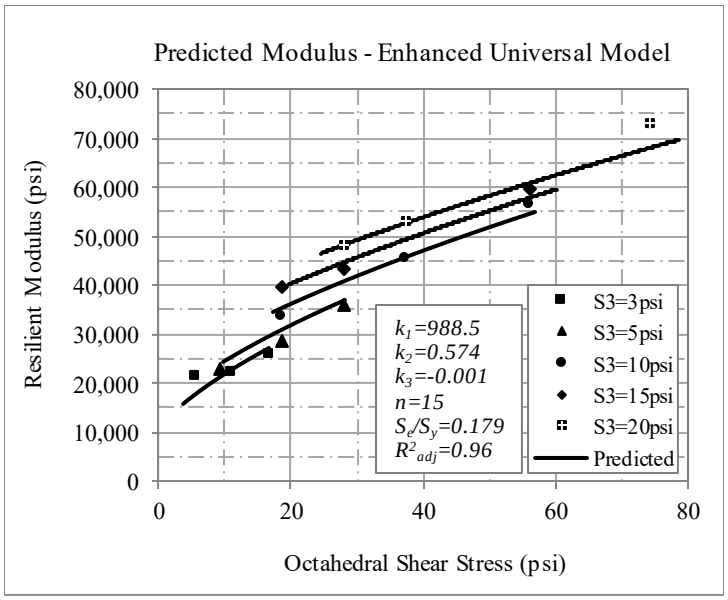
Resilient Modulus

Project	NAPTF-CC8 Construction
Sample Number	Sep17 Trim Lift2 6.1MC
Material Type	P-154
Test Date	2/7/2018
Test Standard	AASHTO T307
Moisture Content (%)	6.1
Dry Density (pcf)	129
Tested By	RN-JA
Analyzed By	CCary

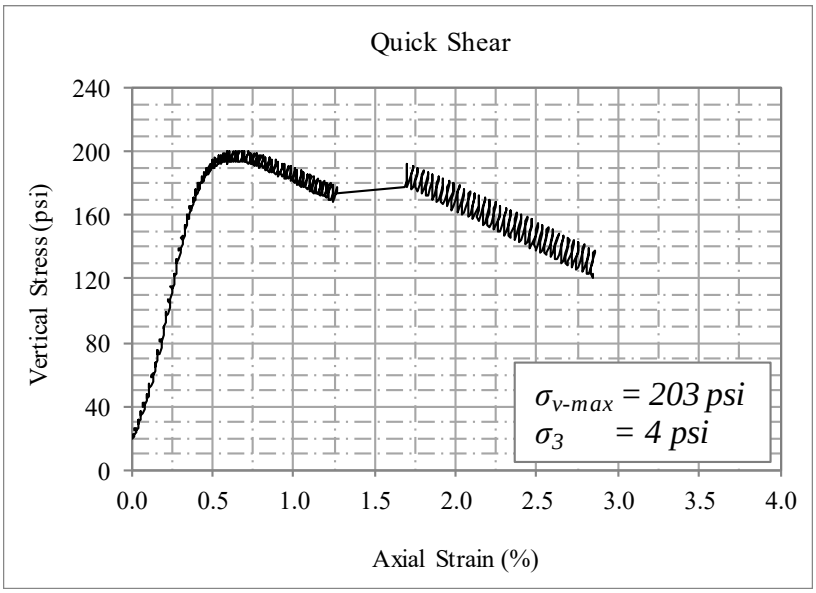
Sequence	Chamber Confining Pressure	Applied Cyclic Stress	Bulk Stress	Octahedral Shear Stress	Measured Resilient Modulus	Predicted Resilient Modulus
Designation	S_3	S_{cyclic}	θ	τ_{oct}	$M_{r\text{-}m}$	$M_{r\text{-}p}$
Unit	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)
1	3.00	10.78	20.90	5.61	21,390	17,774
2	3.00	21.52	32.79	11.21	22,057	23,010
3	3.00	32.10	44.66	16.81	25,831	27,468
4	5.00	17.88	34.84	9.35	23,073	23,824
5	5.00	35.68	54.64	18.68	28,634	30,834
6	5.00	53.53	74.41	28.00	35,918	36,804
7	9.99	35.62	69.59	18.67	33,365	35,424
8	9.99	71.30	109.22	37.35	45,598	45,859
9	9.99	107.00	148.85	56.04	56,530	54,758
10	15.00	35.57	84.57	18.66	39,568	39,618
11	15.00	53.45	104.37	27.99	43,440	44,689
12	15.00	107.00	163.91	56.06	59,883	57,871
13	20.00	53.34	119.37	27.99	48,176	48,268
14	20.00	71.33	139.23	37.35	53,109	52,714
15	20.00	142.05	217.88	74.43	73,226	68,122


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
0
40
80
120
160
Deviator Stress (psi)
k1=988.5
k2=0.574
k3=-0.001
n=15
Se/Sy=0.179
R2adj=0.96
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
0
40
80
120
160
200
240
Bulk Stress (psi)
k1=988.5
k2=0.574
k3=-0.001
n=15
Se/Sy=0.179
R2adj=0.96
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
0
20
40
60
80
Octahedral Shear Stress (psi)
k_1=988.5
k_2=0.574
k_3=-0.001
n=15
S_e/S_y=0.179
R^2_{adj}=0.96
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted

Quick Shear


Quick Shear
Vertical Stress (psi)
240
200
160
120
80
40
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Axial Strain (%)
$\sigma_{v\text{-}max}$ = 203 psi
σ_3 = 4 psi

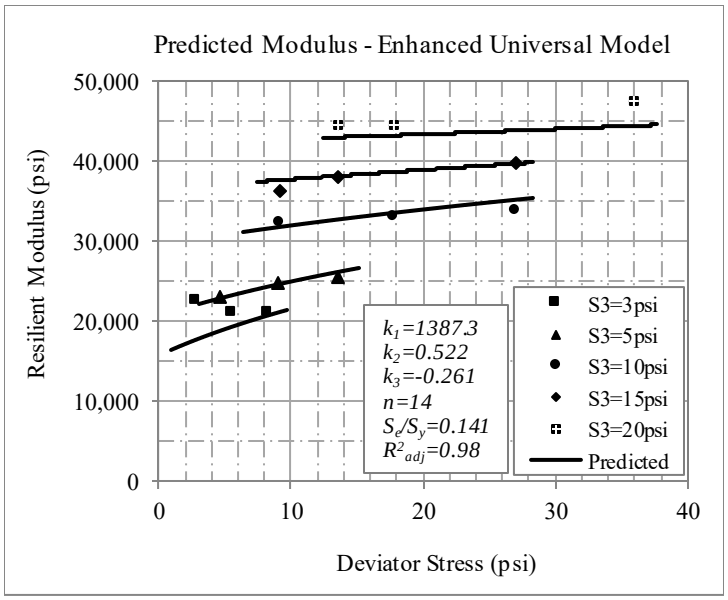
SPECIMEN: SEP17 TRIM LIFT2 6.3MC

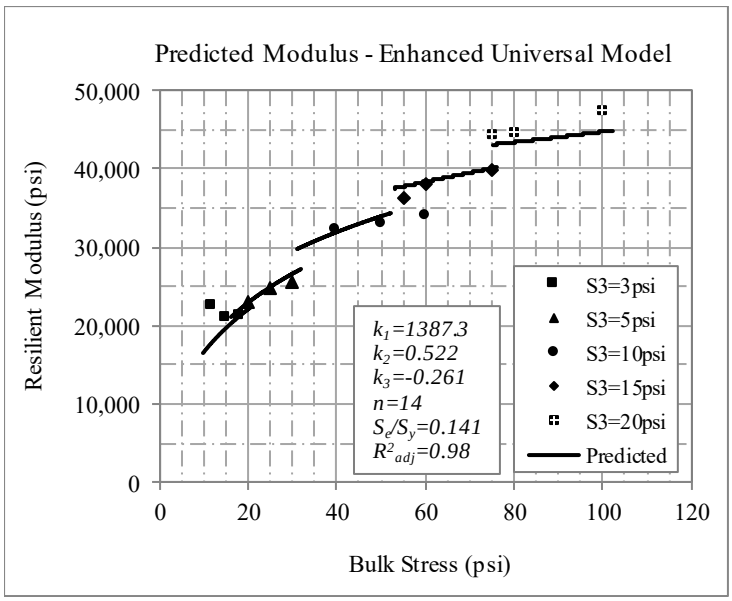
Resilient Modulus

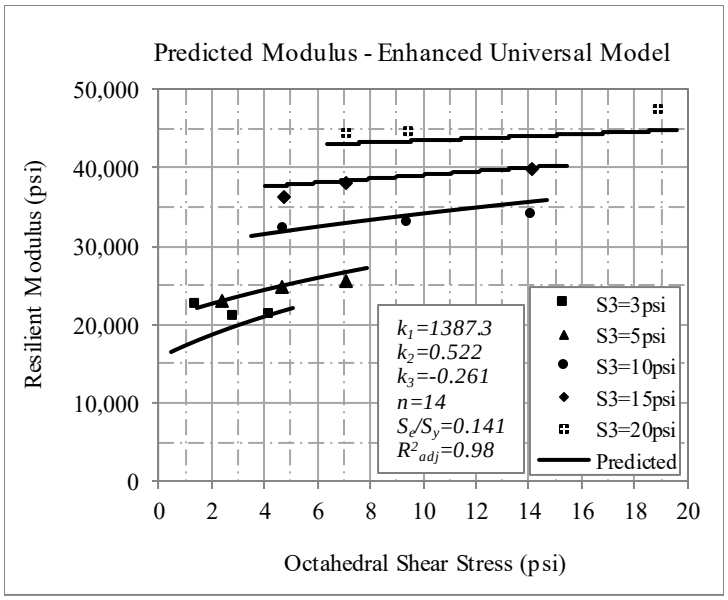
Project	NAPTF-CC8 Construction
Sample Number	Sep17 Trim Lift2 6.3MC
Material Type	P-154
Test Date	2/6/2018
Test Standard	AASHTO T307
Moisture Content (%)	6.3
Dry Density (pcf)	123
Tested By	RN-JA
Analyzed By	CCary

Sequence	Chamber Confining Pressure	Applied Cyclic Stress	Bulk Stress	Octahedral Shear Stress	Measured Resilient Modulus	Predicted Resilient Modulus
Designation	S_3	S_{cyclic}	θ	τ_{oct}	$M_{r\text{-}m}$	$M_{r\text{-}p}$
Unit	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)
1	3.00	2.80	11.99	1.41	22,568	17,903
2	3.00	5.55	15.01	2.83	21,089	19,689
3	3.00	8.25	18.01	4.25	21,132	21,222
4	5.00	4.66	20.02	2.36	23,032	23,045
5	5.00	9.09	24.98	4.70	24,787	25,017
6	5.00	13.62	30.02	7.08	25,527	26,722
7	9.99	9.12	39.97	4.71	32,242	31,976
8	9.99	17.85	49.99	9.44	32,938	33,953
9	9.99	27.04	60.00	14.15	33,895	35,648
10	15.00	9.20	54.98	4.71	36,289	37,770
11	15.00	13.58	59.97	7.06	38,014	38,361
12	15.00	27.08	75.01	14.15	39,827	40,057
13	20.00	13.55	75.01	7.08	44,512	43,109
14	20.00	17.85	80.03	9.44	44,614	43,408
15	20.00	36.00	99.99	18.85	47,471	44,748

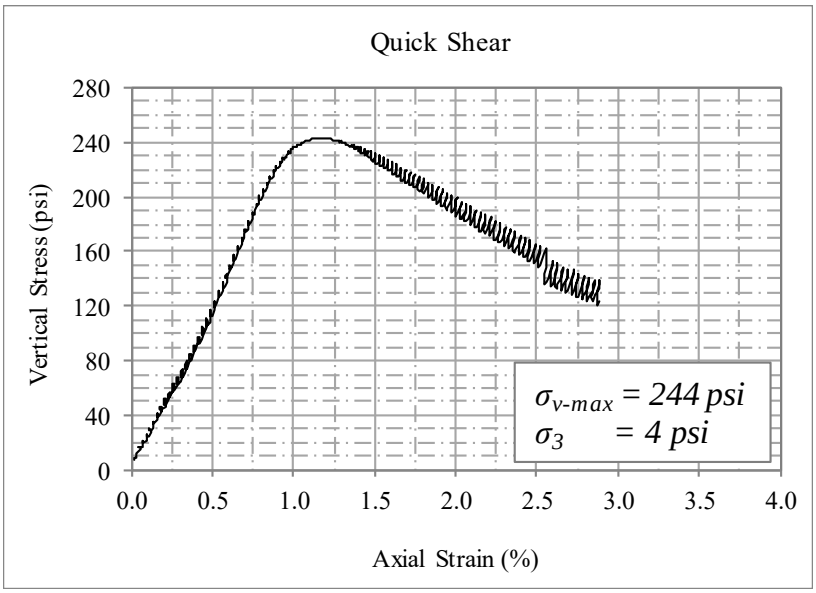
* Data not considered for determination of non-linear parameters


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
50,000
40,000
30,000
20,000
10,000
0
0
10
20
30
40
Deviator Stress (psi)
k1=1387.3
k2=0.522
k3=-0.261
n=14
Se/Sy=0.141
R2adj=0.98
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
50,000
40,000
30,000
20,000
10,000
0
0
20
40
60
80
100
120
Bulk Stress (psi)
k1=1387.3
k2=0.522
k3=-0.261
n=14
Se/Sy=0.141
R2adj=0.98
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted


Predicted Modulus - Enhanced Universal Model
Resilient Modulus (psi)
50,000
40,000
30,000
20,000
10,000
0
0 2 4 6 8 10 12 14 16 18 20
Octahedral Shear Stress (psi)
k1=1387.3
k2=0.522
k3=-0.261
n=14
Se/Sy=0.141
R2adj=0.98
S3=3psi
S3=5psi
S3=10psi
S3=15psi
S3=20psi
Predicted

Quick Shear


Quick Shear
Vertical Stress (psi)
280
240
200
160
120
80
40
0
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
Axial Strain (%)
σv-max = 244 psi
σ3 = 4 psi

P-306 Econocrete

Acceptance and Characterization Data

Date	Load	Location	QC Slump	QC Air	QC Unit Weight	QC Temp	QA Slump
			in	*%*	*pcf*	*^{o}F*	*in*
3/31/2017	1	4+00 to 4+20 South	2.50	5.0	138.7	65.4	5.00
3/31/2017	4	4+60 to 4+80 South	8.00	4.6	142.0	63.7	7.50
3/31/2017	7	5+20 to 5+40 South	4.50	4.8	141.0	66.3	2.50
3/31/2017	8	5+40 to 5+60 South	5.00	4.3	143.0	67.9	4.50
4/6/2017	1	4+00 to 4+20 North	4.50	6.1	137.1	69.3	3.25
4/6/2017	4	4+60 to 4+80 North	5.50	5.2	140.6	72.0	4.25
4/6/2017	7	5+17 to 5+35 North	3.25	5.1	141.3	67.8	2.50
4/6/2017	8	5+35 to 5+55 North	6.75	4.5	143.0	69.9	3.25
9/29/2017	1	5+65 to 5+85 South	3.25	6.7	138.7	69.0	3.25
9/29/2017	2	5+85 to 6+05 South	3.50	5.6	141.3	68.0	N/T
9/29/2017	3	6+05 to 6+27 South	5.00	6.8	138.7	70.0	3.75
9/29/2017	4	6+27 to 6+47 South	3.00	7.0	139.2	72.0	N/T
9/29/2017	5	6+47 to 6+55 South	3.50	7.6	141.0	70.0	2.75
10/2/2017	1	5+65 to 5+85 North	2.75	7.6	137.8	64.0	2.50
10/2/2017	2	5+85 to 6+05 North	4.25	6.5	137.6	65.5	N/T
10/2/2017	3	6+05 to 6+25 North	3.00	6.3	139.6	66.7	2.25
10/2/2017	4	6+25 to 6+45 North	2.75	6.7	138.6	67.4	N/T
10/2/2017	5	6+45 to 6+55 North	3.50	5.8	139.7	69.0	3.50

Date	Load	Location	QA Air	QA Unit Weight	QA Temp	7 Day Compressive Strength	7 Day Compressive Strength
			%	*pcf*	*^{o} F*	*psi*	*psi*
3/31/2017	1	4+00 to 4+20 South	6.0	138.7	69.0	410	390
3/31/2017	4	4+60 to 4+80 South	4.6	142.8	66.0	680	640
3/31/2017	7	5+20 to 5+40 South	4.6	142.1	66.3	560	520
3/31/2017	8	5+40 to 5+60 South	3.7	142.7	66.0	560	530
4/6/2017	1	4+00 to 4+20 North	7.0	138.6	70.0	390	400
4/6/2017	4	4+60 to 4+80 North	5.6	140.8	68.0	450	430
4/6/2017	7	5+17 to 5+35 North	5.0	143.6	68.0	630	520
4/6/2017	8	5+35 to 5+55 North	3.3	145.1	71.0	430	400
9/29/2017	1	5+65 to 5+85 South	7.8	138.6	72.0	640	610
9/29/2017	2	5+85 to 6+05 South	N/T	N/T	N/T	580	590
9/29/2017	3	6+05 to 6+27 South	7.6	137.8	75.0	780	770
9/29/2017	4	6+27 to 6+47 South	N/T	N/T	N/T	730	730
9/29/2017	5	6+47 to 6+55 South	6.2	141.2	71.0	830	830
10/2/2017	1	5+65 to 5+85 North	7.6	138.9	67.0	680	690
10/2/2017	2	5+85 to 6+05 North	N/T	N/T	N/T	570	550
10/2/2017	3	6+05 to 6+25 North	6.8	140.2	70.0	860	860
10/2/2017	4	6+25 to 6+45 North	N/T	N/T	N/T	740	750
10/2/2017	5	6+45 to 6+55 North	6.4	140.5	72.0	630	650

Date	Load	Location	7 Day Resonant Frequency	28 Day Compressive Strength	28 Day Compressive Strength	28 Day Resonant Frequency
			psi	*psi*	*psi*	*psi*
3/31/2017	1	4+00 to 4+20 South	2258000	N/T	N/T	N/T
3/31/2017	4	4+60 to 4+80 South	3484000	N/T	N/T	N/T
3/31/2017	7	5+20 to 5+40 South	2938000	N/T	N/T	N/T
3/31/2017	8	5+40 to 5+60 South	2880500	N/T	N/T	N/T
4/6/2017	1	4+00 to 4+20 North	2291000	N/T	N/T	N/T
4/6/2017	4	4+60 to 4+80 North	2600000	N/T	N/T	N/T
4/6/2017	7	5+17 to 5+35 North	3388000	N/T	N/T	N/T
4/6/2017	8	5+35 to 5+55 North	2661000	N/T	N/T	N/T
9/29/2017	1	5+65 to 5+85 South	N/T	820	860	N/T
9/29/2017	2	5+85 to 6+05 South	N/T	770	750	N/T
9/29/2017	3	6+05 to 6+27 South	N/T	990	1050	3946000
9/29/2017	4	6+27 to 6+47 South	N/T	950	890	3814000
9/29/2017	5	6+47 to 6+55 South	N/T	1090	1100	4304500
10/2/2017	1	5+65 to 5+85 North	N/T	920	930	3602500
10/2/2017	2	5+85 to 6+05 North	N/T	750	720	3345500
10/2/2017	3	6+05 to 6+25 North	N/T	1140	1180	4054500
10/2/2017	4	6+25 to 6+45 North	N/T	940	840	3817500
10/2/2017	5	6+45 to 6+55 North	N/T	830	880	3564000

P-306 Econo-Crete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 03/31/2017

Placement Location = Sta. 4+00 to 5+65, South Side of Pavement (See Placement Map)

7 Day Testing Completed on 04/07/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	43.0 F	41.0 F	93%	15.0 mph ESE	3.0 miles	Light Rain
2:54 PM	55.0 F	52.0 F	89%	17.3 mph SE	2.5 miles	Rain

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Compressive Strength		Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	7 Day	
3/31/2017	1	240	7:33 AM	8:33 AM	QC (Craig)	10	2.50	5.0	N/T	N/T	N/T	N/T	138.7	65.4	166	410	390	
					QA (CSRA)		5.00	6.0	N/T	N/T	N/T	N/T		69.0		AVG =	400	
3/31/2017	2	241	8:07 AM	8:54 AM	QC (Craig)	15	Concrete Not QC/QA Tested								143	No Testing		
					QA (CSRA)													
3/31/2017	3	217	8:49 AM	9:18 AM	QC (Craig)	10	Concrete Not QC/QA Tested								161	No Testing		
					QA (CSRA)													
3/31/2017	4	254	9:11 AM	9:38 AM	QC (Craig)	10	8.00	4.6	N/T	N/T	N/T	N/T	142.0	63.7	106	680	640	
					QA (CSRA)		7.50	4.6	N/T	N/T	N/T	N/T	142.8	66.0		AVG =	660	
3/31/2017	5	226	9:29 AM	10:02 AM	QC (Craig)	10	Concrete Not QC/QA Tested								120	No Testing		
					QA (CSRA)													
3/31/2017	6	233	9:48 AM	10:33 AM	QC (Craig)	15	Concrete Not QC/QA Tested								111	No Testing		62 Revs @ Arrival, 111 @ Placement
					QA (CSRA)													
3/31/2017	7	246	10:09 AM	10:41 AM	QC (Craig)	13	4.50	4.8	N/T	N/T	N/T	N/T	141.0	66.3	74	560	520	
					QA (CSRA)		2.50	4.6	N/T	N/T	N/T	N/T	142.1	66.3		AVG =	540	
3/31/2017	8	217	10:28 AM	11:06 AM	QC (Craig)	5	5.00	4.3	N/T	N/T	N/T	N/T	143.0	67.9	167	560	530	
					QA (CSRA)		4.50	4.0	N/T	3.7	N/T	N/T	142.7	66.0		AVG =	545	
3/31/2017	9	234	10:47 AM	11:30 AM	QC (Craig)	0	Concrete Not QC/QA Tested								116	No Testing		Placed into Transition Area
					QA (CSRA)													

500 - 800 PSI EconoCrete - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Penn Jersey 3/4" Round Stone	1,795	lbs.
Tuckahoe Sand	1,800	lbs.
Water	175	lbs.
Type I Portland Cement	191	lbs.
Flyash Type F (30%)	29	lbs.
Air %	6.0	
W/C Ratio	0.80	

Batch Ticket Information

Load #	YD^3 Batch	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	NRWR Admix[2]
1 (240)	11.0	19,720	20,320	73.1	2,120	310	30.0	73.0
2 (241)	11.0	19,820	20,380	95.3	2,100	310	30.0	73.0
3 (217)	11.0	19,800	20,420	95.3	2,120	320	30.0	72.0
4 (254)	11.0	20,000	20,360	94.7	2,090	310	29.0	73.0
5 (226)	11.0	19,760	20,400	94.1	2,120	310	28.0	73.0
6 (233)	11.0	19,960	20,480	94.1	2,080	310	30.0	72.0
7 (246)	11.0	19,700	20,300	94.7	2,100	320	26.0	73.0
8 (217)	11.0	20,040	20,360	95.3	2,130	320	28.0	72.0
9 (234)	7.0	12,480	12,900	60.5	1,390	200	17.0	46.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] NRWR Admixture = Master Builders - MasterPozzolith 700

Appendix: A - CSRA QA Field Notes B - Batch Tickets C - NAPTF Lab Testing Information D - Mix Design E - Admixture Information F - Truck Placement Location Map

(1)

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 Air Temp 42.2

TRUCK # 240

TIME DISPATCHED

TIME ARRIVED 8:33

REVOLUTIONS 166

Initial Slump 2½ Water Added 10 GAL

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp 65.4 Weight CAN #2 43.28 — 4% = 8.60

Air Content 5% Conveyor Air

Notes: * 039% AGGREGATE CORRECTION

QA
5" SLUMP
69
6.0 AIR

(3) SAMPLES TAKEN

* CONVEYOR @ 5+10

PLACED STA 4+00 – 4+20
℄ TO 30' 6"

(2)

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 Air Temp 42.2

TRUCK # 241

TIME DISPATCHED

TIME ARRIVED 8 54

REVOLUTIONS 143

Initial Slump Water Added 15 GAL.

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp Weight

Air Content Conveyor Air

Notes:

NO TESTING

* MATERIAL WAS TIGHT
TOWARDS END

STA 4+20 → 4+40
℄ TO 30' 6"

#3

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 **Air Temp** 42.2

TRUCK # 217

TIME DISPATCHED

TIME ARRIVED 9:18

REVOLUTIONS 161

Initial Slump ~~8"~~ (QC) ~~QA~~ **Water Added** 10

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp ~~63.7~~ (QC) ~~66~~ (QA) **Weight** ~~43.18~~ (QC) QA 142

Air Content ~~4.6~~ (QC) QA **Conveyor Air**

Notes:

PLACED @ STA 4+46 → 4+55
℄ TO 30'6"

NO SLUMP TAKEN

#4

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 **Air Temp** 42.2

TRUCK # 254

TIME DISPATCHED

TIME ARRIVED 9:38

REVOLUTIONS 106

Initial Slump 8" (QC) 7½" (QA) **Water Added** 10

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 63.7 (QC) 66 (QA) **Weight** 43.18 (QC) ~~44.38~~ (QA) 41.30 142

Air Content 4.6 (QC) 4.6 (QA) **Conveyor Air**

Notes:

PLACED @ STA 4+55 → 4+70
℄ TO 30'6"

- NO SEAL QA
ON AIR TEST - REPEATED

#5

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 **Air Temp** 42.2

TRUCK # 226

TIME DISPATCHED _____

TIME ARRIVED 10:02

REVOLUTIONS 120

Initial Slump _____ **Water Added** 10 GAL

Slump #2 _____ **Water Added** _____

Slump #3 _____ **Water Added** _____

Final Slump _____ **Conveyor Slump** _____

Concrete Temp _____ **Weight** _____

Air Content _____ **Conveyor Air** _____

Notes:

STA 4+70 → 5+00

℄ TO 30' 6"

NO SLUMP TAKEN

REPOSITIONED CONVEYOR

TO STA 6+00

#6

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 **Air Temp** 42.2

TRUCK # 233

TIME DISPATCHED _____

TIME ARRIVED 10.33

REVOLUTIONS 62 – 111 @ PLACEMENT

Initial Slump _____ **Water Added** 15

Slump #2 _____ **Water Added** _____

Slump #3 _____ **Water Added** _____

Final Slump _____ **Conveyor Slump** _____

Concrete Temp _____ **Weight** _____

Air Content _____ **Conveyor Air** _____

Notes:

STA 5+00 → 5+20

℄ to 30' 6"

NO SLUMP TAKEN

#7

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 **Air Temp** 42.2

TRUCK # 246

TIME DISPATCHED

TIME ARRIVED 10:41

REVOLUTIONS 74

Initial Slump QC 4½" QA 2½ **Water Added** 10 GAL

Slump #2 **Water Added** +3 GAL

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp QC 66.3 QA 66.3 **Weight** QC 42.92 QA 44.12

Air Content QC 4.8 QA 4.6 **Conveyor Air**

Notes:

STA 5+20 → 5+40

℄ TO 30'6"

CAPTAINS COURAGEOUS

#8

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 **Air Temp** 42.2

TRUCK # 217

TIME DISPATCHED

TIME ARRIVED 11:06

REVOLUTIONS 167

Initial Slump QC 5" QA 4½" **Water Added** 5 GAL

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp QC 67.9 QA 66.0 **Weight** QC 43.42 QA 44.28 QA #2

Air Content QC 4.3 QA 4.0 **Conveyor Air**

QA #2 3.7

Notes:

STA 5+40 → 5+60

℄ TO 30'6"

COLLECTED QC/QA

FROM THIS TRUCK

#9 WOULD BE MOSTLY TRANSITION

#9

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 3-31-2017 Air Temp 42.2

TRUCK # 234

TIME DISPATCHED

TIME ARRIVED 11 30

REVOLUTIONS

Initial Slump Water Added

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp Weight

Air Content Conveyor Air

Notes:

Sta 5+60 to 5+65

4 to 30' 6'

CC-8 P-306 FIELD PLACEMENT NOTES

DATE Air Temp

TRUCK #

TIME DISPATCHED

TIME ARRIVED

REVOLUTIONS

Initial Slump Water Added

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp Weight

Air Content Conveyor Air

Notes:

P-306MR Lean Concrete Pre Placement Plan

Placement: Two (2) placements. First placement will be the South side from station 4+00 – 5+65. Second placement will be the North side from station 4+00 -5+65. Both placements will be accessed from the east end. P-306MR Placements are from stations 4+00 to 5+65. A conveyor truck will be used to place all materials. The conveyor truck will be set at station 4+95 to place material from station 4+00 to the transition area (4+90 -5+00). The conveyor will be reset east of station 5+65 for material placement from the transition to 5+65. This process will be the same for both placements (North and South lanes).

- Fiberglass mats will be set on existing P-154M surface for truck and conveyor access. The mats will be removed and finish roll completed while conveyor is setting up on new location.
- Truck will be set up in North lane for both placements
- There are no sensors in P-154M or P-306MR materials

.3 AGG CORRECTION FACTOR

Testing: Trucks 1, 4, 7, and 9 to be tested by Craig Testing Laboratories (CTL)

- NAPTF Lab will perform QA testing and observe CTL
- Trucks will be tested for air, unit weight, and slump
- (2) cylinders will be collected from each truck (8 total per placement) for acceptance testing
- (1) Additional cylinder will be collected from sampled trucks for static modulus testing (4 total per placement) *collected by NAPTF Lab personnel.*
- Cylinders will be placed into insulated box.

Covering and Curing: 1 layer of plastic and 1 blanket, weather permitting.
All (8) cylinders to be broken @ 7 days; information relayed back to United Concrete

Sawcutting:
Option 1: @27.5 spacing (5cuts/6 spaces)
Option 2: @33'-0'spacing (4cuts/5paces)

- Based on distance of 4+00 to 5+60

Acceptance Testing

- **Compressive Strength Testing and Air Content** tests will be performed on freshly mixed concrete before the placement of concrete (Table 2).

Table 2. Acceptance tests for CC8 P-306MR

Test	Testing Standards	No. of Samples	Acceptance Criteria
Compressive Strength	ASTM C39	2/sublot	7 Days>500psi Not more than 20%>800psi*
Air Content	ASTM C231	First three truckloads	4%-8%

* Not more than 20% of the individual cylinders in a given lot, tested at seven days, shall have a compressive strength greater than 800 pounds per square inch. When greater than 20% of the individual cylinders in a given lot have 7-day compressive strengths in excess of 800 pounds per square inch, and transverse joints have not been constructed, a bond-breaker shall be used

TRUCK #1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7067060	59264	7:33	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	63890

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20436 lb	20320 lb	3.50% M
3/4STONE	1800 lb	40120 lb	40040 lb	
TYPE1	191.0 lb	2101.0 lb	2120.0 lb	
FLYASH	29.0 lb	2439.0 lb	2430.0 lb	
WATER	21.0 gl	71.2 gl	73.1 gl	
AIR	2.60 oz	28.60 oz	30.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

ADDED 10 GAL

Actual Num Batches: 1

Load 43086 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

Truck #1

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	800
ARRIVE JOB	DEPART JOB	TIME IN
835		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067060	NET 30		03/31/17	07:32

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WESTCOAT, 2ND GATE
DONT STOP AT GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:11		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AS 5425

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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#2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7067061	59265	8:07	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	63891

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20436 lb	20380 lb	3.50% M
3/4STONE	1800 lb	40180 lb	40200 lb	
TYPE1	191.0 lb	2101.0 lb	2100.0 lb	*
FLYASH	29.0 lb	2419.0 lb	2410.0 lb	
WATER	21.0 gl	93.2 gl	95.3 gl	
AIR	2.60 oz	28.60 oz	30.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Num Batches: 1

Load 43411 lb

Slump: 4.00 in # Note: Manual feed occured

ADDED 15 GAL

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK #2

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	830
ARRIVE JOB	DEPART JOB	TIME IN
8YD		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067061	NET 30		03/31/17	08:05

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WESTCOAT, 2ND GATE
DONT STOP AT GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project: FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC WC	ENVIRONM FREIGHT FUELSC WINTER		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICA TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:22		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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TRUCK #3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
217		user	7067062	59266	8:49	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	63892

Material	Design Qty	Required	Batched		% Moisture
CONC	1795 lb	20436 lb	20420 lb		3.50% M
3/4STONE	1800 lb	40220 lb	40220 lb		
TYPE1	191.0 lb	2101.0 lb	2120.0 lb	*	
FLYASH	29.0 lb	2439.0 lb	2440.0 lb	*	
WATER	21.0 gl	93.2 gl	95.3 gl		
AIR	2.60 oz	28.60 oz	30.00 oz		
NRWR	6.60 oz	72.60 oz	72.00 oz		

Actual Num Batches: 1

Load 43461 lb

Slump: 4.00 in # Note: Manual feed occured

ADDED 10

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

Truck #3

DRIVER	TRUCK NO.	TIME OUT
GKIEN	217	9:05
ARRIVE JOB	DEPART JOB	TIME IN
9:15		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067062	NET 30		03/31/17	08:48

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WESTCOAT, 3RD GATE
DONT STOP AT GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:33		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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Truck #4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
254		user	7067064	59268	9:11	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	63894

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20436 lb	20360 lb	3.50% M
3/4STONE	1800 lb	40160 lb	40360 lb	
TYPE1	191.0 lb	2101.0 lb	2090.0 lb	
FLYASH	29.0 lb	2409.0 lb	2400.0 lb	
WATER	21.0 gl	93.2 gl	94.7 gl	
AIR	2.60 oz	28.60 oz	29.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Num Batches: 1

Load 43556 lb

Slump: 4.00 in # Note: Manual feed occured

10 GAL ADDED

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#4

DRIVER	TRUCK NO.	TIME OUT
JPARK	254	9:24
ARRIVE JOB	DEPART JOB	TIME IN
9:38		

OTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
A DITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
T E SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
D AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
TERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
EN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067064	NET 30		03/31/17	09:09

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WESTCOAT, 3RD GATE
DONT STOP AT GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:44		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7067067	59270	9:29	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	63897

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20436 lb	20400 lb	3.50% M
3/4STONE	1800 lb	40200 lb	40160 lb	
TYPE1	191.0 lb	2101.0 lb	2120.0 lb	
FLYASH	29.0 lb	2439.0 lb	2430.0 lb	
WATER	21.0 gl	93.2 gl	94.1 gl	
AIR	2.60 oz	28.60 oz	28.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

#5

Actual Num Batches: 1

Load 43381 lb

Slump: 4.00 in # Note: Manual feed occured

10 Load

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#5

DRIVER	TRUCK NO.	TIME OUT
DHAND	226	940
ARRIVE JOB	DEPART JOB	TIME IN
953		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067067	NET 30		03/31/17	09:20

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WESTCOAT, 3RD GATE
DONT STOP AT GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:55		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

RECEIVED

CUSTOMER COPY

#0

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
233		user	7067068	59271	9:48	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	63898

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20436 lb	20480 lb	3.50% M
3/4STONE	1800 lb	40280 lb	40440 lb	
TYPE1	191.0 lb	2101.0 lb	2080.0 lb	
FLYASH	29.0 lb	2399.0 lb	2390.0 lb	
WATER	21.0 gl	93.2 gl	94.1 gl	
AIR	2.60 oz	28.60 oz	30.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

15 GAL ADDED

Actual Num Batches: 1

Load 43621 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#6

DRIVER	TRUCK NO.	TIME OUT
MIKEP	233	1005
ARRIVE JOB	DEPART JOB	TIME IN
1015		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067068	NET 30		03/31/17	09:48

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WESTCOAT, 3RD GATE
DONT STOP AT GATE

EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:66		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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CUSTOMER COPY

#7

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
246		user	7067069	59272	10:09	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	63899

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20436 lb	20300 lb	3.50% M
3/4STONE	1800 lb	40100 lb	40000 lb	
TYPE1	191.0 lb	2101.0 lb	2100.0 lb	
FLYASH	29.0 lb	2419.0 lb	2420.0 lb	
WATER	21.0 gl	93.2 gl	94.7 gl	
AIR	2.60 oz	28.60 oz	26.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Num Batches: 1

Load 43216 lb

Slump: 4.00 in # Note: Manual feed occured

10 GAL.

+3 GAL

13 TOTAL

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 381
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#7

DRIVER	TRUCK NO.	TIME OUT
THAND	246	10:00
ARRIVE JOB	DEPART JOB	TIME IN
10:40		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067069	NET 30		03/31/17	10:02

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WESTCOAT, 3RD GATE
DONT STOP AT GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:77		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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#8

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
217		user	7067070	59273	10:28	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	63900

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20436 lb	20360 lb	3.50% M
3/4STONE	1800 lb	40160 lb	40400 lb	
TYPE1	191.0 lb	2101.0 lb	2130.0 lb	
FLYASH	29.0 lb	2449.0 lb	2450.0 lb	
WATER	21.0 gl	93.2 gl	95.3 gl	
AIR	2.60 oz	28.60 oz	28.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

5 GALLONS.

Actual Num Batches: 1

Load 43651 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

#8

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
GKIEN	217	1045
ARRIVE JOB	DEPART JOB	TIME IN
1055		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067070	NET 30		03/31/17	10:27

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WESTCOAT, 3RD GATE
DONT STOP AT GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC WC	ENVIRONM FREIGHT FUELSC WINTER		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL	88	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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#9

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
254		user	7067071	59274	10:47	3/31/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
7.00 CYDS	ECONO				W	63901

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	13005 lb	12900 lb	3.50% M
3/4STONE	1800 lb	25500 lb	25380 lb	
TYPE1	191.0 lb	1337.0 lb	1390.0 lb	>
FLYASH	29.0 lb	1593.0 lb	1590.0 lb	
WATER	21.0 gl	59.3 gl	60.5 gl	
TEMPER	.0	74.0 gl	74.0 gl	
AIR	2.60 oz	18.20 oz	17.00 oz	
NRWR	6.60 oz	46.20 oz	46.00 oz	

Actual Num Batches: 1

Load 28096 lb

Slump: 4.00 in #

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#9

DRIVER	TRUCK NO.	TIME OUT
JPARK	254	11:03
ARRIVE JOB	DEPART JOB	TIME IN
11:12		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7067071	NET 30		03/31/17	10:40

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WESTCOAT, 3RD GATE
DONT STOP AT GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
7.00		cy	ECOND	ECONO-CRETE 500-800 PSI		7.00		
0.00								
7.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:95		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

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Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project:	CC8 Phase 2	Section:	P-306	South	Client FAA-ATRD
Technician:	Carlos Rosado	Professional Engineer:	Jeffrey Stein	Date:	4/7/2017

Sample No.	Date Poured	Date Tested	Age	Sta.	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1A	3/31/2017	4/7/2017	7		27.20	5.99	12.00	11430	28.18	410	2
1B	3/31/2017	4/7/2017	7		27.40	5.98	12.00	11040	28.09	390	2
4A	3/31/2017	4/7/2017	7		27.20	5.97		19150	27.99	680	2
4B	3/31/2017	4/7/2017	7		27.30	5.99		18150	28.18	640	2
7A	3/31/2017	4/7/2017	7		27.80	6.00		15830	28.27	560	2
7B	3/31/2017	4/7/2017	7		27.60	5.98		14490	28.09	520	2
8A	3/31/2017	4/7/2017	7		27.70	5.99		15840	28.18	560	2
8B	3/31/2017	4/7/2017	7		27.60	5.96		14840	27.90	530	2
									Ave	540	
									St Dev	100	
									COV	0.19	

Capping Standard Used: ASTM C1231 ASTM C617 Three Cap Checks :

Last ASTM C90 Sulfur Test:

Number of times unbonded cap used prior to testing:

Revised 11/10/2016

Bulk Specific Gravity of Concrete
ASTM C39

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City Int. Airport, NJ 08405

Project:	CC8 Phase 2	Section:	P-306 Econocrete	Client:	FAA ATRD
Technician:		Pro. Engineer	Jeffrey Stein	Date:	4/7/2017

Sample No.	Height	Diameter	Weight (lbs)	Mass in SSD Condition (g) [W]	Mass Submerged in Water (g) [W_s]	Density using measured diameter and length (pcf)	Density by submersion (pcf)
1A				12349.9	6942.7		142.5
1B				12431.1	7026.0		143.5
4A				12318.1	7003.8		144.6
4B				12391.7	7079.6		145.6
7A				12617.7	7118.6		143.2
7B				12514.5	7116.8		144.7
8A				12562	7142.2		144.6
8B				12535	7099		143.9
						Ave	144.1

Volume by measurement = Average Length x Average Diameter^2 x PI/4

Volume by Submersion = (Mass - Submerged Mass)/Density of Water

12/15/2016

PENN JERSEY BUILDING MATERIALS INC.

READY MIX CONCRETE
PROCESSED SAND & GRAVEL
BLOCK - MASONRY - BUILDING PRODUCTS

Contractor : United Concrete
Project : FAA
Location : Pomona
Use : Test Strip

Mix ID number :	ECONO	**Design Date :**	10/12/2016
Compressive Strength :	500-800 Econo-Crete	**Concrete Source :**	Pleasantville, NJ
Aggregate size :	J 157	**Unit Weight :**	147.8
Air content :	6.0% (+/- 1.5%)	**Slump Range :**	3" - 6"
Water / Cement ratio :	0.80		

Constituents :

Total Cementitious : 220

Percentage Pozzolan Replacement : 13%

		ASTM	Quantity	Density	Volume
Cement :	Lafarge Type I	*C-150*	191	3.150	0.97
Pozzolan :	STI ProAsh Type F	*C-618*	29	2.140	0.21
Fine Aggregate :	Tuckahoe Sand & Gravel Inc.	*C-33*	1795	2.631	10.94
Course Aggregate	Berks Products	*C-33*	1800	2.761	10.45
Water :	Potable		175	1.000	2.80
Air :			6%		1.62
Total :			3990		27

157.21 pcf

Admixtures :

		ASTM	floz-cwt	floz/yd	
Normal range water reducer :	BASF MasterPozzolith 700	*C-494*	3	6.6	* or as required
Accelerator (Non-Chloride)	BASF MasterSet AC 534	*C-494*	12 - 32		requested by contractor
Retarder :	BASF MasterSet R 100	*C-494*	1- 3		requested by contractor
Air-Entrainment :	BASF MasterAir AE 90	*C-260*	1	22	* or as required

Submitted By :
James Laus

The following admixtures - additional to the project specifications - may be added at the contractor's request.
Slump, air, and age relative strength subject to change due to weather and jobsite conditions as specified by ASTM C-94 unless otherwise
Penn Jersey Building Materials will deliver the concrete in accordance to ASTM C-94
This mix design has been designed in accordance with ACI 211 and 318

MAILING ADDRESS
P.O. Box 991
Pleasantville NJ 08232

MAIN OFFICE
2819 Fire Road
EHT, NJ 08234
Telephone (609) 645-8135

PLANT LOCATION
2817 Fire Road
Egg Harbor Township NJ 08234
Telephone (609) 641-6994

BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

© BASF Corporation 2015 ■ 01/15 ■ PRE-DAT-0013

BASF Corporation
Admixture Systems
www.master-builders-solutions.basf.us

United States
23700 Chagrin Boulevard
Cleveland, Ohio 44122-5544
Tel: 800 628-9990 ■ Fax: 216 839-8821

Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterPozzolith® 700

Water-Reducing Admixture

Formerly Pozzolith 700N *

Description

MasterPozzolith 700 ready-to-use, liquid admixture is used for making more uniform and predictable quality concrete. It is formulated to meet ASTM C 494/C 494M requirements for Type A, water-reducing, Type B, retarding, and Type D, water-reducing and retarding, admixtures.

Applications

Recommended for use in:

- Ready-mixed concrete
- Precast concrete
- Shotcrete
- Lightweight concrete
- Pumped concrete
- 4x4™ Concrete
- Pervious concrete
- Self-consolidating concrete (SCC)

Features

- Reduced water content for a given workability
- Controlled setting characteristics – normal or retarded

Benefits

- Improved workability
- Reduced segregation
- Improved finishing characteristics for flatwork and cast surfaces
- Increased compressive and flexural strength

Guidelines for Use

Dosage: MasterPozzolith 700 admixture is recommended for use at a dosage of 3-5 fl oz/cwt (195-325 mL/100 kg) of cementitious materials for Type A applications and up to 7 fl oz/cwt (460 mL/100 kg) for Type B and D requirements. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative.

Product Notes

Corrosivity: MasterPozzolith 700 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. MasterPozzolith 700 admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

Compatibility: MasterPozzolith 700 admixture may be used in combination with any BASF admixture. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

MASTER® BUILDERS SOLUTIONS

Storage and Handling

Storage Temperature: MasterPozzolith 700 admixture must be stored at temperatures above 35 ºF (2 ºC). If MasterPozzolith 700 admixture freezes, it can be reconstituted by mild mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterPozzolith 700 admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterPozzolith 700 admixture has been exceeded.

Packaging

MasterPozzolith 700 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPozzolith 700 admixture

Additional Information

For additional information on MasterPozzolith 700 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

NSF Certified to NSF/ANSI 61

* Pozzolith 700N became MasterPozzolith 700 under the Master Builders Solutions brand, effective January 1, 2014.

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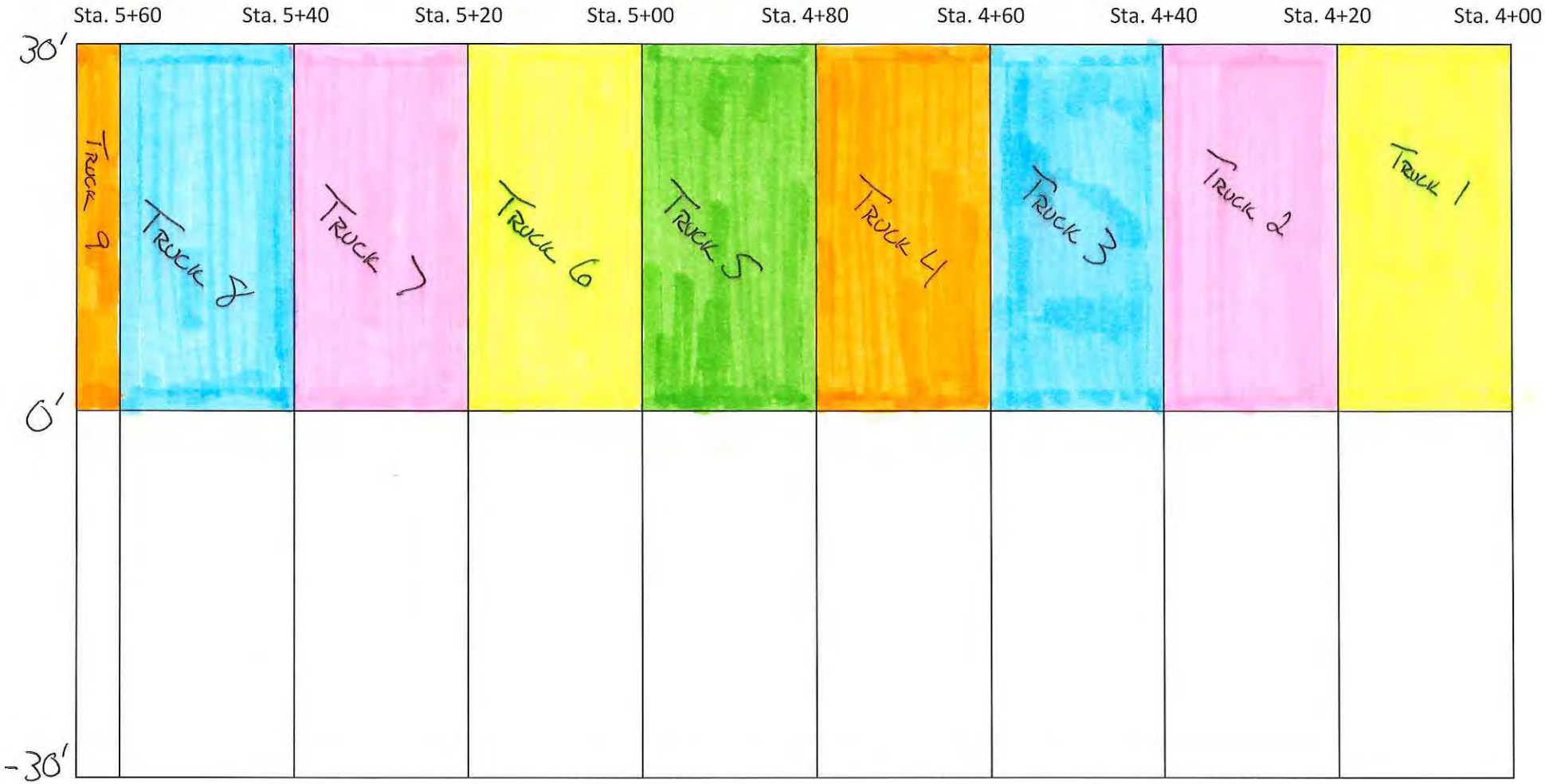
BASF Corporation
Admixture Systems
www.master-builders-solutions.basf.us

United States
23700 Chagrin Boulevard
Cleveland, Ohio 44122-5544
Tel: 800 628-9990 ■ Fax: 216 839-8821

Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

TRUCK 9 - 5+60 - 5+65



P-306 PLACEMENT

3/31/17

P-306 Econo-Crete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 04/06/2017

Placement Location = Sta. 4+00 to 5+65, North Side of Pavement (See Placement Map)

7 Day Testing Completed on 04/13/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	46.9 F	45.0 F	93%	16.1 mph E	2.5 miles	Overcast
2:54 PM	60.1 F	51.1 F	72%	31.1 mph SE	10.0 miles	Overcast

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Compressive Strength		Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	7 Day	
4/6/2017	1	240	7:33 AM	8:12 AM	QC (Craig)	15	3.00	N/T	4.50	6.1	N/T	N/T	137.1	69.3	130	390	400	25 Revs @ Arrival, 79 Revs @ 1st Test,
					QA (CSRA)		N/T	N/T	3.25	7.0	N/T	N/T	138.6	70.0		AVG =	395	130 Revs Final Test
4/6/2017	2	241	8:00 AM	8:28 AM	QC (Craig)	17	Concrete Not QC/QA Tested								191	No Testing		
					QA (CSRA)													
4/6/2017	3	253	8:29 AM	9:04 AM	QC (Craig)	15	Concrete Not QC/QA Tested								146	No Testing		
					QA (CSRA)													
4/6/2017	4	257	8:58 AM	9:28 AM	QC (Craig)	15	5.50	5.2	N/T	N/T	N/T	N/T	140.6	72.0	160	450	430	
					QA (CSRA)		4.25	5.6	N/T	N/T	N/T	N/T	140.8	68.0		AVG =	440	
4/6/2017	5	254	9:32 AM	9:56 AM	QC (Craig)	17	Concrete Not QC/QA Tested								128	No Testing		
					QA (CSRA)													
4/6/2017	6	240	9:59 AM	10:25 AM	QC (Craig)	15	Concrete Not QC/QA Tested								72	No Testing		
					QA (CSRA)													
4/6/2017	7	241	10:21 AM	10:47 AM	QC (Craig)	17	3.25	5.1	N/T	N/T	N/T	N/T	141.3	67.8	125	630	520	15 Gallons Added Before Test,
					QA (CSRA)		2.50	5.0	N/T	N/T	N/T	N/T	143.6	68.0		AVG =	575	2 Gallons Added After Test
4/6/2017	8	257	10:46 AM	11:17 AM	QC (Craig)	10	6.75	4.5	N/T	N/T	N/T	N/T	143.0	69.9	162	430	400	
					QA (CSRA)		3.25	3.3	N/T	N/T	N/T	N/T	145.1	71.0		AVG =	415	
4/6/2017	9	240	11:28 AM	11:50 AM	QC (Craig)	0	.								61	No Testing		
					QA (CSRA)													

500 - 800 PSI EconoCrete - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Penn Jersey 3/4" Round Stone	1,795	lbs.
Tuckahoe Sand	1,800	lbs.
Water	175	lbs.
Type I Portland Cement	191	lbs.
Flyash Type F (30%)	29	lbs.
Air %	6.0	
W/C Ratio	0.80	

Batch Ticket Information

Load #	YD^3 Batch	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	NRWR Admix[2]
1 (240)	11.0	19,660	20,300	100.1	2,090	330	35.0	73.0
2 (241)	11.0	19,720	20,280	99.5	2,130	320	30.0	73.0
3 (253)	11.0	19,620	20,320	100.1	2,140	310	31.0	72.0
4 (257)	11.0	19,740	20,260	100.1	2,090	340	29.0	73.0
5 (254)	11.0	19,780	20,360	99.5	2,100	310	31.0	72.0
6 (240)	11.0	19,880	20,320	100.1	2,100	310	30.0	73.0
7 (241)	11.0	20,060	20,360	99.5	2,130	320	31.0	72.0
8 (257)	11.0	19,820	20,300	99.5	2,110	310	29.0	72.0
9 (240)	7.0	12,660	12,860	64.7	1,330	200	20.0	46.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] NRWR Admixture = Master Builders - MasterPozzolith 700

Appendix: A - CSRA QA Field Notes B - United Concrete Field Notes C - Batch Tickets D - NAPTF Lab Testing Information E - Mix Design F - Admixture Information G - Truck Placement Location Map

#1

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 **Air Temp** _____

TRUCK # 240

TIME DISPATCHED 8.00

TIME ARRIVED 8:12 AM

REVOLUTIONS 25 → 79 @ TESTING. 1ST TIME

Initial Slump 3 **Water Added** 10 GAL

130 REVS → **Slump #2** _____ **Water Added** 5 GAL

Slump #3 _____ **Water Added** _____

Final Slump QC 4½ QA 3¼ **Conveyor Slump** _____

Concrete Temp QC 69.3 QA 70.0 **Weight** QC 42.04 QA 43.22

Air Content QC 6.1 QA 7.0 **Conveyor Air** _____

Notes:

STATION 4+00 → 4+20

4 TO -31.5'

QC CAN WT (CTL)
7.76

QA CAN WT (NAPIT)
8.58

* CONVEYOR @ 5+10 NORTH LANE

#2

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 **Air Temp** _____

TRUCK # 241

TIME DISPATCHED 8:15

TIME ARRIVED 8:28

REVOLUTIONS 191

Initial Slump _____ **Water Added** _____

Slump #2 _____ **Water Added** _____

Slump #3 _____ **Water Added** _____

Final Slump _____ **Conveyor Slump** _____

Concrete Temp _____ **Weight** _____

Air Content _____ **Conveyor Air** _____

Notes:

ADDED (17) GAL

NO TESTING

#3

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 Air Temp _____

TRUCK # 253

TIME DISPATCHED 8:18

TIME ARRIVED 9 04

REVOLUTIONS 146

Initial Slump _____ Water Added 15 GAL

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

NO TESTING

STATION 4+40 → 4+60

℄ TO -31.5'

#4

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 Air Temp _____

TRUCK # 257

TIME DISPATCHED 9:20

TIME ARRIVED 9:28

REVOLUTIONS 160

Initial Slump QC 5 1/2 QA 4 1/4 Water Added 15 GAL.

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump QC QA _____ Conveyor Slump _____

Concrete Temp QC 72.0 QA 68.0 Weight QC 42.90 QA 43.7 lbs

Air Content QC 5.2 QA 5.6 Conveyor Air _____

Notes:

STATIONS 4+60 → 4+75 +/-

℄ TO -31.5'

#5

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 Air Temp _____

TRUCK # 254

TIME DISPATCHED 9:45

TIME ARRIVED 9:56

REVOLUTIONS 128

Initial Slump _____ Water Added 15 GAL +2 GAL

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

NO TESTING

STATION 4+75 +/- → 4+97 +/-

℄ to 305

#6

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 Air Temp _____

TRUCK # 240

TIME DISPATCHED 10:15

TIME ARRIVED 10:25

REVOLUTIONS 72

Initial Slump _____ Water Added 15 GAL.

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

* RESET CONVEYOR TO STATION 6+00

STA 4+97 → 5+20 +/-

℄ to 305

#7

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 Air Temp _____

TRUCK # 241

TIME DISPATCHED 10:30

TIME ARRIVED 10:47

REVOLUTIONS 125

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump QC 3 1/4 QA 2 1/2 Conveyor Slump _____

Concrete Temp QC 67.8 QA 68 Weight QC 43.08 QA 44.48 141

Air Content QC 5.1 QA 5.0 Conveyor Air _____

DRK

Notes:

15 GAL + 2 AFTER TESTING

STA 5+20 +/- → 5+35

℄ → -30.5

#8

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 Air Temp _____

TRUCK # 257

TIME DISPATCHED 11:05

TIME ARRIVED 11:17

REVOLUTIONS 162

Initial Slump _____ Water Added 10 GAL

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump QC 6 3/4 QA 3 1/4 Conveyor Slump _____

Concrete Temp QC 69.9 QA 71 Weight QC 43.52 QA 44.86

Air Content QC 4.5 QA 3.3 Conveyor Air _____

Notes:

10 GAL ADDED

STA 5+35 → 5+55 +/-

℄ → -30.5

#9

CC-8 P-306 FIELD PLACEMENT NOTES

DATE 4-6-2017 Air Temp 57.9

TRUCK # 240

TIME DISPATCHED _____

TIME ARRIVED 11.50

REVOLUTIONS 61

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

0 gal ADDED

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

MAIN GATE @ 7AM

STATION 5+15

P-306MR Lean Concrete Pre Placement Plan

1ST TRUCK 8AM 20-25 MIN BETWEEN TRUCKS.

Placement: Two (2) placements. First placement will be the South side from station 4+00 – 5+65. Second placement will be the North side from station 4+00 -5+65. Both placements will be accessed from the east end. P-306MR Placements are from stations 4+00 to 5+65. A conveyor truck will be used to place all materials. The conveyor truck will be set at station 4+95 to place material from station 4+00 to the transition area (4+90 -5+00). The conveyor will be reset east of station 5+65 for material placement from the transition to 5+65. This process will be the same for both placements (North and South lanes).

- Fiberglass mats will be set on existing P-154M surface for truck and conveyor access. The mats will be removed and finish roll completed while conveyor is setting up on new location.
- Truck will be set up in North lane for both placements
- There are no sensors in P-154M or P-306MR materials

Testing: Trucks 1, 4, 7, and 9 to be tested by Craig Testing Laboratories (CTL)

- NAPTF Lab will perform QA testing and observe CTL
- Trucks will be tested for air, unit weight, and slump
- (2) cylinders will be collected from each truck (8 total per placement) for acceptance testing
- (1) Additional cylinder will be collected from sampled trucks for static modulus testing (4 total per placement) *collected by NAPTF Lab personnel.*
- Cylinders will be placed into insulated box.

Covering and Curing: 1 layer of plastic and 1 blanket, weather permitting. BLANKET FIRST THEN POLY
All (8) cylinders to be broken @ 7 days; information relayed back to United Concrete

Sawcutting:
Option 1: @27.5 spacing (5cuts/6 spaces)
Option 2: @33'-0'spacing (4cuts/5paces)

- Based on distance of 4+00 to 5+60

Acceptance Testing

- **Compressive Strength Testing and Air Content** tests will be performed on freshly mixed concrete before the placement of concrete (Table 2).

Table 2. Acceptance tests for CC8 P-306MR

Test	Testing Standards	No. of Samples	Acceptance Criteria
Compressive Strength	ASTM C39	2/sublot	7 Days>500psi Not more than 20%>800psi*
Air Content	ASTM C231	First three truckloads	4%-8%

* Not more than 20% of the individual cylinders in a given lot, tested at seven days, shall have a compressive strength greater than 800 pounds per square inch. When greater than 20% of the individual cylinders in a given lot have 7-day compressive strengths in excess of 800 pounds per square inch, and transverse joints have not been constructed, a bond-breaker shall be used

Craig Testing

CC8 – Phase 2

Pour Placement P-306 Lean Concrete North Lane 0.00' to -30.5'
from station 4+00 to 5+15

Pour Date 4-6-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight
240	8:14 Door 8:57 Conveyor	128	15	4 1/2	69.3	6.1	42.4	137.0
257	9:29 Door 9:42 Conveyor	160	15	5 1/2	72	5.2	42.9	140.5
241	10:48 Door 10:58 Conveyor	125	17	3 1/4	67.8	5.1	43.08	141
257	11:17 Door 11:27 Conveyor	162	10	7	69.7	4.5	43.54	

Truck #	Gallons	Revolutions	Time
241	17	120	5:29
253			9:03
254			9:57
240			10:30

Pour Ended: 12:05 PM

Total Yards: 95

FAA ~~[illegible]~~ Testing

CC8 – Phase 2

Pour Placement P. 306 Lean Concrete North Lane 0.00' to 30.5' from station 4+00 to 5+65

Pour Date 4-6-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight	Pour Weight
240				3 1/4	70	7.0	43.22		5.6
257				4 1/4	68	5.6	43.78		
241					68	5.0	44.48		
257				3 1/4	71	3.6	44.86		

	Truck #	Gallon	Revolution	Time
2	241	17	120	8.27
3	253			9:05
5	254			9:57
6	240			10:30

Pour Ended: 12:05 pm

Total Yards i 95

#1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7067255	59393	7:33	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	64022

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20387 lb	20300 lb	3.25% M
3/4STONE	1800 lb	40100 lb	39960 lb	
TYPE1	191.0 lb	2101.0 lb	2090.0 lb	
FLYASH	29.0 lb	2409.0 lb	2420.0 lb	
WATER	21.0 gl	99.1 gl	100.1 gl	
AIR	2.80 oz	30.80 oz	35.00 oz	+
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Num Batches: 1

Load 43222 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#1

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	800
ARRIVE JOB	DEPART JOB	TIME IN
815		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067255	NET 30		04/06/17	07:3

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
3RD GATE ON WESTCOAT RD

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:11		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

#2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7067257	59394	8:00	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	64023

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20367 lb	20280 lb	3.25% M
3/4STONE	1800 lb	40080 lb	40000 lb	
TYPE1	191.0 lb	2101.0 lb	2130.0 lb	
FLYASH	29.0 lb	2449.0 lb	2450.0 lb	
WATER	21.0 gl	99.1 gl	99.5 gl	
AIR	2.80 oz	30.80 oz	30.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Num Batches: 1

Load 43306 lb

Slump: 4.00 in # Note: Manual feed occured

ADDED 17 GAL.

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#2

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	815
ARRIVE JOB	DEPART JOB	TIME IN
825		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067257	NET 30		04/06/17	07:5

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
3RD GATE ON WESTCOAT RD

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:22		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

RECEIVED

CUSTOMER COPY

#3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
253		user	7067259	59395	8:29	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	64024

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20367 lb	20320 lb	3.25% M
3/4STONE	1800 lb	40120 lb	39940 lb	
TYPE1	191.0 lb	2101.0 lb	2140.0 lb	*
FLYASH	29.0 lb	2459.0 lb	2450.0 lb	
WATER	21.0 gl	99.1 gl	100.1 gl	
AIR	2.80 oz	30.80 oz	31.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Num Batches: 1

Load 43251 lb

Slump: 4.00 in # Note: Manual feed occured

15 GAL ADDED.

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#3

DRIVER	TRUCK NO.	TIME OUT
SVAND	253	8:15
ARRIVE JOB	DEPART JOB	TIME IN
8:58		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067259	NET 30		04/06/17	08:2[illegible]

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
3RD GATE ON WESTCOAT RD

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
				RG				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:33		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

#4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
257		user	7067260	59396	8:58	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	64025

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20347 lb	20260 lb	3.25% M
3/4STONE	1800 lb	40060 lb	40000 lb	
TYPE1	191.0 lb	2101.0 lb	2090.0 lb	
FLYASH	29.0 lb	2409.0 lb	2430.0 lb	>
WATER	21.0 gl	99.1 gl	100.1 gl	
AIR	2.80 oz	30.80 oz	29.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Num Batches: 1

Load 43311 lb

Slump: 5.00 in # Note: Manual feed occured

15 ADDED

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 961
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#4

DRIVER	TRUCK NO.	TIME OUT
GKIEN	257	920
ARRIVE JOB	DEPART JOB	TIME IN
920		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067260	NET 30		04/06/17	08:57

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
3RD GATE ON WESTCOAT RD

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 5.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:44		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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CUSTOMER COPY

#5

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
254		user	7067265	59400	9:32	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	64029

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20387 lb	20360 lb	3.25% M
3/4STONE	1800 lb	40160 lb	40140 lb	
TYPE1	191.0 lb	2101.0 lb	2100.0 lb	
FLYASH	29.0 lb	2419.0 lb	2410.0 lb	
WATER	21.0 gl	99.1 gl	99.5 gl	
AIR	2.80 oz	30.80 oz	31.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Num Batches: 1

Load 43386 lb

Slump: 5.00 in # Note: Manual feed occured

15 GAL ADDED

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

D Hanak #5

DRIVER	TRUCK NO.	TIME OUT
~~[illegible]~~	254	945
ARRIVE JOB	**DEPART JOB**	**TIME IN**
958		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067265	NET 30		04/06/17	09:2[illegible]

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
3RD GATE ON WESTCOAT RD

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 5.00					
			SALESPERSON: JRICH			CUM. TOTAL:55		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

#6

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7067267	59402	9:59	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	64031

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20387 lb	20320 lb	3.25% M
3/4STONE	1800 lb	40120 lb	40200 lb	
TYPE1	191.0 lb	2101.0 lb	2100.0 lb	
FLYASH	29.0 lb	2419.0 lb	2410.0 lb	
WATER	21.0 gl	99.1 gl	100.1 gl	
AIR	2.80 oz	30.80 oz	30.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Num Batches: 1

Load 43451 lb

Slump: 5.00 in # Note: Manual feed occured

Approx 15 gpl

72 Rec'd

DELIVERY TICKET

#6

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 381
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	1015
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067267	NET 30		04/06/17	09:5[illegible]

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
3RD GATE ON WESTCOAT RD

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 5.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:66		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

#7

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7067268	59403	10:21	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	64032

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20367 lb	20360 lb	3.25% M
3/4STONE	1800 lb	40160 lb	40420 lb	
TYPE1	191.0 lb	2101.0 lb	2130.0 lb	
FLYASH	29.0 lb	2449.0 lb	2450.0 lb	
TEMPER	.0	1.0 gl	1.0 gl	
WATER	21.0 gl	99.1 gl	99.5 gl	
AIR	2.80 oz	30.80 oz	31.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Num Batches: 1

Load 43735 lb

Slump: 5.00 in # Note: Manual feed occured

15 gal.

125 REV.

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#7

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	1030
ARRIVE JOB	DEPART JOB	TIME IN
1040		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067268	NET 30		04/06/17	10:3[illegible]

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
3RD GATE ON WESTCOAT RD

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 5.00					
			SALESPERSON: JRICH			CUM. TOTAL:77		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

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WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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#8

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
257		user	7067270	59404	10:46	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	64033

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20367 lb	20300 lb	3.25% M
3/4STONE	1800 lb	40100 lb	40120 lb	
TYPE1	191.0 lb	2101.0 lb	2110.0 lb	
FLYASH	29.0 lb	2429.0 lb	2420.0 lb	
WATER	21.0 gl	99.1 gl	99.5 gl	
AIR	2.80 oz	30.80 oz	29.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Num Batches: 1

Load 43396 lb

Slump: 5.00 in # Note: Manual feed occured

162 Rev

10 gal

DELIVERY TICKET

#8

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
GKIEN	257	1105
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067270	NET 30		04/06/17	10:45

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
3RD GATE ON WESTCOAT RD

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECOND	ECOND-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 5.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:88		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

#9

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7067273	59406	11:28	4/6/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
7.00 CYDS	ECONO				W	64035

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	12973 lb	12860 lb	3.25% M
3/4STONE	1800 lb	25460 lb	25520 lb	
TYPE1	191.0 lb	1337.0 lb	1330.0 lb	
FLYASH	29.0 lb	1533.0 lb	1530.0 lb	
WATER	21.0 gl	63.1 gl	64.7 gl	
AIR	2.80 oz	19.60 oz	20.00 oz	
NRWR	6.60 oz	46.20 oz	46.00 oz	

Actual Load 27594 lb

Slump: 5.00 in #

Num Batches: 1

8 gal
61 Rev.

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#9

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	1140
ARRIVE JOB	DEPART JOB	TIME IN
1150		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7007 TICKET #: 7067273	NET 30		04/06/17	11:20

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
3RD GATE ON WESTCOAT RD

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
7.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		7.00		
7.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 5.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:95		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project:	CC8 Phase 2					Section:	P-306	North		Client	FAA-ATRD
Technician:			Professional Engineer:		Jeffrey Stein		Date:	4/13/2017			
Sample No.	Date Poured	Date Tested	Age	Sta.	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1A	4/6/2017	4/13/2017	7		27.12	5.98	12.00	10980	28.09	390	2
1B	4/6/2017	4/13/2017	7		27.56	5.98	12.00	11110	28.09	400	2
4A	4/6/2017	4/13/2017	7		27.48	5.98		12720	28.09	450	2
4B	4/6/2017	4/13/2017	7		27.66	6.00		12070	28.27	430	2
7A	4/6/2017	4/13/2017	7		27.94	5.97		17740	27.99	630	2
7B	4/6/2017	4/13/2017	7		28.16	6.00		14780	28.27	520	2
8A	4/6/2017	4/13/2017	7		28.07	5.97		11970	27.99	430	2
8B	4/6/2017	4/13/2017	7		28.31	5.99		11240	28.18	400	2
									Ave	460	
									St Dev	80	
									COV	0.17	
Capping Standard Used:		ASTM C1231	ASTM C617	Three Cap Checks :			xxx		Last ASTM C90 Sulfur Test:		
	Number of times unbonded cap used prior to testing:										

Revised 11/10/2016

Bulk Specific Gravity of Concrete
ASTM C39

NextGen Pavement Materials Laboratory
William J. Hughes Technical Center
Atlantic City Int. Airport, NJ 08405

Project:	CC8 Phase 2	Section:	P-306 Econocrete	Client:	FAA ATRD
Technician:		Pro. Engineer	Jeffrey Stein	Date:	4/13/2017

Sample No.	FFRC1	FFRC2	FFRC3	Mass in SSD Condition (g) [W]	Mass Submerged in Water (g) [W_s]	FFRC Average (ksi)	Density by submersion (pcf)
1A	2256	2256	2256	12301.0	6869.7	2256	141.3
1B	2326	2326	2326	12502.9	7018.5	2326	142.3
4A	2706	2686	2686	12467.1	7058.7	2693	143.8
4B	2507	2507	2507	12544.9	7085	2507	143.4
7A	3362	3362	3384	12675.4	7243.3	3369	145.6
7B	3407	3407	3407	12773.2	7317.8	3407	146.1
8A	2714	2743	2743	12733.7	7328.3	2733	147.0
8B	2580	2608	2580	12841.5	7354.5	2589	146.0

Volume by measurement = Average Length x Average Diameter^2 x PI/4

Volume by Submersion = (Mass - Submerged Mass)/Density of Water

12/15/2016

PENN JERSEY BUILDING MATERIALS INC.

READY MIX CONCRETE
PROCESSED SAND & GRAVEL
BLOCK - MASONRY - BUILDING PRODUCTS

Contractor : United Concrete
Project : FAA
Location : Pomona
Use : Test Strip

Mix ID number :	ECONO	**Design Date :**	10/12/2016
Compressive Strength :	500-800 Econo-Crete	**Concrete Source :**	Pleasantville, NJ
Aggregate size :	J 157	**Unit Weight :**	147.8
Air content :	6.0% (+/- 1.5%)	**Slump Range :**	3" - 6"
Water / Cement ratio :	0.80		

Constituents :

Total Cementitious : 220

Percentage Pozzolan Replacement : 13%

		ASTM	Quantity	Density	Volume
Cement :	Lafarge Type I	*C-150*	191	3.150	0.97
Pozzolan :	STI ProAsh Type F	*C-618*	29	2.140	0.21
Fine Aggregate :	Tuckahoe Sand & Gravel Inc.	*C-33*	1795	2.631	10.94
Course Aggregate	Berks Products	*C-33*	1800	2.761	10.45
Water :	Potable		175	1.000	2.80
Air :			6%		1.62
Total :			3990		27

157.21 pcf

Admixtures :

		ASTM	floz-cwt	floz/yd	
Normal range water reducer :	BASF MasterPozzolith 700	*C-494*	3	6.6	* or as required
Accelerator (Non-Chloride)	BASF MasterSet AC 534	*C-494*	12 - 32		requested by contractor
Retarder :	BASF MasterSet R 100	*C-494*	1- 3		requested by contractor
Air-Entrainment :	BASF MasterAir AE 90	*C-260*	1	22	* or as required

Submitted By :
James Laus

The following admixtures - additional to the project specifications - may be added at the contractor's request.
Slump, air, and age relative strength subject to change due to weather and jobsite conditions as specified by ASTM C-94 unless otherwise
Penn Jersey Building Materials will deliver the concrete in accordance to ASTM C-94
This mix design has been designed in accordance with ACI 211 and 318

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

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* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterPozzolith® 700

Water-Reducing Admixture

Formerly Pozzolith 700N *

Description

MasterPozzolith 700 ready-to-use, liquid admixture is used for making more uniform and predictable quality concrete. It is formulated to meet ASTM C 494/C 494M requirements for Type A, water-reducing, Type B, retarding, and Type D, water-reducing and retarding, admixtures.

Applications

Recommended for use in:

- Ready-mixed concrete
- Precast concrete
- Shotcrete
- Lightweight concrete
- Pumped concrete
- 4x4™ Concrete
- Pervious concrete
- Self-consolidating concrete (SCC)

Features

- Reduced water content for a given workability
- Controlled setting characteristics – normal or retarded

Benefits

- Improved workability
- Reduced segregation
- Improved finishing characteristics for flatwork and cast surfaces
- Increased compressive and flexural strength

Guidelines for Use

Dosage: MasterPozzolith 700 admixture is recommended for use at a dosage of 3-5 fl oz/cwt (195-325 mL/100 kg) of cementitious materials for Type A applications and up to 7 fl oz/cwt (460 mL/100 kg) for Type B and D requirements. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative.

Product Notes

Corrosivity: MasterPozzolith 700 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. MasterPozzolith 700 admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

Compatibility: MasterPozzolith 700 admixture may be used in combination with any BASF admixture. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

MASTER® BUILDERS SOLUTIONS

Storage and Handling

Storage Temperature: MasterPozzolith 700 admixture must be stored at temperatures above 35 ºF (2 ºC). If MasterPozzolith 700 admixture freezes, it can be reconstituted by mild mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterPozzolith 700 admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterPozzolith 700 admixture has been exceeded.

Packaging

MasterPozzolith 700 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPozzolith 700 admixture

Additional Information

For additional information on MasterPozzolith 700 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

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NSF Certified to NSF/ANSI 61

* Pozzolith 700N became MasterPozzolith 700 under the Master Builders Solutions brand, effective January 1, 2014.

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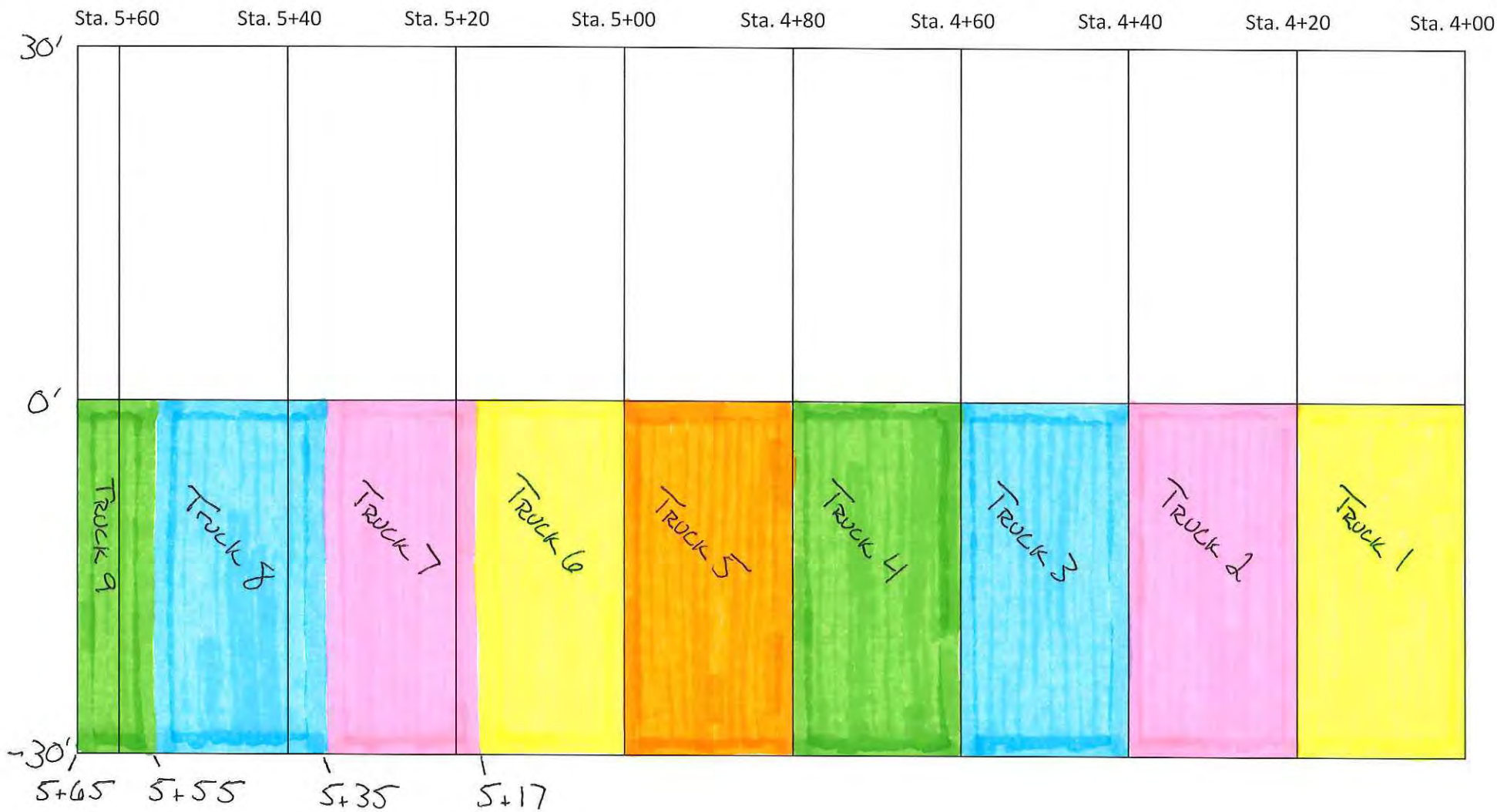

P-306 PLACEMENT
4/6/17

P-306 Econo-Crete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 09/29/2017
Placement Location = Sta. 5+65 to 6+55, South Side of Pavement (See Placement Map)
7 Day Testing Completed on 10/06/2017
28 Day Testing Completed on 10/27/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	54.0 F	46.9 F	77%	5.8 mph NNW	10.0 miles	Clear
2:54 PM	72.0 F	46.0 F	40%	5.8 mph NW	10.0 miles	Mostly Cloudy

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Compressive Strength				Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	7 Day	28 Day	28 Day	
9/29/2017	1	229	7:31 AM	8:08 AM	QC (Craig)	15	1.75	N/T	3.25	6.7	N/T	N/T	138.7	68/69	55	640	610	820	860	Pour delayed 15 min - Vibrating Screed
					QA (CSRA)		1.50	N/T	3.25	7.8	N/T	N/T	138.6	72		Avg =	625	Avg =	840	Issues, # of Revs at arrival not known
9/29/2017	2	252	8:04 AM	8:43 AM	QC (Craig)	0	3.50	5.6	N/T	N/T	N/T	N/T	141.3	68	95	580	590	770	750	
					QA (CSRA)		Concrete Not QA Tested									Avg =	585	Avg =	760	
9/29/2017	3	244	9:06 AM	9:37 AM	QC (Craig)	0	5.00	6.8	N/T	N/T	N/T	N/T	138.7	70	148	780	770	990	1,050	
					QA (CSRA)		3.75	7.6	N/T	N/T	N/T	N/T	137.8	75		Avg =	775	Avg =	1,020	
9/29/2017	4	229	9:40 AM	10:08 AM	QC (Craig)	10	1.50	6.7	3.00	7.0	N/T	N/T	139.2	70/72	205	730	730	950	890	151 Revs @ Arrival, Added 10 Gallons
					QA (CSRA)		Concrete Not QA Tested									Avg =	730	Avg =	920	& 54 Revs
9/29/2017	5	241	10:16 AM	10:45 AM	QC (Craig)	0	3.50	7.6	N/T	N/T	N/T	N/T	141.0	70	148	830	830	1,090	1,100	QC problem with Air, Sounded like Air leaking
					QA (CSRA)		2.75	6.2	N/T	N/T	N/T	N/T	141.2	71		Avg =	830	Avg =	1,095	from Pot

500 - 800 PSI EconoCrete - Concrete Mix Design
Penn Jersey Concrete - Egg Harbor Twp, NJ

Penn Jersey 3/4" Round Stone	1,795	lbs.
Tuckahoe Sand	1,800	lbs.
Water	175	lbs.
Type I Portland Cement	191	lbs.
Flyash Type F (30%)	29	lbs.
Air %	6.0	
W/C Ratio	0.80	

Batch Ticket Information

Load #	YD^3 Batch	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	NRWR Admix[2]
1 (229)	11.0	19,900	20,160	106.7	2,130	310	31.0	72.0
2 (252)	11.0	19,700	20,100	128.8	2,100	310	30.0	73.0
3 (244)	11.0	19,680	20,180	128.2	2,080	320	30.0	72.0
4 (229)	11.0	19,660	20,160	128.2	2,140	310	31.0	72.0
5 (241)	10.0	18,060	18,340	116.8	1,940	280	28.0	66.0

Prepared by: Joe Gawrysiak

Checked by: Chris Tomlinson

[1] Air Admixture = Master Builders - MasterAir AE90
[2] NRWR Admixture = Master Builders - MasterPozzolith 700

Appendix: A - Craig QC Test Report B - CSRA QA Field Notes C - Batch Tickets D - NAPTF Lab Testing Information E - Mix Design F - Admixture Information G - Truck Placement Location Map

CSRA

Testing
QC X (Craig)
QA

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	1	Truck #	229
Dispatch Time	7:57am	Arrival Time	8:08am
Revs @ Arrival	30	Water @ Arrival	5gal
Concrete Temp	68°F/69°F	Can Weight	8.08 lb

Initial Slump	1.75	Water Added	~~15 gal~~	Revs	~~25~~
Air %		Unit Weight			
2nd Slump	~~3.50~~ 3.25	Water Added	15gal	Revs	25
Air %	6.9	Unit Weight	42.76lb		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 5+65 to 5+85

Notes: Spec – Air → 4-8%
2nd Slump; 3rd layer, rodded 27 times
Vibrating Screed had dirt in line; delayed pour ≈ 15 min

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA X (CSRA)

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	1	Truck #	229
Dispatch Time	7:57am	Arrival Time	8:08am
Revs @ Arrival	30	Water @ Arrival	5gal
Concrete Temp	72°F	Can Weight	8.62 lb

Initial Slump	1.5	Water Added		Revs	
Air %		Unit Weight			
2nd Slump	3.25	Water Added	15gal	Revs	25
Air %	8.0	Unit Weight	43.28 lbs		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 5+65 to 5+85

Notes: Spec – Air → 4-8%

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC X (Cris)
QA

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	2	Truck #	252
Dispatch Time	8:10 am	Arrival Time	8:43am
Revs @ Arrival	30 (95)	Water @ Arrival	11 gal
Concrete Temp	68°F	Can Weight	8:08 lbs

Initial Slump	3.5	Water Added		Revs	
Air %	5.8	Unit Weight	43.40 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 5+85 to 6+05

Notes: Spec - Air → 4-8%
1st Air → 2nd Layer → 22 rods
3rd Layer → 24 rods

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA X (CSRA)

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	2	Truck #	252
Dispatch Time	8:10am	Arrival Time	8:43am
Revs @ Arrival	30 (95)	Water @ Arrival	11 gal
Concrete Temp		Can Weight	8:62 lbs

Initial Slump		Water Added		Revs	
Air %		Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 5+85 to 6+05

Notes: Did not test

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC X (Craig)
QA

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	3	Truck #	244
Dispatch Time	9:28am	Arrival Time	9:37am
Revs @ Arrival	30 (148)	Water @ Arrival	6 gal
Concrete Temp	70°F	Can Weight	8.08 lbs

Initial Slump	5.00	Water Added		Revs	
Air %	7.0%	Unit Weight	42.76 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 6+05 to 6+27

Notes: Spec - Air → 4-8%

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA (CSRA)

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	3	Truck #	244
Dispatch Time	9:28am	Arrival Time	9:37am
Revs @ Arrival	30 (148)	Water @ Arrival	6 gal
Concrete Temp	75°F	Can Weight	8.62 lbs

Initial Slump	3.75	Water Added		Revs	
Air %	7.8%	Unit Weight	43.06 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 6+05 to 6+27

Notes: Spec - Air → 4-8%

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC X (Craig)
QA

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	4	Truck #	229
Dispatch Time	9:57am	Arrival Time	10:08am
Revs @ Arrival	30 (151)	Water @ Arrival	6 gal
Concrete Temp	70°F / 72°F	Can Weight	8.08 lbs

Initial Slump	1.50	Water Added		Revs	
Air %	6.9	Unit Weight	43.20		
2nd Slump	NT	Water Added	10 gal	Revs	54
Air %	7.2	Unit Weight	42.88		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 6+27 to 6+47

Notes: Spec – Air → 4-8%
2nd Air; 1st layer = 18 rods; 2nd layer = 23 rods

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA X (CSRA)

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	4	Truck #	229
Dispatch Time	9:57am	Arrival Time	10:08am
Revs @ Arrival	30 (151)	Water @ Arrival	6 gal
Concrete Temp		Can Weight	8.62 lbs

Initial Slump		Water Added		Revs	
Air %		Unit Weight			
2nd Slump	3.00	Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 6+27 to 6+47

Notes: Spec – Air → 4-8%

~~Did not test~~

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC X (Craig)
QA

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	5	Truck #	241
Dispatch Time	10:13am	Arrival Time	10:45am
Revs @ Arrival	30 (148)	Water @ Arrival	10 gal
Concrete Temp	70°F	Can Weight	8.08 lbs

Initial Slump	3.50	Water Added		Revs	
Air %	7.8%	Unit Weight	43.32 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 6+47 to 6+55

Notes: Spec – Air → 4-8%
1st Air, 1st layer – 21 rods
Air sounded like it leaked from pot.

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA X (CSRA)

CC-08 Field Placement Notes for P-306

Date	9/29/17	Air Temp	60°F
Load #	5	Truck #	241
Dispatch Time	10:13am	Arrival Time	10:45am
Revs @ Arrival	30 (148)	Water @ Arrival	10 gal
Concrete Temp	71°F	Can Weight	8.62 lbs

Initial Slump	2.75	Water Added		Revs	
Air %	6.4%	Unit Weight	43.92 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: Sta 6+47 to 6+55

Notes: Spec – Air → 4-8%

Agg Correction: 0.2 *(Air % Values above are uncorrected)*

DELIVERY TICKET

Truck 1

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	7:57
ARRIVE JOB	DEPART JOB	TIME IN
8:08		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7007 TICKET #: 7072599	NET 30		09/29/17	07:26

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WESTCOAT RD, 2ND GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:11	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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Truck 1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7072599	63187	7:31	9/29/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	67883

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20239 lb	20160 lb	2.50% M
3/4STONE	1800 lb	39960 lb	40060 lb	
TYPE1	191.0 lb	2101.0 lb	2130.0 lb	
FLYASH	29.0 lb	2449.0 lb	2440.0 lb	
WATER	21.0 gl	105.8 gl	106.7 gl	
AIR	2.80 oz	30.80 oz	31.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Num Batches: 1

Load 43396 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

Truck 2

DRIVER	TRUCK NO.	TIME OUT
RHAMILTO	252	08:10
ARRIVE JOB	DEPART JOB	TIME IN
08:30		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7007 TICKET #: 7072603	NET 30		09/29/17	08:02

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
INELAND NJ 08362

SHIP TO:
HESTCOAT RD, 2ND GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Slump: 4.00						
		SALESPERSON: JRICH				CUM.	TOTAL:22	
		TAX CODE: NEW JERSEY STATE SALES TAX						

AUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

Truck 2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
252		user	7072603	63191	8:04	9/29/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	67887

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20219 lb	20100 lb	2.50% M
3/4STONE	1800 lb	39900 lb	39800 lb	
TYPE1	191.0 lb	2101.0 lb	2100.0 lb	
FLYASH	29.0 lb	2419.0 lb	2410.0 lb	
WATER	21.0 gl	127.8 gl	128.8 gl	
AIR	2.80 oz	30.80 oz	30.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Load 43311 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

Truck 3

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MRIDD	244	928
ARRIVE JOB	DEPART JOB	TIME IN
936		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7007 TICKET #: 7072613	NET 30		09/29/17	09:00

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WESTCOAT RD, 3RD GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
		Slump: 4.00						
		SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX				CUM.	TOTAL:33	

AUTION: PREVENT BODY CONTACT WITH CONCRETE; AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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Truck 3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
244		user	7072613	63197	9:06	9/29/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	67893

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20219 lb	20180 lb	2.50% M
3/4STONE	1800 lb	39980 lb	39860 lb	
TYPE1	191.0 lb	2091.0 lb	2080.0 lb	*
FLYASH	29.0 lb	2399.0 lb	2400.0 lb	
WATER	21.0 gl	127.8 gl	128.2 gl	
AIR	2.80 oz	30.80 oz	30.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Load 43366 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

Truck 4

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	9:57
ARRIVE JOB	DEPART JOB	TIME IN

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
D AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

ORDER #: 7007

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
			TICKET # 1072620	NET 30		09/29/17	09:37

UNITED CONCRETE, INC.
P.O. BOX 831
INELAND NJ 08362

SHIP TO
WESTCOAT RD, 3RD GATE

Project FAA TEST PAVEMENT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		CY	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FS0	FUELSC				
		Slump: 4.00						
		SALESPERSON: JRICH				CUM.	TOTAL:44	
		TAX CODE: NEW JERSEY STATE SALES TAX						

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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Truck 4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7072620	63202	9:40	9/29/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	67898

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20219 lb	20160 lb	2.50% M
3/4STONE	1800 lb	39960 lb	39820 lb	
TYPE1	191.0 lb	2101.0 lb	2140.0 lb	*
FLYASH	29.0 lb	2459.0 lb	2450.0 lb	
WATER	21.0 gl	127.8 gl	128.2 gl	
AIR	2.80 oz	30.80 oz	31.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Num Batches: 1

Load 43366 lb

Slump: 4.00 in #

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

Truck 5

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
3197	1		ORDER #: 7007 TICKET #: 7072624	NET 30		09/29/17	10:13

TO:
UNITED CONCRETE, INC.
P.O. BOX 831
PINELAND NJ 08362

SHIP TO:
WESTCOAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		10.00		
10.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:54	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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CUSTOMER COPY

Truck 5

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time Date
241		user	7072624	63204	10:16 9/29/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	ECONO				W	67900

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	18399 lb	18340 lb	2.50% M
3/4STONE	1800 lb	36340 lb	36400 lb	
TYPE1	191.0 lb	1910.0 lb	1940.0 lb	*
FLYASH	29.0 lb	2230.0 lb	2220.0 lb	
WATER	21.0 gl	116.2 gl	116.8 gl	
AIR	2.80 oz	28.00 oz	28.00 oz	
NRWR	6.60 oz	66.00 oz	66.00 oz	

Actual Load 39601 lb

Slump: 4.00 in #

Num Batches: 1

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project:	CC-8 P-306	Section:	Sta. 565-655 South	Client	FAA-ATRD
Technician:	MJW	Professional Engineer:	Li	Date:	10/6/2017

Sample No.	Date Poured	Date Tested	Age	Sta.	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1a	9/29/2017	10/6/2017	7		28.92	5.99	12.33	18100	28.18	640	2
1b	9/29/2017	10/6/2017	7		28.58	5.99	12.25	17230	28.18	610	2
		10/6/2017	7							625	
2a	9/29/2017	10/6/2017	7		29.30	6.00	12.42	16540	28.27	580	2
2b	9/29/2017	10/6/2017	7		29.00	6.01	12.21	16850	28.37	590	2
		10/6/2017	7							585	
3a	9/29/2017	10/6/2017	7		28.42	5.99	12.23	22030	28.18	780	2
3b	9/29/2017	10/6/2017	7		28.42	6.00	12.14	21760	28.27	770	2
		10/6/2017	7							775	
4a	9/29/2017	10/6/2017	7		28.70	6.01	12.23	20720	28.37	730	2
4b	9/29/2017	10/6/2017	7		28.60	6.00	12.21	20600	28.27	730	2
		10/6/2017	7							730	
5a	9/29/2017	10/6/2017	7		29.40	6.00	12.20	23530	28.27	830	2
5b	9/29/2017	10/6/2017	7		29.34	6.00	12.14	23440	28.27	830	2
										830	

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 P-306 28 Day **Section:** **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** LI **Date:** 10/27/2017

Sample No.	Date Poured	Date Tested	Age	Sta.	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break	FF
1A	9/29/2017	10/27/2017	28	306	28.76	6.01	12.19	23280	28.37	820	3	
1B	9/29/2017	10/27/2017	28	306	28.64	6.01	12.19	24270	28.37	860	3	
										840		
2A	9/29/2017	10/27/2017	28	306	28.92	5.99	12.16	21820	28.18	770	3	
2B	9/29/2017	10/27/2017	28	306	29.06	5.98	12.24	20960	28.09	750	3	
										760		
3A	9/29/2017	10/27/2017	28	306	28.76	6.02	12.33	28140	28.46	990	3	3946
3B	9/29/2017	10/27/2017	28	306	27.42	6.01	12.28	29900	28.37	1050	3	
										1020		
4A	9/29/2017	10/27/2017	28	306	28.54	6.00	12.24	26760	28.27	950	3	3814
4B	9/29/2017	10/27/2017	28	306	28.41	6.00	12.21	25170	28.27	890	3	
										920		
5A	9/29/2017	10/27/2017	28	306	28.56	6.01	12.17	30950	28.37	1090	3	4360
5B	9/29/2017	10/27/2017	28	306	28.40	6.00	12.21	31060	28.27	1100	3	4249
										1095		

Capping Standard Used: ASTM C1231 ASTM C617 **Three Cap Checks :** **Last ASTM C90 Sulfur Test:**

Number of times unbonded cap used prior to testing:

Revised 11/10/2016

PENN JERSEY BUILDING MATERIALS INC.

READY MIX CONCRETE
PROCESSED SAND & GRAVEL
BLOCK - MASONRY - BUILDING PRODUCTS

Contractor : United Concrete
Project : FAA
Location : Pomona
Use : Test Strip

Mix ID number :	ECONO	**Design Date :**	10/12/2016
Compressive Strength :	500-800 Econo-Crete	**Concrete Source :**	Pleasantville, NJ
Aggregate size :	J 157	**Unit Weight :**	147.8
Air content :	6.0% (+/- 1.5%)	**Slump Range :**	3" - 6"
Water / Cement ratio :	0.80		

Constituents :

Total Cementitious : 220

Percentage Pozzolan Replacement : 13%

		ASTM	Quantity	Density	Volume
Cement :	Lafarge Type I	*C-150*	191	3.150	0.97
Pozzolan :	STI ProAsh Type F	*C-618*	29	2.140	0.21
Fine Aggregate :	Tuckahoe Sand & Gravel Inc.	*C-33*	1795	2.631	10.94
Course Aggregate	Berks Products	*C-33*	1800	2.761	10.45
Water :	Potable		175	1.000	2.80
Air :			6%		1.62
Total :			3990		27

157.21 pcf

Admixtures :

		ASTM	floz-cwt	floz/yd	
Normal range water reducer :	BASF MasterPozzolith 700	*C-494*	3	6.6	* or as required
Accelerator (Non-Chloride)	BASF MasterSet AC 534	*C-494*	12 - 32		requested by contractor
Retarder :	BASF MasterSet R 100	*C-494*	1- 3		requested by contractor
Air-Entrainment :	BASF MasterAir AE 90	*C-260*	1	22	* or as required

Submitted By :
James Laus

The following admixtures - additional to the project specifications - may be added at the contractor's request.
Slump, air, and age relative strength subject to change due to weather and jobsite conditions as specified by ASTM C-94 unless otherwise
Penn Jersey Building Materials will deliver the concrete in accordance to ASTM C-94
This mix design has been designed in accordance with ACI 211 and 318

MAILING ADDRESS
P.O. Box 991
Pleasantville NJ 08232

MAIN OFFICE
2819 Fire Road
EHT, NJ 08234
Telephone (609) 645-8135

PLANT LOCATION
2817 Fire Road
Egg Harbor Township NJ 08234
Telephone (609) 641-6994

BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

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NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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BASF Corporation
Admixture Systems
www.master-builders-solutions.basf.us

United States
23700 Chagrin Boulevard
Cleveland, Ohio 44122-5544
Tel: 800 628-9990 ■ Fax: 216 839-8821

Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterPozzolith® 700

Water-Reducing Admixture

Formerly Pozzolith 700N *

Description

MasterPozzolith 700 ready-to-use, liquid admixture is used for making more uniform and predictable quality concrete. It is formulated to meet ASTM C 494/C 494M requirements for Type A, water-reducing, Type B, retarding, and Type D, water-reducing and retarding, admixtures.

Applications

Recommended for use in:

- Ready-mixed concrete
- Precast concrete
- Shotcrete
- Lightweight concrete
- Pumped concrete
- 4x4™ Concrete
- Pervious concrete
- Self-consolidating concrete (SCC)

Features

- Reduced water content for a given workability
- Controlled setting characteristics – normal or retarded

Benefits

- Improved workability
- Reduced segregation
- Improved finishing characteristics for flatwork and cast surfaces
- Increased compressive and flexural strength

Guidelines for Use

Dosage: MasterPozzolith 700 admixture is recommended for use at a dosage of 3-5 fl oz/cwt (195-325 mL/100 kg) of cementitious materials for Type A applications and up to 7 fl oz/cwt (460 mL/100 kg) for Type B and D requirements. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative.

Product Notes

Corrosivity: MasterPozzolith 700 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. MasterPozzolith 700 admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

Compatibility: MasterPozzolith 700 admixture may be used in combination with any BASF admixture. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

MASTER® BUILDERS SOLUTIONS

Storage and Handling

Storage Temperature: MasterPozzolith 700 admixture must be stored at temperatures above 35 ºF (2 ºC). If MasterPozzolith 700 admixture freezes, it can be reconstituted by mild mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterPozzolith 700 admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterPozzolith 700 admixture has been exceeded.

Packaging

MasterPozzolith 700 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPozzolith 700 admixture

Additional Information

For additional information on MasterPozzolith 700 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

NSF Certified to NSF/ANSI 61

* Pozzolith 700N became MasterPozzolith 700 under the Master Builders Solutions brand, effective January 1, 2014.

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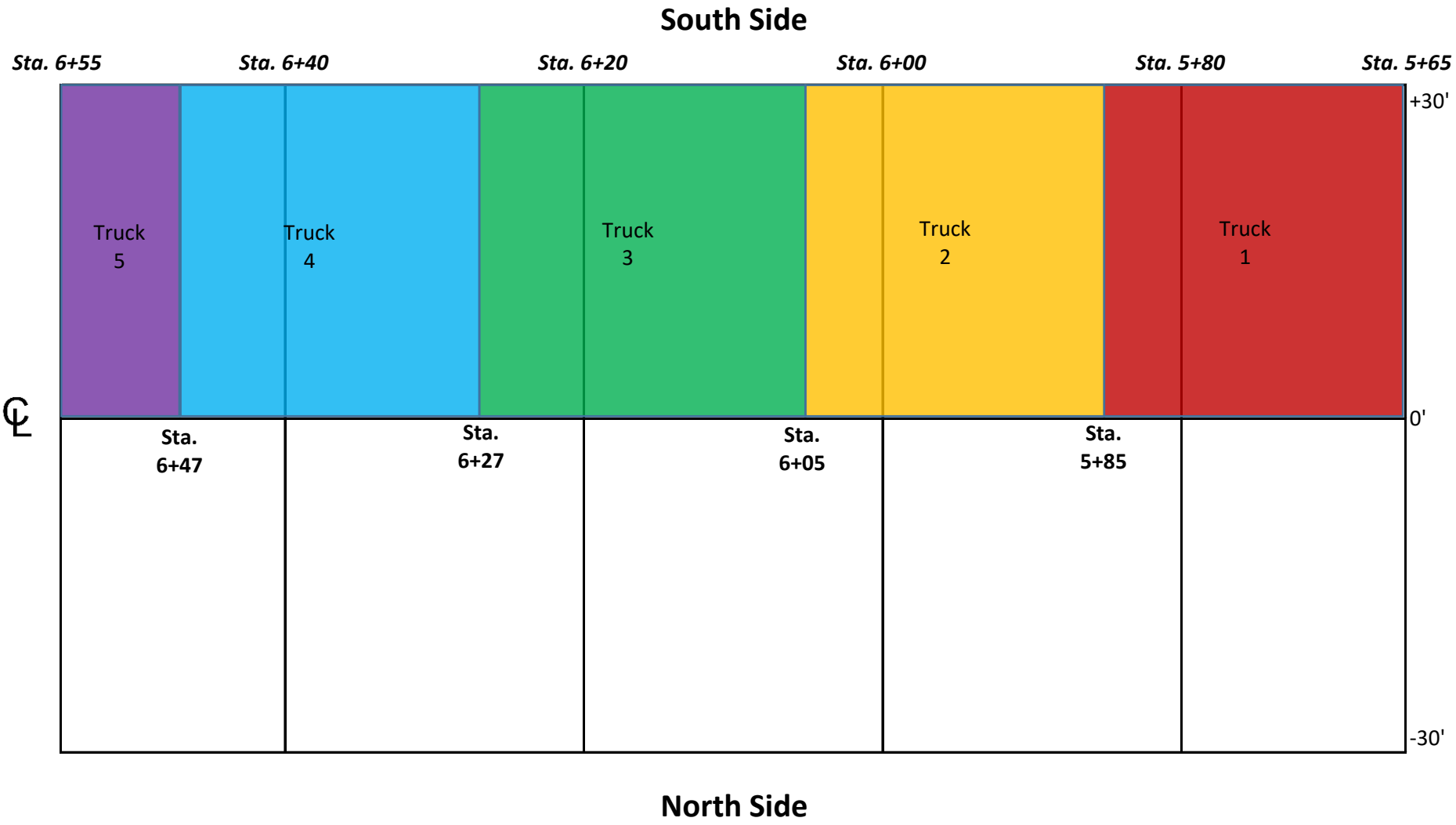
Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

P-306 Concrete Placement

Date: 9/29/2017



P-306 Econo-Crete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 10/02/2017
Placement Location = Sta. 5+65 to 6+55, North Side of Pavement (See Placement Map)
7 Day Testing Completed on 10/09/2017
28 Day Testing Completed on 10/30/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	50.0 F	46.9 F	89%	4.6 mph NW	10.0 miles	Clear
2:54 PM	73.9 F	45.0 F	35%	5.8 mph Var	10.0 miles	Clear

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Compressive Strength				Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	7 Day	28 Day	28 Day	
10/2/2017	1	253	8:23 AM	8:56 AM	QC (Craig)	5	2.75	7.6	N/T	N/T	N/T	N/T	137.8	64	197	680	690	920	930	82 Revs @ Arrival, 197 Revs into Conveyor
					QA (CSRA)		2.50	7.6	N/T	N/T	N/T	N/T	138.9	67		Avg =	685	Avg =	925	
10/2/2017	2	257	9:09 AM	9:37 AM	QC (Craig)	10	4.25	6.5	N/T	N/T	N/T	N/T	137.6	65.5	108	570	550	750	720	78 Revs @ Arrival
					QA (CSRA)		Concrete Not QA Tested									Avg =	560	Avg =	735	
10/2/2017	3	226	9:43 AM	10:09 AM	QC (Craig)	10	3.00	6.3	N/T	N/T	N/T	N/T	139.6	66.7	125	860	860	1,140	1,180	79 Revs @ Arrival, 125 Revs into Conveyor
					QA (CSRA)		2.25	6.8	N/T	N/T	N/T	N/T	140.2	70		Avg =	860	Avg =	1,160	
10/2/2017	4	244	10:16 AM	10:46 AM	QC (Craig)	10	2.75	6.7	N/T	N/T	N/T	N/T	138.6	67.4	146	740	750	940	840	112 Revs @ Arrival, 146 Revs into Conveyor
					QA (CSRA)		Concrete Not QA Tested									Avg =	745	Avg =	890	
10/2/2017	5	257	10:50 AM	11:16 AM	QC (Craig)	10	3.50	5.8	N/T	N/T	N/T	N/T	139.7	69	174	630	650	830	880	78 Revs @ Arrival, 174 Revs into Conveyor
					QA (CSRA)		3.50	6.4	N/T	N/T	N/T	N/T	140.5	72		Avg =	640	Avg =	855	

500 - 800 PSI EconoCrete - Concrete Mix Design
Penn Jersey Concrete - Egg Harbor Twp, NJ

Penn Jersey 3/4" Round Stone	1,795	lbs.
Tuckahoe Sand	1,800	lbs.
Water	175	lbs.
Type I Portland Cement	191	lbs.
Flyash Type F (30%)	29	lbs.
Air %	6.0	
W/C Ratio	0.80	

Batch Ticket Information

Load #	YD^3 Batch	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	NRWR Admix[2]
1 (253)	11.0	19,680	20,160	125.8	2,100	310	29.0	73.0
2 (257)	11.0	19,680	20,220	126.4	2,080	310	28.0	74.0
3 (226)	11.0	19,800	20,220	126.4	2,110	310	27.0	72.0
4 (244)	11.0	19,700	20,220	127.0	2,110	310	26.0	72.0
5 (257)	10.0	18,240	18,380	114.4	1,940	280	25.0	66.0

Prepared by: Joe Gawrysiak

Checked by: Chris Tomlinson

[1] Air Admixture = Master Builders - MasterAir AE90
[2] NRWR Admixture = Master Builders - MasterPozzolith 700

Appendix: A - Craig QC Test Report B - CSRA QA Field Notes C - Batch Tickets D - NAPTF Lab Testing Information E - Mix Design F - Admixture Information G - Truck Placement Location Map

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-306

Date	10/2/17	Air Temp	50°
Load #	1	Truck #	253
Dispatch Time	8:30	Arrival Time	8:56
Revs @ Arrival	82	Water @ Arrival	
Concrete Temp	64°	Can Weight	8.14

Initial Slump	2.75"	Water Added	5 GAL	Revs	+30
Air %	7.8	Unit Weight	42.58		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 5+65 to 5+85

Notes: 197 revolutions into conveyor

Agg Correction 0.2% *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-306

Date	10/2/17	Air Temp	50°
Load #	1	Truck #	253
Dispatch Time	8:30	Arrival Time	8:56
Revs @ Arrival	82	Water @ Arrival	
Concrete Temp	67°	Can Weight	8.60

Initial Slump	2.5"	Water Added	5 GAL	Revs	+30
Air %	7.8	Unit Weight	43.32		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 5+65 to 5+85

Notes:

Agg Correction 0.2% *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-306

Date	10/2/17	Air Temp	57°
Load #	2	Truck #	257
Dispatch Time	9:30	Arrival Time	9:37
Revs @ Arrival	78	Water @ Arrival	
Concrete Temp	65.5°	Can Weight	8.14

Initial Slump	4.25"	Water Added	10 GAL	Revs	+30
Air %	6.7	Unit Weight	42.54		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 5+85 to 6+05

Notes:

Agg Correction 0.2% *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA

CC-08 Field Placement Notes for P-306

Date		Air Temp	
Load #		Truck #	
Dispatch Time		Arrival Time	
Revs @ Arrival		Water @ Arrival	
Concrete Temp		Can Weight	

Initial Slump		Water Added		Revs	
Air %		Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location

Notes:

Agg Correction *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-306

Date	10/2/17	Air Temp	63°
Load #	3	Truck #	226
Dispatch Time	10:00	Arrival Time	10:09
Revs @ Arrival	79	Water @ Arrival	
Concrete Temp	66.7°	Can Weight	8.14

Initial Slump	3.0"	Water Added	10 GAL	Revs	+30
Air %	6.5	Unit Weight	43.04		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+05 to 6+25

Notes: 125 revolutions into conveyor

Agg Correction 0.2% *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-306

Date	10/2/17	Air Temp	63°
Load #	3	Truck #	226
Dispatch Time	10:00	Arrival Time	10:09
Revs @ Arrival	79	Water @ Arrival	
Concrete Temp	70°	Can Weight	8.60

Initial Slump	2.25"	Water Added	10 GAL	Revs	+30
Air %	7.0	Unit Weight	43.64		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+05 to 6+25

Notes:

Agg Correction 0.2% *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-306

Date	10/2/17	Air Temp	68°
Load #	4	Truck #	217
Dispatch Time	10:32	Arrival Time	10:46
Revs @ Arrival	112	Water @ Arrival	
Concrete Temp	67.4°	Can Weight	8.14

Initial Slump	2.75"	Water Added	10 GAL	Revs	
Air %	6.9	Unit Weight	142.80		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+25 to 6+45

Notes: 146 revolutions into conveyor

Agg Correction *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA

CC-08 Field Placement Notes for P-306

Date		Air Temp	
Load #		Truck #	
Dispatch Time		Arrival Time	
Revs @ Arrival		Water @ Arrival	
Concrete Temp		Can Weight	

Initial Slump		Water Added		Revs	
Air %		Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location

Notes:

Agg Correction *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-306

Date	10/2/17	Air Temp	68°
Load #	5	Truck #	257
Dispatch Time	11:05	Arrival Time	11:16
Revs @ Arrival	78	Water @ Arrival	
Concrete Temp	69°	Can Weight	8.14

Initial Slump	3.5"	Water Added	10 GAL	Revs	+30
Air %	6.0	Unit Weight	43.06		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+45 to 6+55

Notes: 174 revolutions into conveyor

Agg Correction 0.2% *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-306

Date	10/2/17	Air Temp	68°
Load #	5	Truck #	257
Dispatch Time	11:05	Arrival Time	11:16
Revs @ Arrival	78	Water @ Arrival	
Concrete Temp	72°	Can Weight	8.60

Initial Slump	3.5"	Water Added	10 GAL	Revs	+30
Air %	6.6	Unit Weight	43.72		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+45 to 6+55

Notes:

Agg Correction 0.2% *(Air % Values above are uncorrected)*

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 1

DRIVER	TRUCK NO.	TIME OUT
SVAND	253	8 1/2
ARRIVE JOB	DEPART JOB	TIME IN
8:55		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
3197	1		ORDER #: 7003 TICKET #: 7072676	NET 30		10/02/17	08:22

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WESTCOAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Slump: 4.00						
		SALESPERSON: JRICH				CUM.	TOTAL:11	
		TAX CODE: NEW JERSEY STATE SALES TAX						

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

RECEIVED

CUSTOMER COPY

TRUCK 1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
253		user	7072676	63248	8:23	10/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	67944

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20258 lb	20160 lb	2.60% M
3/4STONE	1800 lb	39960 lb	39840 lb	
TYPE1	191.0 lb	2101.0 lb	2100.0 lb	
FLYASH	29.0 lb	2419.0 lb	2410.0 lb	
WATER	21.0 gl	125.5 gl	125.8 gl	
AIR	2.70 oz	29.70 oz	29.00 oz	
NRWR	6.60 oz	72.60 oz	73.00 oz	

Actual Load: 43306 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 2

DRIVER	TRUCK NO.	TIME OUT
GKIEN	257	9:30
ARRIVE JOB	DEPART JOB	TIME IN
9:40		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7003 TICKET #: 7072679	NET 30		10/02/17	09:08

SOLD TO:
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO:
ESTCOAT RD, 3RD GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:22	

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
Y CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

IX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

TRUCK 2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
257		user	7072679	63250	9:09	10/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	67946

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20258 lb	20220 lb	2.60% M
3/4STONE	1800 lb	40020 lb	39900 lb	
TYPE1	191.0 lb	2101.0 lb	2080.0 lb	
FLYASH	29.0 lb	2399.0 lb	2390.0 lb	
WATER	21.0 gl	125.5 gl	126.4 gl	
AIR	2.70 oz	29.70 oz	28.00 oz	
NRWR	6.60 oz	72.60 oz	74.00 oz	

Actual Num Batches: 1

Load 43351 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

TRUCK 3

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MIKEP	226	1000
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1000		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7003 TICKET #: 7072683	NET 30		10/02/17	09:41

SOLD TO:
INITED CONCRETE, INC.
P.O. BOX 831
INELAND NJ 08362

SHIP TO:
WESTCOAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM.	TOTAL:33	
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE; AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

IX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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TRUCK 3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7072683	63254	9:43	10/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	67950

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20258 lb	20220 lb	2.60% M
3/4STONE	1800 lb	40020 lb	40020 lb	
TYPE1	191.0 lb	2101.0 lb	2110.0 lb	
FLYASH	29.0 lb	2429.0 lb	2420.0 lb	
WATER	21.0 gl	125.5 gl	126.4 gl	
AIR	2.50 oz	27.50 oz	27.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Num Batches: 1

Load 43501 lb

Slump: 4.00 in #

DELIVERY TICKET

TRUCK 4

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MRIDD	244	1053
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1044		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
3197	1		ORDER #: 7003 TICKET #: 7072685	NET 30		10/02/17	10:14

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
INELAND NJ 08362

SHIP TO:
WESTCOAT RD, 3RD GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:44	

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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TRUCK 4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
244		user	7072685	63256	10:16	10/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	ECONO				W	67952

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	20258 lb	20220 lb	2.60% M
3/4STONE	1800 lb	40020 lb	39920 lb	
TYPE1	191.0 lb	2101.0 lb	2110.0 lb	
FLYASH	29.0 lb	2429.0 lb	2420.0 lb	
TEMPER	.0	1.0 gl	1.0 gl	
WATER	21.0 gl	125.5 gl	127.0 gl	
AIR	2.50 oz	27.50 oz	26.00 oz	
NRWR	6.60 oz	72.60 oz	72.00 oz	

Actual Num Batches: 1

Load 43414 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

TRUCK 5

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
GKIEN	257	11:05
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7003 TICKET #: 7072689	NET 30		10/02/17	10:44

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WESTCOAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	ECONO	ECONO-CRETE 500-800 PSI		10.00		
10.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:54	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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TRUCK 5

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
257		user	7072689	63260	10:50	10/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	ECONO				W	67956

Material	Design Qty	Required	Batched	% Moisture
CONC	1795 lb	18417 lb	18380 lb	2.60% M
3/4STONE	1800 lb	36380 lb	36620 lb	
TYPE1	191.0 lb	1910.0 lb	1940.0 lb	
FLYASH	29.0 lb	2230.0 lb	2220.0 lb	
WATER	21.0 gl	114.1 gl	114.4 gl	
AIR	2.50 oz	25.00 oz	25.00 oz	
NRWR	6.60 oz	66.00 oz	66.00 oz	

Actual Num Batches: 1

Load 39801 lb

Slump: 4.00 in #

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project:	CC-8 P-306	Section:	Sta. 565-655 North	Client	FAA-ATRD
Technician:	MJW	Professional Engineer:	Li	Date:	10/10/2017

Sample No.	Date Poured	Date Tested	Age	Sta.	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1a	10/2/2017	10/10/2017	8		28.28	6.00	12.27	19170	28.27	680	2
1b	10/2/2017	10/10/2017	8		28.14	6.00	12.16	19550	28.27	690	2
										685	
2a	10/2/2017	10/10/2017	8		28.84	5.99	12.47	16180	28.18	570	2
2b	10/2/2017	10/10/2017	8		28.66	6.00	12.36	15550	28.27	550	2
										560	
3a	10/2/2017	10/10/2017	8		28.64	6.02	12.37	24530	28.46	860	2
3b	10/2/2017	10/10/2017	8		28.76	6.00	12.27	24210	28.27	860	2
										860	
4a	10/2/2017	10/10/2017	8		28.70	6.00	12.34	20860	28.27	740	2
4b	10/2/2017	10/10/2017	8		28.73	6.00	12.21	21140	28.27	750	2
										745	
5a	10/2/2017	10/10/2017	8		28.86	6.02	12.27	17920	28.46	630	2
5b	10/2/2017	10/10/2017	8		28.50	6.01	12.34	18580	28.37	650	2
										640	

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** P-306 **Client** FAA-ATRD

Technician: MW/RN **Professional Engineer:** QL **Date:** 10/30/2017

Load	Date of Pour	Date Tested	Age	Truck Number	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break	Free Free Values (ksi)
1A	10/2/2017	10/30/2017	28	-	27.38	6.00	11.95	25960	28.27	920	3	3606
1B	10/2/2017	10/30/2017	28	-	27.37	6.00	11.95	26260	28.27	930	3	3599
									AVG	930		
2A	10/2/2017	10/30/2017	28	-	27.46	5.98	11.95	21020	28.09	750	3	3313
2B	10/2/2017	10/30/2017	28	-	27.39	6.01	12.00	20410	28.37	720	3	3378
									AVG	740		
3A	10/2/2017	10/30/2017	28	-	27.73	6.00	12.00	32170	28.27	1140	3	4035
3B	10/2/2017	10/30/2017	28	-	27.81	5.98	12.00	33250	28.09	1180	3	4074
									AVG	1160		
4A	10/2/2017	10/30/2017	28	-	27.69	6.00	12.00	26670	28.27	940	3	3863
4B	10/2/2017	10/30/2017	28	-	27.46	5.99	12.00	23680	28.18	840	3	3772
									AVG	890		
5A	10/2/2017	10/30/2017	28	-	27.67	6.01	11.95	23680	28.37	830	3	3604
5B	10/2/2017	10/30/2017	28	-	27.69	6.01	11.95	24840	28.37	880	3	3524
									AVG	860		

PENN JERSEY BUILDING MATERIALS INC.

READY MIX CONCRETE
PROCESSED SAND & GRAVEL
BLOCK - MASONRY - BUILDING PRODUCTS

Contractor : United Concrete
Project : FAA
Location : Pomona
Use : Test Strip

Mix ID number :	ECONO	**Design Date :**	10/12/2016
Compressive Strength :	500-800 Econo-Crete	**Concrete Source :**	Pleasantville, NJ
Aggregate size :	J 157	**Unit Weight :**	147.8
Air content :	6.0% (+/- 1.5%)	**Slump Range :**	3" - 6"
Water / Cement ratio :	0.80		

Constituents :

Total Cementitious : 220

Percentage Pozzolan Replacement : 13%

		ASTM	Quantity	Density	Volume
Cement :	Lafarge Type I	*C-150*	191	3.150	0.97
Pozzolan :	STI ProAsh Type F	*C-618*	29	2.140	0.21
Fine Aggregate :	Tuckahoe Sand & Gravel Inc.	*C-33*	1795	2.631	10.94
Course Aggregate	Berks Products	*C-33*	1800	2.761	10.45
Water :	Potable		175	1.000	2.80
Air :			6%		1.62
Total :			3990		27

157.21 pcf

Admixtures :

		ASTM	floz-cwt	floz/yd	
Normal range water reducer :	BASF MasterPozzolith 700	*C-494*	3	6.6	* or as required
Accelerator (Non-Chloride)	BASF MasterSet AC 534	*C-494*	12 - 32		requested by contractor
Retarder :	BASF MasterSet R 100	*C-494*	1- 3		requested by contractor
Air-Entrainment :	BASF MasterAir AE 90	*C-260*	1	22	* or as required

Submitted By :
James Laus

The following admixtures - additional to the project specifications - may be added at the contractor's request.
Slump, air, and age relative strength subject to change due to weather and jobsite conditions as specified by ASTM C-94 unless otherwise
Penn Jersey Building Materials will deliver the concrete in accordance to ASTM C-94
This mix design has been designed in accordance with ACI 211 and 318

MAILING ADDRESS
P.O. Box 991
Pleasantville NJ 08232

MAIN OFFICE
2819 Fire Road
EHT, NJ 08234
Telephone (609) 645-8135

PLANT LOCATION
2817 Fire Road
Egg Harbor Township NJ 08234
Telephone (609) 641-6994

BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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BASF Corporation
Admixture Systems
www.master-builders-solutions.basf.us

United States
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Cleveland, Ohio 44122-5544
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Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
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BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterPozzolith® 700

Water-Reducing Admixture

Formerly Pozzolith 700N *

Description

MasterPozzolith 700 ready-to-use, liquid admixture is used for making more uniform and predictable quality concrete. It is formulated to meet ASTM C 494/C 494M requirements for Type A, water-reducing, Type B, retarding, and Type D, water-reducing and retarding, admixtures.

Applications

Recommended for use in:

- Ready-mixed concrete
- Precast concrete
- Shotcrete
- Lightweight concrete
- Pumped concrete
- 4x4™ Concrete
- Pervious concrete
- Self-consolidating concrete (SCC)

Features

- Reduced water content for a given workability
- Controlled setting characteristics – normal or retarded

Benefits

- Improved workability
- Reduced segregation
- Improved finishing characteristics for flatwork and cast surfaces
- Increased compressive and flexural strength

Guidelines for Use

Dosage: MasterPozzolith 700 admixture is recommended for use at a dosage of 3-5 fl oz/cwt (195-325 mL/100 kg) of cementitious materials for Type A applications and up to 7 fl oz/cwt (460 mL/100 kg) for Type B and D requirements. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative.

Product Notes

Corrosivity: MasterPozzolith 700 admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. MasterPozzolith 700 admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

Compatibility: MasterPozzolith 700 admixture may be used in combination with any BASF admixture. When used in conjunction with other admixtures, each admixture must be dispensed separately into the mixture.

MASTER® BUILDERS SOLUTIONS

Storage and Handling

Storage Temperature: MasterPozzolith 700 admixture must be stored at temperatures above 35 ºF (2 ºC). If MasterPozzolith 700 admixture freezes, it can be reconstituted by mild mechanical agitation. **Do not use pressurized air for agitation.**

Shelf Life: MasterPozzolith 700 admixture has a minimum shelf life of 6 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterPozzolith 700 admixture has been exceeded.

Packaging

MasterPozzolith 700 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterPozzolith 700 admixture

Additional Information

For additional information on MasterPozzolith 700 admixture or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

NSF Certified to NSF/ANSI 61

* Pozzolith 700N became MasterPozzolith 700 under the Master Builders Solutions brand, effective January 1, 2014.

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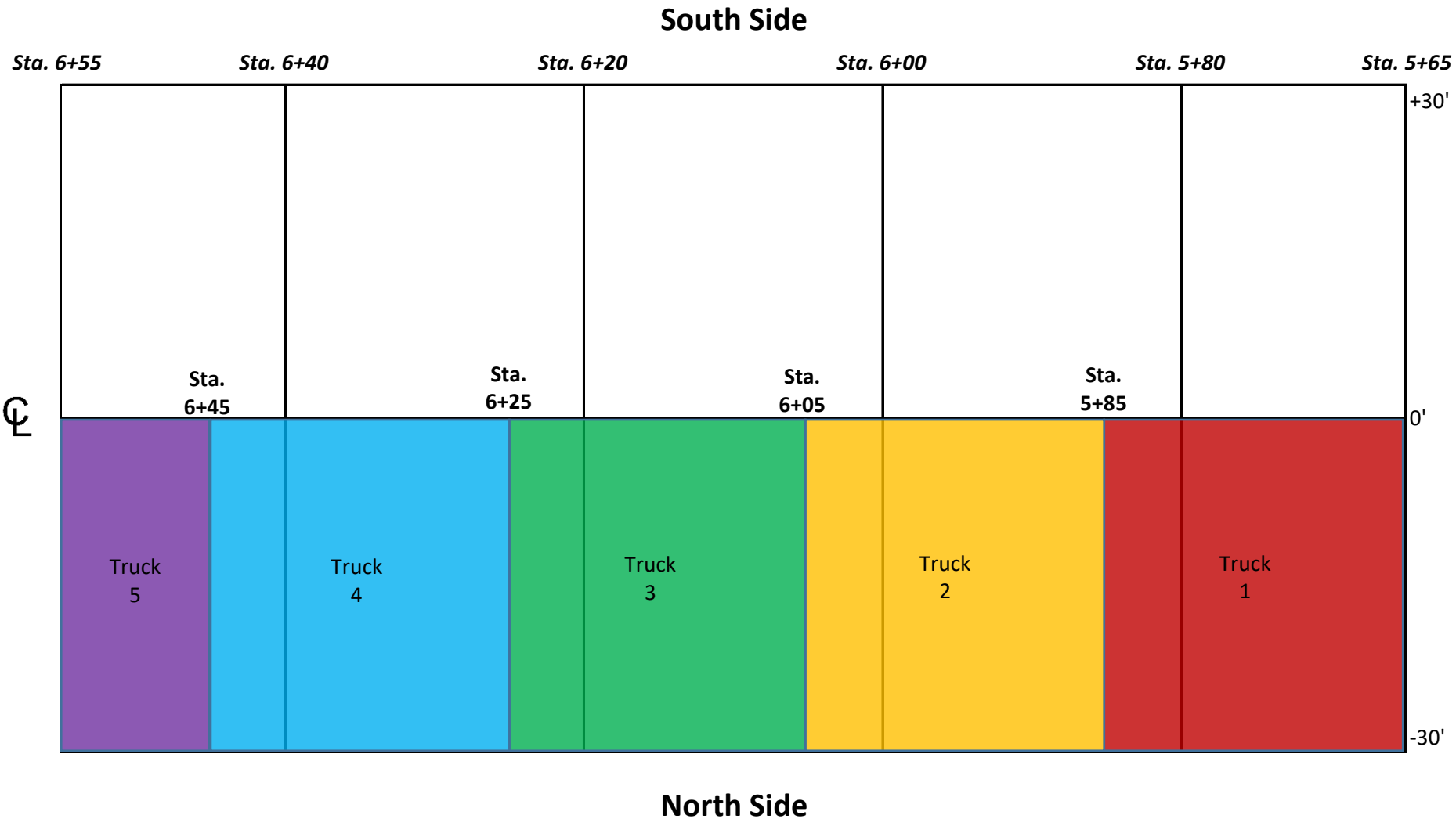
P-306 Concrete Placement

Date: 10/2/2017



P-404 Asphalt Interlayer

Acceptance and Characterization Data

Date	Station	Location	Compaction	Air Voids
			%	%
12/13/2016	3+70	Pass 1	93.2	6.8
12/13/2016	3+55	Pass 2	92.9	7.1
12/13/2016	3+75	Pass 3	92.7	7.3
12/13/2016	3+55	Pass 4	93.1	6.9
12/13/2016	3+60	Pass 5	93.0	7.0
12/13/2016	3+75	Joint 1	90.4	9.6
12/13/2016	3+50	Joint 2	90.1	9.9
12/13/2016	3+60	Joint 3	91.0	9.0
12/13/2016	3+55	Joint 4	90.6	9.4

Mix	Sieve	JMF	12/9/2016 Results	12/12/2016 Results
			%	%
9.5M64	3/4 in	100.0	100.0	100.0
	1/2 in	100.0	100.0	100.0
	3/8 in	92.5	96.3	95.8
	No. 4	60.3	55.9	63.9
	No. 16	29.3	26.2	32.8
	No. 50	11.2	10.4	13.1
	No. 200	4.5	3.1	4.5
	Asphalt Content	5.40	5.44	5.58
	VMA	16.9	17.4	16.4

Martin A. Ackley Associates, Inc.

Quality Control & Testing Services

SBE • BBB • NJSAT • NAPA • AAPT • AASHTO/AMRL • Public Works Contractor

Main Office & Laboratory

416 White Horse Pike (856) 768-7768

Atco, New Jersey Fax (856) 768-0868

ASPHALT COMPACTION FIELD REPORT for: Dec. 13, 2016

Report #: 16-292

CLIENT/PROJECT DATA

Client: **Asphalt Paving Systems**
Project: **NAFEC Pavement Test Bldg**
Paving Contractor: **Asphalt Paving Systems**
Supplier: **A.E. Stone**

MIX DATA

Mix Type: **164.2**
Mat Thickness:
Mat Width:
Tonnage/Loads:

CONTRACTOR EQUIPMENT USED ON SITE

Paver:
Transfer Vehicle:
Breakdown Roller:
Intermediate Roller:
Finish Roller:

REMARKS/COMMENTS

Density testing on existing pavement

TECH/TIME

Arrival Time: 12:00 pm
Left Site: 1:30 pm
Technician: Marty Ackley, Jr.
Client Rep.: **Signature on file**

CLIENT RECOMENDATIONS:

To provide our clients with the most accurate Nuclear Density Gauge readings Martin A. Ackley Associates, Inc. highly recommends establishing a correlation between the nuclear density gauge and the cores in accordance with Table 401.03.03.C6 of the New Jersey Department of Transportation Standard Specifications for each mix type being placed.

DISCLAIMER:

In no event will Martin A. Ackley Associates, Inc. be responsible for any damages or penalties resulting from Martin A. Ackley Associates, Inc. testing services or reporting of results or from use or distribution of materials tested. Although Martin A Ackley Associates, Inc. endeavors to provide accurate testing and reporting, the testing and reporting of results are provided by Martin A. Ackley Associates, Inc. without any warranty, express or implied, as to their accuracy. In no event will Martin A. Ackley Associates, Inc. be liable for any direct, indirect, special, punitive, or consequential damages resulting from the testing or reporting of test results.

MARTIN A ACKLEY ASSOCIATES, INC. **Field Report**

Client	Asphalt Paving Systems	**Contact**	
Job	NAFEC Pavement Test Bldg.		
Date	12/13/2016	TECH	MA

GAUGE C-300 21237 Page 1 of 1

Correction Factor	0	**Factor Waived By**	CONTRACTOR MUST SIGN OFF HERE

Mix Type 164.2

	Rice 1	**164.2**	Rice 2	162.0	Rice 3			
	Time		Time		Time			
Station / Lane	Offset	% Comp.	Corrected	Air Voids	Mat Temp.	Time	Rice USED	Comments
Station 3+70	4'	93.2	93.2	6.8			1	Pass 1
Station 3+55	4'	92.9	92.9	7.1			1	Pass 2
Station 3+75	4'	92.7	92.7	7.3			1	Pass 3
Station 3+55	4'	93.1	93.1	6.9			1	Pass 4
Station 3+60	4'	93.0	93.0	7.0			1	Pass 5
Station 3+75	4'	90.4	90.4	9.6			1	Joint 1
Station 3+50	4'	90.1	90.1	9.9			1	Joint 2
Station 3+60	4'	91.0	91.0	9.0			1	Joint 3
Station 3+55	4'	90.6	90.6	9.4			1	Joint 4

LB-400 3/07

NEW JERSEY DEPARTMENT OF TRANSPORTATION
IGNITION METHOD & GYRATORY TEST FOR COMPLIANCE

DAILY REPORT NO. : 2016-1
DP#: N/A

Contract ID : N/A
PROJECT : FAA NAPTF Building Test Pad Pomona, NJ 08234
PRODUCER : A.E. Stone, Inc.
CONTRACTOR : Asphalt Paving System Corp.
LOCATION : Egg Harbor Twp., NJ 08234
DATE : 12/12/16
MIX NO. : 9.5M64
SER. NO.: S02DS0500

	Day 12/9/2016			Day 12/12/2016		
Lot Sample No.	1 - A			1 - B		
Starting Temperature	538°c			538°c		
Elapsed Time	34:00:00			43:00:00		
A-Sample Weight	1944.0			2294.0		
A-Sample Weight Adjusted For Moisture	1943.7			2293.7		
B - Sample Weight After Ignition	1831.5			2158.5		
C-Wgt. Loss	112.2			135.2		
D-% Loss (C/A x 100)	5.77			5.89		
E-Temperature Compensation **	0.15			0.13		
F-Calibration Factor (From Design)	0.18			0.18		
G-% Bitumen (D-E-F)	**5.44**			**5.58**		
SIEVE SIZE	Wgt.	Ret. %	Pass %	Wgt.	Ret. %	Pass %
2" (50.0mm)			**100.0**			**100.0**
1-1/2" (37.5mm)			**100.0**			**100.0**
1" (25.0mm)			**100.0**			**100.0**
3/4" (19.0mm)			**100.0**			**100.0**
1/2" (12.5mm)			**100.0**			**100.0**
3/8" (9.5mm)	67.8	3.7	**96.3**	90.5	4.2	**95.8**
No. 4 (4.75mm)	806.8	44.1	**55.9**	778.9	36.1	**63.9**
No. 8 (2.36mm)	1107.2	60.5	**39.5**	1230.1	57.0	**43.0**
No. 16 (1.18mm)	1349.4	73.8	**26.2**	1450.5	67.2	**32.8**
No. 30 (600um)	1481.9	81.0	**19.0**	1642.1	76.1	**23.9**
No. 50 (300um)	1638.5	89.6	**10.4**	1875.7	86.9	**13.1**
No. 100 (150um)	1731.3	94.6	**5.4**	2005.5	93.0	**7.0**
No. 200 (75um)	1773.1	96.9	**3.1**	2059.9	95.5	**4.5**
Minus N0. 200	56.5	3.1		97.6	4.5	
Total Aggregate Weight	1829.6			2157.5		
Weight Before Wash	1831.5			2158.5		
Weight After Wash	1780.1			2065.0		
Wash Loss	51.4			93.5		
Fines In Pan	5.1			4.1		
Total Minus No. 200	56.5			97.6		

GYRATION LEVELS	Nini	Ndes	Nmax
	7	75	115
% AC Absorbed:		0.18	

GYRATORY RESULTS TO Ndes		
Mix Temp.	**320°F**	**325°F**
Sp. Gr. Of Binder (Gb)	1.041	1.041
Specimen Ht. @ Ndes	118.0	116.4
Specimen Ht. @ Nini	129.0	125.8
Weight in Air	5146.5	5150.2
Weight in Water	3120.3	3131.2
Weight SSD	5151.3	5152.2
Bulk Specific Gravity(Gmb)	**2.534**	**2.548**
Air Voids - %	4.6	3.1
% Gmm @ Ndes	**95.43**	**96.85**
% Gmm @ Nini	**87.29**	**89.62**
Total Volume	39.464	39.241
Effective AC	5.262	5.404
Volume of AC	5.054	5.191
% AC by Volume	12.808	13.228
% VMA	**17.4**	**16.4**
% VFA	**73.7**	**80.8**
Dust / Binder Ratio	**0.6**	**0.8**

MAXIMUM SPECIFIC GRAVITY (Gmm)		
Sample Weight	2138.4	1948.6
Weight in H_2O After Vac.	1333.1	1208.0
Wt. of Displaced H_2O	805.3	740.6
Maximum Sp. Gr. (Gmm)	**2.655**	**2.631**

MOISTURE	
Pan Weight	251.6
Wet Weight	1565.4
Dry Weight	1565.2
Moisture Content %	0.015

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Plant File

* Only For Test Method B (without integral scale) **Only For Test Method A (with integral scale)

I certify that the above test was sampled by me, and that all operations were performed in accordance with NJDOT Specifications and Procedures to the best of my knowledge.

SIGNED :

Department of Transportation Representative

LB-400 3/07

NEW JERSEY DEPARTMENT OF TRANSPORTATION
IGNITION METHOD & GYRATORY TEST FOR COMPLIANCE

DAILY REPORT NO. : 2016-1
DP#: N/A

Contract ID :

PROJECT : FAA NAPTF Building Test Pad Pomona, NJ 08234

CONTRACTOR : Asphalt Paving System Corp.
Egg Harbor Twp., NJ 08234

DATE : 6/3/2016
MIX NO. : 9.5M64
SER. NO.: S02DS0500

PRODUCER : A.E. Stone, Inc.

	Day			Day		
Lot Sample No.	Lot 1 - C			Lot 1 - D		
Starting Temperature	538°c			538°c		
Elapsed Time						
A-Sample Weight						
A-Sample Weight Adjusted For Moisture						
B - Sample Weight After Ignition						
C-Wgt. Loss						
D-% Loss (C/A x 100)						
E-Temperature Compensation **						
F-Calibration Factor (From Design)						
G-% Bitumen (D-E-F)						
SIEVE SIZE	Wgt.	Ret. %	Pass %	Wgt.	Ret. %	Pass %
2" (50.0mm)			100.0			100.0
1-1/2" (37.5mm)			100.0			100.0
1" (25.0mm)			100.0			100.0
3/4" (19.0mm)			100.0			100.0
1/2" (12.5mm)			100.0			100.0
3/8" (9.5mm)			100.0			100.0
No. 4 (4.75mm)			100.0			100.0
No. 8 (2.36mm)			100.0			100.0
No. 16 (1.18mm)			100.0			100.0
No. 30 (600um)			100.0			100.0
No. 50 (300um)			100.0			100.0
No. 100 (150um)			100.0			100.0
No. 200 (75um)			100.0			100.0
Minus N0. 200						
Total Aggregate Weight						
Weight Before Wash						
Weight After Wash						
Wash Loss						
Fines In Pan						
Total Minus No. 200						

GYRATION LEVELS	Nini	Ndes	Nmax
	7	75	115
% AC Absorbed:		0.18	
GYRATORY RESULTS TO Ndes			
Mix Temp.		320°F	325°F
Sp. Gr. Of Binder (Gb)		1.041	1.041
Specimen Ht. @ Ndes			
Specimen Ht. @ Nini			
Weight in Air			
Weight in Water			
Weight SSD			
Bulk SpecificGravity(Gmb)			
Air Voids - %			
% Gmm @ Ndes			
% Gmm @ Nini			
Total Volume			
Effective AC			
Volume of AC		#VALUE!	#VALUE!
% AC by Volume			
% VMA			
% VFA			
Dust / Binder Ratio		#VALUE!	#VALUE!
MAXIMUM SPECIFIC GRAVITY (Gmm)			
Sample Weight		1970.4	2211.2
Weight in H2O After Vac.		1223.9	1371.5
Wt. Of Displaced H2O		746.5	839.7
Maximun Sp. Gr. (Gmm)		2.640	2.633
MOISTURE			
Pan Weight		171.4	
Wet Weight		2145.6	
Dry Weight		2145.1	
Moisture Content %		0.025	

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Plant File

* Only For Test Method B (without integral scale) **Only For Test Method A (with integral scale)

I certify that the above test was sampled by me, and that all operations were performed in accordance with NJDOT Specifications and Proceedures to the best of my knowledge.

SIGNED :

Department of Transportation Representative

LB-400 3/07

NEW JERSEY DEPARTMENT OF TRANSPORTATION
IGNITION METHOD & GYRATORY TEST FOR COMPLIANCE

DAILY REPORT NO. : 2016-1
DP#: N/A

Contract ID :
PROJECT : FAA NAPTF Building Test Pad Pomona, NJ 08234
CONTRACTOR : Asphalt Paving System Corp.
DATE :
PRODUCER : A.E. Stone, Inc.
LOCATION : Egg Harbor Twp., NJ 08234
MIX NO. : 9.5M64
SER. NO.: S02DS0500

Day

Lot Sample No.	1 - E			1 - F		
Starting Temperature	538°C			538°C		
Elapsed Time						
A-Sample Weight						
A-Sample Weight Adjusted For Moisture						
B - Sample Weight After Ignition						
C-Wgt. Loss						
D-% Loss (C/A x 100)						
E-Temperature Compensation **						
F-Calibration Factor (From Design)						
G-% Bitumen (D-E-F)						
SIEVE SIZE	Wgt.	Ret. %	Pass %	Wgt.	Ret. %	Pass %
2" (50.0mm)			100.0			100.0
1-1/2" (37.5mm)			100.0			100.0
1" (25.0mm)			100.0			100.0
3/4" (19.0mm)			100.0			100.0
1/2" (12.5mm)			100.0			100.0
3/8" (9.5mm)			100.0			100.0
No. 4 (4.75mm)			100.0			100.0
No. 8 (2.36mm)			100.0			100.0
No. 16 (1.18mm)			100.0			100.0
No. 30 (600um)			100.0			100.0
No. 50 (300um)			100.0			100.0
No. 100 (150um)			100.0			100.0
No. 200 (75um)			100.0			100.0
Minus N0. 200						
Total Aggregate Weight						
Weight Before Wash						
Weight After Wash						
Wash Loss						
Fines In Pan						
Total Minus No. 200						

GYRATION LEVELS	Nini	Ndes	Nmax
	7	75	115
% AC Absorbed:		.18	
GYRATORY RESULTS TO Ndes			
Mix Temp.		°F	°F
Sp. Gr.of Binder (Gb)		1.041	1.039
Specimen Ht. @ Ndes			
Specimen Ht. @ Nini			
Weight in Air			
Weight in Water			
Weight SSD			
Bulk Specific Gravity(Gmb)			
Air Voids - %			
% Gmm @ Ndes			
% Gmm @ Nini			
Total Volume			
Effective AC			
Volume of AC		#VALUE!	#VALUE!
% AC by Volume			
% VMA			
% VFA			
Dust / Binder Ratio		#VALUE!	#VALUE!
MAXIMUM SPECIFIC GRAVITY (Gmm)			
Sample Weight			
Weight in H2O After Vac.			
Wt. Of Displaced H2O			
Maximum Sp. Gr. (Gmm)			
MOISTURE			
Pan Weight		169.6	
Wet Weight		1991.8	
Dry Weight		1991.4	
Moisture Content %		0.022	

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Plant File

* Only For Test Method B (without integral scale)

**Only For Test Method A (with integral scale)

I certify that the above test was sampled by me, and that all operations were performed in accordance with NJDOT Specifications and Procedures to the best of my knowledge.

SIGNED :

Department of Transportation Representative

Mix No.	9.5M64
Lot No.	1
Serial No.	S02DS0500

HMA - LOT DATA

PRODUCER A.E. Stone, Inc. LOCATION Egg Harbor Twp., NJ 08234

LOT:STARTED December 9, 2016 (Date) ENDED December 12, 2016 (Date) EXACT SIZE 65.86 TONS

	PROJECT SHIPPED TO	DP#	CONTRACTOR	LOADS	TONS SHIPPED
1	FAA - NAPTF Building Pomona, NJ	N/A	Asphalt Paving Syster	1	15.53
2	FAA - NAPTF Building Pomona, NJ	N/A	Asphalt Paving Syster	2	50.33
3					
4					
5					
				TOTAL	65.86

LOT PORTION	A	B	C	D	E	2 SAMPLES		JOB MIX REQUIREMENTS		
Date Sampled	9-Dec	12-Dec								
* Project Shipped To	1	2								
Inspectors Report #	1	2				AVG.		MIN.	MAX.	
Technician Name	KS/AES	KS/AES								
Inspectors Name	N/A	N/A								

SIEVE PASSING %	COMPOSITION ANALYSIS						Formula	Control Points		
50.0mm (2")	100.0	100.0				**100.0**	-			
37.5mm (1-1/2")	100.0	100.0				**100.0**	-	-	-	
25.0mm (1")	100.0	100.0				**100.0**	-	-	-	
19.0mm (3/4")	100.0	100.0				**100.0**	-	-	-	
12.5mm (1/2")	100.0	100.0				**100.0**	100.0	100	-	
9.5mm (3/8")	96.3	95.8				**96.0**	92.5	90	100	
4.75mm (No.4)	55.9	63.9				**59.9**	60.3	-	90	
2.36mm (No.8)	39.5	43.0				**41.2**	40.0	32	67	
1.18mm (No.16)	26.2	32.8				**29.5**	29.3	-	-	
600um (No.30)	19.0	23.9				**21.4**	19.6	-	-	
300um (No.50)	10.4	13.1				**11.8**	11.2	-	-	
150um (No.100)	5.4	7.0				**6.2**	6.6	-	-	
75um (No.200)	3.1	4.5				**3.8**	4.5	2	10	
Binder Content	5.44	5.58				**5.51**	5.40	-	-	

TEST PROPERTY	GYRATORY TEST RESULTS							MIN.	MAX.	
Gmm @ N des	95.43	96.85				**96.1**		95	97	Req. for Contr.
Vtm @ N des	4.6	3.1				**3.9**		3	5	
Dust/Binder Ratio	0.6	0.8				**0.7**		0.6	1.3	
VMA	17.4	16.4				**16.9**		15		
VFA	73.7	80.8				**77.2**		65	78	Design
Marshall Vtm 75 Blow	6.2	4.5				**5.4**		2	8	
Stability - Load lbs.	1848	2275				**2062**		900		
Flow 0.01 in.	10.0	11.0				**10.5**		6	16	

Volumetric and Gradation tests results are for control only, adjustments made as needed and recorded on LB-64

* IDENTIFY PROJECT BY LINE NUMBER

REMARKS: Lot (conforms) with job mix requirements.

LOT CONFORMS TO 2007 NJDOT CONTROL REQ. SPEC. REF. 902.02.04-1

Copies To:

REGION SOUTH MATERIALS
RESIDENT ENGINEER
CONTRACTOR
PLANT
PRODUCER

Prepared by 12/12/2016
Keith P. Sterling Q/C Manager A.E. Stone

Approved by
Regional Materials Engineer Date

P-501 Portland Cement Concrete Pavement

Acceptance and Characterization Data

Date	Load	Location	QC Slump	QC Air	QC Unit Weight	QC Temp	QA Slump
			in	*%*	*pcf*	*^{o}F*	*in*
12/28/2016	1	4+00 to 3+75 Lane 1	5.25	6.5	138.2	70.0	4.25
12/28/2016	2	3+75 to 3+45 Lane 1	3.50	4.5	137.8	69.8	N/T
12/28/2016	3	3+45 to 3+15 Lane 1	4.00	4.0	141.3	72.0	N/T
12/28/2016	4	3+15 to 3+00 Lane 1 & 4+00 to 3+90 Lane 3	3.50	6.9	137.4	69.9	N/T
12/28/2016	5	3+90 to 3+60 Lane 3	5.25	6.2	137.6	66.3	3.75
12/28/2016	6	3+60 to 3+30 Lane 3	5.50	5.3	140.2	65.3	N/T
12/28/2016	7	3+30 to 3+05 Lane 3	3.50	5.8	138.8	67.5	N/T
12/28/2016	8	3+05 to 3+00 Lane 3 & 4+00 to 3+75 Lane 5	4.25	6.0	140.1	69.0	N/T
12/28/2016	9	3+75 to 3+45 Lane 5	4.50	5.5	140.2	69.0	3.25
12/28/2016	10	3+45 to 3+20 Lane 5	4.50	7.0	137.4	68.1	N/T
12/28/2016	11	3+20 to 3+00 Lane 5	3.50	6.0	139.2	65.6	N/T
1/4/2017	1	4+00 to 3+75 Lane 2	4.50	6.8	138.7	69.0	3.25
1/4/2017	2	3+75 to 3+50 Lane 2	5.00	7.4	137.9	65.1	4.25
1/4/2017	3	3+50 to 3+20 Lane 2	4.75	7.0	138.4	67.9	3.50
1/4/2017	4	3+20 to 3+00 Lane 2 & 4+00 to 3+90 Lane 4	3.00	5.3	140.3	69.8	N/T
1/4/2017	5	3+90 to 3+60 Lane 4	5.25	5.6	140.4	66.9	N/T
1/4/2017	6	3+60 to 3+30 Lane 4	3.50	5.4	141.4	65.3	3.25
1/4/2017	7	3+30 to 3+05 Lane 4	3.75	5.6	139.4	60.8	3.25
1/4/2017	8	3+05 to 3+00 Lane 4	4.75	1.8	145.2	71.3	N/T
4/27/2017	1	5+00 to 4+80 Lane 1	2.50	6.0	140.2	67.8	2.75
4/27/2017	2	4+80 to 4+60 Lane 1	2.75	6.7	139.3	68.2	N/T
4/27/2017	3	4+60 to 4+40 Lane 1	4.75	7.0	137.8	68.4	4.75
4/27/2017	4	4+40 to 4+25 Lane 1	2.50	5.1	140.6	68.7	2.75
4/27/2017	5	4+25 to 4+05 Lane 1	4.00	5.1	140.7	71.5	N/T
4/27/2017	6	4+05 to 4+00 Lane 1 & 5+00 to 4+90 Lane 3	3.25	5.0	141.3	71.0	N/T
4/27/2017	7	4+90 to 4+70 Lane 3	3.25	5.5	140.2	71.0	2.75
4/27/2017	8	4+70 to 4+50 Lane 3	3.50	4.5	141.6	74.0	N/T
4/27/2017	9	4+50 to 4+35 Lane 3	3.00	5.3	141.4	72.0	N/T
4/27/2017	10	4+35 to 4+15 Lane 3	4.50	5.2	140.8	72.0	3.75
4/27/2017	11	4+15 to 4+00 Lane 3	3.50	6.1	140.5	71.0	N/T
5/2/2017	1	5+00 to 4+80 Lane 2	4.50	4.9	139.7	72.6	5.00
5/2/2017	2	4+80 to 4+60 Lane 2	4.00	5.6	137.0	74.8	N/T
5/2/2017	3	4+60 to 4+45 Lane 2	3.75	5.8	138.5	74.3	3.50
5/2/2017	4	4+45 to 4+25 Lane 2	5.00	6.9	135.7	74.0	5.00
5/2/2017	5	4+25 to 4+05 Lane 2	4.00	6.5	139.0	73.7	N/T
5/2/2017	6	4+05 to 4+00 Lane 2 & 5+00 to 4+85 Lane 4	4.00	5.1	141.0	76.0	3.50
5/2/2017	7	4+85 to 4+70 Lane 4	4.00	5.0	141.0	75.3	N/T
5/2/2017	8	4+70 to 4+50 Lane 4	4.00	5.1	139.8	75.3	N/T
5/2/2017	9	4+50 to 4+30 Lane 4	4.50	6.0	139.4	75.4	5.00
5/2/2017	10	4+30 to 4+15 Lane 4	4.25	6.0	139.5	75.6	N/T
5/2/2017	11	4+15 to 4+00 Lane 4	4.00	5.0	140.6	77.0	N/T

Date	Load	Location	QC Slump	QC Air	QC Unit Weight	QC Temp	QA Slump
			in	*%*	*pcf*	*^{o}F*	*in*
5/11/2017	1	5+00 to 5+15 off. 15' to 30'	4.50	5.8	138.4	71.3	4.75
5/11/2017	2	5+30 to 5+45 off. 15' to 30'	4.25	5.0	140.6	67.8	N/T
5/11/2017	3	5+15 to 5+30 off. 0' to 15'	5.00	5.8	139.3	78.4	5.00
5/11/2017	4	5+45 to 5+60 off. 0' to 15'	6.00	7.0	138.8	67.6	5.75
5/11/2017	5	5+00 to 5+15 off. 0' to -15'	4.50	7.5	136.8	69.0	5.50
5/11/2017	6	5+30 to 5+45 off. 0' to -15'	4.75	7.0	137.2	68.7	N/T
5/11/2017	7	5+15 to 5+30 off. -15' to -30'	5.75	Leaked	134.3	68.0	N/T
5/11/2017	8	5+45 to 5+60 off. -15' to -30'	4.75	7.2	137.2	69.0	4.75
5/17/2017	1	5+15 to 5+30 off. 15' to 30'	4.75	6.0	140.5	71.0	4.25
5/17/2017	2	5+45 to 5+60 off. 15' to 30'	6.00	7.4	138.3	70.2	N/T
5/17/2017	3	5+00 to 5+15 off. 0' to 15'	4.00	5.3	141.1	72.6	4.00
5/17/2017	4	5+30 to 5+45 off. 0' to 15'	5.75	5.9	140.0	73.5	N/T
5/17/2017	5	5+15 to 5+30 off. 0' to -15'	5.50	6.6	139.6	72.7	N/T
5/17/2017	6	5+45 to 5+60 off. 0' to -15'	5.50	8.1	137.8	71.8	5.50
5/17/2017	7	5+00 to 5+15 off. -15' to -30'	5.00	8.0	136.6	75.0	N/T
5/17/2017	8	5+30 to 5+45 off. -15' to -30'	4.00	5.4	141.2	76.0	3.50
10/12/2017	1	5+60 to 5+70 off. 30' to 5'	5.75	3.6	145.6	78.0	4.75
10/12/2017	2	5+60 to 5+70 off. 5' to -20'	4.50	5.0	147.8	79.0	4.50
10/12/2017	3	5+60 to 5+70 off. -20' to -30' & 6+00 to 6+10 off. 30' to 15' & 0' to -5'	5.25	5.2	143.7	80.0	5.25
10/12/2017	4	6+00 to 6+10 off. -5' to -30' & 6+40 to 6+55 off. 30' to 25'	5.50	5.7	142.2	75.0	5.50
10/12/2017	5	6+40 to 6+55 off. 25' to 0'	5.00	7.1	141.5	75.0	N/T
10/12/2017	6	6+40 to 6+55 off. 0' to -25'	5.00	4.6	146.3	76.0	4.75
10/12/2017	7	6+40 to 6+55 off. -25' to -30'	5.50	5.9	143.8	75.0	N/T
10/24/2017	1	5+70 to 5+85 & 6+25 to 6+33 off. 15' to 30'	4.25	5.7	144.8	76.0	4.00
10/24/2017	2	6+33 to 6+40 off. 15' to 30' & 5+85 to 6+00 off. 0' to 15'	4.00	6.3	144.5	77.0	N/T
10/24/2017	3	6+10 to 6+25 off. 0' to 15' & 5+70 to 5+80 off. 0' to -15'	4.25	6.7	143.1	77.0	5.00
10/24/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. 0' to -15' & 5+85 to 5+87 off. -15' to -30'	3.75	5.6	146.8	76.0	N/T
10/24/2017	5	5+87 to 6+00 & 6+10 to 6+21 off. -15' to -30'	3.75	5.9	146.3	79.0	3.25
10/24/2017	6	6+21 to 6+25 off -15' to -30'	4.00	7.7	140.6	80.0	4.25
10/30/2017	1	5+85 to 6+00 off. 15' to 30' & 5+70 to 5+75 off. 0' to 15'	5.25	6.7	143.7	67.0	4.50
10/30/2017	2	5+75 to 5+85 & 6+00 to 6+10 off. 0' to 15' & 5+85 to 5+88 off. 0' to -15'	5.25	4.8	145.4	70.0	N/T
10/30/2017	3	5+88 to 6+00 off. 0' to -15' & 5+70 to 5+80 off. -15' to -30'	3.50	5.2	145.6	70.0	3.50
10/30/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. -15' to -30' & 6+10 to 6+15 off. -10' to -15'	5.50	5.7	144.2	67.0	N/T
10/30/2017	5	6+10 to 6+15 off. 0' to -10', 6+15 to 6+25 off. 0' to -15' & 6+25 to 6+33 off. 0' to 15'	4.00	6.3	144.0	66.0	4.25
10/30/2017	6	6+33 to 6+40 off. 0' to 15' & 6+10 to 6+20 off. 15' to 30'	3.50	7.5	142.6	69.0	N/T
10/30/2017	7	6+20 to 6+25 off. 15' to 30'	2.75	3.2	149.0	68.0	2.50

Date	Load	Location	QA Air	QA Unit Weight	QA Temp	7 Day Flexural Strength	7 Day Compressive Strength
			%	pcf	^{o}F	psi	psi
12/28/2016	1	4+00 to 3+75 Lane 1	N/T	43.84	N/T	500	N/T
12/28/2016	2	3+75 to 3+45 Lane 1	N/T	N/T	N/T	480	N/T
12/28/2016	3	3+45 to 3+15 Lane 1	N/T	N/T	N/T	505	N/T
12/28/2016	4	3+15 to 3+00 Lane 1 & 4+00 to 3+90 Lane 3	N/T	N/T	N/T	480	N/T
12/28/2016	5	3+90 to 3+60 Lane 3	6.0	43.44	N/T	480	N/T
12/28/2016	6	3+60 to 3+30 Lane 3	N/T	N/T	N/T	485	N/T
12/28/2016	7	3+30 to 3+05 Lane 3	N/T	N/T	N/T	455	N/T
12/28/2016	8	3+05 to 3+00 Lane 3 & 4+00 to 3+75 Lane 5	N/T	N/T	N/T	480	N/T
12/28/2016	9	3+75 to 3+45 Lane 5	5.6	43.6	N/T	485	N/T
12/28/2016	10	3+45 to 3+20 Lane 5	N/T	N/T	N/T	495	N/T
12/28/2016	11	3+20 to 3+00 Lane 5	N/T	N/T	N/T	N/T	N/T
1/4/2017	1	4+00 to 3+75 Lane 2	6.2	140.0	71.0	465	N/T
1/4/2017	2	3+75 to 3+50 Lane 2	7.2	138.8	N/T	420	N/T
1/4/2017	3	3+50 to 3+20 Lane 2	6.6	139.6	N/T	430	N/T
1/4/2017	4	3+20 to 3+00 Lane 2 & 4+00 to 3+90 Lane 4	N/T	N/T	N/T	480	N/T
1/4/2017	5	3+90 to 3+60 Lane 4	N/T	N/T	N/T	455	N/T
1/4/2017	6	3+60 to 3+30 Lane 4	N/T	N/T	N/T	425	N/T
1/4/2017	7	3+30 to 3+05 Lane 4	N/T	N/T	N/T	480	N/T
1/4/2017	8	3+05 to 3+00 Lane 4	N/T	N/T	N/T	N/T	N/T
4/27/2017	1	5+00 to 4+80 Lane 1	5.7	141.0	66.0	530	N/T
4/27/2017	2	4+80 to 4+60 Lane 1	N/T	N/T	N/T	505	N/T
4/27/2017	3	4+60 to 4+40 Lane 1	N/T	N/T	N/T	495	N/T
4/27/2017	4	4+40 to 4+25 Lane 1	5.5	141.1	N/T	455	N/T
4/27/2017	5	4+25 to 4+05 Lane 1	N/T	N/T	N/T	480	N/T
4/27/2017	6	4+05 to 4+00 Lane 1 & 5+00 to 4+90 Lane 3	N/T	N/T	N/T	510	N/T
4/27/2017	7	4+90 to 4+70 Lane 3	5.0	141.4	N/T	455	N/T
4/27/2017	8	4+70 to 4+50 Lane 3	N/T	N/T	N/T	480	N/T
4/27/2017	9	4+50 to 4+35 Lane 3	N/T	N/T	N/T	510	N/T
4/27/2017	10	4+35 to 4+15 Lane 3	5.0	141.3	N/T	455	N/T
4/27/2017	11	4+15 to 4+00 Lane 3	N/T	N/T	N/T	440	N/T
5/2/2017	1	5+00 to 4+80 Lane 2	5.0	140.9	72.6	500	N/T
5/2/2017	2	4+80 to 4+60 Lane 2	N/T	N/T	N/T	360	N/T
5/2/2017	3	4+60 to 4+45 Lane 2	N/T	N/T	N/T	445	N/T
5/2/2017	4	4+45 to 4+25 Lane 2	9.0	137.4	N/T	435	N/T
5/2/2017	5	4+25 to 4+05 Lane 2	6.6	N/T	N/T	475	N/T
5/2/2017	6	4+05 to 4+00 Lane 2 & 5+00 to 4+85 Lane 4	4.5	141.4	76.0	485	N/T
5/2/2017	7	4+85 to 4+70 Lane 4	N/T	N/T	N/T	400	N/T
5/2/2017	8	4+70 to 4+50 Lane 4	N/T	N/T	N/T	450	N/T
5/2/2017	9	4+50 to 4+30 Lane 4	6.4	138.2	N/T	455	N/T
5/2/2017	10	4+30 to 4+15 Lane 4	N/T	N/T	N/T	475	N/T
5/2/2017	11	4+15 to 4+00 Lane 4	N/T	N/T	N/T	490	N/T

Date	Load	Location	QA Air	QA Unit Weight	QA Temp	7 Day Flexural Strength	7 Day Compressive Strength
			%	pcf	^{o}F	psi	psi
5/11/2017	1	5+00 to 5+15 off. 15' to 30'	5.6	139.2	69.0	390	N/T
5/11/2017	2	5+30 to 5+45 off. 15' to 30'	N/T	N/T	N/T	455	N/T
5/11/2017	3	5+15 to 5+30 off. 0' to 15'	5.7	139.1	71.0	420	N/T
5/11/2017	4	5+45 to 5+60 off. 0' to 15'	6.0	139.2	68.0	460	N/T
5/11/2017	5	5+00 to 5+15 off. 0' to -15'	7.6	136.9	69.0	405	N/T
5/11/2017	6	5+30 to 5+45 off. 0' to -15'	N/T	N/T	N/T	415	N/T
5/11/2017	7	5+15 to 5+30 off. -15' to -30'	8.0	N/T	N/T	400	N/T
5/11/2017	8	5+45 to 5+60 off. -15' to -30'	7.6	135.6	68.0	405	N/T
5/17/2017	1	5+15 to 5+30 off. 15' to 30'	5.5	140.1	72.0	360	N/T
5/17/2017	2	5+45 to 5+60 off. 15' to 30'	N/T	N/T	N/T	410	N/T
5/17/2017	3	5+00 to 5+15 off. 0' to 15'	5.3	140.4	73.5	500	N/T
5/17/2017	4	5+30 to 5+45 off. 0' to 15'	N/T	N/T	N/T	450	N/T
5/17/2017	5	5+15 to 5+30 off. 0' to -15'	N/T	N/T	N/T	420	N/T
5/17/2017	6	5+45 to 5+60 off. 0' to -15'	8.0	136.8	72.0	385	N/T
5/17/2017	7	5+00 to 5+15 off. -15' to -30'	N/T	N/T	N/T	440	N/T
5/17/2017	8	5+30 to 5+45 off. -15' to -30'	5.3	140.5	76.0	490	N/T
10/12/2017	1	5+60 to 5+70 off. 30' to 5'	3.3	147.4	79.0	750	4190
10/12/2017	2	5+60 to 5+70 off. 5' to -20'	5.0	149.0	77.0	760	4090
10/12/2017	3	5+60 to 5+70 off. -20' to -30' & 6+00 to 6+10 off. 30' to 15' & 0' to -5'	5.0	145.8	77.0	715	3880
10/12/2017	4	6+00 to 6+10 off. -5' to -30' & 6+40 to 6+55 off. 30' to 25'	4.9	146.7	77.0	750	4350
10/12/2017	5	6+40 to 6+55 off. 25' to 0'	N/T	N/T	N/T	745	4030
10/12/2017	6	6+40 to 6+55 off. 0' to -25'	3.6	147.6	75.0	790	4780
10/12/2017	7	6+40 to 6+55 off. -25' to -30'	5.1	N/T	N/T	705	3930
10/24/2017	1	5+70 to 5+85 & 6+25 to 6+33 off. 15' to 30'	4.9	147.5	N/T	808	N/T
10/24/2017	2	6+33 to 6+40 off. 15' to 30' & 5+85 to 6+00 off. 0' to 15'	N/T	N/T	N/T	808	N/T
10/24/2017	3	6+10 to 6+25 off. 0' to 15' & 5+70 to 5+80 off. 0' to -15'	6.1	145.0	N/T	876	N/T
10/24/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. 0' to -15' & 5+85 to 5+87 off. -15' to -30'	N/T	N/T	N/T	843	N/T
10/24/2017	5	5+87 to 6+00 & 6+10 to 6+21 off. -15' to -30'	5.3	147.6	N/T	795	N/T
10/24/2017	6	6+21 to 6+25 off -15' to -30'	7.3	143.4	N/T	687	N/T
10/30/2017	1	5+85 to 6+00 off. 15' to 30' & 5+70 to 5+75 off. 0' to 15'	6.3	145.0	67.0	677	N/T
10/30/2017	2	5+75 to 5+85 & 6+00 to 6+10 off. 0' to 15' & 5+85 to 5+88 off. 0' to -15'	N/T	N/T	N/T	819	N/T
10/30/2017	3	5+88 to 6+00 off. 0' to -15' & 5+70 to 5+80 off. -15' to -30'	5.0	146.6	70.0	684	N/T
10/30/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. -15' to -30' & 6+10 to 6+15 off. -10' to -15'	N/T	N/T	N/T	744	N/T
10/30/2017	5	6+10 to 6+15 off. 0' to -10', 6+15 to 6+25 off. 0' to -15' & 6+25 to 6+33 off. 0' to 15'	5.7	146.2	66.0	789	N/T
10/30/2017	6	6+33 to 6+40 off. 0' to 15' & 6+10 to 6+20 off. 15' to 30'	N/T	N/T	N/T	721	N/T
10/30/2017	7	6+20 to 6+25 off. 15' to 30'	2.7	149.9	67.0	809	N/T

Date	Load	Location	7 Day Resonant Frequency	28 Day Flexural Strength	28 Day Flexural Strength	28 Day Flexural Strength	28 Day Compressive Strength
			psi	*psi*	*psi*	*psi*	*psi*
12/28/2016	1	4+00 to 3+75 Lane 1	N/T	555	625	560	4320
12/28/2016	2	3+75 to 3+45 Lane 1	N/T	560	475	550	4440
12/28/2016	3	3+45 to 3+15 Lane 1	N/T	500	570	580	4360
12/28/2016	4	3+15 to 3+00 Lane 1 & 4+00 to 3+90 Lane 3	N/T	560	525	480	4160
12/28/2016	5	3+90 to 3+60 Lane 3	N/T	560	545	530	4450
12/28/2016	6	3+60 to 3+30 Lane 3	N/T	590	540	545	4480
12/28/2016	7	3+30 to 3+05 Lane 3	N/T	580	554	570	4630
12/28/2016	8	3+05 to 3+00 Lane 3 & 4+00 to 3+75 Lane 5	N/T	530	520	N/T	4610
12/28/2016	9	3+75 to 3+45 Lane 5	N/T	590	560	N/T	4630
12/28/2016	10	3+45 to 3+20 Lane 5	N/T	560	645	595	5120
12/28/2016	11	3+20 to 3+00 Lane 5	N/T	N/T	N/T	N/T	4240
1/4/2017	1	4+00 to 3+75 Lane 2	N/T	565	565	540	4670
1/4/2017	2	3+75 to 3+50 Lane 2	N/T	575	570	560	4290
1/4/2017	3	3+50 to 3+20 Lane 2	N/T	515	590	530	4100
1/4/2017	4	3+20 to 3+00 Lane 2 & 4+00 to 3+90 Lane 4	N/T	555	595	560	4670
1/4/2017	5	3+90 to 3+60 Lane 4	N/T	580	545	555	4350
1/4/2017	6	3+60 to 3+30 Lane 4	N/T	540	550	540	4130
1/4/2017	7	3+30 to 3+05 Lane 4	N/T	585	575	545	4370
1/4/2017	8	3+05 to 3+00 Lane 4	N/T	N/T	N/T	N/T	N/T
4/27/2017	1	5+00 to 4+80 Lane 1	4113000	700	660	695	5370
4/27/2017	2	4+80 to 4+60 Lane 1	4869000	655	630	620	4770
4/27/2017	3	4+60 to 4+40 Lane 1	4704000	615	610	595	4450
4/27/2017	4	4+40 to 4+25 Lane 1	5022333	600	580	585	4700
4/27/2017	5	4+25 to 4+05 Lane 1	4841000	585	600	625	4580
4/27/2017	6	4+05 to 4+00 Lane 1 & 5+00 to 4+90 Lane 3	4949000	650	655	665	4680
4/27/2017	7	4+90 to 4+70 Lane 3	4680000	630	620	580	4450
4/27/2017	8	4+70 to 4+50 Lane 3	4947000	595	635	615	4850
4/27/2017	9	4+50 to 4+35 Lane 3	4970000	635	585	620	4490
4/27/2017	10	4+35 to 4+15 Lane 3	4852000	575	615	590	4330
4/27/2017	11	4+15 to 4+00 Lane 3	4724000	580	625	610	4450
5/2/2017	1	5+00 to 4+80 Lane 2	N/T	525	555	590	4440
5/2/2017	2	4+80 to 4+60 Lane 2	N/T	495	530	520	3670
5/2/2017	3	4+60 to 4+45 Lane 2	N/T	550	600	540	4240
5/2/2017	4	4+45 to 4+25 Lane 2	4323000	550	555	580	4030
5/2/2017	5	4+25 to 4+05 Lane 2	N/T	565	580	550	3710
5/2/2017	6	4+05 to 4+00 Lane 2 & 5+00 to 4+85 Lane 4	4756000	630	575	575	4420
5/2/2017	7	4+85 to 4+70 Lane 4	N/T	585	590	610	4750
5/2/2017	8	4+70 to 4+50 Lane 4	4569000	595	555	585	4360
5/2/2017	9	4+50 to 4+30 Lane 4	N/T	575	575	570	4200
5/2/2017	10	4+30 to 4+15 Lane 4	4166000	555	555	545	4280
5/2/2017	11	4+15 to 4+00 Lane 4	4618000	585	575	560	4070

Date	Load	Location	7 Day Resonant Frequency	28 Day Flexural Strength	28 Day Flexural Strength	28 Day Flexural Strength	28 Day Compressive Strength
			psi	*psi*	*psi*	*psi*	*psi*
5/11/2017	1	5+00 to 5+15 off. 15' to 30'	4420000	460	528	480	3560
5/11/2017	2	5+30 to 5+45 off. 15' to 30'	4723000	590	550	565	4190
5/11/2017	3	5+15 to 5+30 off. 0' to 15'	4514000	535	515	595	4040
5/11/2017	4	5+45 to 5+60 off. 0' to 15'	4603000	570	545	530	3850
5/11/2017	5	5+00 to 5+15 off. 0' to -15'	4352000	495	475	510	3630
5/11/2017	6	5+30 to 5+45 off. 0' to -15'	4353000	490	505	525	3830
5/11/2017	7	5+15 to 5+30 off. -15' to -30'	4265000	485	465	505	3250
5/11/2017	8	5+45 to 5+60 off. -15' to -30'	4290000	505	565	530	3560
5/17/2017	1	5+15 to 5+30 off. 15' to 30'	4277000	505	425	475	2730
5/17/2017	2	5+45 to 5+60 off. 15' to 30'	4179000	510	455	510	3260
5/17/2017	3	5+00 to 5+15 off. 0' to 15'	4677000	570	520	545	3710
5/17/2017	4	5+30 to 5+45 off. 0' to 15'	4782000	590	580	605	4410
5/17/2017	5	5+15 to 5+30 off. 0' to -15'	4323000	525	495	485	3700
5/17/2017	6	5+45 to 5+60 off. 0' to -15'	4227000	495	480	495	3350
5/17/2017	7	5+00 to 5+15 off. -15' to -30'	4471000	525	565	520	3800
5/17/2017	8	5+30 to 5+45 off. -15' to -30'	4859000	590	620	620	4550
10/12/2017	1	5+60 to 5+70 off. 30' to 5'	6239000	967	N/T	N/T	5630
10/12/2017	2	5+60 to 5+70 off. 5' to -20'	6344000	921	N/T	N/T	5380
10/12/2017	3	5+60 to 5+70 off. -20' to -30' & 6+00 to 6+10 off. 30' to 15' & 0' to -5'	5767000	819	N/T	N/T	4790
10/12/2017	4	6+00 to 6+10 off. -5' to -30' & 6+40 to 6+55 off. 30' to 25'	5879000	896	N/T	N/T	5560
10/12/2017	5	6+40 to 6+55 off. 25' to 0'	5809000	881	N/T	N/T	4520
10/12/2017	6	6+40 to 6+55 off. 0' to -25'	6394000	940	N/T	N/T	6160
10/12/2017	7	6+40 to 6+55 off. -25' to -30'	5766000	835	N/T	N/T	5050
10/24/2017	1	5+70 to 5+85 & 6+25 to 6+33 off. 15' to 30'	6199000	934	894	854	5270
10/24/2017	2	6+33 to 6+40 off. 15' to 30' & 5+85 to 6+00 off. 0' to 15'	5942000	794	759	813	4770
10/24/2017	3	6+10 to 6+25 off. 0' to 15' & 5+70 to 5+80 off. 0' to -15'	6255000	890	977	917	5150
10/24/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. 0' to -15' & 5+85 to 5+87 off. -15' to -30'	6252000	782	788	845	5050
10/24/2017	5	5+87 to 6+00 & 6+10 to 6+21 off. -15' to -30'	6028000	782	786	795	4880
10/24/2017	6	6+21 to 6+25 off -15' to -30'	5371000	735	780	615	3910
10/30/2017	1	5+85 to 6+00 off. 15' to 30' & 5+70 to 5+75 off. 0' to 15'	5912000	717	779	953	5230
10/30/2017	2	5+75 to 5+85 & 6+00 to 6+10 off. 0' to 15' & 5+85 to 5+88 off. 0' to -15'	6468000	1003	974	958	6000
10/30/2017	3	5+88 to 6+00 off. 0' to -15' & 5+70 to 5+80 off. -15' to -30'	6120000	905	929	997	5750
10/30/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. -15' to -30' & 6+10 to 6+15 off. -10' to -15'	6140000	921	975	917	5600
10/30/2017	5	6+10 to 6+15 off. 0' to -10', 6+15 to 6+25 off. 0' to -15' & 6+25 to 6+33 off. 0' to 15'	5944000	904	761	882	5440
10/30/2017	6	6+33 to 6+40 off. 0' to 15' & 6+10 to 6+20 off. 15' to 30'	6034000	763	839	841	5290
10/30/2017	7	6+20 to 6+25 off. 15' to 30'	6087000	926	955	970	5780

Date	Load	Location	28 Day Compressive Strength	28 Day Compressive Strength	28 Day Resonant Frequency
			psi	*psi*	*psi*
12/28/2016	1	4+00 to 3+75 Lane 1	4420	4550	5607000
12/28/2016	2	3+75 to 3+45 Lane 1	4380	4370	N/T
12/28/2016	3	3+45 to 3+15 Lane 1	4330	4400	5585000
12/28/2016	4	3+15 to 3+00 Lane 1 & 4+00 to 3+90 Lane 3	4460	4420	N/T
12/28/2016	5	3+90 to 3+60 Lane 3	4490	4630	5608000
12/28/2016	6	3+60 to 3+30 Lane 3	4640	4720	5684333
12/28/2016	7	3+30 to 3+05 Lane 3	4760	4690	N/T
12/28/2016	8	3+05 to 3+00 Lane 3 & 4+00 to 3+75 Lane 5	4480	4590	5764500
12/28/2016	9	3+75 to 3+45 Lane 5	4730	4790	5783000
12/28/2016	10	3+45 to 3+20 Lane 5	4760	4960	5779000
12/28/2016	11	3+20 to 3+00 Lane 5	4420	4690	N/T
1/4/2017	1	4+00 to 3+75 Lane 2	4490	4580	5736000
1/4/2017	2	3+75 to 3+50 Lane 2	3720	4060	5507000
1/4/2017	3	3+50 to 3+20 Lane 2	4040	4100	N/T
1/4/2017	4	3+20 to 3+00 Lane 2 & 4+00 to 3+90 Lane 4	4820	4790	5646500
1/4/2017	5	3+90 to 3+60 Lane 4	3820	4330	5658667
1/4/2017	6	3+60 to 3+30 Lane 4	4200	4190	5646000
1/4/2017	7	3+30 to 3+05 Lane 4	4150	4400	5648500
1/4/2017	8	3+05 to 3+00 Lane 4	N/T	N/T	N/T
4/27/2017	1	5+00 to 4+80 Lane 1	5160	5190	5332333
4/27/2017	2	4+80 to 4+60 Lane 1	4640	4750	5320333
4/27/2017	3	4+60 to 4+40 Lane 1	4520	4390	5055667
4/27/2017	4	4+40 to 4+25 Lane 1	4630	4490	5230667
4/27/2017	5	4+25 to 4+05 Lane 1	4660	4550	5255333
4/27/2017	6	4+05 to 4+00 Lane 1 & 5+00 to 4+90 Lane 3	4690	5070	5449333
4/27/2017	7	4+90 to 4+70 Lane 3	4510	4280	5175000
4/27/2017	8	4+70 to 4+50 Lane 3	4910	4600	5267333
4/27/2017	9	4+50 to 4+35 Lane 3	4510	4680	5198667
4/27/2017	10	4+35 to 4+15 Lane 3	4360	4350	5139667
4/27/2017	11	4+15 to 4+00 Lane 3	4310	4450	5297667
5/2/2017	1	5+00 to 4+80 Lane 2	4470	4190	5257667
5/2/2017	2	4+80 to 4+60 Lane 2	3660	4240	4869000
5/2/2017	3	4+60 to 4+45 Lane 2	4280	4420	5175667
5/2/2017	4	4+45 to 4+25 Lane 2	3960	4090	4867667
5/2/2017	5	4+25 to 4+05 Lane 2	4200	4360	5003333
5/2/2017	6	4+05 to 4+00 Lane 2 & 5+00 to 4+85 Lane 4	4550	4550	5246000
5/2/2017	7	4+85 to 4+70 Lane 4	4600	4580	5364000
5/2/2017	8	4+70 to 4+50 Lane 4	4360	4260	5141667
5/2/2017	9	4+50 to 4+30 Lane 4	4150	4130	5090667
5/2/2017	10	4+30 to 4+15 Lane 4	4210	4280	5133667
5/2/2017	11	4+15 to 4+00 Lane 4	4190	4140	5064667

Date	Load	Location	28 Day Compressive Strength	28 Day Compressive Strength	28 Day Resonant Frequency
			psi	*psi*	*psi*
5/11/2017	1	5+00 to 5+15 off. 15' to 30'	3480	3400	4672667
5/11/2017	2	5+30 to 5+45 off. 15' to 30'	4140	4230	5058667
5/11/2017	3	5+15 to 5+30 off. 0' to 15'	4070	N/T	4897333
5/11/2017	4	5+45 to 5+60 off. 0' to 15'	3930	3910	5085667
5/11/2017	5	5+00 to 5+15 off. 0' to -15'	3680	3760	4586000
5/11/2017	6	5+30 to 5+45 off. 0' to -15'	3960	3830	4752333
5/11/2017	7	5+15 to 5+30 off. -15' to -30'	3340	3340	4551000
5/11/2017	8	5+45 to 5+60 off. -15' to -30'	3570	3460	4639667
5/17/2017	1	5+15 to 5+30 off. 15' to 30'	2780	3040	4629333
5/17/2017	2	5+45 to 5+60 off. 15' to 30'	3110	3210	4646667
5/17/2017	3	5+00 to 5+15 off. 0' to 15'	3790	3800	5028667
5/17/2017	4	5+30 to 5+45 off. 0' to 15'	4230	4350	5069333
5/17/2017	5	5+15 to 5+30 off. 0' to -15'	3670	3720	4696000
5/17/2017	6	5+45 to 5+60 off. 0' to -15'	3180	3230	4579000
5/17/2017	7	5+00 to 5+15 off. -15' to -30'	3830	3830	4774667
5/17/2017	8	5+30 to 5+45 off. -15' to -30'	4560	4640	5121333
10/12/2017	1	5+60 to 5+70 off. 30' to 5'	N/T	N/T	6213000
10/12/2017	2	5+60 to 5+70 off. 5' to -20'	N/T	N/T	6685000
10/12/2017	3	5+60 to 5+70 off. -20' to -30' & 6+00 to 6+10 off. 30' to 15' & 0' to -5'	N/T	N/T	6064000
10/12/2017	4	6+00 to 6+10 off. -5' to -30' & 6+40 to 6+55 off. 30' to 25'	N/T	N/T	6245000
10/12/2017	5	6+40 to 6+55 off. 25' to 0'	N/T	N/T	6072000
10/12/2017	6	6+40 to 6+55 off. 0' to -25'	N/T	N/T	6775000
10/12/2017	7	6+40 to 6+55 off. -25' to -30'	N/T	N/T	6125000
10/24/2017	1	5+70 to 5+85 & 6+25 to 6+33 off. 15' to 30'	5430	5820	6690000
10/24/2017	2	6+33 to 6+40 off. 15' to 30' & 5+85 to 6+00 off. 0' to 15'	5000	4620	6314000
10/24/2017	3	6+10 to 6+25 off. 0' to 15' & 5+70 to 5+80 off. 0' to -15'	4910	5200	6444333
10/24/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. 0' to -15' & 5+85 to 5+87 off. -15' to -30'	5330	4950	6361000
10/24/2017	5	5+87 to 6+00 & 6+10 to 6+21 off. -15' to -30'	4840	4720	6234667
10/24/2017	6	6+21 to 6+25 off -15' to -30'	3850	3910	5941667
10/30/2017	1	5+85 to 6+00 off. 15' to 30' & 5+70 to 5+75 off. 0' to 15'	5280	4890	6212333
10/30/2017	2	5+75 to 5+85 & 6+00 to 6+10 off. 0' to 15' & 5+85 to 5+88 off. 0' to -15'	6210	6350	6625000
10/30/2017	3	5+88 to 6+00 off. 0' to -15' & 5+70 to 5+80 off. -15' to -30'	5460	5610	6491667
10/30/2017	4	5+80 to 5+85 & 6+25 to 6+40 off. -15' to -30' & 6+10 to 6+15 off. -10' to -15'	5890	5940	6511333
10/30/2017	5	6+10 to 6+15 off. 0' to -10', 6+15 to 6+25 off. 0' to -15' & 6+25 to 6+33 off. 0' to 15'	5380	5180	6508333
10/30/2017	6	6+33 to 6+40 off. 0' to 15' & 6+10 to 6+20 off. 15' to 30'	5150	5330	6382000
10/30/2017	7	6+20 to 6+25 off. 15' to 30'	5940	5270	6951667

Location	Elastic Modulus
	psi
4+00 to 4+15 off. -30' to -15'	4148909
4+15 to 4+30 off. -30' to -15'	6195966
4+30 to 4+45 off. -30' to -15'	5984464
4+45 to 4+60 off. -30' to -15'	5128746
4+60 to 4+75 off. -30' to -15'	5746704
4+75 to 4+90 off. -30' to -15'	5637179
5+00 to 5+15 off. -30' to -15'	4935040
5+15 to 5+30 off. -30' to -15'	5102180
5+30 to 5+45 off. -30' to -15'	5002904
5+45 to 5+60 off. -30' to -15'	5137463
5+70 to 5+85 off. -30' to -15'	3409513
5+85 to 6+00 off. -30' to -15'	3552709
6+10 to 6+25 off. -30' to -15'	4614174
6+25 to 6+40 off. -30' to -15'	4524094
4+00 to 4+15 off. -15' to 0'	5955603
4+15 to 4+30 off. -15' to 0'	6234370
4+30 to 4+45 off. -15' to 0'	6248808
4+45 to 4+60 off. -15' to 0'	6174574
4+60 to 4+75 off. -15' to 0'	6216956
4+75 to 4+90 off. -15' to 0'	5850902
5+00 to 5+15 off. -15' to 0'	5520415
5+15 to 5+30 off. -15' to 0'	5595595
5+30 to 5+45 off. -15' to 0'	5703681
5+45 to 5+60 off. -15' to 0'	5592944
5+70 to 5+85 off. -15' to 0'	3384967
5+85 to 6+00 off. -15' to 0'	3911461
6+10 to 6+25 off. -15' to 0'	4758969
6+25 to 6+40 off. -15' to 0'	5117622
4+00 to 4+15 off. 0' to 15'	5737820
4+15 to 4+30 off. 0' to 15'	5958248
4+30 to 4+45 off. 0' to 15'	6019275
4+45 to 4+60 off. 0' to 15'	6043104
4+60 to 4+75 off. 0' to 15'	6096193
4+75 to 4+90 off. 0' to 15'	6089825
5+00 to 5+15 off. 0' to 15'	6045440
5+15 to 5+30 off. 0' to 15'	5894578
5+30 to 5+45 off. 0' to 15'	5770627
5+45 to 5+60 off. 0' to 15'	5614921
5+70 to 5+85 off. 0' to 15'	4016650
5+85 to 6+00 off. 0' to 15'	4001897
6+10 to 6+25 off. 0' to 15'	4514788
6+25 to 6+40 off. 0' to 15'	4992207
4+00 to 4+15 off. 15' to 30'	5470542
4+15 to 4+30 off. 15' to 30'	5344641
4+30 to 4+45 off. 15' to 30'	4625346

Location	Elastic Modulus
	psi
4+45 to 4+60 off. 15' to 30'	4278173
4+60 to 4+75 off. 15' to 30'	6033872
4+75 to 4+90 off. 15' to 30'	5981940
5+00 to 5+15 off. 15' to 30'	5979745
5+15 to 5+30 off. 15' to 30'	4560311
5+30 to 5+45 off. 15' to 30'	5869781
5+45 to 5+60 off. 15' to 30'	5385948
5+70 to 5+85 off. 15' to 30'	3977617
5+85 to 6+00 off. 15' to 30'	3892875
6+10 to 6+25 off. 15' to 30'	4481698
6+25 to 6+40 off. 15' to 30'	4553673

P-501 (650 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 12/28/2016

Placement Location = Sta. 3+00 to 4+00, Lanes 1, 3 & 5 (See Attached Placement Map)

7 Day Testing Completed on 01/04/2017

28 Day Testing Completed on 01/25/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	28.9 F	25.2 F	82%	3.5 mph NW	10.0 miles	Clear
2:54 PM	46.0 F	25.0 F	44%	16.1 mph NW	10.0 miles	Clear

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam Strength (PSI Flex)				Cylinder Strength (PSI)			Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	28 Day	28 Day	28 Day	28 Day	28 Day	
12/28/2016	1	226	7:40 AM	8:19 AM	QC (Craig)	8	2.00	N/T	5.25	6.5	N/T	N/T	138.2	70.0	172	500	555	625	560	4,320	4,420	4,550	101 revs 1st Test, 172 revs 2nd Test, Added 5 gal + 3 gal (1 yard out)
					QA (CSRA)	N/T	N/T	N/T	4.25	N/T	N/T	N/T	43.84	N/T	N/T		Average =		580.0	Average =		4,430	
12/28/2016	2	236	8:00 AM	8:30 AM	QC (Craig)	20	3.50	4.5	N/T	N/T	N/T	N/T	137.8	69.8	117	480	560	475	550	4,440	4,380	4,370	No Samples Taken from Truck, All from Test Item (7 beams, 3 cylinders)
					QA (CSRA)	Concrete Not QA Tested											Average =		528.3	Average =		4,397	
12/28/2016	3	242	8:20 AM	9:21 AM	QC (Craig)	30	4.00	4.0	N/T	N/T	N/T	N/T	141.3	72.0	193	505	500	570	580	4,360	4,330	4,400	Added 20 gal Sitting
					QA (CSRA)	Concrete Not QA Tested											Average =		550.0	Average =		4,363	
12/28/2016	4	226	9:37 AM	10:02 AM	QC (Craig)	5	3.50	6.9	N/T	N/T	N/T	N/T	137.4	69.9	213	480	560	525	480	4,160	4,460	4,420	
					QA (CSRA)	Concrete Not QA Tested											Average =		521.7	Average =		4,347	
12/28/2016	5	236	Missing Ticket	10:37 AM	QC (Craig)	10	5.25	6.2	N/T	N/T	N/T	N/T	137.6	66.3	92	480	560	545	530	4,450	4,490	4,630	Batch Ticket Missing, Truck #4 ticket is one attached from Placement
					QA (CSRA)	N/T	3.75	6.0	N/T	N/T	N/T	N/T	43.44	N/T	N/T		Average =		545.0	Average =		4,523	
12/28/2016	6	242	10:36 AM	11:10 AM	QC (Craig)	10	3.50	N/T	5.50	5.3	N/T	N/T	140.2	65.3	126	485	590	540	545	4,480	4,640	4,720	Reran Slump due to Bad Form (5.25"), Added 5 gal at midpoint of placement
					QA (CSRA)	Concrete Not QA Tested											Average =		558.3	Average =		4,613	
12/28/2016	7	226	11:01 AM	11:33 AM	QC (Craig)	5	6.75	N/T	3.50	5.8	N/T	N/T	138.8	67.5	156	455	580	554	570	4,630	4,760	4,690	Slump High, Let Sit for 10 minutes
					QA (CSRA)	Concrete Not QA Tested											Average =		568.0	Average =		4,693	
12/28/2016	8	236	11:41 AM	12:11 PM	QC (Craig)	5	2.75	N/T	4.25	6.0	N/T	N/T	140.1	69.0	66	480	530	520	N/T	4,610	4,480	4,590	Added 3 gal after Lane Change 3 to 5, Beam #3 Broke while Testing
					QA (CSRA)	Concrete Not QA Tested											Average =		525.0	Average =		4,560	
12/28/2016	9	242	12:22 PM	12:55 PM	QC (Craig)	10	4.50	5.5	N/T	N/T	N/T	N/T	140.2	69.0	127	485	590	560	N/T	4,630	4,730	4,790	10 gal added Pre-Slump, Beam #3 Broke while Testing
					QA (CSRA)	N/T	3.25	5.6	N/T	N/T	N/T	N/T	43.60	N/T	N/T		Average =		575.0	Average =		4,717	
12/28/2016	10	226	12:57 PM	1:20 PM	QC (Craig)	5	4.50	7.0	N/T	N/T	N/T	N/T	137.4	68.1	119	495	560	645	595	5,120	4,760	4,960	
					QA (CSRA)	Concrete Not QA Tested											Average =		600.0	Average =		4,947	
12/28/2016	11	236	1:24 PM	1:50 PM	QC (Craig)	0	3.5	6.0	N/T	N/T	N/T	N/T	139.2	65.6	95	N/T	N/T			4,240	4,420	4,690	No Beams Taken
					QA (CSRA)	Concrete Not QA Tested											Average =		N/T	Average =		4,450	

650 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Tuckahoe 5/8" Round Stone	1,315	lbs.
Penn Jersey 3/4" Round Stone	365	lbs.
Tuckahoe Sand	1,355	lbs.
Water	212	lbs.
Type I Portland Cement	329	lbs.
Flyash Type F (30%)	141	lbs.
Air %	6.0	
W/C Ratio	0.45	
Target Slump	4"	

Batch Ticket Information

Load #	YD^3 Batch	5/8" Stone	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
1 (226)	10.0	13,040	4,040	13,960	122.8	3,320	1,430	60.0	188.0
2 (236)	10.0	13,100	3,640	13,920	122.8	3,260	1,490	60.0	188.0
3 (242)	10.0	13,140	3,620	13,940	152.2	3,250	1,430	60.0	188.0
4 (226)	10.0	13,120	3,640	13,900	152.8	3,250	1,400	60.0	188.0
5 (236)	Missing Truck Ticket, Truck #4 Ticket Attached in Error								
6 (242)	10.0	13,140	3,620	13,900	152.8	3,270	1,400	62.0	188.0
7 (226)	10.0	13,120	3,620	13,920	152.2	3,270	1,400	60.0	188.0
8 (236)	10.0	13,080	3,680	13,920	153.4	3,310	1,400	61.0	188.0
9 (242)	10.0	13,120	3,620	13,900	152.8	3,280	1,400	59.0	188.0
10 (226)	10.0	13,080	3,680	13,940	152.2	3,270	1,430	62.0	188.0
11 (236)	7.0	9,160	2,540	9,720	108.4	2,310	980	42.0	132.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - CSRA QA Field Notes C - Batch Tickets D - NAPTF Lab Testing Information E - Admixture Information F - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-1

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Joe Landy, Ranford Washington, Brian Hirsh, Troy Frable

DATE INSPECTED: 12/28/16 REPORT NO.: CP-1

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air Content (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
1 / 226	8:19 AM	5.25	6.50	138.2	70.0	7	3
2 / 336	8:30 AM	3.50	4.50	137.8	69.8	7	3
3 / 242	9:21 AM	4.00	4.00	141.3	72.0	7	3
4 / 226	10:02 AM	3.50	6.90	137.4	69.9	7	3
5 / 336	10:37 AM	5.25	6.20	137.6	66.3	7	3
6 / 242	11:10 AM	5.50	5.30	140.2	65.3	7	3
7 / 226	11:33 AM	3.50	5.80	138.8	67.5	7	3
8 / 336	12:11 PM	4.25	6.00	140.1	69.0	7	3
9 / 242	12:55 PM	4.50	5.50	140.2	69.0	7	3
10 / 226	1:20 PM	4.50	7.00	137.4	68.1	7	3
11 / 336	1:50 PM	3.50	6.00	139.2	65.6	0	3

Remarks: All test results recorded were given to SRA personnel on site at the time of testing.

Reported to: Project Distribution Reviewed By: Ian Craig

CSRA

6 4
4 6

#1

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12-28-2016 Air Temp _____

TRUCK # 226

TIME DISPATCHED 7:59 AM

TIME ARRIVED 8:09 AM

REVOLUTIONS 172

Initial Slump 2" Water Added 8 GAL

@ 101 REV. Slump #2 5 1/4" QA 4 1/4" Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight 442 QA 43.84

Air Content 6.5 QA. Conveyor Air _____

Placement Location: _____

Notes:

8 GAL/CY HELD
TOTAL ≈ 80 GAL
CAN WEIGHT 9.64

4 GAL ADDED @ SITE
NO SAMPLING

* ADDED 5 GAL + 3 GAL
(1 YD OUT)

#2

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12/28 Air Temp _____

TRUCK # 236

TIME DISPATCHED 8:18

TIME ARRIVED 8.55 IN BLDG TICKET 8:30

REVOLUTIONS 117

Initial Slump 3 1/2" Water Added 20 GAL

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 69.8 Weight 44.58

Air Content 4.5 Conveyor Air _____

Placement Location: _____

Notes:

NO SAMPLES TAKEN FROM TRUCK
25 x 12 x 75
ALL FROM TEST ITEM
(7) BEAMS
(3) CYL

CSRA

#3

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12-28-2016 Air Temp _____

TRUCK # 242

TIME DISPATCHED 8:46

TIME ARRIVED 9:35 8:50 [illegible]

REVOLUTIONS 192

Initial Slump 4.0 Water Added 10

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 72 Weight 44.58

Air Content 4.0 Conveyor Air _____

Placement Location: _____

Notes:

ADDED 20 GAL SITTING

#4

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12-28-2016 Air Temp _____

TRUCK # 226

TIME DISPATCHED _____

TIME ARRIVED 10:02

REVOLUTIONS 213

Initial Slump 3½ Water Added 5 GAL

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 70.0 Weight 43.98

Air Content 6.9 Conveyor Air _____

Placement Location: _____

Notes:

#5 CSRA

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12/28/16 Air Temp _____

TRUCK # 236

TIME DISPATCHED _____

TIME ARRIVED 10:36

REVOLUTIONS 92

Initial Slump 5 1/4 QA 3 3/4 Water Added 10

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 66.3 Weight 44.04 QA 43.44

Air Content 6.2 QA 6.0 Conveyor Air _____

Placement Location: _____

_____

Notes:

#6

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12/29 Air Temp _____

TRUCK # 242

TIME DISPATCHED _____

TIME ARRIVED 11:06

REVOLUTIONS 126

Initial Slump 3 1/2 Water Added 10 GALLONS

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight 44.68

Air Content 5.3 Conveyor Air _____

Placement Location: _____

_____

Notes:

RERAN SLUMP "BAD FORM"
5 1/4 5 1/4

ADDING 5 GAL @ MIDPOINT.

CSRA

#7

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12/28 Air Temp _____

TRUCK # 226

TIME DISPATCHED _____

TIME ARRIVED 11:25

REVOLUTIONS 156

Initial Slump 6 3/4 Water Added 5 GAL

Slump #2 3 1/2 Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 67.5 Weight 44.34

Air Content 5.8 Conveyor Air _____

Placement Location: _____

Notes:

HIGH SLUMP LET SET FOR 10 MINUTES

~~PUMP LOAD~~

#8

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12/28 Air Temp _____

TRUCK # 236

TIME DISPATCHED _____

TIME ARRIVED 12:10

REVOLUTIONS 66

Initial Slump 2 3/4 Water Added 5 GALL

Slump #2 4 1/4 Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp ① 66.2 ② 69.0 Weight 44.66

Air Content 6.0 Conveyor Air _____

Placement Location: _____

Notes:

ADDED 3 gal.

* ADDED AFTER LANE CHANGE 3 TO 5

CSRA

#9

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12/28 Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED 12:55

REVOLUTIONS 127

Initial Slump 4.5 QA 3.25 Water Added 10 GAL PRE SLUMP

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 69.1 Weight 44.70 QA 43.60

Air Content 5.5 QA 5.4 Conveyor Air _____

Placement Location: _____

_____

Notes:

#10

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12/28 Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED 1:20

REVOLUTIONS 119

Initial Slump 4.5 Water Added _____ ADDED 5

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 68.1 Weight 43.98

Air Content 7.6 Conveyor Air _____

Placement Location: _____

_____

Notes:

#11 CSRA

CC-8 P-501 FIELD PLACEMENT NOTES

DATE 12/28 Air Temp _____

TRUCK # 236

TIME DISPATCHED _____

TIME ARRIVED 1:51

REVOLUTIONS 95

Initial Slump 3½ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 65.6 Weight 44.44

Air Content 6.0 Conveyor Air _____

Placement Location: _____

_____

Notes:

CC-8 P-501 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Placement Location: _____

_____

Notes:

#1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7063427	0	7:40	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61929

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13960 lb	3.25% M
3/4LOCAL	365 lb	17610 lb	18000 lb	>
5/8LOCAL	1315 lb	31150 lb	31040 lb	
TYPE1	329.0 lb	3290.0 lb	3320.0 lb	
FLYASH	141.0 lb	4730.0 lb	4750.0 lb	
WATER	25.5 gl	122.2 gl	122.8 gl	
AIR	6.10 oz	61.00 oz	60.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Num Batches: 1

Load 36831 lb

Slump: 4.00 in #

Held

-8 per yd

DELIVERY TICKET

#1

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHAND	226	759
ARRIVE JOB	DEPART JOB	TIME IN
810		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
E SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
D AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
TERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063427	NET 30		12/28/16	07:3

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	650FLEX2A	650 FLEX 2		10.00		
10.00 1.00			ENV F20 FSC WC	ENVIRONM FREIGHT FUELSC WINTER		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:10		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

#2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
236		user	7063429	0	8:00	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61931

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13920 lb	3.25% M
3/4LOCAL	365 lb	17570 lb	17560 lb	
5/8LOCAL	1315 lb	30710 lb	30660 lb	
TYPE1	329.0 lb	3290.0 lb	3260.0 lb	
FLYASH	141.0 lb	4670.0 lb	4750.0 lb	>
WATER	25.5 gl	122.2 gl	122.8 gl	
AIR	6.10 oz	61.00 oz	60.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Num Batches: 1

Load 36451 lb

Slump: 4.00 in #

Held 4 gallon per yd

DELIVERY TICKET

#2

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8125
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
PDALE	236	8:18
ARRIVE JOB	DEPART JOB	TIME IN
8:30		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063429	NET 30		12/28/16	07:59

#1

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:20		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

#3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
242		user	7063431	0	8:20	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61933

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13940 lb	3.25% M
3/4LOCAL	365 lb	17590 lb	17560 lb	
5/8LOCAL	1315 lb	30710 lb	30700 lb	
TYPE1	329.0 lb	3290.0 lb	3250.0 lb	*
FLYASH	141.0 lb	4660.0 lb	4680.0 lb	*
WATER	25.5 gl	151.6 gl	152.2 gl	
AIR	6.10 oz	61.00 oz	60.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual
Load 36670 lb
Slump: 4.00 in #

Num Batches: 1

Held
- 4.5 gallon per yd

DELIVERY TICKET

#3

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
JBEAT	242	8:46 AM
ARRIVE JOB	**DEPART JOB**	**TIME IN**
8:56AM		

N TE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
IE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
D AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
EN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063431	NET 30		12/28/16	08:17

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: FIRST GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:30		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

#4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7063440	0	9:37	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61941

Matenal	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13900 lb	3.25% M
3/4LOCAL	365 lb	17550 lb	17540 lb	
5/8LOCAL	1315 lb	30690 lb	30660 lb	
TYPE1	329.0 lb	3290.0 lb	3250.0 lb	
FLYASH	141.0 lb	4660.0 lb	4650.0 lb	
WATER	25.5 gl	152.2 gl	152.8 gl	
AIR	6.10 oz	61.00 oz	60.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Num Batches: 1

Load 36600 lb

Slump: 4.00 in #

-5 gallon per yd

DELIVERY TICKET

#4

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHAND	226	949
ARRIVE JOB	DEPART JOB	TIME IN
1004		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063440	NET 30		12/28/16	09:3

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
SECOND GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	650FLEX2A	650 FLEX 2		10.00		
10.00 1.00			ENV F20 FSC WC	ENVIRONM FREIGHT FUELSC WINTER		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:40		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

RECEIVED

CUSTOMER COPY

#5

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7063440	57366	9:37	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61941

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13900 lb	3.25% M
3/4LOCAL	365 lb	17550 lb	17540 lb	
5/8LOCAL	1315 lb	30690 lb	30660 lb	
TYPE1	329.0 lb	3290.0 lb	3250.0 lb	
FLYASH	141.0 lb	4660.0 lb	4650.0 lb	
TEMPER	.0	15.0 gl	15.0 gl	
WATER	25.5 gl	152.2 gl	152.8 gl	
AIR	6.10 oz	61.00 oz	60.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Num Batches: 1

Load 36726 lb

Slump: 4.00 in #

-4 gallon per yd

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8185
PLANT 609-641-5994

DRIVER	TRUCK NO.	TIME OUT
PDALE	236	10:21
ARRIVE JOB	**DEPART JOB**	**TIME IN**
10:34		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063443	NET 30		12/28/16	10:05

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
SECOND GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	650FLEX2A	650 FLEX 2		10.00		
10.00 1.00			ENV F20 FSC WC	ENVIRONM FREIGHT FUELSC WINTER		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:50		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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#6

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
242		user	7063445	0	10:36	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61945

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13900 lb	3.25% M
3/4LOCAL	365 lb	17550 lb	17520 lb	
5/8LOCAL	1315 lb	30670 lb	30660 lb	
TYPE1	329.0 lb	3290.0 lb	3270.0 lb	
FLYASH	141.0 lb	4680.0 lb	4670.0 lb	
WATER	25.5 gl	152.2 gl	152.8 gl	
AIR	6.10 oz	61.00 oz	62.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual
Load 36621 lb
Slump: 4.00 in #

Num Batches: 1

-4 yds per yd

DELIVERY TICKET

#6

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
JBEAT	242	10:55AM
ARRIVE JOB	DEPART JOB	TIME IN
11:07AM		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
E SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063445	NET 30		12/28/16	10:35

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: SECOND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:60		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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#7

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7063447	0	11:01	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61947

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13970 lb	13920 lb	3.25% M
3/4LOCAL	365 lb	17570 lb	17540 lb	
5/8LOCAL	1315 lb	30690 lb	30660 lb	
TYPE1	329.0 lb	3290.0 lb	3270.0 lb	
FLYASH	141.0 lb	4680.0 lb	4670.0 lb	
WATER	25.5 gl	152.2 gl	152.2 gl	
AIR	6.10 oz	61.00 oz	60.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Num Batches: 1

Load 36636 lb

Slump: 4.00 in #

-4 gallon per yd

DELIVERY TICKET

#7

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHAND	226	1114
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1125		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063447	NET 30		12/28/16	11:00

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UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO

SECOND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:70		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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#8

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
236		user	7063451	57374	11:41	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61949

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13920 lb	3.25% M
3/4LOCAL	365 lb	17570 lb	17600 lb	
5/8LOCAL	1315 lb	30750 lb	30680 lb	
TYPE1	329.0 lb	3290.0 lb	3310.0 lb	
FLYASH	141.0 lb	4720.0 lb	4710.0 lb	
WATER	25.5 gl	152.2 gl	153.4 gl	
AIR	6.10 oz	61.00 oz	61.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Load 36686 lb

Slump: 4.00 in #

Num Batches: 1

-5 gallon per yd

DELIVERY TICKET

#8

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
PDALE	236	11:56
ARRIVE JOB	DEPART JOB	TIME IN
12:08		

OTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
A DITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063451	NET 30		12/28/16	11:4

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
SECOND GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:80		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE;
MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND
MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND
MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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49

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
242		user	7063454	0	12:22	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61952

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13900 lb	3.25% M
3/4LOCAL	365 lb	17550 lb	17520 lb	
5/8LOCAL	1315 lb	30670 lb	30640 lb	
TYPE1	329.0 lb	3290.0 lb	3280.0 lb	
FLYASH	141.0 lb	4690.0 lb	4680.0 lb	
WATER	25.5 gl	152.2 gl	152.8 gl	
AIR	6.10 oz	61.00 oz	59.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Num Batches: 1

Load 36610 lb

Slump: 4.00 in #

-5 gallon per yd

DELIVERY TICKET

#9

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-5994

DRIVER	TRUCK NO.	TIME OUT
JBEAT	242	12:39PM
ARRIVE JOB	DEPART JOB	TIME IN
12:53PM		

TE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
E SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
D AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
TERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063454	NET 30		12/28/16	12:2

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: SECOND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
) 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	650FLEX2A	650 FLEX 2		10.00		
10.00 1.00			ENV F20 FSC WC	ENVIRONM FREIGHT FUELSC WINTER		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:90		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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#10

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7063457	0	12:57	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	61955

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13990 lb	13940 lb	3.25% M
3/4LOCAL	365 lb	17590 lb	17620 lb	
5/8LOCAL	1315 lb	30770 lb	30700 lb	
TYPE1	329.0 lb	3290.0 lb	3270.0 lb	
FLYASH	141.0 lb	4680.0 lb	4700.0 lb	
WATER	25.5 gl	152.2 gl	152.2 gl	
AIR	6.10 oz	61.00 oz	62.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual
Load 36686 lb
Slump: 4.00 in #

Num Batches: 1

-5 gallon per yd

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHAND	226	110
ARRIVE JOB	**DEPART JOB**	**TIME IN**
120		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063457	NET 30		12/28/16	12:56

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: SECOND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:100		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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#11

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
236		user	7063459	0	13:24	12/28/16

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
7.00 CYDS	650FLEX				W	61957

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	9773 lb	9720 lb	3.25% M
3/4LOCAL	365 lb	12275 lb	12260 lb	
5/8LOCAL	1315 lb	21465 lb	21420 lb	
TYPE1	329.0 lb	2303.0 lb	2310.0 lb	
FLYASH	141.0 lb	3297.0 lb	3290.0 lb	
WATER	25.5 gl	106.6 gl	108.4 gl	
AIR	6.10 oz	42.70 oz	42.00 oz	
HRWR	18.80 oz	131.60 oz	132.00 oz	

Actual
Load 25646 lb
Slump: 4.00 in #

Num Batches: 1

-5 per yd

DELIVERY TICKET

#11

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
PDALE	236	139
ARRIVE JOB	DEPART JOB	TIME IN
150		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7063459	NET 30		12/28/16	13:2

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: SECOND GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
7.00		cy	650FLEX2A	650 FLEX 2		7.00		
0.00								
7.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:107		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** PCC Overlay **Client** FAA-ATRD

Technician: J. Stein **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Lanes 1,3,5														
1	12/28/2016	1/4/2017	7	P	226	6.00	6.05	6.10	6.00	6.00	6.00	18	6090	500
2	12/28/2016	1/4/2017	7	P	236	5.95	6.00	6.10	6.05	6.10	6.05	18	5877	480
3	12/28/2016	1/4/2017	7	P	242	6.05	6.05	5.95	5.95	6.05	6.10	18	6099	505
4	12/28/2016	1/4/2017	7	P	226	5.95	6.00	6.10	6.05	6.00	6.00	18	5799	480
5	12/28/2016	1/4/2017	7	S	236	6.00	6.00	6.00	6.20	6.20	6.25	18	5997	480
6	12/28/2016	1/4/2017	7	P	242	6.05	6.00	5.95	6.00	5.95	6.00	18	5779	485
7	12/28/2016	1/4/2017	7	S	226	6.00	6.00	6.00	6.10	6.15	6.20	18	5606	455
8	12/28/2016	1/4/2017	7	P	236	6.00	6.00	6.00	6.10	6.15	6.20	18	5913	480
9	12/28/2016	1/4/2017	7	P	242	6.00	6.00	6.00	6.05	6.10	6.10	18	5871	485
10	12/28/2016	1/4/2017	7	S	226	6.00	6.05	6.05	6.05	6.00	6.00	18	6019	495
													Average	485
													stdev	15
Lanes 2,4													COV	0.03
1	1/4/2017	1/11/2017	7	P	254	6.00	6.00	6.05	6.00	6.00	6.00	18	5596	465
2	1/4/2017	1/11/2017	7	P	246	6.05	6.00	5.95	5.95	5.90	6.00	18	4990	420
3	1/4/2017	1/11/2017	7	P	240	6.00	6.00	6.05	6.00	6.00	6.05	18	5223	430
4	1/4/2017	1/11/2017	7	P	229	6.05	6.00	6.00	6.05	6.05	6.05	18	5835	480
5	1/4/2017	1/11/2017	7	P	226	6.05	6.05	6.00	6.00	5.95	6.00	18	5487	455
6	1/4/2017	1/11/2017	7	P	246	5.95	6.00	6.05	6.00	6.00	6.00	18	5126	425
7	1/4/2017	1/11/2017	7	P	221	5.95	5.95	6.05	6.10	6.05	6.00	18	5764	480
													Average	450
													stdev	25
													COV	0.06

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project: CC8 Phase 2 | Section: PCC Overlay Lanes 1-3-5 | Client: FAA-ATRD

Technician: J. Stein | Professional Engineer: J. Stein | Date: Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
1	12/28/2016	1/25/2017	28	P	226	6.05	6.05	6.10	6.10	6.05	6.00	18	6867	555
1	12/28/2016	1/25/2017	28			6.00	6.00	6.00	6.10	6.05	5.95	18	7567	625
1	12/28/2016	1/25/2017	28			6.00	6.00	6.00	6.10	6.05	6.05	18	6790	560
2	12/28/2016	1/25/2017	28	P	236	6.05	6.00	5.95	6.00	5.95	5.95	18	6710	560
2	12/28/2016	1/25/2017	28			6.00	6.00	6.00	6.15	6.20	6.20	18	5846	475
2	12/28/2016	1/25/2017	28			5.95	6.00	6.05	5.95	5.95	6.00	18	6563	550
3	12/28/2016	1/25/2017	28	S	242	6.15	6.20	6.25	6.00	6.00	6.05	18	6441	500
3	12/28/2016	1/25/2017	28			6.00	6.10	6.05	6.05	6.05	5.95	18	6945	570
3	12/28/2016	1/25/2017	28			6.05	6.00	6.05	6.00	6.00	5.95	18	7035	580
4	12/28/2016	1/25/2017	28	S	226	6.00	6.00	6.05	6.10	6.10	6.15	18	6878	560
4	12/28/2016	1/25/2017	28			5.95	6.00	6.05	5.95	6.00	6.05	18	6321	525
4	12/28/2016	1/25/2017	28			5.95	6.00	6.05	5.95	6.00	6.10	18	5799	480
5	12/28/2016	1/25/2017	28	P	236	6.05	6.00	6.00	6.05	6.05	6.05	18	6838	560
5	12/28/2016	1/25/2017	28			6.00	6.05	6.05	6.05	6.00	6.05	18	6680	545
5	12/28/2016	1/25/2017	28			6.00	6.05	6.05	6.05	6.05	6.05	18	6498	530
6	12/28/2016	1/25/2017	28	S	242	6.00	6.00	6.00	6.10	6.05	6.10	18	7196	590
6	12/28/2016	1/25/2017	28			6.05	6.00	6.00	6.05	6.05	6.10	18	6579	540
6	12/28/2016	1/25/2017	28			6.05	6.00	6.00	5.95	5.95	5.95	18	6531	545
7	12/28/2016	1/25/2017	28	P	226	5.95	6.00	6.05	6.05	6.00	5.90	18	6934	580
7	12/28/2016	1/25/2017	28			6.00	6.00	6.05	6.00	6.05	6.10	18	6745	554
7	12/28/2016	1/25/2017	28			5.95	6.00	6.05	5.95	6.00	6.00	18	6825	570
8	12/28/2016	1/25/2017	28	P	236	6.05	6.00	6.00	6.05	6.00	6.10	18	6430	530
8	12/28/2016	1/25/2017	28			5.95	6.00	6.05	6.00	6.00	6.00	18	6266	520
8	12/28/2016	1/25/2017	28									18		Broken while seating
9	12/28/2016	1/25/2017	28	S	242	6.05	6.00	6.00	6.05	6.10	6.10	18	7237	590
9	12/28/2016	1/25/2017	28									18		Broken while seating
9	12/28/2016	1/25/2017	28			6.05	6.00	5.95	6.05	6.05	6.00	18	6733	560
10	12/28/2016	1/25/2017	28	P	226	6.00	6.05	6.05	6.00	5.90	5.95	18	6760	560
10	12/28/2016	1/25/2017	28			5.95	6.00	6.05	6.00	6.00	6.00	18	7712	645
10	12/28/2016	1/25/2017	28			6.00	6.00	5.95	5.95	5.95	5.95	18	7035	595
													Average	555
													stdev	35
													COV	0.06

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project:	CC8 Phase 2	Section:	Overlay	Lanes 1-3-5	Client FAA-ATRD
Technician:	MJW	Professional Engineer:	Jeffrey Stein	Date:	

Sample No.	Date Poured	Date Tested	Age	Sta.	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1	12/28/2016	1/25/2017	28	OL		6.00	12.00	122160	28.27	4320	3
2	12/28/2016	1/25/2017	28	OL		6.00	12.00	125460	28.27	4440	3
3	12/28/2016	1/25/2017	28	OL		5.99	12.00	122840	28.18	4360	3
4	12/28/2016	1/25/2017	28	OL		5.99	12.00	117290	28.18	4160	3
5	12/28/2016	1/25/2017	28	OL		5.98	12.00	125060	28.09	4450	3
6	12/28/2016	1/25/2017	28	OL		5.98	12.00	125810	28.09	4480	3
7	12/28/2016	1/25/2017	28	OL		5.98	12.00	129910	28.09	4630	3
8	12/28/2016	1/25/2017	28	OL		5.98	12.00	129340	28.09	4610	3
9	12/28/2016	1/25/2017	28	OL		6.00	12.00	130940	28.27	4630	3
10	12/28/2016	1/25/2017	28	OL		5.96	12.00	142910	27.90	5120	3
11	12/28/2016	1/25/2017	28	OL		6.00	12.00	119970	28.27	4240	3
									Average	4490	
									St. Dev	260	
									COV	0.06	

Capping Standard Used: ASTM C617 Three Cap Checks : XXX Last ASTM C90 Sulfur Test: 11/3/2016

Number of times unbonded cap used prior to testing:

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project:	CC8	Section:	Lanes 1-3-5	Client	FAA-ATRD
Technician:	MJW	Professional Engineer:	Jeffrey Stein	Date:	

Sample No.	Date Poured	Date Tested	Age	Sta.	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1	12/28/2016	1/26/2017	29	OL		6.00	12.23	124980	28.27	4420	3
1	12/28/2016	1/26/2017	29	OL		6.01	12.20	129200	28.37	4550	3
2	12/28/2016	1/26/2017	29	OL		6.00	12.26	123970	28.27	4380	3
2	12/28/2016	1/26/2017	29	OL		6.00	12.25	123510	28.27	4370	3
3	12/28/2016	1/26/2017	29	OL		6.01	12.22	122900	28.37	4330	3
3	12/28/2016	1/26/2017	29	OL		6.02	12.20	125310	28.46	4400	3
4	12/28/2016	1/26/2017	29	OL		6.00	12.29	125980	28.27	4460	3
4	12/28/2016	1/26/2017	29	OL		5.99	12.25	124510	28.18	4420	3
5	12/28/2016	1/26/2017	29	OL		6.00	12.28	126920	28.27	4490	3
5	12/28/2016	1/26/2017	29	OL		6.00	12.26	130880	28.27	4630	3
6	12/28/2016	1/26/2017	29	OL		6.00	12.31	131300	28.27	4640	3
6	12/28/2016	1/26/2017	29	OL		5.99	12.22	133140	28.18	4720	3
7	12/28/2016	1/26/2017	29	OL		6.01	12.25	135160	28.37	4760	3
7	12/28/2016	1/26/2017	29	OL		5.99	12.27	132200	28.18	4690	3
8	12/28/2016	1/26/2017	29	OL		6.00	12.25	126590	28.27	4480	3
8	12/28/2016	1/26/2017	29	OL		6.01	12.23	130190	28.37	4590	3
9	12/28/2016	1/26/2017	29	OL		6.02	12.3	134710	28.46	4730	3
9	12/28/2016	1/26/2017	29	OL		6.02	12.2	136320	28.46	4790	3
10	12/28/2016	1/26/2017	29	OL		6.00	12.3	143200	28.27	4760	3
10	12/28/2016	1/26/2017	29	OL		6.00	12.3	140310	28.27	4960	3
11	12/28/2016	1/26/2017	29	OL		6.00	12.2	124900	28.27	4420	3
11	12/28/2016	1/26/2017	29	OL		6.00	12.2	122630	28.27	4690	3
									Average	4580	
									StDev	170	
									COV	0.04	

Capping Standard Used: ASTM C617 Three Cap Checks : XXX Last ASTM C90 Sulfur Test: 11/3/2016

Number of times unbonded cap used prior to testing:

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

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Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

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NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete
4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

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Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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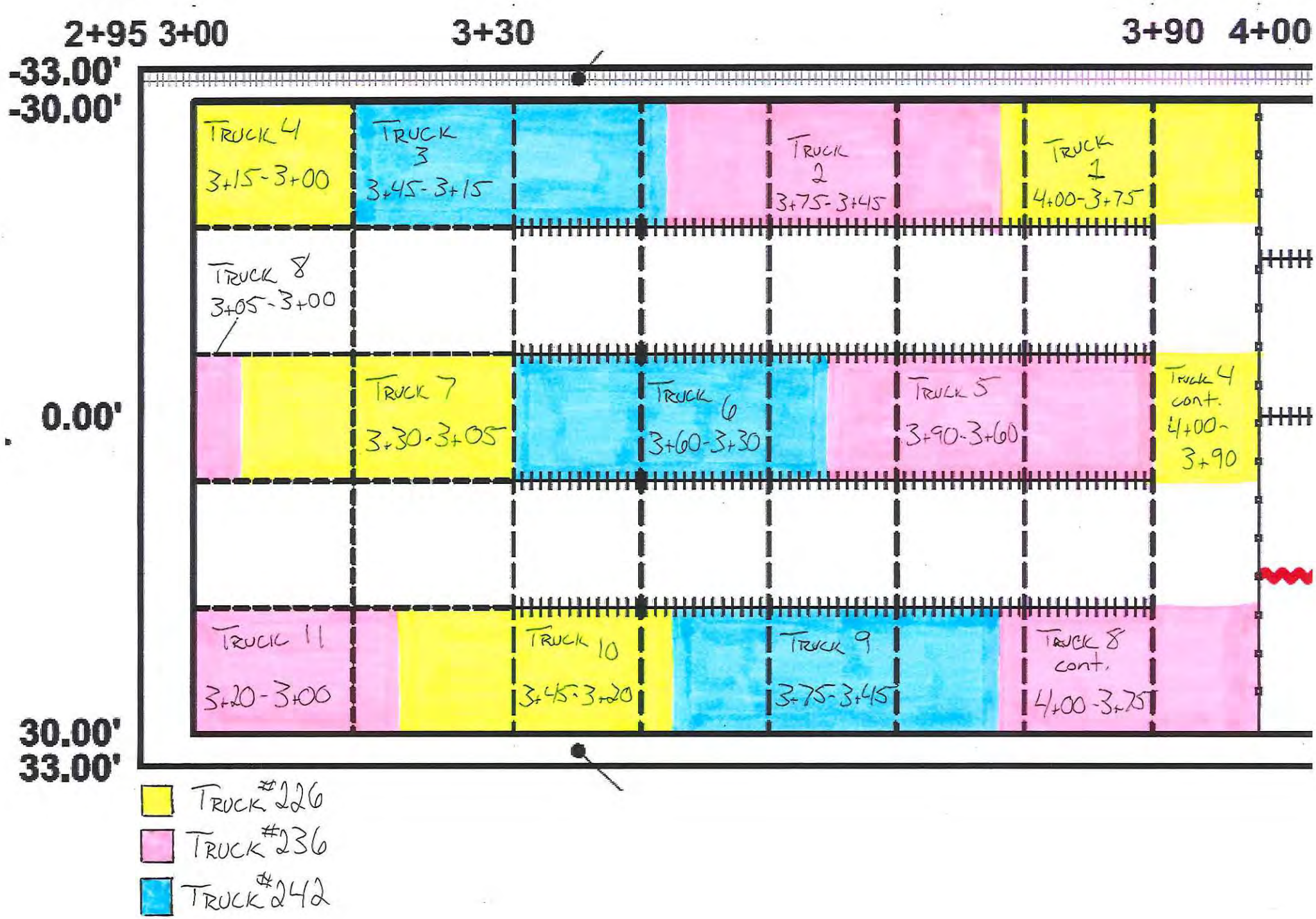
2+95
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0.00'
30.00'
33.00'
TRUCK 4
3+15-3+00
TRUCK 3
3+45-3+15
TRUCK 2
3+75-3+45
TRUCK 1
4+00-3+75
TRUCK 8
3+05-3+00
TRUCK 7
3+30-3+05
TRUCK 6
3+60-3+30
TRUCK 5
3+90-3+60
TRUCK 4 cont.
4+00-3+90
TRUCK 11
3+20-3+00
TRUCK 10
3+45-3+20
TRUCK 9
3+75-3+45
TRUCK 8 cont.
4+00-3+75
TRUCK #226
TRUCK #236
TRUCK #242

P-501 (650 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 01/04/2017

Placement Location = Sta. 3+00 to 4+00, Lanes 2 & 4 (See Attached Placement Map)

7 Day Testing Completed on 01/11/2017

28 Day Testing Completed on 02/01/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	46.0 F	44.1 F	93%	8.1 mph WSW	3.0 miles	Overcast
2:54 PM	53.1 F	39.0 F	59%	11.5 mph W	10.0 miles	Partly Cloudy

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam Strength (PSI Flex)				Cylinder Strength (PSI)			Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	28 Day	28 Day	28 Day	28 Day	28 Day	
1/4/2017	1	254	7:53 AM	8:25 AM	QC (Craig)	4	4.50	6.8	N/T	N/T	N/T	N/T	138.7	69.0	150	465	565	565	540	4,670	4,490	4,580	Added 4 gal of Water @ 3.5-4.0 yards into Truck Placement
					QA (CSRA)	N/T	3.25	6.2	N/T	N/T	N/T	N/T	140.0	71.0	N/T		Average =		556.7		Average =	4,580	
1/4/2017	2	246	8:23 AM	8:50 AM	QC (Craig)	0	5.00	7.4	N/T	N/T	N/T	N/T	137.9	65.1	150	420	575	570	560	4,290	3,720	4,060	
					QA (CSRA)	N/T	4.25	7.2	N/T	N/T	N/T	N/T	138.8	N/T	N/T		Average =		568.3		Average =	4,023	
1/4/2017	3	240	8:54 AM	9:19 AM	QC (Craig)	0	4.75	7.0	N/T	N/T	N/T	N/T	138.4	67.9	96	430	515	590	530	4,100	4,040	4,100	
					QA (CSRA)	N/T	3.50	6.6	N/T	N/T	N/T	N/T	139.6	N/T	N/T		Average =		545.0		Average =	4,080	
1/4/2017	4	229	9:21 AM	9:45 AM	QC (Craig)	5	3.00	5.3	N/T	N/T	N/T	N/T	140.3	69.8	148	480	555	595	560	4,670	4,820	4,790	
					QA (CSRA)	Concrete Not QA Tested											Average =		570.0		Average =	4,760	
1/4/2017	5	226	9:47 AM	10:07 AM	QC (Craig)	8	3.50	N/T	5.25	5.6	N/T	N/T	140.4	66.9	241	455	580	545	555	4,350	3,820	4,330	151 revs 1st test, 241 revs 2nd test
					QA (CSRA)	N/T	2.5	N/T	N/T	5.6	N/T	N/T	N/T	68.0	N/T		Average =		560.0		Average =	4,167	
1/4/2017	6	246	10:17 AM	10:41 AM	QC (Craig)	8	2.25	N/T	3.50	5.6	N/T	N/T	140.5	65.2	71	425	540	550	540	4,130	4,200	4,190	5 gal Water Added after Testing
					QA (CSRA)	N/T	3.00	N/T	3.25	5.4	N/T	N/T	141.4	N/T	N/T		Average =		543.3		Average =	4,173	
1/4/2017	7	221	10:47 AM	11:15 AM	QC (Craig)	5	6.00	N/T	3.75	5.6	N/T	N/T	139.4	60.8	111	480	585	575	545	4,370	4,150	4,400	
					QA (CSRA)	N/T	3.25	N/T	N/T	N/T	N/T	N/T	N/T	N/T	N/T		Average =		568.3		Average =	4,307	
1/4/2017	8	229	11:46 AM	12:08 PM	QC (Craig)	0	4.75	1.8	N/T	N/T	N/T	N/T	145.2	71.3	122	N/T	N/T			N/T			Approval Given by Renaldo Aponte to Place Material in Transition Area
					QA (CSRA)	Concrete Not QA Tested											Average =		N/T		Average =	N/T	

650 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Tuckahoe 5/8" Round Stone	1,315	lbs.
Penn Jersey 3/4" Round Stone	365	lbs.
Tuckahoe Sand	1,355	lbs.
Water	212	lbs.
Type I Portland Cement	329	lbs.
Flyash Type F (30%)	141	lbs.
Air %	6.0	
W/C Ratio	0.45	
Target Slump	4"	

Batch Ticket Information

Load #	YD^3 Batch	5/8" Stone	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
1 (254)	10.0	13,120	3,940	14,020	130.0	3,260	1,410	61.0	188.0
2 (246)	10.0	13,100	3,620	14,040	149.8	3,270	1,410	61.0	188.0
3 (240)	10.0	13,120	3,800	14,020	150.4	3,280	1,400	62.0	188.0
4 (229)	10.0	13,060	3,780	14,020	151.0	3,340	1,430	59.0	188.0
5 (226)	10.0	13,100	3,760	14,020	149.8	3,270	1,430	62.0	188.0
6 (246)	10.0	13,040	3,680	14,000	150.4	3,290	1,430	61.0	188.0
7 (221)	10.0	13,080	3,780	14,060	150.4	3,310	1,400	61.0	188.0
8 (229)	1.5	1,960	620	2,160	19.8	510	210	9.0	28.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - CSRA QA Field Notes C - Batch Tickets D - NAPTF Lab Testing Information E - Admixture Information F - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-1

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Joe Landy, Brian Hirsh, Ranford Washington & Troy Frable

DATE INSPECTED: 1/4/17 REPORT NO.: CP-2

PROJECT PLANS BY: N/A DATED: N/A REVISION NO.: N/A

APPROVAL DATE: N/A

CONCRETE PLACEMENT REPORT

(compressive strength)

LOCATION: Station 3 + 00 to 4 + 00 Middle Strips

Craig Testing Laboratories, Inc. inspector arrived at site as requested by client and inspected concrete placement at the above location per the project plans and documents.

Slump (ASTM C143): * Approved Slump Range: 3" - 6"

Air Content (ASTM C231): * Approved Air % Range: 6.0% ± 1.5%

Temperature (ASTM C1064): * Todays Yardage: 71.5

Concrete Supplier: Penn Jersey Approved Mix ID: 650FLEX2A

Consolidation Method: ☑ Internal ☐ External ☐ Both ☐ None ☐ Other _____ Ambient Temperature (F): *

Strength of Concrete Placed (PSI): 650 Flex No. of Samples (ASTM C31): *

Specimen Type: Cylinder / Beam

Required Strength of Concrete (PSI): 650 Flex On Site Curing Facilities Available ☑ Yes ☐ No

(ACI 301 - 1.6.3.2.d)

☑ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 7:00 - 12:30

☐ Work Above is in Progress and Requires Further Inspection

☐ Field Work is in Substantial Compliance with the following approved documents:

☐ Mix Designs ☐ Drawings ☐ Specifications

☐ Compressive strength samples have met the required strength

☐ ***Inspection done without approved documentation available***

☐ ***Work Deviates from Approved Plans and/or Documents, See NCR No.*** _____

Remarks: All test results recorded were given to SRA personnel on site at the time of testing.
* See attached table for results.

Reported to: Project Distribution Reviewed By: Ian Craig

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-1

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Joe Landy, Ranford Washington, Brian Hirsh, Troy Frable

DATE INSPECTED: 1/4/17 REPORT NO.: CP-2

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
1 / 254	8:25 AM	4.50	6.80	138.7	69.0	7	3
2 / 246	8:50 AM	5.00	7.40	137.9	65.1	7	3
3 / 240	9:19 AM	4.75	7.00	138.4	67.9	7	3
4 / 229	9:45 AM	3.00	5.30	140.3	69.8	7	3
5 / 226	10:07 AM	5.25	5.60	140.4	66.9	7	3
6 / 246	10:41 AM	3.50	5.60	140.5	65.2	7	3
7 / 221	11:15 AM	3.75	5.60	139.4	60.8	7	3
8 / 229	12:08 PM	4.75	1.80	145.2	71.3	0	0

Remarks: Truck # 8 - 229 was placed per Renaldo Aponti of CSRA.
All test results recorded were given to SRA personnel on site at the time of testing.

Reported to: Project Distribution Reviewed By: Ian Craig

CSRA

TRUCK #1

CC-8 P-501 FIELD PLACEMENT NOTES

DATE JAN 4, 2017 **Air Temp** 46.4

TRUCK # 254

TIME DISPATCHED 8:16 AM

TIME ARRIVED 8:23 AM

REVOLUTIONS 75 SPUN ANOTHER 75 BEFORE TESTING

Initial Slump 4 1/2 QA 3 1/4 **Water Added** _____

Slump #2 _____ **Water Added** _____

Slump #3 _____ **Water Added** _____

Final Slump _____ **Conveyor Slump** _____

Concrete Temp 69.0 QA 71.0 **Weight** 44.32 QA 43.58

Air Content 6.9 QA 6.2 **Conveyor Air** _____

Placement Location: LANE 2

Notes:

CRAIL CAN 9.62

NAPTF CAN 8.58

ADDED WATER @ APPROX 3 1/2 / 4 GAL

↳ 4 GAL

TRUCK #2

CC-8 P-501 FIELD PLACEMENT NOTES

DATE JAN 4, 2017 **Air Temp** 47.1

TRUCK # 246

TIME DISPATCHED 8.34

TIME ARRIVED 8.50

REVOLUTIONS 150 SPUN TO FOR SAMPLING

Initial Slump 5 QA 4 1/4 **Water Added** _____

Slump #2 _____ **Water Added** _____

Slump #3 _____ **Water Added** _____

Final Slump _____ **Conveyor Slump** _____

Concrete Temp 65.2 QA **Weight** 44.10 QA 43.28

Air Content 7.4 QA 7.2 **Conveyor Air** _____

Placement Location: _____

Notes:

CSRA

Truck #3

CC-8 P-501 FIELD PLACEMENT NOTES

DATE Jan 4 2017 Air Temp 48.5

TRUCK # 240

TIME DISPATCHED 9:05

TIME ARRIVED 9:19

REVOLUTIONS 96

Initial Slump 4 3/4 QA 3" Water Added

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp 67.9 Weight 44.22 QA 43.48

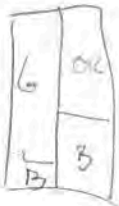
Air Content 7.0 QA 6.6 Conveyor Air

Placement Location:

Notes:

Truck #4

CC-8 P-501 FIELD PLACEMENT NOTES



DATE Jan 4 2017 Air Temp

TRUCK # 229

TIME DISPATCHED 9:32

TIME ARRIVED 9:45

REVOLUTIONS 148

Initial Slump 3" Water Added

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp 69.8 Weight 44.70

Air Content 5.3 Conveyor Air

Placement Location:

Notes:

5 GALLONS ADDED (10 yd IN TRUCK)

CSRA

TRUCK #5

CC-8 P-501 FIELD PLACEMENT NOTES

DATE JAN 4, 2017 **Air Temp** 49.2

TRUCK # 226

TIME DISPATCHED

TIME ARRIVED OUTSIDE 10:08 INSIDE 10:21

REVOLUTIONS 151

Initial Slump 3½ QA 2½ **Water Added**

Slump #2 @241 REVS. 5¼ **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 68.0 **Weight** 44.72

Air Content #1 5.6 #2 5.6 **Conveyor Air**

Placement Location:

Notes:

8 GALLON ADDED

TRUCK #6

CC-8 P-501 FIELD PLACEMENT NOTES

DATE JAN 4, 2017 **Air Temp** 49.6

TRUCK # 246

TIME DISPATCHED 10:30

TIME ARRIVED OUTSIDE 10:40 INSIDE 10:47

REVOLUTIONS 26, 44, 71

Initial Slump QA 2¼ 3 **Water Added** 8 GALLON

Slump #2 3½ 3¼ **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 65.2 **Weight** 44.74 QA 43.94

Air Content 5.6 QA 5.4 **Conveyor Air**

Placement Location:

Notes:

5 GAL ADDED AFTER ~~SL~~ TESTING.

CSRA

TRUCK #7

CC-8 P-501 FIELD PLACEMENT NOTES

DATE JAN 4, 2017 Air Temp 48.6

TRUCK # 221

TIME DISPATCHED

TIME ARRIVED 11:10 OUTSIDE 11:20

REVOLUTIONS 100 111 CONVEYOR

Initial Slump 6" OR 3 1/4" Water Added

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp 60.8 Weight 44.46

Air Content 5.6 Conveyor Air

Placement Location:

Notes:

ADD 5 GAL PER SAMPLE

TRUCK #8

CC-8 P-501 FIELD PLACEMENT NOTES

DATE JAN 4, 2017 Air Temp 51.6

TRUCK # 229

TIME DISPATCHED

TIME ARRIVED 12:08

REVOLUTIONS 122

Initial Slump 4 3/4 Water Added

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp 71.6 Weight 45.92

Air Content 2.0 Conveyor Air

Placement Location:

Notes:

APPROVAL GIVEN BY R APONTE TO PLACE MATERIAL.

#1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
254		user	7063583	57442	7:53	1/4/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	62017

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	14092 lb	14020 lb	4.00% M
3/4LOCAL	365 lb	17670 lb	17960 lb	>
5/8LOCAL	1315 lb	31110 lb	31080 lb	
TYPE1	329.0 lb	3290.0 lb	3260.0 lb	
FLYASH	141.0 lb	4670.0 lb	4670.0 lb	
WATER	25.5 gl	130.1 gl	130.0 gl	
AIR	6.10 oz	61.00 oz	61.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Num Batches: 1

Load 36851 lb

Slump: 4.00 in #

Held 9 gal/yd out

DELIVERY TICKET

#1

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
JPARK	254	8:10
ARRIVE JOB	DEPART JOB	TIME IN
8:20		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7063583	NET 30		01/04/17	07:5

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER
2ND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:10		
			TAX CODE: NEW	JERSEY STATE SALES TAX				

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

#2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
246		user	7063585	57444	8:23	1/4/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	62019

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	14092 lb	14040 lb	4.00% M
3/4LOCAL	365 lb	17690 lb	17660 lb	
5/8LOCAL	1315 lb	30810 lb	30760 lb	
TYPE1	329.0 lb	3290.0 lb	3270.0 lb	
FLYASH	141.0 lb	4680.0 lb	4680.0 lb	
WATER	25.5 gl	150.1 gl	149.8 gl	
AIR	6.10 oz	61.00 oz	61.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Load 36706 lb
Slump: 4.00 in #

Num Batches: 1

Held 4 gal/yd out

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#2

DRIVER	TRUCK NO.	TIME OUT
THAND	246	8:34
ARRIVE JOB	DEPART JOB	TIME IN
8:50		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7063585	NET 30		01/04/17	08:2

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER
2ND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:20		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

#3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7063588	57447	8:54	1/4/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	62022

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	14092 lb	14020 lb	4.00% M
3/4LOCAL	365 lb	17670 lb	17820 lb	>
5/8LOCAL	1315 lb	30970 lb	30940 lb	
TYPE1	329.0 lb	3290.0 lb	3280.0 lb	
FLYASH	141.0 lb	4690.0 lb	4680.0 lb	
WATER	25.5 gl	150.1 gl	150.4 gl	
AIR	6.10 oz	61.00 oz	62.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual
Load 36891 lb
Slump: 4.00 in #

Num Batches: 1

Held 4 gal/yd out

DELIVERY TICKET

#3

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	905
ARRIVE JOB	**DEPART JOB**	**TIME IN**
920		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7063588	NET 30		01/04/17	08:5[illegible]

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
FAA TECH CENTER

2ND GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:30		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

RECEIVED

CUSTOMER COPY

#4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7063590	57449	9:21	1/4/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	62024

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	14092 lb	14020 lb	4.00% M
3/4LOCAL	365 lb	17670 lb	17800 lb	>
5/8LOCAL	1315 lb	30950 lb	30860 lb	
TYPE1	329.0 lb	3290.0 lb	3340.0 lb	
FLYASH	141.0 lb	4750.0 lb	4770.0 lb	
WATER	25.5 gl	150.1 gl	151.0 gl	
AIR	6.10 oz	61.00 oz	59.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Load 36905 lb

Slump: 4.00 in #

Num Batches: 1

Held 9 gal/yd out

DELIVERY TICKET

#4

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	9:32
ARRIVE JOB	**DEPART JOB**	**TIME IN**
9:43		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ID AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7063590	NET 30		01/04/17	09:20

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER
2ND GATE ON WESTCOAT

EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:40		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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#5

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7063593	57451	9:47	1/4/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	62026

Material	Design Qty	Required	Batched		% Moisture
CONC	1355 lb	14092 lb	14020 lb		4.00% M
3/4LOCAL	365 lb	17670 lb	17780 lb	>	
5/8LOCAL	1315 lb	30930 lb	30880 lb		
TYPE1	329.0 lb	3290.0 lb	3270.0 lb		
FLYASH	141.0 lb	4680.0 lb	4700.0 lb	*	
WATER	25.5 gl	150.1 gl	149.8 gl		
AIR	6.10 oz	61.00 oz	62.00 oz		
HRWR	18.80 oz	188.00 oz	188.00 oz		

Actual Num Batches: 1

Load 36846 lb

Slump: 4.00 in #

Held 4gal/yd out

DELIVERY TICKET

#5

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHAND	226	957
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1007		

OTE:
/INUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
D AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7063593	NET 30		01/04/17	09:4

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER
2ND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:50		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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#C

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
246		user	7063595	57452	10:17	1/4/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	62027

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	14092 lb	14000 lb	4.00% M
3/4LOCAL	365 lb	17650 lb	17680 lb	
5/8LOCAL	1315 lb	30830 lb	30720 lb	
TYPE1	329.0 lb	3290.0 lb	3290.0 lb	
FLYASH	141.0 lb	4700.0 lb	4720.0 lb	
WATER	25.5 gl	150.1 gl	150.4 gl	
AIR	6.10 oz	61.00 oz	61.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual
Load 36711 lb
Slump: 4.00 in #

Num Batches: 1

Held 4gal/yd out

9#

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

#6

DRIVER	TRUCK NO.	TIME OUT
THAND	246	10:30
ARRIVE JOB	DEPART JOB	TIME IN
10:41		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7063595	NET 30		01/04/17	10:17

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
FAA TECH CENTER

2ND GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	650FLEX2A	650 FLEX 2		10.00		
10.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:60		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

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#7

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
221		user	7063599	57456	10:47	1/4/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	650FLEX				W	62031

Material	Design Qty	Required	Batched		% Moisture
CONC	1355 lb	14092 lb	14060 lb		4.00% M
3/4LOCAL	365 lb	17710 lb	17840 lb	>	
5/8LOCAL	1315 lb	30990 lb	30920 lb		
TYPE1	329.0 lb	3290.0 lb	3310.0 lb		
FLYASH	141.0 lb	4720.0 lb	4710.0 lb		
WATER	25.5 gl	150.1 gl	150.4 gl		
AIR	6.10 oz	61.00 oz	61.00 oz		
HRWR	18.80 oz	188.00 oz	188.00 oz		

Actual Num Batches: 1

Load 36901 lb

Slump: 4.00 in #

Held 4gal/yd out

#7

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
GKIEN	221	11:00
ARRIVE JOB	**DEPART JOB**	**TIME IN**
11:10		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
D AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7063599	NET 30		01/04/17	10:4

S UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO FAA TECH CENTER
2ND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	650FLEX2A	650 FLEX 2		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:70		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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#8

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7063603	57457	11:46	1/4/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
1.50 CYDS	650FLEX				W	62032

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	2114 lb	2160 lb	4.00% M
3/4LOCAL	365 lb	2708 lb	2780 lb	
5/8LOCAL	1315 lb	4753 lb	4740 lb	
TYPE1	329.0 lb	493.5 lb	510.0 lb	
FLYASH	141.0 lb	721.5 lb	720.0 lb	
WATER	25.5 gl	18.0 gl	19.8 gl	
AIR	6.10 oz	9.15 oz	9.00 oz	
HRWR	18.80 oz	28.20 oz	28.00 oz	

Actual Num Batches: 1

Load 5627 lb

Slump: 4.00 in # Note: Manual feed occured

Held 6gal/yd out

DELIVERY TICKET

#8

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	11:56
ARRIVE JOB	DEPART JOB	TIME IN
12:05		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7063603	NET 30		01/04/17	11:45

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER

2ND GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
1.50		cy	650FLEX2A	650 FLEX 2		1.50		
0.00								
1.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			WC	WINTER				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:	71.5	
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** PCC Overlay **Client** FAA-ATRD

Technician: J. Stein **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Lanes 1,3,5														
1	12/28/2016	1/4/2017	7	P	226	6.00	6.05	6.10	6.00	6.00	6.00	18	6090	500
2	12/28/2016	1/4/2017	7	P	236	5.95	6.00	6.10	6.05	6.10	6.05	18	5877	480
3	12/28/2016	1/4/2017	7	P	242	6.05	6.05	5.95	5.95	6.05	6.10	18	6099	505
4	12/28/2016	1/4/2017	7	P	226	5.95	6.00	6.10	6.05	6.00	6.00	18	5799	480
5	12/28/2016	1/4/2017	7	S	236	6.00	6.00	6.00	6.20	6.20	6.25	18	5997	480
6	12/28/2016	1/4/2017	7	P	242	6.05	6.00	5.95	6.00	5.95	6.00	18	5779	485
7	12/28/2016	1/4/2017	7	S	226	6.00	6.00	6.00	6.10	6.15	6.20	18	5606	455
8	12/28/2016	1/4/2017	7	P	236	6.00	6.00	6.00	6.10	6.15	6.20	18	5913	480
9	12/28/2016	1/4/2017	7	P	242	6.00	6.00	6.00	6.05	6.10	6.10	18	5871	485
10	12/28/2016	1/4/2017	7	S	226	6.00	6.05	6.05	6.05	6.00	6.00	18	6019	495
													Average	485
													stdev	15
Lanes 2,4													COV	0.03
1	1/4/2017	1/11/2017	7	P	254	6.00	6.00	6.05	6.00	6.00	6.00	18	5596	465
2	1/4/2017	1/11/2017	7	P	246	6.05	6.00	5.95	5.95	5.90	6.00	18	4990	420
3	1/4/2017	1/11/2017	7	P	240	6.00	6.00	6.05	6.00	6.00	6.05	18	5223	430
4	1/4/2017	1/11/2017	7	P	229	6.05	6.00	6.00	6.05	6.05	6.05	18	5835	480
5	1/4/2017	1/11/2017	7	P	226	6.05	6.05	6.00	6.00	5.95	6.00	18	5487	455
6	1/4/2017	1/11/2017	7	P	246	5.95	6.00	6.05	6.00	6.00	6.00	18	5126	425
7	1/4/2017	1/11/2017	7	P	221	5.95	5.95	6.05	6.10	6.05	6.00	18	5764	480
													Average	450
													stdev	25
													COV	0.06

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** PCC Overlay Lanes 2-4 **Client** FAA-ATRD

Technician: J. Stein **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
1	1/4/2017	2/1/2017	28		254	5.95	6.00	6.05	6.00	6.00	6.00	18	6802	565
1	1/4/2017	2/1/2017	28			5.95	6.05	6.10	6.00	6.05	6.05	18	6915	565
1	1/4/2017	2/1/2017	28			6.00	6.05	6.10	6.05	6.05	6.00	18	6626	540
2	1/4/2017	2/1/2017	28		246	6.05	6.00	5.95	6.00	6.00	6.00	18	6873	575
2	1/4/2017	2/1/2017	28			5.95	6.00	6.05	6.00	5.95	6.00	18	6823	570
2	1/4/2017	2/1/2017	28			6.05	6.00	5.95	6.05	6.05	6.05	18	6801	560
3	1/4/2017	2/1/2017	28		240	5.95	6.00	6.05	6.05	6.05	6.00	18	6220	515
3	1/4/2017	2/1/2017	28			6.00	6.00	6.05	5.95	5.95	5.95	18	7071	590
3	1/4/2017	2/1/2017	28			6.00	6.05	6.05	5.90	5.95	6.00	18	6388	530
4	1/4/2017	2/1/2017	28		229	5.95	6.05	6.05	6.10	6.05	6.10	18	6793	555
4	1/4/2017	2/1/2017	28			6.05	6.00	5.95	6.05	6.00	6.00	18	7179	595
4	1/4/2017	2/1/2017	28			5.95	6.00	6.05	6.00	6.00	6.00	18	6738	560
5	1/4/2017	2/1/2017	28		226	6.00	6.00	6.05	6.05	6.05	6.05	18	7086	580
5	1/4/2017	2/1/2017	28			6.05	6.05	6.00	6.00	5.95	6.00	18	6597	545
5	1/4/2017	2/1/2017	28			5.95	6.05	6.05	6.10	6.10	6.10	18	6838	555
6	1/4/2017	2/1/2017	28		246	6.05	6.00	6.00	5.95	5.95	5.90	18	6439	540
6	1/4/2017	2/1/2017	28			6.00	6.05	6.10	6.00	6.00	6.00	18	6690	550
6	1/4/2017	2/1/2017	28			6.00	6.00	6.05	6.05	6.00	6.05	18	6553	540
7	1/4/2017	2/1/2017	28		221	6.00	6.00	5.95	6.05	6.00	6.00	18	7029	585
7	1/4/2017	2/1/2017	28			6.00	6.00	5.95	6.10	6.05	6.10	18	6932	575
7	1/4/2017	2/1/2017	28			6.10	6.05	6.00	6.00	5.95	6.05	18	6651	545
													Average	560
													stdev	20
													COV	0.04

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** Lanes 2 & 4 **Client** FAA-ATRD

Technician: Renee' Norcross **Professional Engineer:** Jeffrey Stein **Date:** 2/1/2017

Sample No.	Date Poured	Date Tested	Age	Sta.	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
T1	1/4/2017	2/1/2017	28	-	-	6.00	12.3	132080	28.27	4670	3
	1/4/2017	2/1/2017	28	-	-	6.00	12.4	126840	28.27	4490	3
	1/4/2017	2/1/2017	28	-	-	5.98	12.4	128630	28.09	4580	3
T2	1/4/2017	2/1/2017	28	-	-	5.99	12.4	121010	28.18	4290	3
	1/4/2017	2/1/2017	28	-	-	6.00	12.4	105170	28.27	3720	5
	1/4/2017	2/1/2017	28	-	-	5.99	12.3	114530	28.18	4060	3
T3	1/4/2017	2/1/2017	28	-	-	5.99	12.20	115550	28.18	4100	3
	1/4/2017	2/1/2017	28	-	-	5.99	12.30	113820	28.18	4040	5
	1/4/2017	2/1/2017	28	-	-	5.99	12.30	115550	28.18	4100	5
T4	1/4/2017	2/1/2017	28	-	-	5.99	12.3	131480	28.18	4670	3
	1/4/2017	2/1/2017	28	-	-	5.99	12.4	135770	28.18	4820	3
	1/4/2017	2/1/2017	28	-	-	5.98	12.3	134660	28.09	4790	5
T5	1/4/2017	2/1/2017	28	-	-	5.98	12.3	122120	28.09	4350	3
	1/4/2017	2/1/2017	28	-	-	5.99	12.4	107630	28.18	3820	3
	1/4/2017	2/1/2017	28	-	-	5.99	12.3	122090	28.18	4330	3
T6	1/4/2017	2/1/2017	28	-	-	5.99	12.4	116320	28.18	4130	5
	1/4/2017	2/1/2017	28	-	-	6.00	12.4	118830	28.27	4200	5
	1/4/2017	2/1/2017	28	-	-	5.99	12.3	118080	28.18	4190	5
T7	1/4/2017	2/1/2017	28	-	-	5.98	12.5	122810	28.09	4370	3
	1/4/2017	2/1/2017	28	-	-	6.00	12.4	117230	28.27	4150	3
	1/4/2017	2/1/2017	28	-	-	5.98	12.4	123600	28.09	4400	3
									Average	4300	
									StDev	300	
									COV	0.07	

Capping Standard Used: ASTM C617 **Three Cap Checks :** xxx **Last ASTM C90 Sulfur Test:** 11/3/2016

Number of times unbonded cap used prior to testing: n/a

Revised 11/10/2016

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

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NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete
4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

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* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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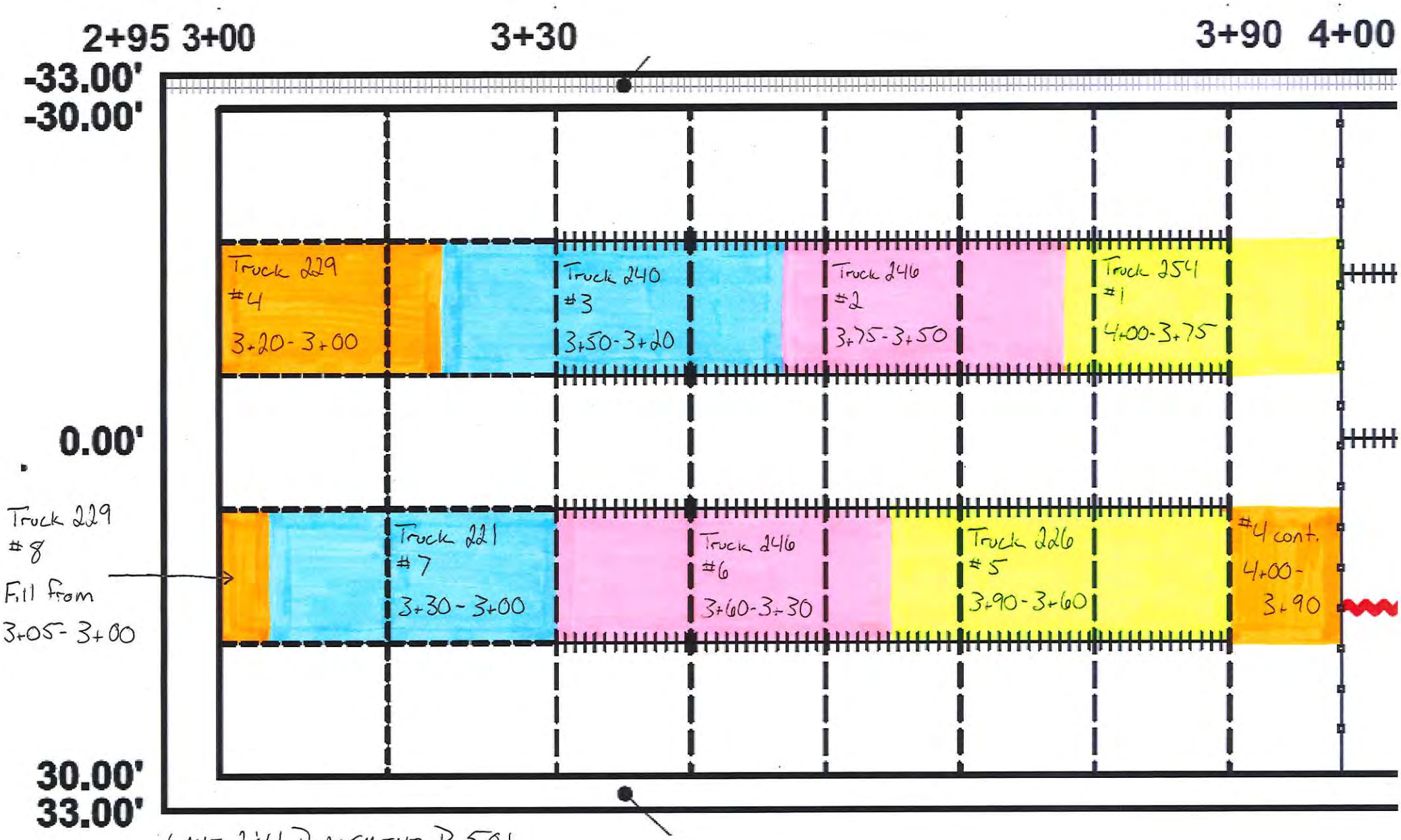

LANE 2 & 4 PLACEMENT P-501

1/4/17

P-501 (650 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 04/27/2017

Placement Location = Sta. 4+00 to 5+00, Lanes 1 & 3 (See Attached Placement Map)

7 Day Testing Completed on 05/04/2017

28 Day Testing Completed on 05/25/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	60.1 F	55.9 F	86%	3.5 mph S	4.0 miles	Overcast
2:54 PM	66.0 F	60.1 F	81%	2.5 mph SE	2.5 miles	Overcast

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam Strength (PSI Flex)				Cylinder Strength (PSI)			Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	28 Day	28 Day	28 Day	28 Day	28 Day	
4/27/2017	REJECTED	254	7:33 AM	8:01 AM	QC (Craig)	0	5.50	8.8	N/T	8.9	N/T	N/T	N/T	65.0	165	N/A	N/A	N/A	N/A	N/A	N/A	N/A	REJECTED Due to High Air %
					QA (CSRA)	0	3.75	10.0	N/T	N/T	N/T	N/T	134.8	65.0	169		Average =		N/A	Average =		N/A	
4/27/2017	REJECTED	242	7:59 AM	8:25 AM	QC (Craig)	0	6.25	8.5	N/T	N/T	N/T	N/T	N/T	66.8	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	REJECTED Due to High Air %
					QA (CSRA)	0	6.50	8.5	N/T	N/T	N/T	N/T	135.4	66.0	68		Average =		N/A	Average =		N/A	
4/27/2017	1	247	8:33 AM	8:55 AM	QC (Craig)	0	2.50	6.0	N/T	N/T	N/T	N/T	140.2	67.8	73	530	700	660	695	5,370	5,160	5,190	
					QA (CSRA)	0	2.75	5.7	N/T	N/T	N/T	N/T	141.0	66.0	73		Average =		685.0	Average =		5,240	
4/27/2017	2	226	9:17 AM	9:40 AM	QC (Craig)	0	2.75	6.7	N/T	N/T	N/T	N/T	139.3	68.2	92	505	655	630	620	4,770	4,640	4,750	
					QA (CSRA)	Concrete Not QA Tested											Average =		635.0	Average =		4,720	
4/27/2017	3	242	9:45 AM	10:10 AM	QC (Craig)	0	6.50	N/T	5.50	N/T	4.75	7.0	137.8	68.4	97	495	615	610	595	4,450	4,520	4,390	Into Truck @ 10:39 AM, went with QC #'s
					QA (CSRA)	N/T	N/T	N/T	N/T	N/T	4.75	N/T	N/T	N/T	N/T		Average =		606.7	Average =		4,453	
4/27/2017	4	247	10:17 AM	10:45 AM	QC (Craig)	0	2.25	N/T	2.50	5.1	N/T	N/T	140.6	68.7	107	455	600	580	585	4,700	4,630	4,490	
					QA (CSRA)	0	2.75	5.5	N/T	N/T	N/T	N/T	141.1	N/T	N/T		Average =		588.3	Average =		4,607	
4/27/2017	5	226	10:43 AM	11:05 AM	QC (Craig)	12	2.75	5.2	4.00	5.1	N/T	N/T	140.7	71.5	176	480	585	600	625	4,580	4,660	4,550	99 revs 1st test, 176 revs 2nd test
					QA (CSRA)	Concrete Not QA Tested											Average =		603.3	Average =		4,597	
4/27/2017	6	242	11:18 AM	11:43 AM	QC (Craig)	5	5.50	N/T	3.25	5.0	N/T	N/T	141.3	71.0	120	510	650	655	665	4,680	4,690	5,070	81 revs 1st test, 120 revs 2nd test
					QA (CSRA)	Concrete Not QA Tested											Average =		656.7	Average =		4,813	
4/27/2017	7	247	11:43 AM	12:05 PM	QC (Craig)	5	2.00	N/T	3.25	5.5	N/T	N/T	140.2	71.0	127	455	630	620	580	4,450	4,510	4,280	70 revs 1st test, 126 revs 2nd test
					QA (CSRA)	N/T	1.50	N/T	2.75	5.0	N/T	N/T	141.4	N/T	N/T		Average =		610.0	Average =		4,413	
4/27/2017	8	245	12:10 PM	12:39 PM	QC (Craig)	20	3.50	4.5	N/T	N/T	N/T	N/T	141.6	74.0	120	480	595	635	615	4,850	4,910	4,600	
					QA (CSRA)	Concrete Not QA Tested											Average =		615.0	Average =		4,787	
4/27/2017	9	241	12:43 PM	1:10 PM	QC (Craig)	10	3.00	5.3	N/T	N/T	N/T	N/T	141.4	72.0	126	510	635	585	620	4,490	4,510	4,680	
					QA (CSRA)	Concrete Not QA Tested											Average =		613.3	Average =		4,560	
4/27/2017	10	247	1:20 PM	1:45 PM	QC (Craig)	5	4.50	5.2	N/T	N/T	N/T	N/T	140.8	72.0	111	455	575	615	590	4,330	4,360	4,350	
					QA (CSRA)	N/T	3.75	5.0	N/T	N/T	N/T	N/T	141.3	N/T	N/T		Average =		593.3	Average =		4,347	
4/27/2017	11	241	2:00 PM	2:34 PM	QC (Craig)	5	3.5	6.1	N/T	N/T	N/T	N/T	140.5	71.0	136	440	580	625	610	4,450	4,310	4,450	
					QA (CSRA)	Concrete Not QA Tested											Average =		605.0	Average =		4,403	

650 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Tuckahoe 5/8" Round Stone	1,315	lbs.
Penn Jersey 3/4" Round Stone	365	lbs.
Tuckahoe Sand	1,355	lbs.
Water	212	lbs.
Type I Portland Cement	329	lbs.
Flyash Type F (30%)	141	lbs.
Air %	6.0	
W/C Ratio	0.45	

Batch Ticket Information

Load #	YD^3 Batch	5/8" Stone	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
Reject (254)	11.0	14,360	4,000	15,480	133.0	3,680	1,540	68.0	204.0
Reject (242)	11.0	14,520	4,020	15,380	143.8	3,590	1,550	64.0	208.0
1 (247)	11.0	14,360	4,040	15,340	154.0	3,670	1,560	52.0	204.0
2 (226)	11.0	14,420	3,980	15,420	143.8	3,630	1,550	54.0	208.0
3 (242)	11.0	14,360	4,080	15,360	143.8	3,600	1,540	54.0	208.0
4 (247)	11.0	14,400	4,060	15,380	143.8	3,650	1,560	53.0	208.0
5 (226)	11.0	14,360	4,020	15,480	144.4	3,600	1,570	53.0	204.0
6 (242)	11.0	14,380	4,040	15,480	143.2	3,610	1,570	54.0	208.0
7 (247)	11.0	14,400	4,040	15,380	142.6	3,600	1,540	53.0	208.0
8 (245)	11.0	14,460	4,020	15,380	143.2	3,640	1,540	54.0	208.0
9 (241)	11.0	14,440	4,040	15,460	131.8	3,690	1,540	52.0	208.0
10 (247)	11.0	14,400	3,980	15,500	142.0	3,660	1,550	54.0	208.0
11 (241)	11.0	14,440	4,060	15,380	141.4	3,650	1,540	52.0	208.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - United Concrete QC Field Notes C - CSRA QA Field Notes D - Batch Tickets E - NAPTF Lab Testing Information F - Admixture Information G - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-3

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Joe Landy, Brian Hirsh, Charlie Giercyk , John Clements
Robert Todd

DATE INSPECTED: 4/27/16 REPORT NO.: CP-5

PROJECT PLANS BY: N/A DATED: N/A REVISION NO.: N/A

APPROVAL DATE: N/A

CONCRETE PLACEMENT REPORT

(compressive strength)

LOCATION: Station 400 to 500 West Side

Craig Testing Laboratories, Inc. inspector arrived at site as requested by client and inspected concrete placement at the above location per the project plans and documents.

Slump (ASTM C143): * Approved Slump Range: 3" - 6"

Air Content (ASTM C231): * Approved Air % Range: 6.0% ± 1.5%

Temperature (ASTM C1064): * Todays Yardage: 121

Concrete Supplier: Penn Jersey Approved Mix ID: 650FLEX2A

Consolidation Method: ☑ Internal ☐ External ☐ Both ☐ None ☐ Other _____ Ambient Temperature (F): *

Strength of Concrete Placed (PSI): 650 Flex No. of Samples (ASTM C31): *

Specimen Type: Cylinder / Beam

Required Strength of Concrete (PSI): 650 Flex On Site Curing Facilities Available ☑ Yes ☐ No
(ACI 301 - 1.6.3.2.d)

☐ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 7:00 - 3:00
☐ Work Above is in Progress and Requires Further Inspection
☑ Field Work is in Substantial Compliance with the following approved documents:
☑ Mix Designs ☐ Drawings ☐ Specifications
☐ Compressive strength samples have met the required strength
☐ ***Inspection done without approved documentation available***
☐ ***Work Deviates from Approved Plans and/or Documents, See NCR No.*** _____

Remarks: All test results recorded were provided to Ronaldo Aponte, who accepted all test results.
* See attached table for results.

Reported to: Project Distribution Reviewed By: Ian Craig

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-3

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Joe Landy, Brian Hirsh, Charles Giercyk , John Clements, Robert Todd

DATE INSPECTED: 4/27/16 REPORT NO.: CP-5

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
1 / 247	8:55 AM	2.50	6.00	140.2	67.8	7	3
2 / 226	9:40 AM	2.75	6.40	139.3	68.2	7	3
3 / 242	10:10 AM	4.75	6.70	137.8	68.4	7	3
4 / 247	10:45 AM	2.50	5.10	140.6	68.7	7	3
5 / 226	11:05 AM	4.00	4.80	140.7	71.5	7	3
6 / 242	11:43 AM	3.25	4.90	141.3	70.0	7	3
7 / 247	12:05 PM	3.25	5.50	140.2	71.0	7	3
8 / 245	12:39 PM	3.50	4.50	141.6	74.0	7	3
9 / 241	1:10 PM	3.00	5.30	141.4	72.0	7	3
10 / 247	1:45 PM	4.50	5.20	140.8	72.0	7	3
11 / 241	2:34 AM	3.50	6.10	140.5	71.0	7	3

Remarks: All test results recorded were provided to Ronaldo Aponte, who accepted all test results.

Reported to: Project Distribution Reviewed By: Ian Craig

Craig Testing

CC8 – Phase 2

Pour Placement P-501 Lane 1 (-15.00' to -30.00') and Lane 3 (0.00' to 15.0

Pour Date 4-27-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test (1st / 2nd)	Scale Weight	United Weight
254	8:03	165	0	5 1/2		8.8 / 8.9	41.80	Rejected
REJECTED								
242 REJECTED	8:27	67	0			8.5	41.50	Rejected
START POUR								
247	8:58	73	0	2 1/2	67.8	6.0	42.74	140.16
POURED								
226	9:40	92	0	2 3/4	68.2	6.7	42.52	139.28
POURED								
242	10:10	97	0	1st 6 1/2 / 2nd 5 1/2 / 3rd 4 3/4	68.4	7.0	42.14	137.75
POURED								
247	10:45	107	0	2 1/2	68.7	5.1	42.86	140.64
POURED								
226	11:05	176	2nd 5 / 1st 7 (12)	1st 2 3/4 / 2nd 4	1st 70.1 / 2nd 71.5	1st 5.2 / 2nd 5.1	1st 43.00 / 2nd 42.88	1st 141.20 / 2nd 140.72
POURED								
242	11:43	120	5	3 1/4	71.0	5.0	43.00	141.20
POURED								
247	12:06	127	5	3 1/4	71.0	5.5	42.74	140.16
POURED								
245	12:39	120	20	3 1/2	74.0	4.5	43.10	140.14
POURED								
241	1:10	126	10	3	72.0	5.3	43.06	144.14
POURED								
247	1:43	111	5	4 1/2	72.0	5.2	42.90	140.80
POURED								
241	2:54	136	5	3 1/2	71.0	6.1		
POURED								

Slump Range - 2 1/2 - 5

Air Range - 4.2 - 7.8

Correction Factor - 1.02

Pour Ended @ 3:00 PM

Total Yards = 121

TAA

CC8 – Phase 2

Pour Placement P 501 Lane 2 (-15.00' to -30.00') and Lane 3 (0.00' to 15.00')

Pour Date 4-27-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight
254				3 3/4	65.0	10.0	42.30	REJECTED
242				6 1/2	66.0	8.5	42.46	REJECTED
START POUR								
247				2 3/4	66.0	5.7		
226								
242				4 3/4				
247				2 3/4		5.5	43.88	
226								
242								
247				2 3/4		5.0	43.96	
245								
241								
247				3 3/4		5.0	43.92	
241								

Rejected by "Un" "I asked Mike & he said he will check with his boss

CC-8 P-~~306~~ 501 FIELD PLACEMENT NOTES

DATE X 04/27 Air Temp 67.3 – 65 C FAA

TRUCK # 1

TIME DISPATCHED

TIME ARRIVED 8:02

REVOLUTIONS 147 + 5

Initial Slump 5.5 Water Added 0

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp Weight 41.8 scale

Air Content tried twice Conveyor Air

Notes: 8.8 & 8.5

CC-8 P-~~306~~ 501 FIELD PLACEMENT NOTES

DATE Air Temp

TRUCK #

TIME DISPATCHED

TIME ARRIVED

REVOLUTIONS

Initial Slump 3 3/4 Water Added 0

Slump #2 Water Added

Slump #3 Water Added

Final Slump Conveyor Slump

Concrete Temp Weight

Air Content Conveyor Air

Notes:

(–)

Craig

CC-8 P-306 FIELD PLACEMENT NOTES

(2)

DATE _____ Air Temp _____

TRUCK # 2

TIME DISPATCHED _____

TIME ARRIVED 8.27

REVOLUTIONS 6.25 47 + 20

Initial Slump 6 1/3 Water Added 0

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 66.8 Weight 41.5

Air Content 8.5 Conveyor Air _____

Notes:

Another sample
slump: 6.0
Air content: 8.3

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump 6.5 Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content 8.5 Conveyor Air _____

Notes:

7

C

Pass 5'

CC-8 P-306 FIELD PLACEMENT NOTES

B

DATE _____ Air Temp _____

TRUCK # 3

TIME DISPATCHED [illegible]

TIME ARRIVED 8:57

REVOLUTIONS 73

Initial Slump 2.5 Water Added 0

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 67.9 Weight 42-74

Air Content 6.0 Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight 43.86

Air Content [illegible] Conveyor Air _____

Notes: 5.7

2-5

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 4

TIME DISPATCHED _____

TIME ARRIVED 9:41

REVOLUTIONS 92

Initial Slump 2 3/4 Water Added 2.5 → 5 0

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 68.0 Weight 42.52

Air Content 6.7 Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

5

CC-8 P-~~306~~ 301 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 5

TIME DISPATCHED _____

TIME ARRIVED 10:12

REVOLUTIONS 67 + 30

Initial Slump 6.5 Water Added _____

Slump #2 5.5 Water Added _____

New sample

Slump #3 5.5 Water Added _____

Final Slump 4 3/4 Conveyor Slump _____

Concrete Temp 68.4 Weight 42.1

Air Content 6.7 Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 6

TIME DISPATCHED _____

TIME ARRIVED 10:45

REVOLUTIONS 107

Initial Slump 2.5 Water Added 0

Slump #2 2.75 Water Added 0

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content ~~5.5~~ 5.2 Conveyor Air _____

Notes: 42.86

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content 5.5 Conveyor Air _____

Notes: 43.88

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 7

TIME DISPATCHED _____

TIME ARRIVED 11:05

REVOLUTIONS 176

Initial Slump 2 3/4 Water Added 7 gal

Slump #2 4.00 Water Added 5 gal

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 70.5 Weight 43,000 42,88

Air Content 5.7 Conveyor Air _____

Notes: 5.7

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 8

TIME DISPATCHED _____

TIME ARRIVED 11:43

REVOLUTIONS 81 ~~+25~~ now 120

Initial Slump 5.5 Water Added 5 gal

Slump #2 3.25 Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 71 Weight 4300

Air Content 5.0 Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 9

TIME DISPATCHED _____

TIME ARRIVED 12:06

REVOLUTIONS 70 → 126

Initial Slump 2.0 Water Added _____

Slump #2 3.25 Water Added 5 gal

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 71 Weight 42.74

Air Content 5.2 Conveyor Air _____

Notes: corrected it was 5.5

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump 1.5 Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight 43.96

Air Content _____ Conveyor Air _____

Notes:

T10

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 10

TIME DISPATCHED _____

TIME ARRIVED 12:39

REVOLUTIONS 120

Initial Slump 3.5 Water Added 20 gal

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content 4.5 Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 11

TIME DISPATCHED _____

TIME ARRIVED 1:10

REVOLUTIONS 126

Initial Slump 3.0 Water Added 10

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 72 Weight 43.06

Air Content 5.3 Conveyor Air _____

Notes: Albert was saying the mix is dry

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 12

TIME DISPATCHED _____

TIME ARRIVED 1:43

REVOLUTIONS 109 → 111

Initial Slump 4.5 Water Added 5 gal

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 72 Weight 42.9

Air Content 5.2 Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # 13

TIME DISPATCHED _____

TIME ARRIVED 2:28 pm

REVOLUTIONS 136

Initial Slump 3.5 Water Added 10

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp 71 Weight 42.8

Air Content 6.1 Conveyor Air _____

Notes:

T13

CC-8 P-306 FIELD PLACEMENT NOTES

DATE _____ Air Temp _____

TRUCK # _____

TIME DISPATCHED _____

TIME ARRIVED _____

REVOLUTIONS _____

Initial Slump _____ Water Added _____

Slump #2 _____ Water Added _____

Slump #3 _____ Water Added _____

Final Slump _____ Conveyor Slump _____

Concrete Temp _____ Weight _____

Air Content _____ Conveyor Air _____

Notes:

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHAND	254	752
ARRIVE JOB	DEPART JOB	TIME IN
802		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068121	NET 30		04/27/17	07:29

SOLD TO
UNITED CONCRETE, INC.
P. O. BOX 831
WELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	650FLEX2A	650 FLEX 2		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:11		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
254		user	7068121	0	7:33	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
7 00 CYDS	650FLEX				W	64527

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15480 lb	4.00% M
3/4LOCAL	365 lb	19495 lb	19480 lb	
5/8LOCAL	1315 lb	33945 lb	33840 lb	
TYPE1	329.0 lb	3619.0 lb	3680.0 lb	
FLYASH	141.0 lb	5231.0 lb	5220.0 lb	
WATER	25.5 gl	132.1 gl	133.0 gl	
AIR	6.10 oz	67.10 oz	68.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Load 40187 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T(2)

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
JBEAT	242	8:13AM
ARRIVE JOB	DEPART JOB	TIME IN
8:24AM		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068125	NET 30		04/27/17	07:52

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	650FLEX2A	650 FLEX 2		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:22		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

T(2)

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
242		user	7068125	0	7:59	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
1 00 CYDS	650FLEX				W	64531

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15380 lb	4.00% M
3/4LOCAL	365 lb	19395 lb	~~19500~~ lb - 108lb dry side	
5/8LOCAL	1315 lb	33965 lb	33920 lb	
TYPE1	329.0 lb	3619.0 lb	3590.0 lb	
FLYASH	141.0 lb	5141.0 lb	5140.0 lb	
WATER	25.5 gl	143.1 gl	143.8 gl	
AIR	5.85 oz	64.35 oz	64.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual
Load 40277 lb
Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHEMP	247	845
ARRIVE JOB	DEPART JOB	TIME IN
855		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068130	NET 30		04/27/17	08:3

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	650FLEX2A 679	650 FLEX 2 42-74		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00	5.7	
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:22		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

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WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

RECEIVED

CUSTOMER COPY

T3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
247		user	7068130	59896	8:33	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
00 CYDS	650FLEX				W	64536

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15481 lb	15340 lb	4.00% M
3/4LOCAL	365 lb	19355 lb	19380 lb	
5/8LOCAL	1315 lb	33845 lb	33740 lb	
TYPE1	329.0 lb	3619.0 lb	3670.0 lb	
FLYASH	141.0 lb	5221.0 lb	5230.0 lb	
WATER	25.5 gl	154.1 gl	154.0 gl	
AIR	4.90 oz	53.90 oz	52.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Load 40291 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T (4)

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MIKEP	226	930
ARRIVE JOB	DEPART JOB	TIME IN
940		

NOTE:
7 MINUT R CUBIC YARD UNLOADING TIME PERMITTED.
ADDITION TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068139	NET 30		04/27/17	09:13

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	650FLEX2A	650 FLEX 2		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:22		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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T 4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7068139	59902	9:17	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
1 10 CYDS	650FLEX				W	64544

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15420 lb	4.00% M
3/4LOCAL	365 lb	19435 lb	19400 lb	
5/8LOCAL	1315 lb	33865 lb	33820 lb	
TYPE1	329.0 lb	3619.0 lb	3630.0 lb	
FLYASH	141.0 lb	5181.0 lb	5180.0 lb	
WATER	25.5 gl	143.1 gl	143.8 gl	
AIR	4.90 oz	53.90 oz	54.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Load 40216 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

TS

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
JBEAT	242	10:00AM
ARRIVE JOB	DEPART JOB	TIME IN
10:11AM		

NOTE:
7 MINU... PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068144	NET 30		04/27/17	09:42

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:33		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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T (5)

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
242		user	7068144	59907	9:45	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
.00 CYDS	650FLEX				W	64549

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15481 lb	15360 lb	4.00% M
3/4LOCAL	365 lb	19375 lb	19440 lb	
5/8LOCAL	1315 lb	33905 lb	33800 lb	
TYPE1	329.0 lb	3619.0 lb	3600.0 lb	
FLYASH	141.0 lb	5151.0 lb	5140.0 lb	
WATER	25.5 gl	143.1 gl	143.8 gl	
AIR	4.90 oz	53.90 oz	54.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual
Load 40176 lb
Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T6

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHEMP	247	1030
ARRIVE JOB	DEPART JOB	TIME IN
1040		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068149	NET 30		04/27/17	10:1

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:44		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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CUSTOMER COPY

T (6)

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
247		user	7068149	59912	10:17	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
00 CYDS	650FLEX				W	64554

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15480 lb	4.00% M
3/4LOCAL	365 lb	19495 lb	19500 lb	
5/8LOCAL	1315 lb	33965 lb	33860 lb	
TYPE1	329.0 lb	3619.0 lb	3600.0 lb	
FLYASH	141.0 lb	5151.0 lb	5170.0 lb	
TEMPER	.0	1.0 gl	1.0 gl	
WATER	25.5 gl	143.1 gl	144.4 gl	
AIR	4.90 oz	53.90 oz	53.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Load 40260 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T7

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MIKEP	226	1255
ARRIVE JOB	DEPART JOB	TIME IN
1105		

NOTE:
MINUTE ER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068153	NET 30		04/27/17	10:4

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:55		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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T 7

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7068153	59915	10:43	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
.00 CYDS	650FLEX				W	64557

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15481 lb	15380 lb	4.00% M
3/4LOCAL	365 lb	19395 lb	19440 lb	
5/8LOCAL	1315 lb	33905 lb	33840 lb	
TYPE1	329.0 lb	3619.0 lb	3650.0 lb	
FLYASH	141.0 lb	5201.0 lb	5210.0 lb	
TEMPER	.0	1.0 gl	1.0 gl	
WATER	25.5 gl	143.1 gl	143.8 gl	
AIR	4.90 oz	53.90 oz	53.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Load 40294 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T(8)

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-0135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
JBEAT	242	11:31AM
ARRIVE JOB	DEPART JOB	TIME IN
11:41AM		

NOT
7 MIN...ES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068161	NET 30		04/27/17	11:17

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:66		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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T8

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
242		user	7068161	59922	11:18	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
1 00 CYDS	650FLEX				W	64564

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15481 lb	15480 lb	4.00% M
3/4LOCAL	365 lb	19495 lb	19520 lb	
5/8LOCAL	1315 lb	33985 lb	33900 lb	
TYPE1	329.0 lb	3619.0 lb	3610.0 lb	
FLYASH	141.0 lb	5161.0 lb	5180.0 lb	
WATER	25.5 gl	143.1 gl	143.2 gl	
AIR	4.90 oz	53.90 oz	54.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Load 40311 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHEMP	247	1165
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1205		

NOTE:
7 MINUT. ER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068165	NET 30		04/27/17	11:42

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:77		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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T9

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
247		user	7068165	59925	11:43	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
1 00 CYDS	650FLEX				W	64567

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15481 lb	15380 lb	4.00% M
3/4LOCAL	365 lb	19395 lb	19420 lb	
5/8LOCAL	1315 lb	33885 lb	33820 lb	
TYPE1	329.0 lb	3619.0 lb	3600.0 lb	
FLYASH	141.0 lb	5151.0 lb	5140.0 lb	
WATER	25.5 gl	143.1 gl	142.6 gl	
AIR	4.90 oz	53.90 oz	53.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Load 40186 lb

Slump: 4.00 in #

Num Batches: 1

1.10

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
BSCHW	245	12:21
ARRIVE JOB	DEPART JOB	TIME IN
12:37		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068168	NET 30		04/27/17	12:07

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	650FLEX2A	650 FLEX 2		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:88		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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CUSTOMER COPY

T10

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
245		user	7068168	0	12:10	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
00 CYDS	650FLEX				W	64570

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15481 lb	15380 lb	4.00% M
3/4LOCAL	365 lb	19395 lb	19400 lb	
5/8LOCAL	1315 lb	33865 lb	33860 lb	
TYPE1	329.0 lb	3619.0 lb	3640.0 lb	*
FLYASH	141.0 lb	5191.0 lb	5180.0 lb	
WATER	25.5 gl	143.1 gl	143.2 gl	
AIR	4.90 oz	53.90 oz	54.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual
Load 40271 lb
Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T (11)

PENN JERSEY
ING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068173	NET 30		04/27/17	12:4

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	650FLEX2A	650 FLEX 2		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:99		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X Mon 17
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T (11)

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7068173	59931	12:43	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
.00 CYDS	650FLEX				W	64573

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15460 lb	4.00% M
3/4LOCAL	365 lb	19475 lb	19500 lb	
5/8LOCAL	1315 lb	33965 lb	33940 lb	
TYPE1	329.0 lb	3619.0 lb	3690.0 lb	
FLYASH	141.0 lb	5241.0 lb	5230.0 lb	
WATER	25.5 gl	132.1 gl	131.8 gl	
AIR	4.90 oz	53.90 oz	52.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual
Load 40286 lb
Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T12 T12

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHEMP	247	1133
ARRIVE JOB	DEPART JOB	TIME IN
1142		

OTE:
MINU ER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068180	NET 30		04/27/17	13:13

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:110		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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T12

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
247		user	7068180	59937	13:20	4/27/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
1 00 CYDS	650FLEX				W	64579

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15481 lb	15500 lb	4.00% M
3/4LOCAL	365 lb	19515 lb	19480 lb	
5/8LOCAL	1315 lb	33945 lb	33880 lb	
TYPE1	329.0 lb	3619.0 lb	3660.0 lb	
FLYASH	141.0 lb	5211.0 lb	5210.0 lb	
WATER	25.5 gl	143.1 gl	142.0 gl	
AIR	4.90 oz	53.90 oz	54.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Load 40311 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T13

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
7 MINUT. ER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7004 TICKET #: 7068190	NET 30		04/27/17	13:59

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, FIRST GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	650FLEX2A	650 FLEX 2		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:121		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE;
MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

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I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7068190	59943	14:00	4/27/17

T13

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
1 00 CYDS	650FLEX				W	64585

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15380 lb	4.00% M
3/4LOCAL	365 lb	19395 lb	19440 lb	
5/8LOCAL	1315 lb	33905 lb	33880 lb	
TYPE1	329.0 lb	3609.0 lb	3650.0 lb	
FLYASH	141.0 lb	5201.0 lb	5190.0 lb	
WATER	25.5 gl	143.1 gl	141.4 gl	
AIR	4.90 oz	53.90 oz	52.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Load 40276 lb

Slump: 4.00 in #

Num Batches: 1

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** Station 4+00 to 5+00 **Client** FAA-ATRD

Technician: J. Stein **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Lanes 1,3														
1	4/27/2017	5/4/2017	7	S		6.05	6.05	6.05	6.15	6.10	6.05	18	6576	530
2	4/27/2017	5/4/2017	7	S		5.90	6.00	6.00	6.05	6.05	6.10	18	6063	505
3	4/27/2017	5/4/2017	7	S		6.05	6.00	6.00	6.10	6.10	6.15	18	6083	495
4	4/27/2017	5/4/2017	7	S		6.05	6.05	6.10	6.10	6.10	6.10	18	5688	455
5	4/27/2017	5/4/2017	7	S		5.90	5.95	6.00	6.10	6.10	6.10	18	5741	480
6	4/27/2017	5/4/2017	7	S		6.00	6.00	6.00	6.10	6.10	6.10	18	6248	510
7	4/27/2017	5/4/2017	7	S		6.05	6.05	6.10	6.05	6.05	6.05	18	5639	455
8	4/27/2017	5/4/2017	7	S		6.00	6.00	6.00	6.10	6.20	6.20	18	5925	480
9	4/27/2017	5/4/2017	7	S		6.05	6.10	6.15	6.10	6.05	6.10	18	6407	510
10	4/27/2017	5/4/2017	7	S		6.10	6.05	6.05	6.25	6.25	6.15	18	5756	455
11	4/27/2017	5/4/2017	7	S		6.00	6.00	6.05	6.05	6.05	6.00	18	5354	440
													Average	485
													stdev	30
Lanes 2,4	Pending												COV	0.06

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project: CC8 Phase 2 **Section:** Station 4+00 to 5+00 **Client** FAA-ATRD

Technician: R. Norcross/ C. Rosado **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Lanes 1,3														
1B	4/27/2017	5/25/2017	28			6.00	6.05	6.05	6.05	6.05	6.00	18	8524	700
1C	4/27/2017	5/25/2017	28			6.00	6.05	6.05	6.10	6.00	6.05	18	8056	660
1D	4/27/2017	5/25/2017	28			6.00	6.00	5.95	6.05	6.00	6.00	18	8312	695
2B	4/27/2017	5/25/2017	28			6.05	6.00	6.05	6.05	6.00	6.05	18	8001	655
2C	4/27/2017	5/25/2017	28			6.00	6.00	6.05	6.05	6.05	6.05	18	7636	630
2D	4/27/2017	5/25/2017	28			6.05	6.05	6.00	6.05	6.05	6.05	18	7594	620
3B	4/27/2017	5/25/2017	28			5.95	6.00	6.05	6.05	6.05	6.00	18	7432	615
3C	4/27/2017	5/25/2017	28			6.00	6.00	6.05	6.00	6.00	6.00	18	7331	610
3D	4/27/2017	5/25/2017	28			6.05	6.00	6.00	6.05	6.00	6.05	18	7205	595
4B	4/27/2017	5/25/2017	28			5.95	6.00	6.05	6.00	6.00	6.00	18	7211	600
4C	4/27/2017	5/25/2017	28			6.05	6.05	6.00	6.10	6.10	6.15	18	7178	580
4D	4/27/2017	5/25/2017	28			6.00	6.00	6.05	6.10	6.00	6.05	18	7133	585
5B	4/27/2017	5/25/2017	28			6.00	6.00	6.05	6.05	6.05	6.10	18	7145	585
5C	4/27/2017	5/25/2017	28			6.00	6.05	6.05	6.05	6.05	6.05	18	7321	600
5D	4/27/2017	5/25/2017	28			6.00	6.05	6.05	6.05	6.05	6.05	18	7677	625
6B	4/27/2017	5/25/2017	28			6.00	6.00	6.05	6.10	6.10	6.10	18	7958	650
6C	4/27/2017	5/25/2017	28			6.05	6.05	6.00	6.05	6.05	6.10	18	8038	655
6D	4/27/2017	5/25/2017	28			6.00	6.00	6.00	6.10	6.10	6.10	18	8134	665
7B	4/27/2017	5/25/2017	28			6.05	6.05	6.05	6.05	6.05	6.05	18	7778	630
7C	4/27/2017	5/25/2017	28			6.05	6.05	6.05	6.10	6.05	6.05	18	7652	620
7D	4/27/2017	5/25/2017	28			6.05	6.00	6.00	6.00	6.00	6.05	18	6994	580
8B	4/27/2017	5/25/2017	28			6.00	6.05	6.05	6.10	6.10	6.05	18	7328	595
8C	4/27/2017	5/25/2017	28			6.00	6.00	6.10	6.05	6.05	6.05	18	7774	635
8D	4/27/2017	5/25/2017	28			6.00	6.05	6.05	6.05	6.05	6.05	18	7547	615
9B	4/27/2017	5/25/2017	28			6.00	6.00	5.95	6.05	6.05	6.05	18	7645	635
9C	4/27/2017	5/25/2017	28			5.95	6.00	6.05	6.10	6.10	6.10	18	7112	585
9D	4/27/2017	5/25/2017	28			6.00	6.00	6.00	6.10	6.10	6.05	18	7539	620
10B	4/27/2017	5/25/2017	28			6.00	6.00	6.05	6.05	6.05	6.05	18	7010	575
10C	4/27/2017	5/25/2017	28			6.05	6.05	6.00	6.10	6.05	6.05	18	7551	615
10D	4/27/2017	5/25/2017	28			6.00	6.00	6.05	6.05	6.05	6.05	18	7208	590
11B	4/27/2017	5/25/2017	28			6.05	6.00	6.00	6.05	6.05	6.05	18	7084	580
11C	4/27/2017	5/25/2017	28			6.00	6.00	6.05	6.05	6.10	6.10	18	7621	625
11D	4/27/2017	5/25/2017	28			6.00	6.00	6.00	6.10	6.10	6.05	18	7423	610
													Average	620
													St Dev	30
													COV	0.05

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project:	CC8 Phase 2	Section:	Station 4+00 to 5+00	Client	FAA-ATRD
Technician:	J. Stein/ R. Norcross	Professiona	J. Stein	Date:	Various

Sample No.	Date Poured	Date Tested	Age	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
Lanes 1,3									
1A	4/27/2017	5/25/2017	28	6.00	12.00	151960	28.27	5370	1
1B	4/27/2017	5/25/2017	28	5.99	12.00	145350	28.18	5160	2
1C	4/27/2017	5/25/2017	28	5.99	12.00	146140	28.18	5190	1
2A	4/27/2017	5/25/2017	28	5.99	12.00	134450	28.18	4770	1
2B	4/27/2017	5/25/2017	28	5.99	12.00	130640	28.18	4640	2
2C	4/27/2017	5/25/2017	28	5.99	12.00	133740	28.18	4750	2
3A	4/27/2017	5/25/2017	28	6.00	12.00	125770	28.27	4450	1
3B	4/27/2017	5/25/2017	28	5.99	12.00	127360	28.18	4520	1
3C	4/27/2017	5/25/2017	28	5.99	12.00	123650	28.18	4390	1
4A	4/27/2017	5/25/2017	28	5.98	12.00	132010	28.09	4700	2
4B	4/27/2017	5/25/2017	28	6.00	12.00	130940	28.27	4630	1
4C	4/27/2017	5/25/2017	28	6.00	12.00	127060	28.27	4490	2
5A	4/27/2017	5/25/2017	28	6.01	12.00	129990	28.37	4580	2
5B	4/27/2017	5/25/2017	28	6.00	12.00	131860	28.27	4660	2
5C	4/27/2017	5/25/2017	28	6.00	12.00	128660	28.27	4550	1
6A	4/27/2017	5/25/2017	28	5.99	12.00	131920	28.18	4680	1
6B	4/27/2017	5/25/2017	28	6.00	12.00	132700	28.27	4690	1
6C	4/27/2017	5/25/2017	28	5.99	12.00	142740	28.18	5070	1
7A	4/27/2017	5/25/2017	28	6.00	12.00	125810	28.27	4450	1
7B	4/27/2017	5/25/2017	28	6.00	12.00	127440	28.27	4510	2
7C	4/27/2017	5/25/2017	28	5.99	12.00	120630	28.18	4280	2
8A	4/27/2017	5/25/2017	28	6.00	12.00	137230	28.27	4850	1
8B	4/27/2017	5/25/2017	28	6.00	12.00	138880	28.27	4910	1
8C	4/27/2017	5/25/2017	28	6.01	12.00	130490	28.37	4600	1
9A	4/27/2017	5/25/2017	28	6.01	12.00	127440	28.37	4490	1
9B	4/27/2017	5/25/2017	28	6.00	12.00	127380	28.27	4510	2
9C	4/27/2017	5/25/2017	28	6.00	12.00	132420	28.27	4680	1
10A	4/27/2017	5/25/2017	28	6.00	12.00	122400	28.27	4330	2
10B	4/27/2017	5/25/2017	28	6.00	12.00	123140	28.27	4360	2
10C	4/27/2017	5/25/2017	28	6.00	12.00	123080	28.27	4350	1
11A	4/27/2017	5/25/2017	28	6.01	12.00	126230	28.37	4450	2
11B	4/27/2017	5/25/2017	28	6.00	12.00	121830	28.27	4310	2
11C	4/27/2017	5/25/2017	28	5.99	12.00	125310	28.18	4450	2
							Average	4630	
							St Dev	270	
							COV	0.06	

BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete
4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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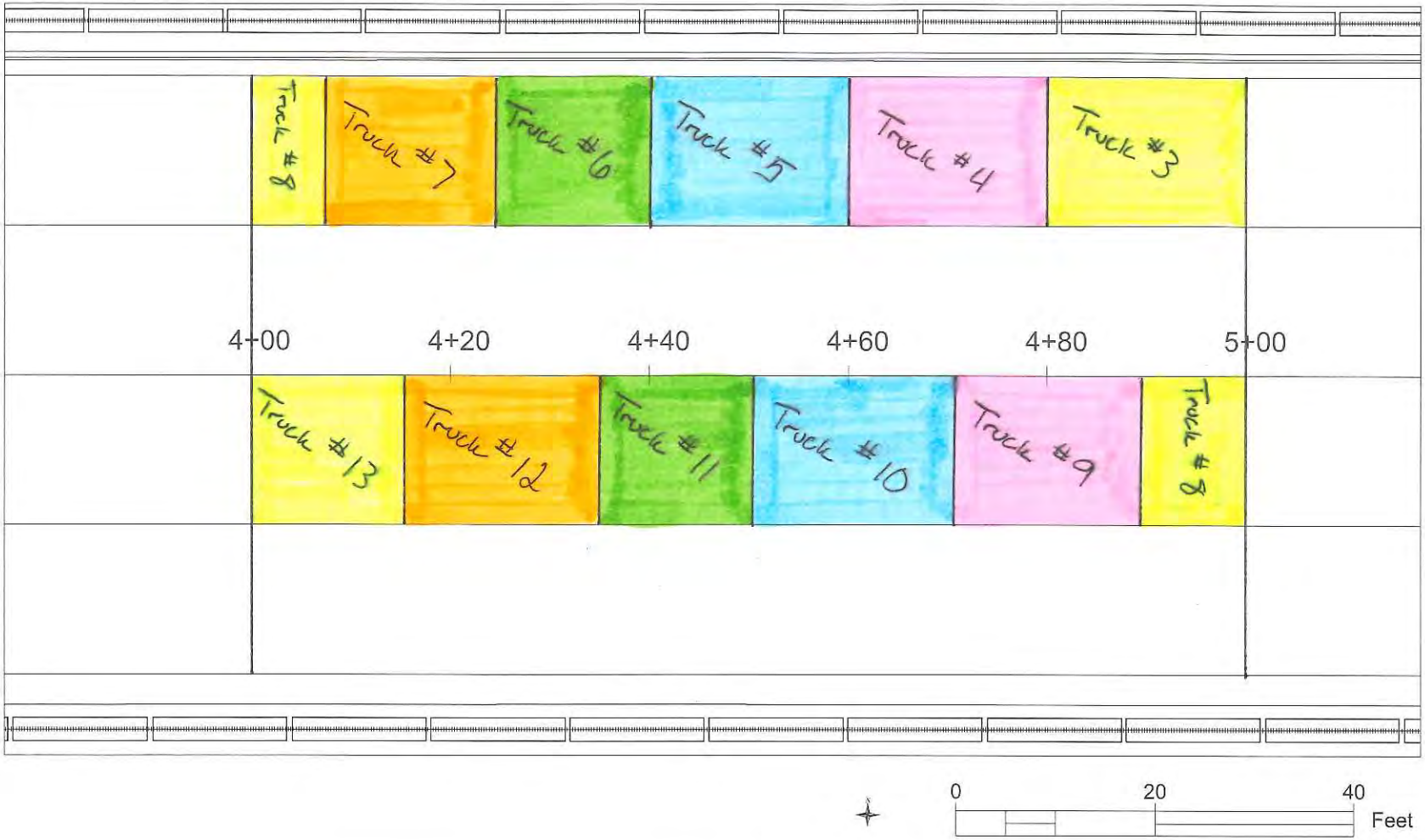
Tel: 800 387-5862 ■ Fax: 905 792-0651

P-501 Placement
4/27/17

Phase 2 Joint Comparison Test



NO.	REVISIONS	DATE	BY	CHK	APR

APPLIED RESEARCH ASSOCIATES, INC.
2828 FIRE ROAD, SUITE 200
EGG HARBOR TOWNSHIP,
NEW JERSEY 08234
PHONE: (609) 380-4240

FOR

NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ

	NAME	DATE
DRAWN	MP	04/27/2017
CHECKED		
FAA APPROVAL DATE:		
PROJECT NO:		

NAPTF CC8
CONSTRUCTION

SIZE: ANSI D | SCALE: AS NOTED | SHEET 1 OF 1

CAD FILE: D00077.00031_CC8-CONSTRUCTION_4-27-17.DWG

1 XXXX XXXXXXXX M.H.

P-501 (650 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 05/02/2017

Placement Location = Sta. 4+00 to 5+00, Lanes 2 & 4 (See Attached Placement Map)

7 Day Testing Completed on 05/09/2017

28 Day Testing Completed on 05/30/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	68.0 F	64.0 F	87%	9.2 mph S	8.0 miles	Mostly Cloudy
2:54 PM	78.1 F	48.9 F	36%	23.0 mph W	10.0 miles	Clear

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam Strength (PSI Flex)				Cylinder Strength (PSI)			Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	28 Day	28 Day	28 Day	28 Day	28 Day	
5/2/2017	REJECTED	256	7:35 AM	8:07 AM	QC (Craig)	5	2.50	N/T	5.5	4.3	N/T	N/T	138.7	75.1	119	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Low Air - Rejected, Truck Pulled to Side &
					QA (CSRA)	N/T	4.00	4.5	N/T	N/T	N/T	N/T	N/T	N/T	119		Average =		N/A	Average =		N/A	Added Air Entrainment (% Not Known)
5/2/2017	1	241	8:05 AM	8:31 AM	QC (Craig)	0	4.50	4.9	N/T	N/T	N/T	N/T	139.7	72.6	108	500	525	555	590	4,440	4,470	4,190	
					QA (CSRA)	0	5.00	5.0	N/T	N/T	N/T	N/T	140.9	72.6	108		Average =		556.7	Average =		4,367	
5/2/2017	2	256	7:35 AM	8:44 AM	QC (Craig)	10	4.00	5.6	N/T	N/T	N/T	N/T	137.0	74.8	173	360	495	530	520	3,670	3,660	4,240	Retest of 1st Truck that was Rejected, Added
					QA (CSRA)	Concrete Not QA Tested											Average =		515.0	Average =		3,857	Air Entrainment (% Not Known)
5/2/2017	3	226	8:18 AM	8:44 AM	QC (Craig)	5	3.75	5.8	N/T	N/T	N/T	N/T	138.5	74.3	137	445	550	600	540	4,240	4,280	4,420	
					QA (CSRA)	N/T	3.50	N/T	N/T	N/T	N/T	N/T	N/T	N/T	137		Average =		563.3	Average =		4,313	
5/2/2017	4	257	8:54 AM	9:20 AM	QC (Craig)	0	5.00	7.1	N/T	6.9	N/T	N/T	135.7	74.0	108	435	550	555	580	4,030	3,960	4,090	QA Air Test Incorrect, QC Retest Showed
					QA (CSRA)	N/T	5.00	9.0	N/T	N/T	N/T	N/T	137.4	N/T	107		Average =		561.7	Average =		4,027	6.9%, Concrete Placed
5/2/2017	REJECTED	241	Unknown	9:42 AM	QC (Craig)	5	2.75	7.8	4.25	7.5	2.50	N/T	N/T	N/T	140	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Rejected Due to High Air %, 115
			No Ticket		QA (CSRA)	N/T	N/T	8.0	N/T	N/T	N/T	N/T	N/T	N/T	N/T		Average =		N/A	Average =		N/A	revs 1st Test, 140 revs 2nd Test
5/2/2017	REJECTED	256	Unknown	10:12 AM	QC (Craig)	0	6.00	6.1	N/T	N/T	N/T	N/T	N/T	N/T	115	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Rejected Due to High Slump and Loose Mix
			No Ticket		QA (CSRA)	Concrete Not QA Tested											Average =		N/A	Average =		N/A	After Adding Air Entrainment
5/2/2017	5	226	9:56 AM	10:20 AM	QC (Craig)	2	4.00	6.5	N/T	N/T	N/T	N/T	139.0	73.7	158	475	565	580	550	3,710	4,200	4,360	
					QA (CSRA)	N/T	N/T	6.6	N/T	N/T	N/T	N/T	N/T	N/T	N/T		Average =		565.0	Average =		4,090	
5/2/2017	6	246	10:08 AM	10:35 AM	QC (Craig)	5	4.00	5.1	N/T	N/T	N/T	N/T	141.0	76.0	117	485	630	575	575	4,420	4,550	4,550	
					QA (CSRA)	N/T	3.50	4.5	N/T	N/T	N/T	N/T	141.4	76.0	N/T		Average =		593.3	Average =		4,507	
5/2/2017	7	241	10:37 AM	11:03 AM	QC (Craig)	5	4.00	5.0	N/T	N/T	N/T	N/T	141.0	75.3	125	400	585	590	610	4,750	4,600	4,580	
					QA (CSRA)	Concrete Not QA Tested											Average =		595.0	Average =		4,643	
5/2/2017	8	229	11:05 AM	11:39 AM	QC (Craig)	15	3.00	N/T	4.00	5.1	N/T	N/T	139.8	75.3	221	450	595	555	585	4,360	4,360	4,260	196 revs 1st Test, 221 revs 2nd Test
					QA (CSRA)	Concrete Not QA Tested											Average =		578.3	Average =		4,327	
5/2/2017	9	226	11:31 AM	12:00 PM	QC (Craig)	0	4.50	6.0	N/T	N/T	N/T	N/T	139.4	75.4	122	455	575	575	570	4,200	4,150	4,130	
					QA (CSRA)	0	5.00	6.4	N/T	N/T	N/T	N/T	138.2	N/T	N/T		Average =		573.3	Average =		4,160	
5/2/2017	10	253	11:45 AM	12:10 PM	QC (Craig)	5	6.00	N/T	4.25	6.0	N/T	N/T	139.5	75.6	164	475	555	555	545	4,280	4,210	4,280	127 revs 1st Test, 164 revs 2nd Test
					QA (CSRA)	Concrete Not QA Tested											Average =		551.7	Average =		4,257	
5/2/2017	11	246	12:07 PM	12:40 PM	QC (Craig)	7	3.00	N/T	4.00	5.0	N/T	N/T	140.6	77.0	189	490	585	575	560	4,070	4,190	4,140	
					QA (CSRA)	Concrete Not QA Tested											Average =		573.3	Average =		4,133	

650 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Tuckahoe 5/8" Round Stone	1,315	lbs.
Penn Jersey 3/4" Round Stone	365	lbs.
Tuckahoe Sand	1,355	lbs.
Water	212	lbs.
Type I Portland Cement	329	lbs.
Flyash Type F (30%)	141	lbs.
Air %	6.0	
W/C Ratio	0.45	

Batch Ticket Information

Load #	YD^3 Batch	5/8" Stone	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
1	11.0	14,440	4,000	15,520	153.4	3,680	1,550	54.0	204.0
2	11.0	14,340	4,040	15,420	131.8	3,620	1,560	52.0	204.0
3	11.0	14,400	4,020	15,420	154.0	3,630	1,540	51.0	204.0
4	11.0	14,420	3,980	15,360	154.0	3,600	1,540	67.0	204.0
5	11.0	14,400	3,980	15,420	152.8	3,630	1,550	66.0	208.0
6	11.0	14,340	4,000	15,380	153.4	3,660	1,610	67.0	204.0
7	11.0	14,360	4,000	15,380	153.4	3,660	1,540	60.0	208.0
8	11.0	14,400	4,000	15,420	154.0	3,590	1,560	58.0	208.0
9	11.0	14,400	4,020	15,440	153.4	3,610	1,540	57.0	204.0
10	11.0	14,460	4,040	15,500	153.4	3,620	1,540	61.0	208.0
11	11.0	14,420	3,980	15,460	153.4	3,600	1,540	59.0	204.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - United Concrete QC Field Notes C - CSRA QA Field Notes D - Batch Tickets E - NAPTF Lab Testing Information F - Admixture Information G - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-3

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Joe Landy, Brian Hirsh, Ken Hahn, John Dilleshaw
Robert Todd

DATE INSPECTED: 5/2/16 REPORT NO.: CP-6

PROJECT PLANS BY: N/A DATED: N/A REVISION NO.: N/A

APPROVAL DATE: N/A

CONCRETE PLACEMENT REPORT

(compressive strength)

LOCATION: Station 400 to 500 East Side

Craig Testing Laboratories, Inc. inspector arrived at site as requested by client and inspected concrete placement at the above location per the project plans and documents.

Slump (ASTM C143): * Approved Slump Range: 3" - 6"

Air Content (ASTM C231): * Approved Air % Range: 6.0% ± 1.5%

Temperature (ASTM C1064): * Todays Yardage: 121

Concrete Supplier: Penn Jersey Approved Mix ID: 650FLEX2A

Consolidation Method: ☑ Internal ☐ External ☐ Both ☐ None ☐ Other _____ Ambient Temperature (F): *

Strength of Concrete Placed (PSI): 650 Flex No. of Samples (ASTM C31): *

Specimen Type: Cylinder / Beam

Required Strength of Concrete (PSI): 650 Flex On Site Curing Facilities Available ☑ Yes ☐ No
(ACI 301 - 1.6.3.2.d)

☐ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 7:00 - 2:00
☐ Work Above is in Progress and Requires Further Inspection
☑ Field Work is in Substantial Compliance with the following approved documents:
☑ Mix Designs ☐ Drawings ☐ Specifications
☐ Compressive strength samples have met the required strength
☐ ***Inspection done without approved documentation available***
☐ ***Work Deviates from Approved Plans and/or Documents, See NCR No.*** _____

Remarks: All test results recorded were provided to Ronaldo Aponte, who accepted all test results.
* See attached table for results.

Reported to: Project Distribution Reviewed By: Ian Craig

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-3

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Joe Landy, Brian Hirsh, Ken Hahn, John Dilleshaw
Robert Todd

DATE INSPECTED: 5/2/17 REPORT NO.: CP-6

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
1 / 241	8:31 AM	5.50	4.30	138.7	75.1	7	3
2 / 256	8:44 AM	2.75	6.40	139.3	68.2	7	3
3 / 226	8:44 AM	4.50	5.80	138.5	74.2	7	3
4 / 257	9:20 AM	5.00	6.90	135.7	74.0	7	3
5 / 226	10:20 AM	4.00	6.50	139.0	73.7	7	3
6 / 246	10:35 AM	4.00	5.10	141.0	76.0	7	3
7 / 241	11:03 AM	4.00	5.00	141.0	75.3	7	3
8 / 229	11:39 AM	4.00	5.10	139.8	75.3	7	3
9 / 226	12:00 PM	4.50	6.00	139.4	75.4	7	3
10 / 253	12:10 PM	4.25	6.00	139.5	75.6	7	3
11 / 246	12:40 PM	4.00	5.00	140.6	76.0	7	3

Remarks: All test results recorded were provided to Ronaldo Aponte, who accepted all test results.

Reported to: Project Distribution Reviewed By: Ian Craig

Craig Testing

CC8 – Phase 2

Pour Placement P-501 Lane 2 (0.00' to 15.00') and Lane 4 (15.00' to 30.00')

Pour Date 5-2-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight	
256	8:07	120	5	1st 2 1/2 / 2nd 5 1/2	75.1	4.3	44.54	138.72	Air low-Ark.
RETEST									
241	8:31	108	0	4 1/2	72.6	4.9	44.70	139.71	
POURED									
254 Retest	8:44	173	+5= 10	4	74.8	5.6	44.12	137.04	
POURED									
226	8:44	137	5	3 3/4	74.3	5.8	44.50	138.50	
POURED									
257	9:20	108	0	5	74.0	1st 7.1 / 2nd 6.9	4	135.68	
POURED									
241	9:42	140	5	1st 2 3/4 / 2nd 4 1/4 / 3rd 2 1/2		7.8	REJECTED		Air high
Rejected									
256	10:00	115	0	6			REJECTED		slump too low
Rejected									
226	10:20	158	2	4	73.7	6.5	44.42	139.0	
POURED									
244	10:35	117	5	4	76.0	5.1	44.44	141.10	
POURED									
241	11:03	125	5	4	75.3	5.0	44.90	141.0	
POURED									
229	11:39	196	15	4	75.3	5.1	44.64	139.80	
POURED									
226	12:00	122	0	4 1/2	75.4	6.2	44.52	139.36	
POURED									
253	12:10	164	5	4 1/4	75.6	6.0	44.56	139.52	
POURED									
246	12:40	159	7	4	77.0	5.0			
POURED									

End pour: ~~1:12~~ 1:15 PM

Total yards: 121

HA

CC8 – Phase 2

Pour Placement F 501 Lane 2 (0.00' to 15'.00') and Lane 4 (15.00' to 30.00')

Pour Date 5-2-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight
256	8.07			4		4.5	43.64	
RETEST	(WRONG)							
241				5		5.0	43.82	
POURED								
256								
RETESTED By Craig POURED								
226				3.5	69.4			
POURED								
257				5		9.0 Test was incorrect CRAIG Test was approved - Pour		
POURED								
241						8.0	REJECTED	for high
REJECTED								
256							REJECTED	Slump test
REJECTED								
226						6.6		
POURED								
246				3 1/2	76	4.5	43.96	
POURED								
241								
POURED								
229								
POURED								
226			0	5		6.4	43.14	
POURED								
253								
POURED								
246								
POURED								

CSRA

QC

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp**

Truck# 1 (256)

Time Dispatched

Time Arrived 8:07am

Revolutions 67 → 119

Initial Slump 2.5 **Water Added** 0

Slump #2 5.5 **Water Added** 5gal

Slump #3 **Water Added**

Final Slump 5.5 **Conveyor Slump**

Concrete Temp 75.1 **Weight** 44.54

Air Content 4.3 **Conveyor Air**

Placement Location

Notes Rejected (Air is out)

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp**

Truck# 1 (256)

Time Dispatched

Time Arrived 8:07am

Revolutions 67 → 119

Initial Slump 4 **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight** 43.64

Air Content 4.5 **Conveyor Air**

Placement Location

Notes

CSRA

T2 QC

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp** 66.5

Truck# 2 (241)

Time Dispatched

Time Arrived 8:30 am

Revolutions 108

Initial Slump 4.5 **Water Added** 0

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 4. **Conveyor Slump**

Concrete Temp 72.6 **Weight** 44.70

Air Content 4.9 **Conveyor Air**

Placement Location 5+00 to 4+80

Notes OK

T2 QA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 2

Time Dispatched

Time Arrived 8:30 AM

Revolutions 108

Initial Slump 5 **Water Added** 0

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 72.6 **Weight** 43.82

Air Content 5.00 **Conveyor Air**

Placement Location

Notes

CSRA

T1 Repeat

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp**

Truck# (3) 1 repeat (256)

Time Dispatched

Time Arrived 8:43

Revolutions 173

Initial Slump 4.0 **Water Added** 10gals

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 4.0 **Conveyor Slump**

Concrete Temp 74.8 **Weight** 44.12

Air Content 5.6 **Conveyor Air**

Placement Location 4+80 to 4+60

Notes Truck ok ticke T1
Truck 1 returned back ~~No ticke~~

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

T4

QC

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/17 **Air Temp** 69.4

Truck# 4 C226

Time Dispatched

Time Arrived 8:57am

Revolutions 137

Initial Slump 3.75 **Water Added** 5gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 3.75 **Conveyor Slump**

Concrete Temp 74.3 **Weight** 44.5

Air Content 5.8 **Conveyor Air**

Placement Location 4+60 to 4+45

Notes Truck OK

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/17 **Air Temp** 69.4

Truck# 4

Time Dispatched

Time Arrived 8:57am

Revolutions 137

Initial Slump 3.5 **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp** 69.6

Truck# 5 (257)

Time Dispatched

Time Arrived 9:23 am

Revolutions 107

Initial Slump 5.0 **Water Added** .0

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 5 **Conveyor Slump**

Concrete Temp 74.0 **Weight** 43.78

Air Content 7.1 6.9 **Conveyor Air**

Placement Location ~~4+60 to 4~~ 4+45 → 4+25

Notes Truck OK

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 5.0 **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight** 42.96

Air Content 9 **Conveyor Air**

Placement Location

Notes

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp**

Truck# 6

Time Dispatched

Time Arrived 9:42

Revolutions 115 +25 → 140

Initial Slump 3.0 **Water Added** 0

Slump #2 4.5 **Water Added** 5 gal

Slump #3 2 1/4 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight** 43.52

Air Content 7.8 → 7.5 → **Conveyor Air**

Placement Location

Notes Rejected truck @ 10:13

CC8 P-501 FIELD PLACEMENT NOTES

Date 5/2/2017 **Air Temp**

Truck# 7 250

Time Dispatched

Time Arrived 10:12

Revolutions 14

Initial Slump 6" **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content 6.1 **Conveyor Air**

Placement Location

Notes ~~Rejected~~ partial truck @ 10:21

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp**

Truck# 8 (226)

Time Dispatched 9:56 am

Time Arrived 10:20 am

Revolutions 158

Initial Slump 4.0 **Water Added** 2

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 73.7 **Weight** 44.42

Air Content 6.5 **Conveyor Air**

Placement Location 4+25 ~~to~~ → 4+05

Notes OK

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content 6.6 **Conveyor Air**

Placement Location

Notes

CSRA

T.9

QC

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp**

Truck# 9 (246)

Time Dispatched

Time Arrived 10:35

Revolutions 117

Initial Slump 4.0 **Water Added** 5

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 76 **Weight** 44.9 ~~84~~

Air Content 5.1 **Conveyor Air**

Placement Location 4+05 → 4+00
& 5+00 → 4+85

Notes OK

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 3.5 **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 76 **Weight** 43.96

Air Content 4.5 **Conveyor Air**

Placement Location

Notes

CSRA

QC T10

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/17 **Air Temp**

Truck# 10 (241)

Time Dispatched

Time Arrived 11:03

Revolutions 125

Initial Slump 4" **Water Added** 5 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 4.0 **Conveyor Slump**

Concrete Temp 75.3 **Weight** 44.9

Air Content 5.0 **Conveyor Air**

Placement Location 4+85 → 4+70

Notes OK

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/02/2017 **Air Temp**

Truck# 11 (229)

Time Dispatched

Time Arrived 11:38

Revolutions 196 + 25

Initial Slump 3.0 **Water Added** 10

Slump #2 4 **Water Added** 5

Slump #3 **Water Added**

Final Slump 4 **Conveyor Slump**

Concrete Temp 78.2 **Weight** 44.64

Air Content 5.1 **Conveyor Air**

Placement Location 4+70 → 4+50

Notes OK

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

QC

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 12 (226)

Time Dispatched

Time Arrived 12:05

Revolutions 122

Initial Slump 4.5 **Water Added** 0

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 75.4 **Weight** 41.452

Air Content 6.0 **Conveyor Air**

Placement Location 4+50 → 4+30

Notes Truck OK

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 5 **Water Added** 0

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight** 43.14

Air Content 6.4 **Conveyor Air**

Placement Location

Notes

CSRA

to placed

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 13 (253)

Time Dispatched

Time Arrived 12:20 pm

Revolutions 127

Initial Slump 6.0 **Water Added** 5 gal

Slump #2 4.14 **Water Added** —

Slump #3 **Water Added**

Final Slump 4.14 **Conveyor Slump**

Concrete Temp 75.6 **Weight**

Air Content — 6.0 **Conveyor Air**

Placement Location 4+30 → 4+15

Notes OK

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 14 (246)

Time Dispatched

Time Arrived ~~12:35~~ 12:40

Revolutions 189

Initial Slump 3 **Water Added** 0

Slump #2 4 **Water Added** 5

Slump #3 **Water Added** 2

Final Slump 4 **Conveyor Slump**

Concrete Temp 77 **Weight** 44.82

Air Content 5.0 **Conveyor Air**
4.7 corrected

Placement Location 4+15 → 4+00

Notes

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

DELIVERY TICKET

T1

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
JPARK	256	7:55
ARRIVE JOB	DEPART JOB	TIME IN
8:07		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
78197	1		ORDER #: 7005 TICKET #: 7068317	NET 30		05/02/17	07:27

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:11		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

T1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
256		user	7068317	60037	7:35	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64681

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15420 lb	4.00% M
3/4LOCAL	365 lb	19435 lb	19460 lb	
5/8LOCAL	1315 lb	33925 lb	33800 lb	
TYPE1	329.0 lb	3619.0 lb	3620.0 lb	
FLYASH	141.0 lb	5171.0 lb	5180.0 lb	
WATER	25.5 gl	132.1 gl	131.8 gl	
AIR	4.90 oz	53.90 oz	52.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Load 40096 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

T2

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	8/5
ARRIVE JOB	DEPART JOB	TIME IN
8/5		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068321	NET 30		05/02/17	07:5

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:22		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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CUSTOMER COPY

T 2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7068321	60040	8:05	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64684

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15520 lb	4.00% M
3/4LOCAL	365 lb	19535 lb	19520 lb	
5/8LOCAL	1315 lb	33985 lb	33960 lb	
TYPE1	329.0 lb	3619.0 lb	3680.0 lb	
FLYASH	141.0 lb	5231.0 lb	5230.0 lb	
WATER	25.5 gl	154.1 gl	153.4 gl	
AIR	4.90 oz	53.90 oz	54.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Num Batches: 1

Load 40486 lb

Slump: 4.00 in #

DELIVERY TICKET

T4

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MIKEP	226	8:35
ARRIVE JOB	DEPART JOB	TIME IN
8:44		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068327	NET 30		05/02/17	08:1[illegible]

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:33		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

T4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7068327	60042	8:18	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64686

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15481 lb	15420 lb	4.00% M
3/4LOCAL	365 lb	19435 lb	19440 lb	
5/8LOCAL	1315 lb	33905 lb	33840 lb	
TYPE1	329.0 lb	3619.0 lb	3630.0 lb	
FLYASH	141.0 lb	5181.0 lb	5170.0 lb	
WATER	25.5 gl	154.1 gl	154.0 gl	
AIR	4.90 oz	53.90 oz	51.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Load: 40331 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TS

DRIVER	TRUCK NO.	TIME OUT
GKIEN	257	910
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068334	NET 30		05/02/17	08:52

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:44		
			TAX CODE: NEW	JERSEY STATE SALES TAX				

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

TS

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
257		user	7068334	60045	8:54	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64689

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15360 lb	4.00% M
3/4LOCAL	365 lb	19375 lb	19340 lb	
5/8LOCAL	1315 lb	33805 lb	33760 lb	
TYPE1	329.0 lb	3619.0 lb	3600.0 lb	
FLYASH	141.0 lb	5151.0 lb	5140.0 lb	
WATER	25.5 gl	154.1 gl	154.0 gl	
AIR	6.11 oz	67.21 oz	67.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Load 40202 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - CHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MIKEP	226	10:10
ARRIVE JOB	**DEPART JOB**	**TIME IN**
10:22		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068343	NET 30		05/02/17	09:56

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
MINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

4 slump

73.7 F.

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		CY	650FLEX2A	650 FLEX 2		11.00		
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:77		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

RECEIVED
YARD COPY

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7068343	60051	9:56	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64695

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15420 lb	4.00% M
3/4LOCAL	365 lb	19435 lb	19400 lb	
5/8LOCAL	1315 lb	33865 lb	33800 lb	
TYPE1	329.0 lb	3619.0 lb	3630.0 lb	
FLYASH	141.0 lb	5181.0 lb	5180.0 lb	
WATER	25.5 gl	154.1 gl	152.8 gl	
AIR	6.11 oz	67.21 oz	66.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual
Load 40272 lb
Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
THAND	246	10:03
ARRIVE JOB	**DEPART JOB**	**TIME IN**
10:42		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068345	NET 30		05/02/17	10:08

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:88		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
246		user	7068345	60052	10:08	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64696

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15380 lb	4.00% M
3/4LOCAL	365 lb	19395 lb	19380 lb	
5/8LOCAL	1315 lb	33845 lb	33720 lb	
TYPE1	329.0 lb	3619.0 lb	3660.0 lb	
FLYASH	141.0 lb	5211.0 lb	5270.0 lb	>
WATER	25.5 gl	154.1 gl	153.4 gl	
AIR	6.11 oz	67.21 oz	67.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Num Batches: 1

Load 40287 lb

Slump: 4.00 in #

DELIVERY TICKET

T10

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	1048
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1100		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068350	NET 30		05/02/17	10:30

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:77		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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T70

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7068350	60055	10:37	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64699

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15380 lb	4.00% M
3/4LOCAL	365 lb	19395 lb	19380 lb	
5/8LOCAL	1315 lb	33845 lb	33740 lb	
TYPE1	329.0 lb	3619.0 lb	3660.0 lb	
FLYASH	141.0 lb	5211.0 lb	5200.0 lb	
WATER	25.5 gl	154.1 gl	153.4 gl	
AIR	5.40 oz	59.40 oz	60.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Num Batches: 1

Load 40237 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

T11

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	11:24
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068353	NET 30		05/02/17	11:05

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	650FLEX2A	650 FLEX 2		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:88		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

T\\

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7068353	60056	11:05	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64700

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15420 lb	4.00% M
3/4LOCAL	365 lb	19435 lb	19420 lb	
5/8LOCAL	1315 lb	33885 lb	33820 lb	
TYPE1	329.0 lb	3619.0 lb	3590.0 lb	
FLYASH	141.0 lb	5141.0 lb	5150.0 lb	
WATER	25.5 gl	154.1 gl	154.0 gl	
AIR	5.40 oz	59.40 oz	58.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Num Batches: 1

Load 40272 lb

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

T 12

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MIKEP	226	11:46
ARRIVE JOB	DEPART JOB	TIME IN
1158		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

75.4F.
5 slump
6.4 Air.
5.9%

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068358	NET 30		05/02/17	11:24

SOLD TO: UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:99		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

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T 12

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7068358	60060	11:31	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64704

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15440 lb	4.00% M
3/4LOCAL	365 lb	19455 lb	19460 lb	
5/8LOCAL	1315 lb	33925 lb	33860 lb	
TYPE1	329.0 lb	3609.0 lb	3610.0 lb	
FLYASH	141.0 lb	5161.0 lb	5150.0 lb	
WATER	25.5 gl	154.1 gl	153.4 gl	
AIR	5.40 oz	59.40 oz	57.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Load 40316 lb

Slump: 4.00 in #

Num Batches: 1

T13

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
SVAND	253	1155
ARRIVE JOB	DEPART JOB	TIME IN
1210		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068361	NET 30		05/02/17	11:4

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:110		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

773

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
253		user	7068361	60062	11:45	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64706

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15500 lb	4.00% M
3/4LOCAL	365 lb	19515 lb	19540 lb	
5/8LOCAL	1315 lb	34005 lb	34000 lb	
TYPE1	329.0 lb	3619.0 lb	3620.0 lb	
FLYASH	141.0 lb	5171.0 lb	5160.0 lb	
WATER	25.5 gl	154.1 gl	153.4 gl	
AIR	5.40 oz	59.40 oz	61.00 oz	
HRWR	18.80 oz	206.80 oz	208.00 oz	

Actual Load 40457 lb

Slump: 4.00 in #

Num Batches: 1

T 14

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
THAND	246	12:05
ARRIVE JOB	**DEPART JOB**	**TIME IN**
12:38		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7005 TICKET #: 7068363	NET 30		05/02/17	12:06

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FIRST GATE ON WESTCOAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	650FLEX2A	650 FLEX 2		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:121		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

114

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
246		user	7068363	60063	12:07	5/2/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	650FLEX				W	64707

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	15501 lb	15460 lb	4.00% M
3/4LOCAL	365 lb	19475 lb	19440 lb	
5/8LOCAL	1315 lb	33905 lb	33860 lb	
TYPE1	329.0 lb	3619.0 lb	3600.0 lb	
FLYASH	141.0 lb	5151.0 lb	5140.0 lb	
WATER	25.5 gl	154.1 gl	153.4 gl	
AIR	5.40 oz	59.40 oz	59.00 oz	
HRWR	18.80 oz	206.80 oz	204.00 oz	

Actual Load 40296 lb

Slump: 4.00 in #

Num Batches: 1

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** Station 4+00 to 5+00 **Client** FAA-ATRD

Technician: J. Stein **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Lanes 2,4														
1	5/2/2017	5/9/2017	7	S		6.00	6.00	6.00	6.10	6.10	6.10	18	6116	500
2	5/2/2017	5/9/2017	7	S		6.00	6.00	6.00	6.10	6.05	6.10	18	4405	360
3	5/2/2017	5/9/2017	7	S		6.05	6.05	6.10	6.15	6.15	6.15	18	5613	445
4	5/2/2017	5/9/2017	7	S		6.05	6.05	6.05	6.05	6.05	6.05	18	5332	435
5	5/2/2017	5/9/2017	7	S		6.05	6.00	6.00	6.10	6.15	6.15	18	5834	475
6	5/2/2017	5/9/2017	7	S		6.00	6.00	6.00	6.25	6.20	6.15	18	6016	485
7	5/2/2017	5/9/2017	7	S		5.85	5.90	5.95	6.10	6.10	6.10	18	4725	400
8	5/2/2017	5/9/2017	7	S		6.05	6.05	6.05	6.00	6.00	6.05	18	5486	450
9	5/2/2017	5/9/2017	7	S		5.95	5.95	6.00	6.05	6.00	6.00	18	5386	455
10	5/2/2017	5/9/2017	7	S		6.05	6.05	6.10	6.15	6.15	6.15	18	5978	475
11	5/2/2017	5/9/2017	7	S		6.10	6.10	6.05	6.05	6.10	6.10	18	6116	490
													Average	450
													stdev	40
													COV	0.09

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project: CC8 Phase 2 **Section:** Station 4+00 to 5+00 **Client** FAA-ATRD

Technician: R. Norcross/ C. Rosado **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Lanes 2,4														
1B	5/2/2017	5/30/2017	28	S		6.00	6.00	6.00	6.05	6.05	6.00	18	6360	525
1C	5/2/2017	5/30/2017	28	S		6.00	6.05	6.10	6.05	6.10	6.05	18	6836	555
1D	5/2/2017	5/30/2017	28	S		6.00	6.05	6.05	6.05	6.05	6.05	18	7231	590
2B	5/2/2017	5/30/2017	28	S		6.10	6.10	6.15	6.10	6.05	6.10	18	6256	495
2C	5/2/2017	5/30/2017	28	S		6.05	6.05	6.05	6.05	6.00	6.00	18	6454	530
2D	5/2/2017	5/30/2017	28	S		6.05	6.00	6.00	6.10	6.10	6.10	18	6355	520
3B	5/2/2017	5/30/2017	28	S		6.10	6.05	6.10	6.15	6.10	6.10	18	6915	550
3C	5/2/2017	5/30/2017	28	S		6.00	6.00	6.05	6.10	6.05	6.05	18	7293	600
3D	5/2/2017	5/30/2017	28	S		6.00	6.00	6.00	6.10	6.10	6.10	18	6601	540
4B	5/2/2017	5/30/2017	28	S		6.00	6.00	6.00	6.05	6.05	6.05	18	6666	550
4C	5/2/2017	5/30/2017	28	S		6.00	6.00	6.00	6.10	6.10	6.10	18	6746	555
4D	5/2/2017	5/30/2017	28	S		6.05	6.05	6.00	6.20	6.15	6.10	18	7212	580
5B	5/2/2017	5/30/2017	28	S		6.05	6.05	6.10	6.05	6.05	6.05	18	6986	565
5C	5/2/2017	5/30/2017	28	S		5.95	5.95	6.00	6.05	6.05	6.10	18	6939	580
5D	5/2/2017	5/30/2017	28	S		6.05	6.05	6.00	6.15	6.10	6.15	18	6844	550
6B	5/2/2017	5/30/2017	28	S		6.10	6.05	6.05	6.10	6.05	6.05	18	7837	630
6C	5/2/2017	5/30/2017	28	S		6.00	5.90	5.85	6.10	6.10	6.10	18	6850	575
6D	5/2/2017	5/30/2017	28	S		5.85	5.90	5.95	6.15	6.10	6.10	18	6779	575
7B	5/2/2017	5/30/2017	28	S		6.05	6.10	6.15	6.00	5.95	5.95	18	7187	585
7C	5/2/2017	5/30/2017	28	S		6.00	6.00	6.00	6.15	6.20	6.15	18	7289	590
7D	5/2/2017	5/30/2017	28	S		6.00	5.95	5.95	6.15	6.10	6.15	18	7419	610
8B	5/2/2017	5/30/2017	28	S		6.10	6.05	6.00	6.05	6.05	6.05	18	7291	595
8C	5/2/2017	5/30/2017	28	S		6.05	6.05	6.05	6.00	6.05	6.10	18	6827	555
8D	5/2/2017	5/30/2017	28	S		5.95	5.95	6.00	6.10	6.10	6.10	18	7057	585
9B	5/2/2017	5/30/2017	28	S		6.05	6.00	6.00	6.00	6.00	6.05	18	6949	575
9C	5/2/2017	5/30/2017	28	S		5.95	5.95	6.00	6.05	6.05	6.00	18	6891	575
9D	5/2/2017	5/30/2017	28	S		6.00	6.00	6.00	6.10	6.10	6.10	18	6967	570
10B	5/2/2017	5/30/2017	28	S		6.00	6.05	6.10	6.10	6.10	6.10	18	6870	555
10C	5/2/2017	5/30/2017	28	S		6.00	6.00	6.00	6.10	6.20	6.20	18	6870	555
10D	5/2/2017	5/30/2017	28	S		6.05	6.00	6.05	6.15	6.15	6.20	18	6811	545
11B	5/2/2017	5/30/2017	28	S		6.00	6.10	6.15	6.05	6.05	6.10	18	7327	585
11c	5/2/2017	5/30/2017	28	S		5.90	5.95	6.00	6.20	6.15	6.10	18	6947	575
11D	5/2/2017	5/30/2017	28	S		6.05	6.05	6.10	6.05	6.05	6.00	18	6914	560
													Average	565
													St Dev	25
													COV	0.04

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project:	CC8 Phase 2	Section:	Station 4+00 to 5+00	Client	FAA-ATRD
Technician:	J. Stein/ R. Norcross	Professiona	J. Stein	Date:	Various

Sample No.	Date Poured	Date Tested	Age	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
Lanes 2,4									
1A	5/2/2017	5/30/2017	28	5.96	12.00	123800	27.90	4440	1
1B	5/2/2017	5/30/2017	28	5.97	12.00	125000	27.99	4470	2
1C	5/2/2017	5/30/2017	28	5.98	12.00	117640	28.09	4190	2
2A	5/2/2017	5/30/2017	28	5.98	12.00	102950	28.09	3670	1
2B	5/2/2017	5/30/2017	28	5.97	12.00	102440	27.99	3660	2
2C	5/2/2017	5/30/2017	28	5.96	12.00	118420	27.90	4240	1
3A	5/2/2017	5/30/2017	28	5.98	12.00	119200	28.09	4240	1
3B	5/2/2017	5/30/2017	28	5.97	12.00	119760	27.99	4280	1
3C	5/2/2017	5/30/2017	28	5.98	12.00	124170	28.09	4420	1
4A	5/2/2017	5/30/2017	28	5.98	12.00	113140	28.09	4030	2
4B	5/2/2017	5/30/2017	28	5.99	12.00	111670	28.18	3960	1
4C	5/2/2017	5/30/2017	28	5.98	12.00	114750	28.09	4090	2
5A	5/2/2017	5/30/2017	28	5.97	12.00	103920	27.99	3710	2
5B	5/2/2017	5/30/2017	28	5.99	12.00	118370	28.18	4200	1
5C	5/2/2017	5/30/2017	28	5.98	12.00	122330	28.09	4360	1
6A	5/2/2017	5/30/2017	28	5.99	12.00	124520	28.18	4420	1
6B	5/2/2017	5/30/2017	28	6.00	12.00	128720	28.27	4550	1
6C	5/2/2017	5/30/2017	28	6.01	12.00	129200	28.37	4550	2
7A	5/2/2017	5/30/2017	28	5.99	12.00	133900	28.18	4750	1
7B	5/2/2017	5/30/2017	28	6.01	12.00	130450	28.37	4600	2
7C	5/2/2017	5/30/2017	28	5.99	12.00	129190	28.18	4580	1
8A	5/2/2017	5/30/2017	28	6.00	12.00	123270	28.27	4360	1
8B	5/2/2017	5/30/2017	28	6.00	12.00	123390	28.27	4360	2
8C	5/2/2017	5/30/2017	28	6.00	12.00	120400	28.27	4260	1
9A	5/2/2017	5/30/2017	28	6.00	12.00	118760	28.27	4200	2
9B	5/2/2017	5/30/2017	28	6.01	12.00	117590	28.37	4150	2
9C	5/2/2017	5/30/2017	28	6.00	12.00	116780	28.27	4130	1
10A	5/2/2017	5/30/2017	28	6.01	12.00	121540	28.37	4280	1
10B	5/2/2017	5/30/2017	28	6.00	12.00	119110	28.27	4210	1
10C	5/2/2017	5/30/2017	28	6.00	12.00	121140	28.27	4280	1
11A	5/2/2017	5/30/2017	28	6.00	12.00	115110	28.27	4070	1
11B	5/2/2017	5/30/2017	28	6.00	12.00	118590	28.27	4190	2
11C	5/2/2017	5/30/2017	28	6.00	12.00	117010	28.27	4140	1
							Average	4240	
							St Dev	250	
							COV	0.06	

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

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NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete
4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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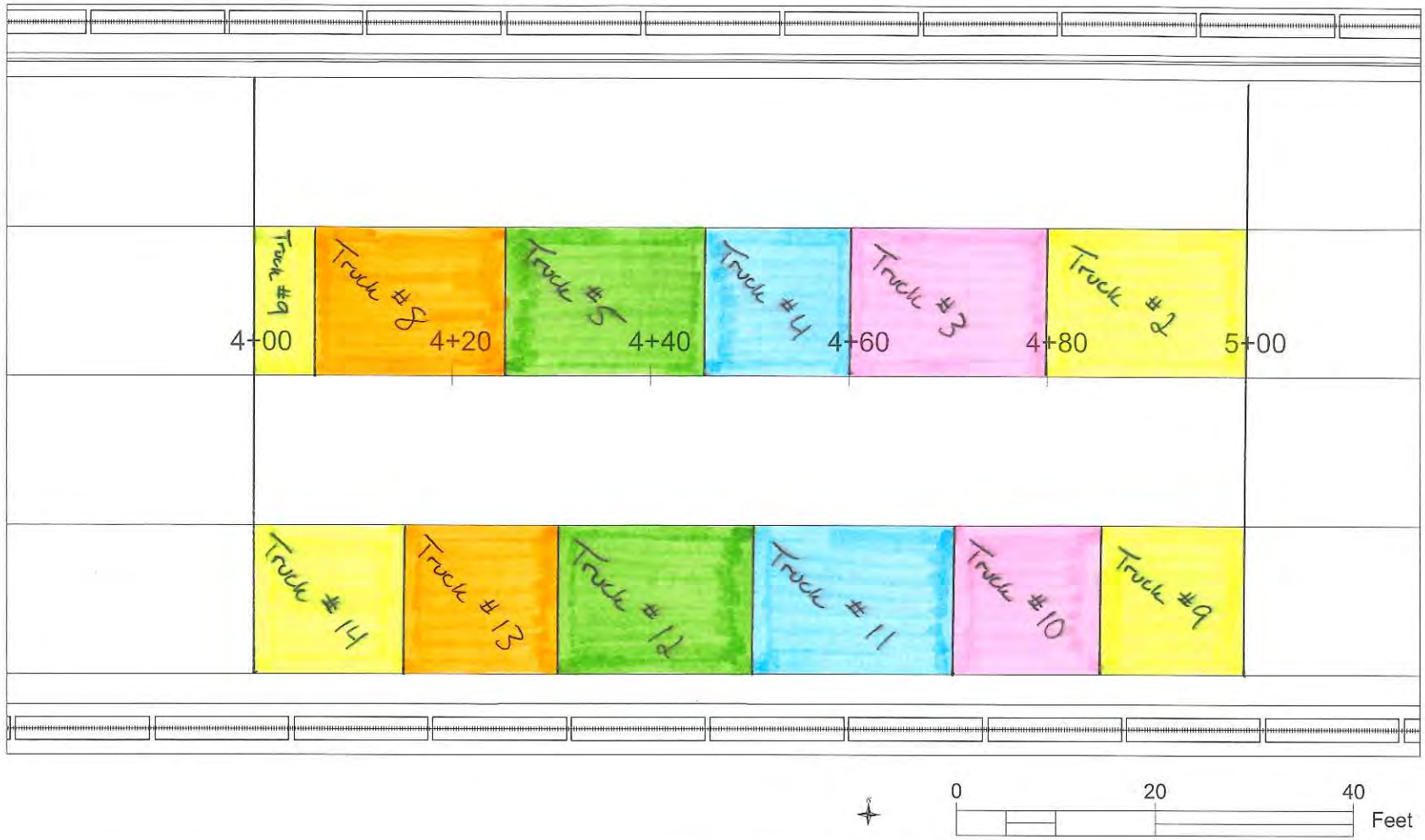
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

P-501 Placement
5/2/17

Phase 2 Joint Comparison Test



NO.	REVISIONS	DATE	BY	CHK	APR

APPLIED RESEARCH ASSOCIATES, INC.
2628 FIRE ROAD, SUITE 200
EGG HARBOR TOWNSHIP,
NEW JERSEY 08234
PHONE: (609) 380-4240

FOR NATIONAL AIRPORT PAVEMENT TEST FACILITY
ATLANTIC CITY AIRPORT, NJ

	NAME	DATE
DRAWN	MP	04/27/2017
CHECKED		
FAA APPROVAL DATE:		
PROJECT NO:		

NAPTF CC8
CONSTRUCTION

SIZE: ANSI D | SCALE: AS NOTED | SHEET 1 OF 1

CAD FILE: D00077.00031_CC8-CONSTRUCTION_4-27-17.DWG

1 XXXX XXXXXXXX M.M.

P-501 (650 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 05/11/2017

Placement Location = Sta. 5+00 to 5+60, Boxes # 1, 3, 5, 7, 9, 11, 13, 15 (See Attached Placement Map)

7 Day Testing Completed on 05/18/2017

28 Day Testing Completed on 06/08/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	53.1 F	48.0 F	83%	8.1 mph NE	10.0 miles	Mostly Cloudy
2:54 PM	59.0 F	39.0 F	48%	15.0 mph E	10.0 miles	Clear

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam Strength (PSI Flex)				Cylinder Strength (PSI)			Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	28 Day	28 Day	28 Day	28 Day	28 Day	
5/11/2017	1	241	7:22 AM	8:06 AM	QC (Craig)	10	3.00	N/T	4.50	5.8	N/T	N/T	138.4	71.3	217	390	460	528	480	3,560	3,480	3,400	130 revs 1st Test, 217 revs 2nd Test
					QA (CSRA)	10	3.25	N/T	4.75	5.6	N/T	N/T	139.2	69.0	N/T		Average =		489.3	Average =		3,480	
5/11/2017	2	257	8:00 AM	8:39 AM	QC (Craig)	10	4.25	5.0	N/T	N/T	N/T	N/T	140.6	67.8	195	455	590	550	565	4,190	4,140	4,230	
					QA (CSRA)	Concrete Not QA Tested											Average =		568.3	Average =		4,187	
5/11/2017	Rejected	229	8:32 AM	9:05 AM	QC (Craig)	22	3.25	N/T	4.00	3.9	5.75	N/T	141.4	70.4	366	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Air Too Low, Added Air Entrainment & Slump
					QA (CSRA)	N/T	3.50	N/T	4.75	3.7	6.50	N/T	141.9	71.0	N/T		Average =		N/A	Average =		N/A	Too High (Mix Fell Apart)
5/11/2017	3	245	9:05 AM	9:52 AM	QC (Craig)	15	3.75	3.5	5.00	5.8	N/T	N/T	139.3	78.4	230	420	535	515	595	4,040	4,070	N/A	202 revs 1st Test, 230 revs 2nd Test, Added
					QA (CSRA)	N/T	4.00	3.50	5.00	5.70	N/T	N/T	139.1	71.0	N/T		Average =		548.3	Average =		4,055	Air Entrainment (Unknown %)
5/11/2017	4	241	9:49 AM	10:13 AM	QC (Craig)	10	6.00	7.0	N/T	N/T	N/T	N/T	138.8	67.6	150	460	570	545	530	3,850	3,930	3,910	
					QA (CSRA)	N/T	5.75	6.0	N/T	N/T	N/T	N/T	139.2	68.0	N/T		Average =		548.3	Average =		3,897	
5/11/2017	5	257	10:37 AM	11:06 AM	QC (Craig)	0	4.50	7.5	N/T	N/T	N/T	N/T	136.8	69.0	165	405	495	475	510	3,630	3,680	3,760	
					QA (CSRA)	N/T	5.5	7.6	N/T	N/T	N/T	N/T	136.9	69.0	N/T		Average =		493.3	Average =		3,690	
5/11/2017	6	229	11:06 AM	11:47 AM	QC (Craig)	10	4.75	7.0	N/T	N/T	N/T	N/T	137.2	68.7	187	415	490	505	525	3,830	3,960	3,830	
					QA (CSRA)	Concrete Not QA Tested											Average =		506.7	Average =		3,873	
5/11/2017	7	245	11:41 AM	12:09 PM	QC (Craig)	10	5.75	Leaked	N/T	Leaked	N/T	N/T	134.3	68.0	140	400	485	465	505	3,250	3,340	3,340	QC Air Test Leaked 2x, Used QA Value of 8.0
					QA (CSRA)	N/T	N/T	8.0	N/T	N/T	N/T	N/T	N/T	N/T	N/T		Average =		485.0	Average =		3,310	Air %
5/11/2017	8	241	12:17 PM	12:40 PM	QC (Craig)	2	5.50	8.0	4.75	7.2	N/T	N/T	137.2	69.0	125	405	505	565	530	3,560	3,570	3,460	
					QA (CSRA)	N/T	6.00	N/T	5.25	8.5	4.75	7.6	135.6	68	N/T		Average =		533.3	Average =		3,530	

650 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Tuckahoe 5/8" Round Stone	1,315	lbs.
Penn Jersey 3/4" Round Stone	365	lbs.
Tuckahoe Sand	1,355	lbs.
Water	212	lbs.
Type I Portland Cement	329	lbs.
Flyash Type F (30%)	141	lbs.
Air %	6.0	
W/C Ratio	0.45	

Batch Ticket Information

Load #	YD^3 Batch	5/8" Stone	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
1	9.5	12,440	3,480	13,240	93.5	3,170	1,340	52.0	176.0
2	9.5	12,480	3,440	13,240	121.6	3,240	1,330	51.0	176.0
3	9.5	12,400	3,480	13,240	140.2	3,150	1,330	50.0	176.0
4	9.5	13,080	3,660	13,940	146.8	3,300	1,410	54.0	188.0
5	9.5	12,380	3,460	13,200	140.2	3,150	1,360	52.0	180.0
6	9.5	12,460	3,460	13,200	140.2	3,130	1,330	51.0	176.0
7	9.5	12,420	3,480	13,240	140.2	3,110	1,360	51.0	180.0
8	9.5	12,420	3,480	13,300	139.0	3,120	1,340	52.0	176.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - United Concrete QC Field Notes C - CSRA QA Field Notes D - Batch Tickets E - NAPTF Lab Testing Information F - Admixture Information G - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-3

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Bob Todd, Joe Landy, Ken Hahn, John Peacock

DATE INSPECTED: 5/11/17 REPORT NO.: CP-7

PROJECT PLANS BY: N/A DATED: N/A REVISION NO.: N/A

APPROVAL DATE: N/A

CONCRETE PLACEMENT REPORT

(compressive strength)

LOCATION: Station 500 to 560 Alternating 15 x 15 Boxes

Craig Testing Laboratories, Inc. inspector arrived at site as requested by client and inspected concrete placement at the above location per the project plans and documents.

Slump (ASTM C143): * Approved Slump Range: 3" - 6"

Air Content (ASTM C231): * Approved Air % Range: 6.0% ± 1.5%

Temperature (ASTM C1064): * Todays Yardage: 88

Concrete Supplier: Penn Jersey Approved Mix ID: 650FLEX2A

Consolidation Method: ☑ Internal ☐ External ☐ Both ☐ None ☐ Other _____ Ambient Temperature (F): 55°F

Strength of Concrete Placed (PSI): 650 Flex No. of Samples (ASTM C31): *

Specimen Type: Cylinder / Beam

Required Strength of Concrete (PSI): 650 Flex On Site Curing Facilities Available ☑ Yes ☐ No

(ACI 301 - 1.6.3.2.d)

☐ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 7:00 - 2:00

☐ Work Above is in Progress and Requires Further Inspection

☑ Field Work is in Substantial Compliance with the following approved documents:

☑ Mix Designs ☐ Drawings ☐ Specifications

☐ Compressive strength samples have met the required strength

☐ ***Inspection done without approved documentation available***

☐ ***Work Deviates from Approved Plans and/or Documents, See NCR No.*** _____

Remarks: All test results recorded were provided to Ronaldo Aponte, who accepted all test results.
* See attached table for results.

Reported to: Project Distribution Reviewed By: Ian Craig

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-3

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Bob Todd, Joe Landy, Ken Hahn, John Peacock

DATE INSPECTED: 5/11/17 REPORT NO.: CP-7

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
1 / 241	8:06 AM	4.50	5.80	138.4	71.3	7	3
2 / 257	8:39 AM	4.25	5.00	140.6	67.8	7	3
3 / 245	9:52 AM	5.00	5.80	139.3	78.4	7	3
4 / 241	10:13 AM	6.00	7.00	138.8	67.6	7	3
5 / 257	11:06 AM	4.50	7.50	136.8	69.0	7	3
6 / 229	11:47 AM	4.75	7.00	137.2	68.7	7	3
7 / 245	12:09 PM	5.75	8.00	134.3	68.0	7	3
8 / 241	12:40 PM	4.75	7.20	137.2	69.0	7	3

Remarks: All test results recorded were provided to Ronaldo Aponte, who accepted all test results.

Reported to: Project Distribution Reviewed By: Ian Craig

Curing testing

CC8 – Phase 2

Pour Placement P-501 Boxes 1-8 from 5+00 to 5+60 (See Box layout on reverse side)

Pour Date 5-11-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight
241	8:26 A 8:31 C	217	5	4 1/2	71.3	5.8	44.30	138.40
Poured	15.00 to 30.00 @ 5+00 to 5+15							
257	8:39 A 8:52 C	195	10	4 1/4	67.8	5.0	44.86	140.60
Poured	15.00 to 30.00 @ 5+30 to 5+45							
229	9:00 A X C	366	20	1st 4 2nd 5 3/4	70.4	1st 3.9 2nd X	45.06	
REJECTED	Air too low, Added Air entrainment which made Slump to high (6 1/2 by FAA)							
245	9:32 A 10:17 C	230	15	1st 3 3/4 2nd 5	69	1st 3.5 2nd 5.8	1st 45.40 2nd 44.54	139.64
Poured	Added Air Entrainment 0.00 to 15.00 @ 5+15 to 5+30							
241	10:13 A 10:30 C	150	10	6	67.4	7.0	44.22	138.80
Poured	0.00 to 15.00 @ 5+45 to 5+60							
257	11:04 A 11:30 C	165	0	4 1/2	67	7.5	43.90	136.80
Poured	0.00 to -15.00 from 5+00 to 5+15							
229	11:47 A 11:56 C	157	10	4 3/4	68.7	7.0	44.16	137.20
Poured	0.00 to -15.00 from 5+30 to 5+45							
245	12:12 A 12:36 C			5 3/4	Test can linked air 2 times. FAA Test superseded. →		43.42	134.32
Poured	-15.00 to -30.00 @ 5+15 to 5+30							
241	12:40 1:10	125	2	1st 5 1/2 2nd 4 3/4	69.0	1st 8.0 2nd 7.2	1st 42.10 2nd 42.46	137.20
	-15.00 to -30.00 @ 5+30 to 5+45							

Pour ended @ 1:30 PM

Total yards 76.5

FAA

CC8 – Phase 2

Pour Placement P501 Boxes 1-8 from 5700 + 5760

Pour Date 5-11-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight
241				4 3/4	69.0	5.6		
257								
229				1st 4 3/4 2nd 6 1/2		3.7	44.08	
Rejected because of air and slump								
245				1st 4 2nd 5	1st 2nd	3.5 5.7	1st 44.34 2nd 43.36	
Added air entrainment								
241				5 3/4		6.0		
257				5 1/2	69	7.6	42.82	
229								
245						8.0		
241				1st 6 2nd 5 1/4 3rd 4 3/4	68	7.6	42.50	

CSRA

QC

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 1 (241)

Time Dispatched

Time Arrived 8:06 am

Revolutions 130 → ~~150~~ 217

Initial Slump 3.0 **Water Added** 0

Slump #2 4.5 **Water Added** ~~8~~ 10 gal

Slump #3 ~~4~~ **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 70 71.3 **Weight** 44.3

Air Content 5.8 **Conveyor Air**

Placement Location

Notes

QA

CC8 P-501 FIELD PLACEMENT NOTES e m cont = 8.60

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 3.25 **Water Added**

Slump #2 4 3/4 **Water Added** ~~5~~ 10 gal

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 69 **Weight** 43.40

Air Content 5.6 **Conveyor Air**

Placement Location

Notes

CSRA

QC

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 2 (257)

Time Dispatched

Time Arrived 8:39

Revolutions 195

Initial Slump 4.25 **Water Added** 10 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 67.8 **Weight** 44.86

Air Content 5.0 **Conveyor Air**
Corr 4.7

Placement Location

Notes

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

Timing is perfect

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# T3 (229)

Time Dispatched

Time Arrived 9:05 am

Revolutions 288 → 366 → +30

Initial Slump 3.25 **Water Added** 15 gal

Slump #2 4.0 **Water Added** +5

Slump #3 4 3/4 ~~6.0~~ **Water Added** +2

Final Slump **Conveyor Slump**

Concrete Temp 70.4 **Weight** 45.06

Air Content 3.4 **Conveyor Air**

Placement Location

Notes Rejected

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 3.5 **Water Added**

Slump #2 4 3/4 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 71 **Weight** 44.08

Air Content 3.7 **Conveyor Air**

Placement Location

Notes

CSRA

G2C

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# T4 1245

Time Dispatched

Time Arrived 9:51

Revolutions 2 + 2 + 28

Initial Slump 3 3/4 **Water Added** 10#

Slump #2 5.0 **Water Added** +5

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 69 78.4 **Weight** 45.4 44.54

Air Content 3.5 5.8 **Conveyor Air**

Placement Location

Notes Accepted

G2A

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 4 **Water Added**

Slump #2 5 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 69 71 **Weight** 44.34 43.38

Air Content 5.7 corrected 5.4 **Conveyor Air**

Placement Location

Notes

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 5 (241)

Time Dispatched

Time Arrived 10:18

Revolutions 150

Initial Slump 6 **Water Added** 10 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 6 **Conveyor Slump**

Concrete Temp 67.6 **Weight** 44.22

Air Content 7.0 **Conveyor Air**

Placement Location

Notes Accepted

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 5 3/4 **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 5 3/4 **Conveyor Slump**

Concrete Temp 68 **Weight** 43.4

Air Content 6 **Conveyor Air**

Placement Location

Notes

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 6 (257)

Time Dispatched

Time Arrived 11:05

Revolutions 165

Initial Slump 4.5 **Water Added** 0

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 69 **Weight** 43.90

Air Content 7.5 **Conveyor Air**

Correct 7.2

Placement Location

Notes Accepted

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 5.5 **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 69 **Weight** 42.82

Air Content 7.6 **Conveyor Air**

Corrected 7.3

Placement Location

Notes

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 7 (229)

Time Dispatched

Time Arrived 11:46

Revolutions 187

Initial Slump 4 3/4 **Water Added** 10

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 87 **Weight** 44.16

Air Content 7.0 corrected 6.7 **Conveyor Air**

Placement Location

Notes Accepted

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# 8(245)

Time Dispatched 134

Time Arrived 12:09 PM

Revolutions 140

Initial Slump 5 3/4 **Water Added** 10 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 68.0 **Weight** ~~43.28~~ leaked
43.42 leaked

Air Content **Conveyor Air**

Placement Location

Notes No craig Air

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content 8.0 **Conveyor Air**
correct 8.7 8.0

Placement Location

Notes we used QA value

CSRA

QC

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck# T9 (2417)

Time Dispatched

Time Arrived 12:43 pm

Revolutions 125

Initial Slump 5.5 **Water Added** 2 gal

Slump #2 4 3/4 **Water Added**

Slump #3 **Water Added**

Final Slump 4 3/4 **Conveyor Slump**

Concrete Temp 69 **Weight** 42.10 42.46

Air Content 8.0 **Conveyor Air**

correc 7.7 → 7.2 correc 6.9

Placement Location

Notes Accepted

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump 6 **Water Added**

Slump #2 5 1/4 4 3/4 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 68 **Weight** 42.50

Air Content 8.5 **Conveyor Air**

Correc 8.2 → 7.6 correc 7.3

Placement Location

Notes Accepted

DELIVERY TICKET

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

T1

PENN JERSEY
DING MATERIALS CO., INC.

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	700
ARRIVE JOB	**DEPART JOB**	**TIME IN**
800		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068738	NET 30		05/11/17	07:2

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER (ENTER 2ND GATE)

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Slump: 4.50						
		SALESPERSON: JRICH				CUM. TOTAL:9.5		
		TAX CODE: NEW JERSEY STATE SALES TAX						

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

RECEIVED

CUSTOMER COPY

T1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7068738	60354	7:22	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
.0 CYDS	650FLEX				W	65002

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13240 lb	3.50% M
3/4LOCAL	365 lb	16708 lb	16720 lb	
5/8LOCAL	1315 lb	29213 lb	29160 lb	
TYPE1	329.0 lb	3125.5 lb	3170.0 lb	
FLYASH	141.0 lb	4509.5 lb	4510.0 lb	
WATER	25.5 gl	93.3 gl	93.5 gl	
AIR	5.40 oz	51.30 oz	52.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual Load 34464 lb

Slump: 4.50 in #

Num Batches: 1

DELIVERY TICKET

T2

PENN JERSEY
DING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
GKIEN	257	820
ARRIVE JOB	**DEPART JOB**	**TIME IN**
830		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	ORDER REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 76063 TICKET #: 7068743	NET 30		05/11/17	07:59

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
FAA TECH CENTER (ENTER 2ND GATE)

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.50					
			SALESPERSON: JRICH			CUM. TOTAL:19		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

IX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND
IX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND
MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

T2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
257		user	7068743	60356	8:00	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10 CYDS	650FLEX				W	65004

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13303 lb	13240 lb	3.50% M
3/4LOCAL	365 lb	16708 lb	16680 lb	
5/8LOCAL	1315 lb	29173 lb	29160 lb	
TYPE1	329.0 lb	3125.5 lb	3240.0 lb	>
FLYASH	141.0 lb	4579.5 lb	4570.0 lb	
WATER	25.5 gl	121.8 gl	121.6 gl	
AIR	5.40 oz	51.30 oz	51.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual Num Batches: 1

Load 34779 lb

Slump: 4.50 in #

DELIVERY TICKET

T3

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	8:48
ARRIVE JOB	DEPART JOB	TIME IN

OTE:
MINU ER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 6003 TICKET #: 7068746	NET 30		05/11/17	08:30

S UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: FAA TECH CENTER (ENTER 2ND GATE)

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.50					
			SALESPERSON: JRICH			CUM. TOTAL:28.5		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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T3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7068746	60359	8:32	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
50 CYDS	650FLEX				W	65007

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13303 lb	13280 lb	3.50% M
3/4LOCAL	365 lb	16748 lb	16720 lb	
5/8LOCAL	1315 lb	29213 lb	29140 lb	
TYPE1	329.0 lb	3125.5 lb	3120.0 lb	
FLYASH	141.0 lb	4459.5 lb	4450.0 lb	
WATER	25.5 gl	131.3 gl	130.6 gl	
AIR	5.40 oz	51.30 oz	51.00 oz	
HRWR	18.80 oz	178.60 oz	180.00 oz	

Actual Load 34714 lb

Slump: 4.50 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

T4

PENN JERSEY BUILDING MATERIALS CO., INC.

DRIVER	TRUCK NO.	TIME OUT
BSCHW	245	
ARRIVE JOB	**DEPART JOB**	**TIME IN**
9:31		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068751	NET 30		05/11/17	09:05

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO: FAA TECH CENTER (ENTER 2ND GATE)

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.50					
			SALESPERSON: JRICH			CUM. TOTAL:38		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE; AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

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T4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
245		user	7068751	60363	9:05	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
9.50 CYDS	650FLEX				W	65011

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13303 lb	13240 lb	3.50% M
3/4LOCAL	365 lb	16708 lb	16720 lb	
5/8LOCAL	1315 lb	29213 lb	29120 lb	
TYPE1	329.0 lb	3125.5 lb	3150.0 lb	*
FLYASH	141.0 lb	4489.5 lb	4480.0 lb	
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	5.40 oz	51.30 oz	50.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual
Load 34804 lb
Slump: 4.50 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BLDG MTRLS. - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TS

PENN JERSEY
BUILDING MATERIALS CO., INC.

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	9:50
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1010		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068754	NET 30		05/11/17	09:47

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
FAA TECH CENTER (ENTER 2ND GATE)

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project: FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	650FLEX2A	650 FLEX 2		10.00		
10.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.50					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:38.5		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
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15

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7068754	60366	9:49	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
1 00 CYDS	650FLEX				W	65014

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	14024 lb	13940 lb	3.50% M
3/4LOCAL	365 lb	17590 lb	17600 lb	
5/8LOCAL	1315 lb	30750 lb	30680 lb	
TYPE1	329.0 lb	3290.0 lb	3300.0 lb	
FLYASH	141.0 lb	4710.0 lb	4710.0 lb	*
WATER	25.5 gl	148.2 gl	146.8 gl	
AIR	5.40 oz	54.00 oz	54.00 oz	
HRWR	18.80 oz	188.00 oz	188.00 oz	

Actual Load 36630 lb

Slump: 4.50 in #

Num Batches: 1

DELIVERY TICKET

T 6

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

PENN JERSEY
DING MATERIALS CO., INC.

DRIVER	TRUCK NO.	TIME OUT
GKIEN	257	1055
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1105		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068761	NET 30		05/11/17	10:36

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UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

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FAA TECH CENTER (ENTER 2ND GATE)

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.50					
			SALESPERSON: JRICH			CUM. TOTAL:48		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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T6

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
257		user	7068761	60371	10:37	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
0 CYDS	650FLEX				W	65019

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13303 lb	13200 lb	3.50% M
3/4LOCAL	365 lb	16668 lb	16660 lb	
5/8LOCAL	1315 lb	29153 lb	29040 lb	
TYPE1	329.0 lb	3125.5 lb	3150.0 lb	*
FLYASH	141.0 lb	4489.5 lb	4510.0 lb	
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	5.40 oz	51.30 oz	52.00 oz	
HRWR	18.80 oz	178.60 oz	180.00 oz	

Actual Load 34755 lb

Slump: 4.50 in #

Num Batches: 1

DELIVERY TICKET

T7

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

PENN JERSEY
DING MATERIALS CO., INC.

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	11:36
ARRIVE JOB	DEPART JOB	TIME IN
11:40		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068767	NET 30		05/11/17	11:05

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER (ENTER 2ND GATE)

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.50					
			SALESPERSON: JRICH			CUM. TOTAL:57.5		
			TAX CODE: NEW	JERSEY STATE SALES TAX				

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

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CUSTOMER COPY

T7

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7068767	60374	11:06	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
0 CYDS	650FLEX				W	65022

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13303 lb	13200 lb	3.50% M
3/4LOCAL	365 lb	16668 lb	16660 lb	
5/8LOCAL	1315 lb	29153 lb	29120 lb	
TYPE1	329.0 lb	3125.5 lb	3130.0 lb	
FLYASH	141.0 lb	4469.5 lb	4460.0 lb	
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	5.40 oz	51.30 oz	51.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual Load 34784 lb

Slump: 4.50 in #

Num Batches: 1

DELIVERY TICKET

T 8

PENN JERSEY
DING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
BSCHW	245	11:59
ARRIVE JOB	**DEPART JOB**	**TIME IN**
12:08		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068773	NET 30		05/11/17	11:40

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER (ENTER END GATE)

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.50					
			SALESPERSON: JRICH			CUM. TOTAL:67		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

T8

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
245		user	7068773	60376	11:41	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10 CYDS	650FLEX				W	65025

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13303 lb	13240 lb	3.50% M
3/4LOCAL	365 lb	16708 lb	16720 lb	
5/8LOCAL	1315 lb	29213 lb	29140 lb	
TYPE1	329.0 lb	3125.5 lb	3110.0 lb	
FLYASH	141.0 lb	4449.5 lb	4470.0 lb	
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	5.40 oz	51.30 oz	51.00 oz	
HRWR	18.80 oz	178.60 oz	180.00 oz	

Actual Load 34814 lb

Slump: 4.50 in #

Num Batches: 1

DELIVERY TICKET

T9

PENN JERSEY
ING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	12:15
ARRIVE JOB	DEPART JOB	TIME IN
12:30		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068778	NET 30		05/11/17	12:16

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
FAA TECH CENTER (ENTER 2ND GATE)

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50 0.00		cy	650FLEX2A	650 FLEX 2		9.50		
9.50 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.50					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:76.5		

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

X DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND
X DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND
MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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T 9

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7068778	60380	12:17	5/11/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10 CYDS	650FLEX				W	65029

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13303 lb	13300 lb	3.50% M
3/4LOCAL	365 lb	16768 lb	16780 lb	
5/8LOCAL	1315 lb	29273 lb	29200 lb	
TYPE1	329.0 lb	3125.5 lb	3120.0 lb	
FLYASH	141.0 lb	4459.5 lb	4460.0 lb	
WATER	25.5 gl	140.8 gl	139.0 gl	
AIR	5.40 oz	51.30 oz	52.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual Load 34854 lb

Slump: 4.50 in #

Num Batches: 1

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** Station 4+00 to 5+00 **Client** FAA-ATRD

Technician: J. Stein **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Slabs placed on May 11														
1	5/11/2017	5/18/2017	7	S		6.00	6.05	6.10	6.15	6.10	6.10	18	4840	390
2	5/11/2017	5/18/2017	7	S		6.00	6.00	6.05	6.10	6.10	6.05	18	5586	455
3	5/11/2017	5/18/2017	7	S		6.05	6.05	6.05	6.10	6.10	6.05	18	5176	420
4	5/11/2017	5/18/2017	7	S		6.05	6.05	6.05	6.10	6.10	6.05	18	5696	460
5	5/11/2017	5/18/2017	7	S		5.95	6.00	5.95	6.15	6.15	6.15	18	4920	405
6	5/11/2017	5/18/2017	7	P		6.10	6.05	6.00	6.15	6.10	6.10	18	5153	415
7	5/11/2017	5/18/2017	7	S		6.10	6.05	6.00	6.10	6.10	6.10	18	4963	400
8	5/11/2017	5/18/2017	7	S		6.05	6.00	5.95	6.15	6.10	6.00	18	4934	405
													Average	420
													stdev	30
													COV	0.07

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** Station 4+00 to 5+00 **Client** FAA-ATRD

Technician: R. Norcross/ C. Rosado **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Slabs placed on May 11														
1B	5/11/2017	6/8/2017	28	S		6.00	6.05	6.10	6.05	6.10	6.10	18	5713	460
1C	5/11/2017	6/8/2017	28	S		6.10	6.10	6.10	6.05	6.10	6.10	18	6579	525
1D	5/11/2017	6/8/2017	28	P		6.05	6.00	6.00	6.05	6.10	6.10	18	5857	480
2B	5/11/2017	6/8/2017	28	S		6.05	6.05	6.00	6.05	6.10	6.10	18	7247	590
2C	5/11/2017	6/8/2017	28	S		6.10	6.05	6.05	6.05	6.05	6.05	18	6814	550
2D	5/11/2017	6/8/2017	28	S		6.05	6.05	6.05	6.05	6.10	6.10	18	6990	565
3B	5/11/2017	6/8/2017	28	S		6.00	6.05	6.10	6.00	6.05	6.05	18	6580	535
3C	5/11/2017	6/8/2017	28	S		6.00	6.05	6.10	6.05	6.05	6.10	18	6337	515
3D	5/11/2017	6/8/2017	28	P		6.00	6.05	6.05	6.10	6.10	6.10	18	7345	595
4B	5/11/2017	6/8/2017	28	S		6.00	6.05	6.05	6.10	6.15	6.10	18	7022	570
4C	5/11/2017	6/8/2017	28	S		6.00	6.10	6.15	6.05	6.10	6.10	18	6790	545
4D	5/11/2017	6/8/2017	28	P		6.10	6.05	6.00	6.05	6.10	6.05	18	6525	530
5B	5/11/2017	6/8/2017	28	S		6.10	6.05	6.00	6.00	6.05	6.10	18	6061	495
5C	5/11/2017	6/8/2017	28	S		6.10	6.10	6.05	6.05	6.10	6.10	18	5936	475
5D	5/11/2017	6/8/2017	28	P		6.05	6.00	6.00	6.00	6.00	6.05	18	6153	510
6B	5/11/2017	6/8/2017	28	S		6.05	6.10	6.10	6.00	6.05	6.05	18	6091	490
6C	5/11/2017	6/8/2017	28	S		6.00	6.05	6.05	6.05	6.05	6.00	18	6182	505
6D	5/11/2017	6/8/2017	28	S		6.00	5.95	6.00	6.10	6.05	6.05	18	6357	525
7B	5/11/2017	6/8/2017	28	S		6.00	6.05	6.05	6.05	6.00	6.00	18	5923	485
7C	5/11/2017	6/8/2017	28	S		6.05	6.00	6.00	6.00	6.00	6.00	18	5623	465
7D	5/11/2017	6/8/2017	28	S		6.05	6.05	6.10	6.10	6.10	6.10	18	6318	505
8B	5/11/2017	6/8/2017	28	S		6.00	6.05	6.10	6.00	6.10	6.10	18	6210	505
8C	5/11/2017	6/8/2017	28	P		6.05	6.00	6.00	6.00	5.95	6.00	18	6769	565
8D	5/11/2017	6/8/2017	28	S		6.00	6.00	6.00	6.00	6.00	6.10	18	6379	530
													Average	520
													St Dev	40
													COV	0.08

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project:	CC8 Phase 2	Section:	Station 4+00 to 5+00	Client	FAA-ATRD
Technician:	J. Stein/ R. Norcross	Professiona	J. Stein	Date:	Various

Sample No.	Date Poured	Date Tested	Age	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
Slabs placed on May 11									
1A	5/11/2017	6/8/2017	28	5.99	12.00	100290	28.18	3560	2
1B	5/11/2017	6/8/2017	28	6.00	12.00	98440	28.27	3480	2
1C	5/11/2017	6/8/2017	28	6.00	12.00	96050	28.27	3400	2
2A	5/11/2017	6/8/2017	28	6.00	12.00	118550	28.27	4190	1
2B	5/11/2017	6/8/2017	28	6.00	12.00	117110	28.27	4140	2
2C	5/11/2017	6/8/2017	28	5.99	12.00	119330	28.18	4230	1
3A	5/11/2017	6/8/2017	28	6.00	12.00	114110	28.27	4040	2
3B	5/11/2017	6/8/2017	28	6.00	12.00	115100	28.27	4070	1
3C	5/11/2017	6/8/2017	28						Cylinder broken on 5-30
4A	5/11/2017	6/8/2017	28	6.00	12.00	108840	28.27	3850	1
4B	5/11/2017	6/8/2017	28	6.00	12.00	111070	28.27	3930	2
4C	5/11/2017	6/8/2017	28	5.99	12.00	110260	28.18	3910	2
5A	5/11/2017	6/8/2017	28	6.00	12.00	102540	28.27	3630	1
5B	5/11/2017	6/8/2017	28	6.01	12.00	104490	28.37	3680	2
5C	5/11/2017	6/8/2017	28	5.99	12.00	105850	28.18	3760	1
6A	5/11/2017	6/8/2017	28	6.01	12.00	108630	28.37	3830	1
6B	5/11/2017	6/8/2017	28	6.00	12.00	112040	28.27	3960	1
6C	5/11/2017	6/8/2017	28	6.00	12.00	108270	28.27	3830	1
7A	5/11/2017	6/8/2017	28	6.00	12.00	91930	28.27	3250	1
7B	5/11/2017	6/8/2017	28	6.00	12.00	94470	28.27	3340	1
7C	5/11/2017	6/8/2017	28	6.01	12.00	94820	28.37	3340	2
8A	5/11/2017	6/8/2017	28	6.00	12.00	100770	28.27	3560	1
8B	5/11/2017	6/8/2017	28	5.99	12.00	100570	28.18	3570	2
8C	5/11/2017	6/8/2017	28	5.99	12.00	97560	28.18	3460	2
							Average	3740	
							St Dev	290	
							COV	0.08	

BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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BASF
We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete
4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

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Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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Canada
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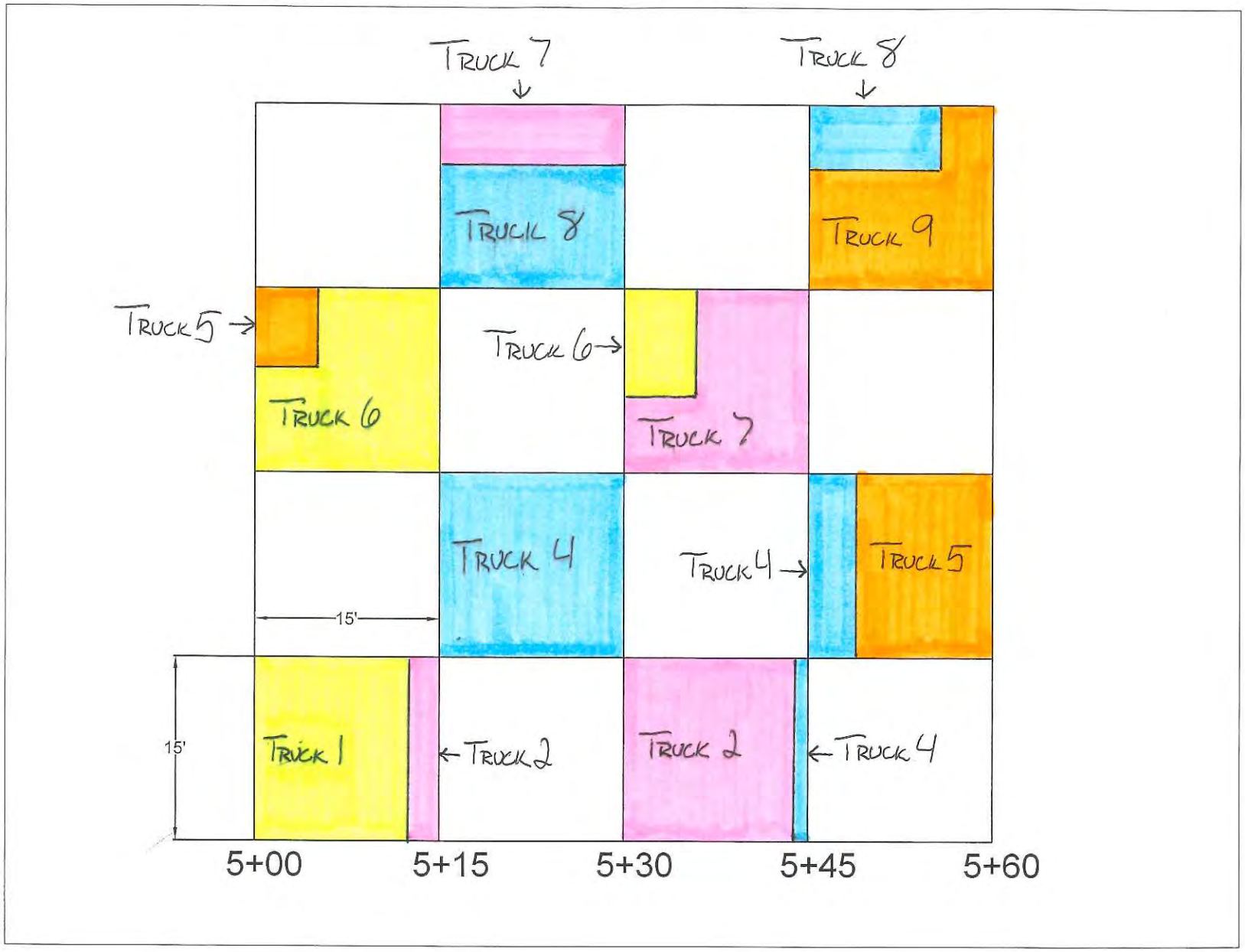
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

P-501 Placement
5/11/17

PHASE 2 STRENGTH/FATIGUE TEST



P-501 (650 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 05/17/2017

Placement Location = Sta. 5+00 to 5+60, Boxes # 2, 4, 6 ,8, 10, 12, 14, 16 (See Attached Placement Map)

7 Day Testing Completed on 05/27/2017

28 Day Testing Completed on 06/14/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	66.9 F	59.0 F	76%	4.6 mph SSW	10.0 miles	Clear
2:54 PM	86.0 F	64.9 F	49%	13.8 mph SSE	10.0 miles	Clear

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam Strength (PSI Flex)				Cylinder Strength (PSI)			Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	28 Day	28 Day	28 Day	28 Day	28 Day	
5/17/2017	1	256	7:26 AM	7:57 AM	QC (Craig)	5	4.75	6.0	N/T	N/T	N/T	N/T	140.5	71.0	130	360	505	425	475	2,730	2,780	3,040	
					QA (CSRA)	N/T	4.25	5.5	N/T	N/T	N/T	N/T	140.1	72.0	130		Average =		468.3	Average =		2,850	
5/17/2017	2	226	7:57 AM	8:18 AM	QC (Craig)	5	4.00	4.1	6.00	7.4	N/T	N/T	138.3	70.2	148	410	510	455	510	3,260	3,110	3,210	110 revs 1st Test, 148 revst 2nd Test
					QA (CSRA)	Concrete Not QA Tested											Average =		491.7	Average =		3,193	
5/17/2017	3	245	8:24 AM	8:45 AM	QC (Craig)	5	3.50	N/T	4.00	5.3	N/T	N/T	141.1	72.6	160	500	570	520	545	3,710	3,790	3,800	120 revs 1st Test, 160 revs 2nd Test
					QA (CSRA)	N/T	4.00	5.3	N/T	N/T	N/T	N/T	140.4	73.0	160		Average =		545.0	Average =		3,767	
5/17/2017	4	249	8:59 AM	9:24 AM	QC (Craig)	7	5.75	5.9	N/T	N/T	N/T	N/T	140.0	73.5	133	450	590	580	605	4,410	4,230	4,350	
					QA (CSRA)	Concrete Not QA Tested											Average =		591.7	Average =		4,330	
5/17/2017	5	256	9:22 AM	9:46 AM	QC (Craig)	5	5.50	6.6	N/T	N/T	N/T	N/T	139.6	72.7	119	420	525	495	485	3,700	3,670	3,720	
					QA (CSRA)	Concrete Not QA Tested											Average =		501.7	Average =		3,697	
5/17/2017	6	226	9:56 AM	10:14 AM	QC (Craig)	0	5.50	8.1	N/T	N/T	N/T	N/T	137.8	71.8	63	385	495	480	495	3,350	3,180	3,230	
					QA (CSRA)	0	5.50	8.0	N/T	N/T	N/T	N/T	136.8	72.0	63		Average =		490.0	Average =		3,253	
5/17/2017	7	245	10:21 AM	10:47 AM	QC (Craig)	2	5.00	8.0	N/T	N/T	N/T	N/T	136.6	75.0	90	440	525	565	520	3,800	3,830	3,830	
					QA (CSRA)	Concrete Not QA Tested											Average =		536.7	Average =		3,820	
5/17/2017	8	249	10:42 AM	11:02 AM	QC (Craig)	5	4.00	5.4	N/T	N/T	N/T	N/T	141.2	76.0	104	490	590	620	620	4,550	4,560	4,640	
					QA (CSRA)	5	3.50	5.3	N/T	N/T	N/T	N/T	140.5	76.0	104		Average =		610.0	Average =		4,583	

650 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Tuckahoe 5/8" Round Stone	1,315	lbs.
Penn Jersey 3/4" Round Stone	365	lbs.
Tuckahoe Sand	1,355	lbs.
Water	212	lbs.
Type I Portland Cement	329	lbs.
Flyash Type F (30%)	141	lbs.
Air %	6.0	
W/C Ratio	0.45	

Batch Ticket Information

Load #	YD^3 Batch	5/8" Stone	3/4" Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
1	9.5	12,480	3,480	13,280	139.6	3,150	1,330	52.0	176.0
2	9.5	12,460	3,460	13,300	140.2	3,160	1,360	40.0	180.0
3	9.5	12,400	3,500	13,300	140.2	3,100	1,330	41.0	176.0
4	9.5	12,420	3,440	13,180	140.2	3,200	1,370	50.0	180.0
5	9.5	12,460	3,500	13,200	140.2	3,100	1,330	50.0	176.0
6	9.5	12,440	3,480	13,260	139.6	3,100	1,330	51.0	176.0
7	9.5	12,420	3,480	13,240	139.0	3,180	1,330	51.0	180.0
8	9.5	12,440	3,480	13,260	140.2	3,160	1,330	51.0	176.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - United Concrete QC Field Notes C - CSRA QA Field Notes D - Batch Tickets E - NAPTF Lab Testing Information F - Admixture Information G - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-3

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Bob Todd, Joe Landy, Ken Hahn, Brian Hirsh, Charlie Giercyk

DATE INSPECTED: 5/17/17 REPORT NO.: CP-8

PROJECT PLANS BY: N/A DATED: N/A REVISION NO.: N/A

APPROVAL DATE: N/A

CONCRETE PLACEMENT REPORT

(compressive strength)

LOCATION: Station 500 to 560 Alternating 15 x15 Boxes

Craig Testing Laboratories, Inc. inspector arrived at site as requested by client and inspected concrete placement at the above location per the project plans and documents.

Slump (ASTM C143): * Approved Slump Range: 3" - 6"

Air Content (ASTM C231): * Approved Air % Range: 6.0% ± 1.5%

Temperature (ASTM C1064): * Todays Yardage: 88

Concrete Supplier: Penn Jersey Approved Mix ID: 650FLEX2A

Consolidation Method: ☑ Internal ☐ External ☐ Both ☐ None ☐ Other _____ Ambient Temperature (F): 63 - 75°F

Strength of Concrete Placed (PSI): 650 Flex No. of Samples (ASTM C31): *

Specimen Type: Cylinder / Beam

Required Strength of Concrete (PSI): 650 Flex On Site Curing Facilities Available ☑ Yes ☐ No

(ACI 301 - 1.6.3.2.d)

☐ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 7:00 - 12:30

☐ Work Above is in Progress and Requires Further Inspection

☑ Field Work is in Substantial Compliance with the following approved documents:

☑ Mix Designs ☐ Drawings ☐ Specifications

☐ Compressive strength samples have met the required strength

☐ ***Inspection done without approved documentation available***

☐ ***Work Deviates from Approved Plans and/or Documents, See NCR No.*** _____

Remarks: All test results recorded were provided to Ronaldo Aponte, who accepted all test results.
* See attached table for results.

Reported to: Project Distribution Reviewed By: Ian Craig

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-3

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Bob Todd, Joe Landy, Ken Hahn, Brian Hirsh, Charlie Giercyk

DATE INSPECTED: 5/17/17 REPORT NO.: CP-8

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
1 / 256	7:57 AM	4.75	6.00	140.5	71.0	7	3
2 / 226	8:18 AM	5.00	7.40	138.3	70.2	7	3
3 / 245	8:45 AM	4.00	5.30	141.1	72.6	7	3
4 / 249	9:24 AM	5.75	5.90	140.0	73.5	7	3
5 / 256	9:46 AM	5.50	6.60	139.6	72.7	7	3
6 / 226	10:14 AM	5.50	8.10	137.8	71.8	7	3
7 / 245	10:47 PM	5.00	8.00	136.6	75.0	7	3
8 / 249	11:02 PM	4.00	5.40	141.2	76.0	7	3

Remarks: All test results recorded were provided to Ronaldo Aponte, who accepted all test results.

Reported to: Project Distribution Reviewed By: Ian Craig

(RA's Testing

CC8 – Phase 2

Pour Placement P-501 Boxes 9-16 from 5+00 to 5+60 (See Reverse side for layout)

Pour Date 5-17-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight	Can weight 7.84
256	7:57 A 8:17 C	130	5	4 3/4	70.8	6.0	42.98	140.56	
Poured	15.00 to 30.00 @ 5+15 to 5+30								
226	8:17 A	110	0+5	4	70.4	4.1	43.56	142.88	Air too low added Air entrainer
Retested	~~[illegible]~~								
226 Retest	8:43 Retest 8:49 C	148	5+0.5	6	70	7.4	42.42	138.32	
Poured	15.00 to 30.00 @ 5+45 to 5+60								
245	8:45 A 9:00 C	160	5	4	72	5.3	43.12	141.12	
Poured	0.00 to 15.00 @ 5+00 to 5+15								
249	9:24 A 9:40 C	133	7	5 3/4	73.5	5.9	42.88	140.16	
Poured	0.00 to 15.00 @ 5+30 to 5+45								
256	9:45 A 9:59 C	119	5	5 1/2	72.7	6.5	42.74	139.60	
Poured	0.00 to -15.00 @ 5+15 to 5+30								
226	10:14 A 10:30 C	63	0	5 1/2	71.8	8.1	42.30	137.84	
Poured	0.00 to -15.00 @ 5+45 to 5+60								
245	10:47 A 10:58 C	90	2	5	75	8.1	42.10	137.04	
Poured	15.00 to -30.00 @ 5+00 to 5+15								
249	11:02 A 11:15 C	104	5	4	76	5.4	43.16	~~[illegible]~~ 141.28	
Poured	-15.00 to -30.00 @ 5+45 to 5+60								

Pour Ended 11:30

Total Yards 76

FAA

CC8 – Phase 2

Pour Placement P-506 Boxes 9-16 from 5+00 to 5+60

Pour Date 5-17-17

Truck #	Arrival Time @ Conveyor	Revolutions of Barrel	Water Added	Slump Test	Temperature Test	Air Test	Scale Weight	United Weight
256				4 1/4	72	5.5	43.62	
Poured								
224								
Retested								
226								
Poured								
245				4	72.0	5.3	43.70	
Poured								
249								
Poured								
256								
Poured								
226				5 1/2	72	8.0	42.80	
Poured								
245								
Poured								
249				3 1/2		5.3	43.72	
Poured-								

CSRA

empty weight 7.84

Qc

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# T1 (256)

Time Dispatched

Time Arrived 7:58 am

Revolutions 130

Initial Slump 4.75 **Water Added** 5 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 4.75 **Conveyor Slump**

Concrete Temp 71 **Weight** 42.98

Air Content 6.0 **Conveyor Air**

Placement Location 15 → 30 ctr is 0.00 ft
5+15 → 3+30

Notes Accepted

empty weight 8.60

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# T1 (256)

Time Dispatched

Time Arrived 7:58 am

Revolutions 130

Initial Slump 4 1/2 **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 4.25 **Conveyor Slump**

Concrete Temp 72 **Weight** 43.62

Air Content 5.5 **Conveyor Air**

Placement Location

Notes Accepted

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

we added admixture to raise the air content

Date 05/17/2017 **Air Temp**

Truck# 2 (226)

Time Dispatched

Time Arrived 8:18am

Revolutions 110 → 148

Initial Slump 4 **Water Added** 5gal

Slump #2 6.0 **Water Added** —

Slump #3 **Water Added**

Final Slump 6.0 **Conveyor Slump**

Concrete Temp 70.0 **Weight** 43.56

Air Content 4.1 **Conveyor Air**
correc 3.8 → 7.4
correct 7.1

Placement Location

Notes Accepted

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

Qc

CC8 P-501 FIELD PLACEMENT NOTES

initial slump was too; we added 5 gal.

Date 05/17/2017 **Air Temp**

Truck# 3 (245)

Time Dispatched

Time Arrived 8:45

Revolutions 120 → 160

Initial Slump 3.5 **Water Added** ——

Slump #2 4.0 **Water Added** 5

Slump #3 **Water Added**

Final Slump 4.0 **Conveyor Slump**

Concrete Temp 72.6 **Weight** 43.12

Air Content 5.3 **Conveyor Air**
Correc 5.0

Placement Location

Notes Accepted

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# 5 (245)

Time Dispatched

Time Arrived 8:45 am

Revolutions 120 → 160

Initial Slump **Water Added**

Slump #2 4.0 **Water Added**

Slump #3 **Water Added**

Final Slump 4.0 **Conveyor Slump**

Concrete Temp 73.0 **Weight** 43.70

Air Content 5.3 **Conveyor Air**
corrected 5.0

Placement Location

Notes Accepted

CSRA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# 4 (249)

Time Dispatched

Time Arrived 9:22 am

Revolutions 133

Initial Slump 5 3/4 **Water Added** 7 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp 73.5 **Weight** 42.88

Air Content ~~[illegible]~~ 5.9 **Conveyor Air**

Placement Location

Notes Accepted

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

Qc

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# 5 (256)

Time Dispatched

Time Arrived 9:46

Revolutions 119

Initial Slump 5.5 **Water Added** 5 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 5.5 **Conveyor Slump**

Concrete Temp 72.7 **Weight** 42.74

Air Content 6.6 correc 6.3 **Conveyor Air**

Placement Location

Notes Accepted

CC8 P-501 FIELD PLACEMENT NOTES

Date **Air Temp**

Truck#

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

Q c

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# 6 (226)

Time Dispatched

Time Arrived 10:15 am

Revolutions 63 revs

Initial Slump 5.5 **Water Added** —

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 5.5 **Conveyor Slump**

Concrete Temp 71.8 **Weight** 42.3

Air Content 8.1 **Conveyor Air**
Corrected 7.8

Placement Location

Notes Accepted

Q A

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# 6 (226)

Time Dispatched

Time Arrived 10:15 am

Revolutions 63 revs

Initial Slump 5.5 **Water Added** —

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 5.5 **Conveyor Slump**

Concrete Temp 72 **Weight** 42.80

Air Content 8.0 **Conveyor Air**
Corrected 7.7

Placement Location

Notes Accepted

CSRA

QC

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# 7 (245)

Time Dispatched

Time Arrived 10:45

Revolutions 90

Initial Slump 5.0 **Water Added** 2 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 5.0 **Conveyor Slump**

Concrete Temp 75 **Weight** 42.10

Air Content 8.0 **Conveyor Air**
corr 7.7

Placement Location

Notes Accepted

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# 7 (245)

Time Dispatched

Time Arrived

Revolutions

Initial Slump **Water Added**

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump **Conveyor Slump**

Concrete Temp **Weight**

Air Content **Conveyor Air**

Placement Location

Notes

CSRA

QC

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# T8 (249)

Time Dispatched

Time Arrived 11:03

Revolutions 104

Initial Slump 4.0 **Water Added** 5 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 4.0 **Conveyor Slump**

Concrete Temp 76.0 **Weight** 43.16

Air Content 5.4 **Conveyor Air**
Corre 5.1

Placement Location

Notes Accepted

QA

CC8 P-501 FIELD PLACEMENT NOTES

Date 05/17/2017 **Air Temp**

Truck# T8 (249)

Time Dispatched

Time Arrived 11:03

Revolutions 104

Initial Slump 3.5 **Water Added** 5 gal

Slump #2 **Water Added**

Slump #3 **Water Added**

Final Slump 4.0 **Conveyor Slump**

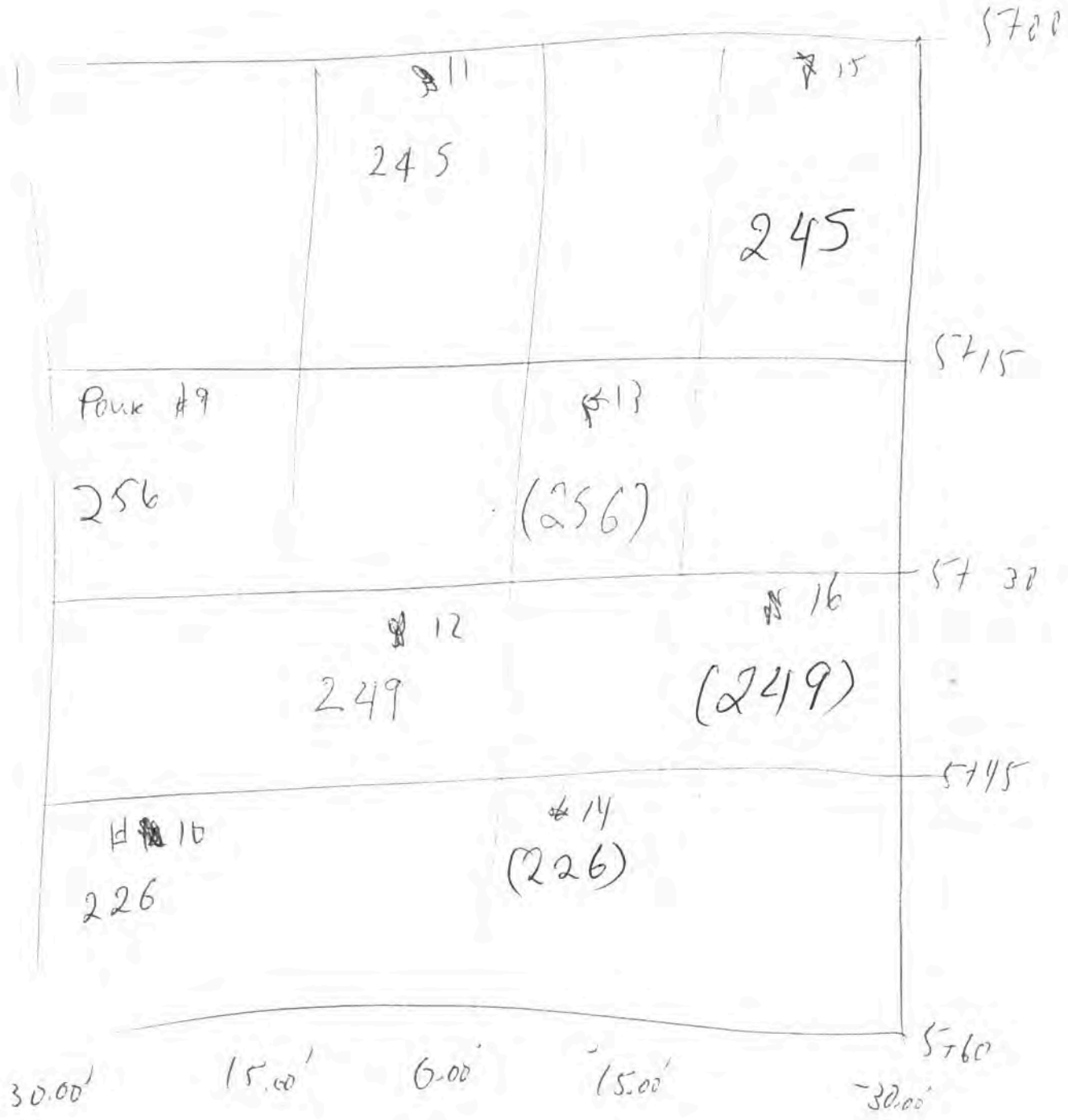
Concrete Temp **Weight** 43.72

Air Content 5.3 **Conveyor Air**
correc 5.0

Placement Location

Notes Accepted

5-17-17 Boxes 9-16



DELIVERY TICKET

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

T1

DRIVER	TRUCK NO.	TIME OUT
JPARK	256-	7:45
ARRIVE JOB	DEPART JOB	TIME IN
8:00		

PENN JERSEY BUILDING MATERIALS CO., INC.

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068898	NET 30		05/17/17	07:2

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
2ND GATE, WEST COAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:9.5		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

RECEIVED

CUSTOMER COPY

T1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
256		user	7068898	60474	7:26	5/17/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
9.50 CYDS	650FLEX				W	65123

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13280 lb	3.50% M
3/4LOCAL	365 lb	16748 lb	16760 lb	
5/8LOCAL	1315 lb	29253 lb	29240 lb	
TYPE1	329.0 lb	3125.5 lb	3150.0 lb	
FLYASH	141.0 lb	4489.5 lb	4480.0 lb	
WATER	25.5 gl	140.8 gl	139.6 gl	
AIR	5.40 oz	51.30 oz	52.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual Load 34899 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T2

PENN JERSEY
LDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MIKEP	226	810
ARRIVE JOB	DEPART JOB	TIME IN
815		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068902	NET 30		05/17/17	07:55

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
2ND GATE, WEST COAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:19		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

T2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
226		user	7068902	60478	7:57	5/17/17

ad Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
9.50 CYDS	650FLEX				W	65127

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13300 lb	3.50% M
3/4LOCAL	365 lb	16768 lb	16760 lb	
5/8LOCAL	1315 lb	29253 lb	29220 lb	
TYPE1	329.0 lb	3125.5 lb	3160.0 lb	
FLYASH	141.0 lb	4499.5 lb	4520.0 lb	*
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	4.20 oz	39.90 oz	40.00 oz	
HRWR	18.80 oz	178.60 oz	180.00 oz	

Actual Load 34924 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T3

PENN JERSEY
'ILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
RDECK	245	8:36
ARRIVE JOB	**DEPART JOB**	**TIME IN**
8:45		

'OTE.
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068905	NET 30		05/17/17	08:20

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
2ND GATE, WEST COAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:28.5		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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CUSTOMER COPY

T3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
245		user	7068905	60481	8:24	5/17/17

ad Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
.50 CYDS	650FLEX				W	65130

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13300 lb	3.50% M
3/4LOCAL	365 lb	16768 lb	16800 lb	
5/8LOCAL	1315 lb	29293 lb	29200 lb	
TYPE1	329.0 lb	3125.5 lb	3100.0 lb	
FLYASH	141.0 lb	4439.5 lb	4430.0 lb	
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	4.20 oz	39.90 oz	41.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual Load 34814 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

J 4

PENN JERSEY
'ILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
FSALI	249	9:18
ARRIVE JOB	**DEPART JOB**	**TIME IN**
9:22		

NOTE.
. MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
'DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
.HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
.ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
'ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
.LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
.HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068907	NET 30		05/17/17	08:58

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
2ND GATE, WEST COAT

.O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
'O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:38		
			TAX CODE: NEW JERSEY STATE SALES TAX					

.AUTION: PREVENT BODY CONTACT WITH CONCRETE;
/AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

.IX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND
.IX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND
MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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T4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
249		user	7068907	60483	8:59	5/17/17

ad Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
9.50 CYDS	650FLEX				W	65132

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13180 lb	3.50% M
3/4LOCAL	365 lb	16648 lb	16620 lb	
5/8LOCAL	1315 lb	29113 lb	29040 lb	
TYPE1	329.0 lb	3125.5 lb	3200.0 lb	>
FLYASH	141.0 lb	4539.5 lb	4570.0 lb	>
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	5.40 oz	51.30 oz	50.00 oz	
HRWR	18.80 oz	178.60 oz	180.00 oz	

Actual Num Batches: 1

Load 34794 lb

Slump: 4.00 in #

DELIVERY TICKET

T S

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
JPARK	256	9:34
ARRIVE JOB	**DEPART JOB**	**TIME IN**
9:46		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068910	NET 30		05/17/17	09:2

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
2ND GATE, WEST COAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:47.5		
			TAX CODE: NEW	JERSEY STATE SALES TAX				

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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TS

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
6		user	7068910	60486	9:22	5/17/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
9.50 CYDS	650FLEX				W	65135

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13200 lb	3.50% M
3/4LOCAL	365 lb	16668 lb	16700 lb	
5/8LOCAL	1315 lb	29193 lb	29160 lb	
TYPE1	329.0 lb	3125.5 lb	3100.0 lb	
FLYASH	141.0 lb	4439.5 lb	4430.0 lb	
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	5.40 oz	51.30 oz	50.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual
Load 34774 lb
Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T6

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
MIKEP	226	1005
ARRIVE JOB	DEPART JOB	TIME IN
1010		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068914	NET 30		05/17/17	09:52

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
2ND GATE, WEST COAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:57		
			TAX CODE: NEW JERSEY STATE SALES TAX					

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

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T6

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
5		user	7068914	60490	9:56	5/17/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
9.50 CYDS	650FLEX				W	65139

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13260 lb	3.50% M
3/4LOCAL	365 lb	16728 lb	16740 lb	
5/8LOCAL	1315 lb	29233 lb	29180 lb	
TYPE1	329.0 lb	3125.5 lb	3100.0 lb	
FLYASH	141.0 lb	4439.5 lb	4430.0 lb	
WATER	25.5 gl	140.8 gl	139.6 gl	
AIR	5.40 oz	51.30 oz	51.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual Load 34789 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

T7

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
RDECK	245	10:3
ARRIVE JOB	DEPART JOB	TIME IN

NOTE.
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068916	NET 30		05/17/17	10:20

UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
2ND GATE, WEST COAT

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50 0.00		cy	650FLEX2A	650 FLEX 2		9.50		
9.50 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:66.5		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

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T7

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
245		user	7068916	60492	10:21	5/17/17

ad	Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
.50	CYDS	650FLEX				W	65141

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13240 lb	3.50% M
3/4LOCAL	365 lb	16708 lb	16720 lb	
5/8LOCAL	1315 lb	29213 lb	29140 lb	
TYPE1	329.0 lb	3125.5 lb	3180.0 lb	
FLYASH	141.0 lb	4519.5 lb	4510.0 lb	
WATER	25.5 gl	140.8 gl	139.0 gl	
AIR	5.40 oz	51.30 oz	51.00 oz	
HRWR	18.80 oz	178.60 oz	180.00 oz	

Actual Num Batches: 1

Load 34824 lb

Slump: 4.00 in #

DELIVERY TICKET

T8

PENN JERSEY
'ILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
FSALI	249	1050
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1102		

'OTE.
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
79197	1		ORDER #: 7003 TICKET #: 7068917	NET 30		05/17/17	10:4

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
2ND GATE, WEST COAT

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
9.50		cy	650FLEX2A	650 FLEX 2		9.50		
0.00								
9.50			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH			CUM. TOTAL:76		
			TAX CODE: NEW JERSEY STATE SALES TAX					

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

T8

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
249		user	7068917	60493	10:42	5/17/17

ad Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
.50 CYDS	650FLEX				W	65142

Material	Design Qty	Required	Batched	% Moisture
CONC	1355 lb	13323 lb	13260 lb	3.50% M
3/4LOCAL	365 lb	16728 lb	16740 lb	
5/8LOCAL	1315 lb	29233 lb	29180 lb	
TYPE1	329.0 lb	3125.5 lb	3160.0 lb	*
FLYASH	141.0 lb	4499.5 lb	4490.0 lb	
WATER	25.5 gl	140.8 gl	140.2 gl	
AIR	5.40 oz	51.30 oz	51.00 oz	
HRWR	18.80 oz	178.60 oz	176.00 oz	

Actual Load 34854 lb

Slump: 4.00 in #

Num Batches: 1

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** Station 4+00 to 5+00 **Client** FAA-ATRD

Technician: J. Stein/ R. Norcross **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Slabs placed on May 17														
1	5/17/2017	5/24/2017	7	S		6.10	6.05	6.00	6.00	6.00	6.00	18	4421	360
2	5/17/2017	5/24/2017	7	S		6.10	6.05	6.00	6.00	6.00	5.95	18	4963	410
3	5/17/2017	5/24/2017	7	S		6.00	6.00	6.00	6.00	6.00	6.00	18	5992	500
4	5/17/2017	5/24/2017	7	S		6.10	6.10	6.10	6.05	6.05	6.10	18	5624	450
5	5/17/2017	5/24/2017	7	S		5.80	5.90	5.95	6.05	6.05	6.10	18	4885	420
6	5/17/2017	5/24/2017	7	S		6.15	6.05	6.00	5.90	5.95	6.00	18	4711	385
7	5/17/2017	5/24/2017	7	S		6.10	6.05	6.00	5.95	6.00	6.00	18	5353	440
8	5/17/2017	5/24/2017	7	S		6.10	6.05	6.10	6.15	6.05	5.95	18	6108	490
													Average	430
													stdev	50
													COV	0.12

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** Station 4+00 to 5+00 **Client** FAA-ATRD

Technician: R. Norcross/ C. Rosado **Professional Engineer:** J. Stein **Date:** Various

Load	Date of Pour	Date Tested	Age	Mold	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
Slabs placed on May 17														
1B	5/17/2017	6/14/2017	28			6.15	6.05	6.05	6.10	6.10	6.10	18	6362	505
1C	5/17/2017	6/14/2017	28			6.05	6.05	6.00	6.05	6.00	6.05	18	5200	425
1D	5/17/2017	6/14/2017	28			6.05	6.05	6.10	6.05	6.05	6.05	18	5891	475
2B	5/17/2017	6/14/2017	28			5.95	6.00	6.00	6.05	6.05	6.10	18	6137	510
2C	5/17/2017	6/14/2017	28			6.00	6.00	6.05	6.10	6.15	6.15	18	5603	455
2D	5/17/2017	6/14/2017	28			6.05	6.10	6.15	6.05	6.00	6.05	18	6379	510
3B	5/17/2017	6/14/2017	28			5.85	5.85	5.85	6.00	6.00	6.05	18	6501	570
3C	5/17/2017	6/14/2017	28			6.00	6.00	6.00	6.10	6.10	6.10	18	6370	520
3D	5/17/2017	6/14/2017	28			6.00	6.00	6.00	6.00	6.05	6.05	18	6589	545
4B	5/17/2017	6/14/2017	28			6.05	6.05	6.10	5.95	6.00	6.00	18	7223	590
4C	5/17/2017	6/14/2017	28			6.15	6.10	6.05	6.05	6.00	6.05	18	7204	580
4D	5/17/2017	6/14/2017	28			6.05	6.00	5.95	6.05	6.00	6.00	18	7273	605
5B	5/17/2017	6/14/2017	28			5.90	5.95	6.00	6.05	6.05	6.05	18	6246	525
5C	5/17/2017	6/14/2017	28			5.90	5.95	6.00	6.15	6.10	6.10	18	5954	495
5D	5/17/2017	6/14/2017	28			6.00	5.95	5.95	5.95	6.00	6.00	18	5746	485
6B	5/17/2017	6/14/2017	28			6.05	6.10	6.15	5.95	6.00	6.00	18	6131	495
6C	5/17/2017	6/14/2017	28			6.05	6.05	6.05	6.05	6.05	6.05	18	5912	480
6D	5/17/2017	6/14/2017	28			6.00	5.95	6.00	6.05	6.05	6.00	18	5933	495
7B	5/17/2017	6/14/2017	28			5.95	6.00	6.00	6.05	6.10	6.10	18	6338	525
7C	5/17/2017	6/14/2017	28			6.00	6.05	6.10	6.00	6.05	6.05	18	6943	565
7D	5/17/2017	6/14/2017	28			5.95	5.95	5.95	6.05	6.05	6.05	18	6190	520
8B	5/17/2017	6/14/2017	28			6.05	6.05	6.05	6.00	6.00	6.00	18	7174	590
8C	5/17/2017	6/14/2017	28			6.00	5.95	5.95	5.95	6.05	6.10	18	7404	620
8D	5/17/2017	6/14/2017	28			6.00	6.05	6.05	6.05	6.00	6.00	18	7547	620
													Average	530
													St Dev	55
													COV	0.10

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project:	CC8 Phase 2	Section:	Station 4+00 to 5+00	Client	FAA-ATRD
Technician:	J. Stein/ R. Norcross	Professiona	J. Stein	Date:	Various

Sample No.	Date Poured	Date Tested	Age	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
Slabs placed on May 17									
1A	5/17/2017	6/14/2017	28	6.00	12.00	77210	28.27	2730	1
1B	5/17/2017	6/14/2017	28	6.00	12.00	78510	28.27	2780	2
1C	5/17/2017	6/14/2017	28	6.00	12.00	86070	28.27	3040	1
2A	5/17/2017	6/14/2017	28	6.00	12.00	92140	28.27	3260	1
2B	5/17/2017	6/14/2017	28	6.00	12.00	87830	28.27	3110	1
2C	5/17/2017	6/14/2017	28	6.00	12.00	90710	28.27	3210	1
3A	5/17/2017	6/14/2017	28	5.99	12.00	104460	28.18	3710	2
3B	5/17/2017	6/14/2017	28	6.00	12.00	107160	28.27	3790	1
3C	5/17/2017	6/14/2017	28	6.01	12.00	107540	28.27	3800	2
4A	5/17/2017	6/14/2017	28	6.00	12.00	124600	28.27	4410	1
4B	5/17/2017	6/14/2017	28	6.00	12.00	119630	28.27	4230	1
4C	5/17/2017	6/14/2017	28	5.99	12.00	122640	28.18	4350	1
5A	5/17/2017	6/14/2017	28	6.00	12.00	104610	28.27	3700	2
5B	5/17/2017	6/14/2017	28	6.00	12.00	103770	28.27	3670	1
5C	5/17/2017	6/14/2017	28	6.00	12.00	105110	28.27	3720	1
6A	5/17/2017	6/14/2017	28	6.00	12.00	94800	28.27	3350	1
6B	5/17/2017	6/14/2017	28	6.01	12.00	90300	28.37	3180	2
6C	5/17/2017	6/14/2017	28	5.99	12.00	90990	28.18	3230	1
7A	5/17/2017	6/14/2017	28	6.00	12.00	107390	28.27	3800	2
7B	5/17/2017	6/14/2017	28	6.00	12.00	108220	28.27	3830	1
7C	5/17/2017	6/14/2017	28	6.00	12.00	108360	28.27	3830	1
8A	5/17/2017	6/14/2017	28	5.99	12.00	128190	28.18	4550	2
8B	5/17/2017	6/14/2017	28	6.00	12.00	128940	28.27	4560	1
8C	5/17/2017	6/14/2017	28	6.00	12.00	131210	28.27	4640	1
							Average	3690	
							St Dev	560	
							COV	0.15	

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

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NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete
4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

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* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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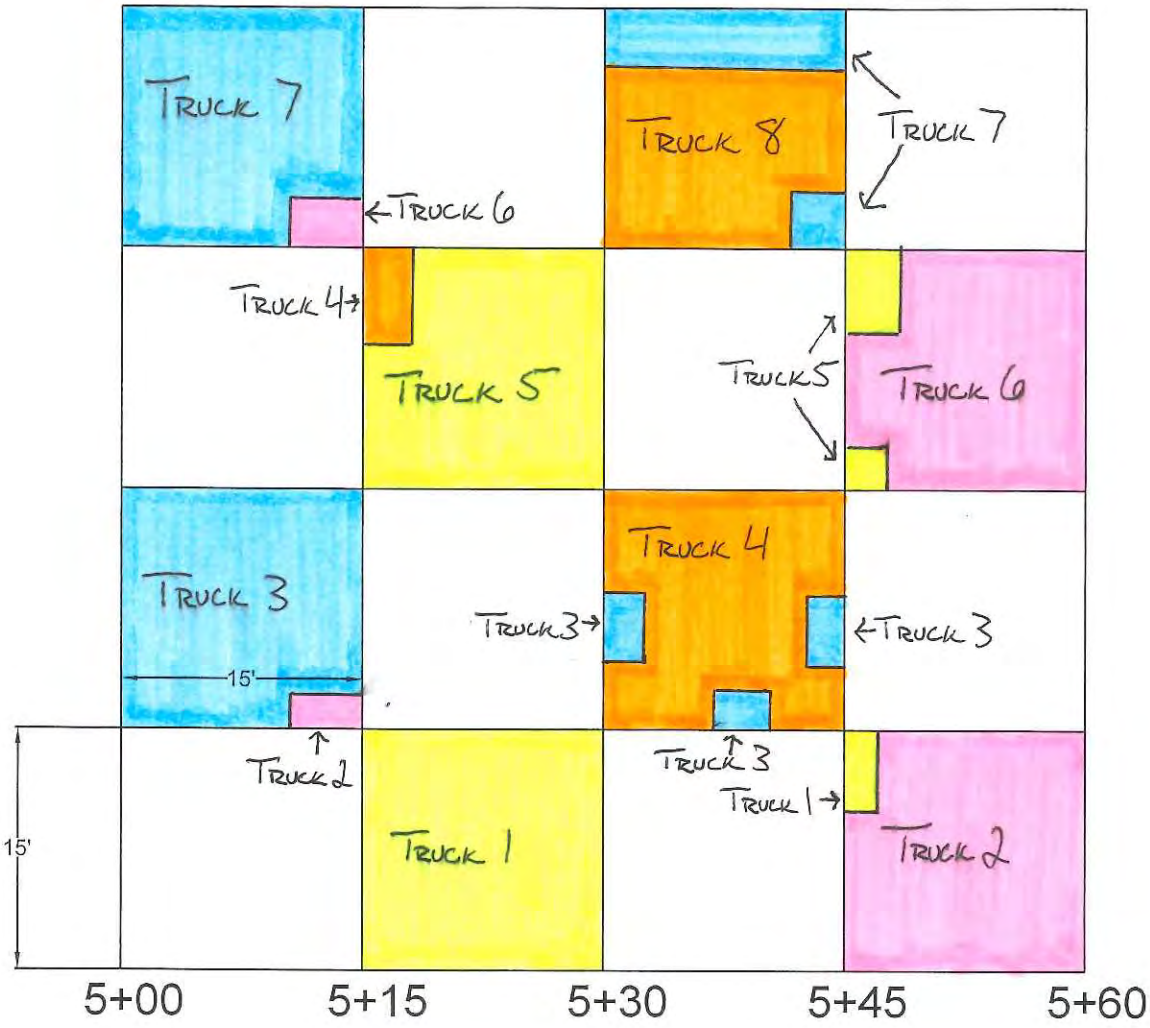
Tel: 800 387-5862 ■ Fax: 905 792-0651

P-501 Placement
5/17/17

PHASE 2 STRENGTH/FATIGUE TEST



P-501 (900 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 10/12/2017

Placement Location = Sta. 5+60 to 5+70 Transition, Sta. 6+00 to 6+10 Transition and Sta. 6+40 to 6+55 Transition (See Attached Placement Map)

7 Day Testing Completed on 10/19/2017

28 Day Testing Completed on 11/09/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	59.0 F	57.9 F	96%	21.9 mph ENE	4.0 miles	Light Rain
2:54 PM	61.0 F	53.1 F	75%	19.6 mph ENE	10.0 miles	Overcast

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam (PSI Flex)		Cylinder Strength (PSI)		Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	7 Day	28 Day	
10/12/2017	1	240	7:24 AM	7:50 AM	QC (Craig)	10	4.50	3.2	5.75	3.6	N/T	N/T	145.6	78.0	200	750	967	4,190	5,630	15 oz air entrain added before 2nd test, Truck accepted by CSRA
					QA (CSRA)		4.75	2.7	4.75	3.3	N/T	N/T	147.4	79.0						
10/12/2017	2	254	8:03 AM	8:22 AM	QC (Craig)	0	5.00	3.3	4.50	5.0	N/T	N/T	147.8	79.0	233	760	921	4,090	5,380	24 oz air entrain added before 1st test, 40 oz added before 2nd test
					QA (CSRA)		4.75	3.0	4.50	5.0	N/T	N/T	149.0	77.0						
10/12/2017	3	236	8:47 AM	9:15 AM	QC (Craig)	0	4.50	2.6	5.25	5.2	N/T	N/T	143.7	80.0	166	715	819	3,880	4,790	64 oz air entrain added before 2nd test
					QA (CSRA)		3.50	2.5	5.25	5.0	N/T	N/T	145.8	77.0						
10/12/2017	4	240	9:31 AM	9:54 AM	QC (Craig)	0	5.50	5.7	N/T	N/T	N/T	N/T	142.2	75.0	111	750	896	4,350	5,560	64 oz air entrain added before 1st test
					QA (CSRA)		5.50	4.9	N/T	N/T	N/T	N/T	146.7	77.0						
10/12/2017	5	254	10:04 AM	10:23 AM	QC (Craig)	0	5.00	7.1	N/T	N/T	N/T	N/T	141.5	75.0	126	745	881	4,030	4,520	
					QA (CSRA)		Concrete Not QA Tested													
10/12/2017	6	236	10:41 AM	11:02 AM	QC (Craig)	0	5.00	4.6	N/T	N/T	N/T	N/T	146.3	76.0	78	790	940	4,780	6,160	
					QA (CSRA)		4.75	4.0	N/T	3.6	N/T	N/T	147.6	75.0						
10/12/2017	7	240	11:19 AM	11:42 AM	QC (Craig)	0	6.25	6.7	5.5	5.9	N/T	N/T	143.8	75.0	97	705	835	3,930	5,050	
					QA (CSRA)		N/T	7.6	N/T	5.1	N/T	N/T	N/T	N/T						

900 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Berks #8 Stone	250	lbs.
Berks #57 Stone	1,550	lbs.
Tuckahoe Sand	910	lbs.
Water	315	lbs.
Type I Portland Cement	529	lbs.
Flyash Type F (25%)	176	lbs.
Air %	6.0	
W/C Ratio	0.45	

Batch Ticket Information

Load #(Truck #)	YD^3 Batch	#8 Stone	#57 Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
1 (240)	10.0	2,460	15,380	9,320	284.6	5,270	1,750	141.0	276.0
2 (254)	10.0	2,480	15,480	9,400	261.2	5,310	1,750	141.0	280.0
3 (236)	10.0	2,480	15,400	9,340	252.2	5,300	1,780	174.0	284.0
4 (240)	11.0	2,740	16,940	10,300	277.4	5,850	1,940	198.0	308.0
5 (254)	11.0	2,720	16,960	10,320	277.4	5,860	1,960	272.0	308.0
6 (236)	11.0	2,720	16,960	10,240	277.4	5,780	1,920	252.0	312.0
7 (240)	3.0	740	4,640	2,800	76.1	1,600	530	70.0	84.0

Prepared by: Joe Gawrysiak

Checked by: TBD

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - CSRA QA Field Notes C - Batch Tickets D - NAPTF Lab Testing Information E - Mix Design F - Admixture Information G - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-4

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Bob Todd, Joe Landy, Brian Hirsh, Rob Barrett

DATE INSPECTED: 10/12/17 REPORT NO.: CP-11

PROJECT PLANS BY: N/A DATED: N/A REVISION NO.: N/A

APPROVAL DATE: N/A

CONCRETE PLACEMENT REPORT

(compressive strength)

LOCATION: Transistions 4, 5 & 6

Craig Testing Laboratories, Inc. inspector arrived at site as requested by client and inspected concrete placement at the above location per the project plans and documents.

Slump (ASTM C143): * Approved Slump Range: 3" - 6"

Air Content (ASTM C231): * Approved Air % Range: 6.0% ± 1.5%

Temperature (ASTM C1064): * Todays Yardage: 66

Concrete Supplier: Penn Jersey Approved Mix ID: 900FLEX

Consolidation Method: ☑ Internal ☐ External ☐ Both ☐ None ☐ Other _____ Ambient Temperature (F): _____

Strength of Concrete Placed (PSI): 900 Flex No. of Samples (ASTM C31): *

Specimen Type: Cylinder / Beam

Required Strength of Concrete (PSI): 900 Flex On Site Curing Facilities Available ☑ Yes ☐ No

(ACI 301 - 1.6.3.2.d)

☐ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 7:00 - 1:00

☐ Work Above is in Progress and Requires Further Inspection

☑ Field Work is in Substantial Compliance with the following approved documents:

☑ Mix Designs ☐ Drawings ☐ Specifications

☐ Compressive strength samples have met the required strength

☐ ***Inspection done without approved documentation available***

☐ ***Work Deviates from Approved Plans and/or Documents, See NCR No.*** _____

Remarks: All test results recorded were given to CSRA personnel on site at the time of testing.
* See attached table for results.

Reported to: Project Distribution Reviewed By: Ian Craig

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Bob Todd, Joe Landy, Brian Hirsh, Rob Barrett

DATE INSPECTED: 10/12/17 REPORT NO.: CP

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
1 / 240	7:50 AM	5.75	3.90	147.0	77.0	3	2
2 / 254	8:22 AM	4.50	5.30	150.4	79.0	3	2
3 / 236	9:15 AM	5.25	5.50	143.7	78.0	3	2
4 / 240	9:54 AM	5.50	6.00	142.2	75.0	3	2
5 / 254	10:23 AM	5.00	7.40	141.5	74.5	3	2
6 / 236	11:02 AM	5.00	4.90	138.9	75.5	3	2
7 / 240	11:42 PM	5.50	6.20	143.8	75.2	3	2

Remarks:

Reported to: Project Distribution Reviewed By: Ian Craig

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	60°
Load #	1	Truck #	240
Dispatch Time	7:44	Arrival Time	7:50
Revs @ Arrival	82	Water @ Arrival	—
Concrete Temp	1st 76° 2nd 78°	Can Weight	8.06

2nd Test Same Sample

Initial Slump	6.5 (4.5)	Water Added	10 GAL	Revs	+30
Air %	3.5	Unit Weight	44.76		
2nd Slump	5.75	Water Added	—	Revs	+30
Air %	3.9	Unit Weight	44.46		
3rd Slump		Water Added		Revs	
Air %	2.5	Unit Weight (MID TRUCK)	45.09		

Placement Location: 5+60 to 5+70 Off. 30' to 5'

Notes: 15oz. Air Entrainment Added before 2nd Test
200 revs into conveyor
Truck accepted due to being placed in transition.

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	60°
Load #	1	Truck #	240
Dispatch Time	7:44	Arrival Time	7:50
Revs @ Arrival	82	Water @ Arrival	—
Concrete Temp	1st 76° 2nd 79°	Can Weight	8.64

Initial Slump	4.75	Water Added	10 GAL	Revs	+30
Air %	3.0	Unit Weight	—		
2nd Slump	4.75	Water Added	—	Revs	+30
Air %	3.6	Unit Weight	45.50		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: 5+60 to 5+70 Off. 30' to 5'

Notes:

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	60°
Load #	2	Truck #	254
Dispatch Time	8:15	Arrival Time	8:22
Revs @ Arrival	80	Water @ Arrival	—
Concrete Temp	1st 75° 2nd 79°	Can Weight	8.06

Initial Slump	5.0	Water Added	—	Revs	+30
Air %	3.6	Unit Weight	45.66		
2nd Slump	4.5	Water Added	—	Revs	+30
Air %	5.3	Unit Weight	45.02		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 5+60 to 5+70 Off. 5' to -20'

Notes: 24 oz. Air Entrainment before 1st Test
40 oz. Air Entrainment before 2nd Test
135 revs @ 1st Test
233 revs into conveyor

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	60°
Load #	2	Truck #	254
Dispatch Time	8:15	Arrival Time	8:22
Revs @ Arrival	80	Water @ Arrival	—
Concrete Temp	1st 78° 2nd 77°	Can Weight	8.64

Initial Slump	4.75	Water Added	—	Revs	+30
Air %	3.3	Unit Weight	46.58		
2nd Slump	4.5	Water Added	—	Revs	+30
Air %	5.3	Unit Weight	45.90		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 5+60 to 5+70 Off. 5' to -20'

Notes: Truck into building @ 8:45
Into Conveyor @ 9:16

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	60°
Load #	3	Truck #	236
Dispatch Time	8:58	Arrival Time	9:15
Revs @ Arrival	64	Water @ Arrival	—
Concrete Temp	1st 76° 2nd 80°	Can Weight	8.06

Initial Slump	4.5	Water Added	—	Revs	—
Air %	2.9	Unit Weight	45.40		
2nd Slump	5.25	Water Added	—	Revs	+30
Air %	5.5	Unit Weight	43.98		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location

Notes: 64oz. Air Entrainment before 2nd Test
166 revs into conveyor

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	60°
Load #	3	Truck #	236
Dispatch Time	8:58	Arrival Time	9:15
Revs @ Arrival	64	Water @ Arrival	—
Concrete Temp	1st 74° 2nd 77°	Can Weight	8.64

Initial Slump	3.5	Water Added	—	Revs	—
Air %	2.8	Unit Weight	—		
2nd Slump	5.25	Water Added	—	Revs	+30
Air %	5.3	Unit Weight	45.10		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location

Notes: 5+60 to 5+70 Off. -20' to -30'
6+00 to 6+10 Off. 30' to 15'
6+00 to 6+10 Off. 0' to -5'

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	62°
Load #	4	Truck #	240
Dispatch Time	9:50	Arrival Time	9:54
Revs @ Arrival	81	Water @ Arrival	—
Concrete Temp	75°	Can Weight	8.06

Initial Slump	5.5	Water Added	—	Revs	+30
Air %	6.0	Unit Weight	43.62		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location

Notes: 64oz. Air Entrainment before 1st Test

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	62°
Load #	4	Truck #	240
Dispatch Time	9:50	Arrival Time	9:54
Revs @ Arrival	81	Water @ Arrival	—
Concrete Temp	77°	Can Weight	8.64

Initial Slump	5.5	Water Added	—	Revs	+30
Air %	5.2	Unit Weight	45.32		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location

Notes: 6+00 to 6+10 Off. -5' to -30'
6+40 to 6+55 Off. 30' to 25'

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	62°
Load #	5	Truck #	254
Dispatch Time	10:15	Arrival Time	10:23
Revs @ Arrival	126	Water @ Arrival	—
Concrete Temp	75°	Can Weight	8.06

Initial Slump	5.0	Water Added	—	Revs	—
Air %	7.4	Unit Weight	143.44		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: 6+40 to 6+55 Off. 25' to 0'

Notes:

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA

CC-08 Field Placement Notes for P-501

Date		Air Temp	
Load #		Truck #	
Dispatch Time		Arrival Time	
Revs @ Arrival		Water @ Arrival	
Concrete Temp		Can Weight	

Initial Slump		Water Added		Revs	
Air %		Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes: QA Did Not Test

Agg Correction: *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	63°
Load #	6	Truck #	236
Dispatch Time	10:51	Arrival Time	11:02
Revs @ Arrival	48	Water @ Arrival	—
Concrete Temp	76°	Can Weight	8.06

Initial Slump	5.0	Water Added	—	Revs	+30
Air %	4.9	Unit Weight	44.64		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+40 to 6+55 0' to -25'

Notes:

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	63°
Load #	6	Truck #	236
Dispatch Time	10:51	Arrival Time	11:02
Revs @ Arrival	48	Water @ Arrival	—
Concrete Temp	75°	Can Weight	8.64

Initial Slump	4.75	Water Added	—	Revs	+30
Air %	4.3	Unit Weight	45.54		
2nd Slump	—	Water Added	—	Revs	—
Air %	3.9	Unit Weight	45.72		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+40 to 6+55 0' to -25'

Notes:

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	63°
Load #	7	Truck #	240
Dispatch Time	11:30	Arrival Time	11:42
Revs @ Arrival	67	Water @ Arrival	—
Concrete Temp	1st 74° 2nd 75°	Can Weight	8.06

2nd Test Same Sample

Initial Slump	7.0 (6.25)	Water Added	—	Revs	+30
Air %	7.0	Unit Weight	42.78		
2nd Slump	5.5	Water Added	—	Revs	—
Air %	6.2	Unit Weight	44.02		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+40 to 6+55 -25' to -30'

Notes:

Agg Correction 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/12	Air Temp	63°
Load #	7	Truck #	240
Dispatch Time	11:30	Arrival Time	11:42
Revs @ Arrival	67	Water @ Arrival	—
Concrete Temp	—	Can Weight	8.64

Initial Slump	—	Water Added	—	Revs	+30
Air %	7.9	Unit Weight	—		
2nd Slump	—	Water Added	—	Revs	—
Air %	5.4	Unit Weight	—		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location 6+40 to 6+55 -25' to -30'

Notes:

Agg Correction 0.3 *(Air % Values above are uncorrected)*

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	744
ARRIVE JOB	**DEPART JOB**	**TIME IN**
755		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7001 TICKET #: 7073044	NET 30	10	/12/17	07:22

SOLD TO
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO
EST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	900FLEX	900 FLEX		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Sl@@D: 4.00						
		SALESPERSON: JRICH				CUM.	TOTAL:10	
		TAX CODE: NEW JERSEY STATE SALES TAX						

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7073044	63539	7:24	10/12/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	900FLEX				W	68238

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	9373 lb	9320 lb	3.00% M
3/4STONE	1550 lb	24820 lb	24700 lb	
1/2STONE	250 lb	27200 lb	27160 lb	
TYPE1	529.0 lb	5280.0 lb	5270.0 lb	
FLYASH	176.0 lb	7030.0 lb	7020.0 lb	
WATER	37.8 gl	285.3 gl	284.6 gl	
AIR	14.10 oz	141.00 oz	141.00 oz	
HRWR	28.20 oz	282.00 oz	276.00 oz	

Actual Load 36591 lb

Slump: 4.00 in #

Num Batches: 1

Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHAND	254	815
ARRIVE JOB	**DEPART JOB**	**TIME IN**
822		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7001 TICKET #: 7073052	NET 30		10/12/17	08:02

SOLD TO
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO
EST COAT RD, 3RD GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	900FLEX	900 FLEX		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Slump: 4.00						
		SALESPERSON: JRICH				CUM. TOTAL:20		
		TAX CODE: NEW JERSEY STATE SALES TAX						

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
254		user	7073052	63545	8:03	10/12/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	900FLEX				W	68244

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	9396 lb	9400 lb	3.25% M
3/4STONE	1550 lb	24900 lb	24880 lb	
1/2STONE	250 lb	27380 lb	27360 lb	
TYPE1	529.0 lb	5290.0 lb	5310.0 lb	
FLYASH	176.0 lb	7070.0 lb	7060.0 lb	
WATER	37.8 gl	262.6 gl	261.2 gl	
AIR	14.10 oz	141.00 oz	141.00 oz	
HRWR	28.20 oz	282.00 oz	280.00 oz	

Actual Load 36626 lb

Num Batches: 1

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
PDALE	236	8:58
ARRIVE JOB	**DEPART JOB**	**TIME IN**
9:08		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7001 TICKET #: 7073063	NET 30		10/12/17	08:45

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project -FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	900FLEX	900 FLEX		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Slump: 4.00						
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM. TOTAL:30		

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____
RECEIVED

CUSTOMER COPY

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
236		user	7073063	63552	8:47	10/12/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	900FLEX				W	68251

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	9396 lb	9340 lb	3.25% M
3/4STONE	1550 lb	24840 lb	24740 lb	
1/2STONE	250 lb	27240 lb	27220 lb	
TYPE1	529.0 lb	5290.0 lb	5300.0 lb	
FLYASH	176.0 lb	7060.0 lb	7080.0 lb	
WATER	37.8 gl	252.6 gl	252.2 gl	
AIR	17.50 oz	175.00 oz	174.00 oz	
HRWR	28.20 oz	282.00 oz	284.00 oz	

Actual Load 36434 lb

Slump: 4.00 in #

Num Batches: 1

Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	950
ARRIVE JOB	**DEPART JOB**	**TIME IN**
959		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7001 TICKET #: 7073073	NET 30		10/12/17	09:27

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:41	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7073073	63558	9:31	10/12/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68257

Material	Design Qty		Required		Batched		% Moisture
CONC	910	lb	10335	lb	10300	lb	3.25% M
3/4STONE	1550	lb	27350	lb	27240	lb	
1/2STONE	250	lb	29990	lb	29980	lb	
TYPE1	529.0	lb	5819.0	lb	5850.0	lb	
FLYASH	176.0	lb	7786.0	lb	7790.0	lb	
WATER	37.8	gl	277.8	gl	277.4	gl	
AIR	18.00	oz #	198.00	oz	198.00	oz	
HRWR	28.20	oz	310.20	oz	308.00	oz	

Actual Load 40117 lb

Num Batches: 1

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
DHAND	254	1015
ARRIVE JOB	DEPART JOB	TIME IN
1025		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7001 TICKET #: 7073082	NET 30	10	/12/17	10:03

SOLD TO
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO
EST COAT RD, 3RD GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
		Slump: 4.00						
		SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX				CUM.	TOTAL:52	

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

IX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND
IX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND
MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
254		user	7073082	63565	10:04	10/12/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68264

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10335 lb	10320 lb	3.25% M
3/4STONE	1550 lb	27370 lb	27280 lb	
1/2STONE	250 lb	30030 lb	30000 lb	
TYPE1	529.0 lb	5819.0 lb	5860.0 lb	
FLYASH	176.0 lb	7796.0 lb	7820.0 lb	*
WATER	37.8 gl	277.8 gl	277.4 gl	
AIR	24.70 oz	271.70 oz	272.00 oz	
HRWR	28.20 oz	310.20 oz	308.00 oz	

Actual Load 40171 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
PDALE	236	10:51
ARRIVE JOB	DEPART JOB	TIME IN
11:07		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
8197	1		ORDER #: 7001 TICKET #: 7073088	NET 30		10/12/17	10:40

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO
WEST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
		Slump: 4.00						
		SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX				CUM.	TOTAL:63	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

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WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
236		user	7073088	63570	10:41	10/12/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68269

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10335 lb	10240 lb	3.25% M
3/4STONE	1550 lb	27290 lb	27200 lb	
1/2STONE	250 lb	29950 lb	29920 lb	
TYPE1	529.0 lb	5819.0 lb	5780.0 lb	
FLYASH	176.0 lb	7716.0 lb	7700.0 lb	
WATER	37.8 gl	277.8 gl	277.4 gl	
AIR	22.90 oz	251.90 oz	252.00 oz	
HRWR	28.20 oz	310.20 oz	312.00 oz	

Actual Load 39970 lb

Num Batches: 1

Slump: 4.00 in # Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	1113
ARRIVE JOB	**DEPART JOB**	**TIME IN**
1145		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
8197	1		ORDER #: 7001 TICKET #: 7073097	NET 30		10/12/17	11:21

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WEST COAT RD. 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
3.00 0.00		cy	900FLEX	900 FLEX		3.00		
3.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
1.00		1	SLC	SMALL LOAD CHARGE		1.00		
		Slump: 4.00						
		SALESPERSON: JRICH				CUM.	TOTAL:66	
		TAX CODE: NEW JERSEY STATE SALES TAX						

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

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WATER ADDED GALS APPROVED BY

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I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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CUSTOMER COPY

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7073095	63575	11:19	10/12/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
3.00 CYDS	900FLEX				W	68274

Material	Design Qty		Required	Batched	% Moisture
CONC	910 lb		2819 lb	2800 lb	3.25% M
3/4STONE	1550 lb		7450 lb	7440 lb	
1/2STONE	250 lb		8190 lb	8180 lb	
TYPE1	529.0 lb		1587.0 lb	1600.0 lb	
FLYASH	176.0 lb		2128.0 lb	2130.0 lb	*
WATER	37.8 gl		75.8 gl	76.1 gl	
AIR	23.20 oz	#	69.60 oz	70.00 oz	
HRWR	28.20 oz		84.60 oz	84.00 oz	

Actual Load 10955 lb

Num Batches: 1

Slump: 4.00 in # Note: Manual feed occured

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project: CC8 Phase 2 **Section:** P-501 **Client** FAA-ATRD

Technician: RN/CR **Professional Engineer:** QL **Date:** 10/19/2017

Load	Date of Pour	Date Tested	Age	Truck Number	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)	Free Free Values (ksi)
1	10/12/2017	10/19/2017	7	240	6.00	6.00	6.00	6.10	6.15	6.15	18	9222	750	6239
2	10/12/2017	10/19/2017	7	254	6.05	6.00	6.00	6.05	6.10	6.10	18	9298	760	6344
3	10/12/2017	10/19/2017	7	236	6.05	6.10	6.15	6.10	6.10	6.05	18	9011	715	5767
4	10/12/2017	10/19/2017	7	240	6.10	6.05	6.05	6.05	6.00	5.95	18	9198	750	5879
5	10/12/2017	10/19/2017	7	254	6.00	6.00	6.05	6.05	6.00	6.00	18	9001	745	5809
6	10/12/2017	10/19/2017	7	236	5.95	5.95	6.00	6.10	6.10	6.10	18	9526	790	6394
7	10/12/2017	10/19/2017	7	240	5.90	5.90	5.95	6.05	6.10	6.10	18	8329	705	5766
												Average	745	
												stdev	30	
												COV	0.04	

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Phase 2 **Section:** P-501 **Client** FAA-ATRD

Technician: RN/CR **Professional Engineer:** QL **Date:** 10/19/2017

Load	Date of Pour	Date Tested	Age	Truck Number	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break	Free Free Values (ksi)
1	10/12/2017	10/19/2017	7	240		6.03		119570	28.56	4190	3	
2	10/12/2017	10/19/2017	7	254		6.04		117140	28.65	4090	3	
3	10/12/2017	10/19/2017	7	236	28.98	6.04	12.10	111160	28.65	3880	3	5946
4	10/12/2017	10/19/2017	7	240	28.88	6.04	12.10	124660	28.65	4350	3	5796
5	10/12/2017	10/19/2017	7	254		6.04		115470	28.65	4030	3	
6	10/12/2017	10/19/2017	7	236	29.76	6.06	12.05	137930	28.84	4780	3	6424
7	10/12/2017	10/19/2017	7	240		6.04		112610	28.65	3930	3	
									Average	4180		
									stdev	310		
									COV	0.07		

*Specimens 1, 2, 5 and 7 did not have FFRC testing performed prior to sulfur capping.

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 **Section:** **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** LI **Date:** 11/9/2017

Sample No.	Date of Pour	Date Tested	Age	Sta.	Fre Fre (ksi)	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
1	10/12/2017	11/9/2017	28		6,213	6.00	6.00	6.00	6.05	6.00	5.95	18	11600	967
2	10/12/2017	11/9/2017	28		6,685	6.00	6.00	6.00	6.15	6.15	6.15	18	11323	921
3	10/12/2017	11/9/2017	28		6,064	6.05	6.05	6.10	6.00	6.00	6.00	18	10044	819
4	10/12/2017	11/9/2017	28		6,245	6.10	6.05	6.05	5.95	5.95	5.95	18	10895	896
5	10/12/2017	11/9/2017	28		6,072	6.15	6.10	6.10	6.05	6.05	6.10	18	11109	881
6	10/12/2017	11/9/2017	28		6,775	6.05	6.05	6.00	6.10	6.10	6.10	18	11592	940
7	10/12/2017	11/9/2017	28		6,125	6.00	6.00	6.00	6.10	6.10	6.10	18	10189	835

Measurement to nearest 0.05 inch or 1 mm

Created 12/15/2011

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 **Section:** Transition **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** LI **Date:** 11/9/2017

Sample No.	Date Poured	Date Tested	Age	Fre-Fre (ksi)	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1	10/12/2017	11/9/2017	28	6,175	28.78	5.95	12.05	156480	27.81	5,630	3
2	10/12/2017	11/9/2017	28	6,677	29.60	5.95	12.10	149710	27.81	5,380	3
3	10/12/2017	11/9/2017	28	6,163	29.04	6.05	11.95	137640	28.75	4,790	3
4	10/12/2017	11/9/2017	28	6,100	29.04	6.01	11.90	157820	28.37	5,560	3
5	10/12/2017	11/9/2017	28	6,240	28.72	5.95	12.05	125800	27.81	4,520	3
6	10/12/2017	11/9/2017	28	6,711	29.76	6.00	12.10	174310	28.27	6,160	3
7	10/12/2017	11/9/2017	28	6,298	28.78	5.95	12.05	140430	27.81	5,050	3

Capping Standard Used: ASTM C1231 ASTM C617 **Three Cap Checks :** **Last ASTM C90 Sulfur Test:**

Number of times unbonded cap used prior to testing:

Revised 11/10/2016

PENN JERSEY BUILDING MATERIALS INC.

READY MIX CONCRETE
PROCESSED SAND & GRAVEL
BLOCK - MASONRY - BUILDING PRODUCTS

Contractor : United Concrete
Project : FAA
Location : Pomona, NJ
Use : Test Strip

Mix ID number :	900FLEX	**Design Date :**	10/12/2016
Compressive Strength :	900Flex	**Concrete Source :**	Pleasantville, NJ
Aggregate size :	#8 & #57 Blend	**Unit Weight :**	138.1
Air content :	6.0% (+/- 1.5%)	**Slump Range**	3" - 6"
Water / Cement ratio :	0.45		

Constituents :

Total Cementitious :	705				
Percentage Pozzolan Replacement :	25%				
		ASTM	**Quantity**	**Density**	**Velum**
Cement :	Lafarge Type I	*C-150*	529	3.150	2.69
Pozzolan :	STI ProAsh Type F	*C-618*	176	2.140	1.32
Fine Aggregate :	Tuckahoe Sand & Gravel Inc.	*C-33*	910	2.630	5.52
Course Aggregate :	Berks Products #57	*C-33*	1550	2.67	9.30
Course Aggregate :	Berks Products #8	*C-33*	250	2.67	1.50
Water :	Potable		315	1.000	5.05
Air :			6%		1.62
Total :			3730		27

Admixtur es :

		ASTM	**floz-cwt**	**floz/yd**	
High range water reducer:	BASF MasterGlenium 7500	*C-494*	4	28 .2	
Accelerator {Non-Chloride) :	BASF MasterSet AC 534	*C-494*	12 - 32		requested by contractor
Retarder :	BASF MasterSet R 100	*C-494*	1- 3		requested by contractor
Air-Entrainment :	BASF MasterAir AE 90	*C-260*	1.5	10.6	* or as required

Submitted By :
James Laus

rhe {o//owmg admixtures contorm1nq ro rhe project spec1J1cat1ons mav be added at the conrroctor's requesc
dm1xture dosage ratesore sub1ecr to change due ro weather and 1obs1te candit1ons as permmed bv AC/ 211.l on oropornoning
Penn-Jersey Hwlding Matenals will deliver the concrere 1n accordance co ASTM C-94
This m,x des1qn nos been des1aned ,n accordance with AC/ 318 and 301

MAILING ADDRESS
P.O. Box 991
Pleasantville NJ 08232

MAIN OFFICE
2819 Fire Road
EHT, NJ 08234
Telephone (609) 645-8135

PLANT LOCATION
2817 Fire Road
Egg Harbor Township NJ 08234
Telephone (609) 641-6994

LAFARGE CEMENT

NSF Certified to NSF/ANSI 61

Cement Mill Test Report

Month of Issue: August 2017

Plant:	**Whitehall, PA**
Product:	**Portland Cement Type I**
Silo:	**B-2**
Manufactured:	**July 2017**

ASTM C-150 and AASHTO M-85 Standard Requirements

CHEMICAL ANALYSIS

Item	Spec limit	Test Result
Rapid Method, X-Ray *(C 114)*		
SiO2 (%)	---	19.0
Al2O3 (%)		5.7
Fe2O3 (%)	6.0 max	2.7
CaO (%)	---	61.0
MgO (%)	6.0 max	2.6
SO3 (%)	3.0 max *	4.1
Loss on ignition (%)	3.5 max	2.6
Insoluble residue (%)	1.5 max	0.49
CO2 (%)	---	1.4
Limestone (%)	5.0 max	3.7
CaCO3 in Limestone (%)	70 min	85
Adjusted Potential Phase Composition *(C 150)*		
C3S (%)	---	48
C2S (%)	---	17
C3A (%)	---	11
C4AF (%)	---	8
C3S+4.75*C3A (%)	---	100
ASTM C 150-11 and AASHTO M 85-09 Optional Chemical Requirements:		
NaEq (%)	---	1.02

PHYSICAL ANALYSIS

Item	Spec limit	Test Result	
Air content of mortar (%) *(C 185)*	12 max	8	
Blaine Fineness (m2/kg) *(C 204)*	260 min	377	
-325 (%) *(C 430)*	---	97.1	
Autoclave expansion (%) *(C 151)*	0.80 max	0.03	
Compressive strength (MPa, [PSI]) *(C 109)*			
1 day	---	18.1	2625
3 days	12.0 [1740] min	27.3	3959
7 days	19.0 [2760] min	32.4	4698
28 days (Reflects previous month's data)	---	38.1	5525
Time of setting (minutes)			
Vicat Initial *(C 191)*	45 - 375	110	
Mortar Bar Expansion (%) *(C 1038)***	0.02 max	0.006	

* May exceed 3.0% SO3 maximum based on our C1038 results of <0.02% expansion at 14 days. Data available upon request.

** Current Production run not available - most recent provided

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of applicable PADOT, NYSDOT and NJDOT Specifications for Type I;
ASTM C-150 & AASHTO M-85 STANDARD SPECIFICATIONS FOR TYPE I CEMENT.

Certified By:

James Hess

James Hess - Quality Coordinator

8/2/2017

US East BU - Whitehall Plant
5160 Main St., Whitehall, PA 18052
Phone: (610) 261-3447

LAFARGE NORTH AMERICA

Certification: NSF 61

NSF Certified to NSF/ANSI 61

NewCem Mill Test Report

Month of Issue - July 2017

Plant - Sparrows Point

Manufactured - June 2017

Chemical

		Specification
Sulfide Sulfur (S), %:	0.6	**2.5 max.**
Sulfate Ion (as SO_3), %:	0.0	**4.0 max.**
Alumina (asAl2O3), %:	11.6	**n/a**

Reference Cement

*Equivalent Alkalies, %:	0.6	**0.6-0.9**
*Blaine; cm^2/g	3,900	**n/a**
Compressive Strength, psi:		
7 Day	4,580	**n/a**
28 Day	5,970	**5000 min.**

* Predetermined value

**(28d reflects previous month's data)

Physical

		Specification
Slag Activity Index, %:		
7 Day	100	**n/a**
28 Day**	122	**115**
Compressive Strength, psi:		
7 Day	4,540	**n/a**
28 Day**	7,280	**n/a**
Fineness:		
Blaine; cm^2/g	6,640	**n/a**
45 Micron:		
% retained	1	**20 max.**
Other:		
Air Content, %:	6	**12 max.**

This ground granulated blast furnace slag complies with the current specification of the chemical and physical requirements of ASTM C-989, AASHTO M-302; Grade 120. NewCem is guaranteed to meet all applicable MDOT, FDOT, GADOT, PennDOT, SCDOT, NJDOT, NY DOT and VADH specifications.

US East Region
Sparrows Point Plant
2001 Wharf Road
Baltimore, MD 21219
Telephone: (610) 261-3453

Brian Borowski
Quality Manager, US MPC

7/19/2017
Date

TUCKAHOE SAND AND GRAVEL

MAILING ADDRESS:
P.O. BOX 991
PLEASANTVILLE, NJ 08232

PLANT ADDRESS:
100 SHARP ROAD
TUCKAHOE, NJ 08250

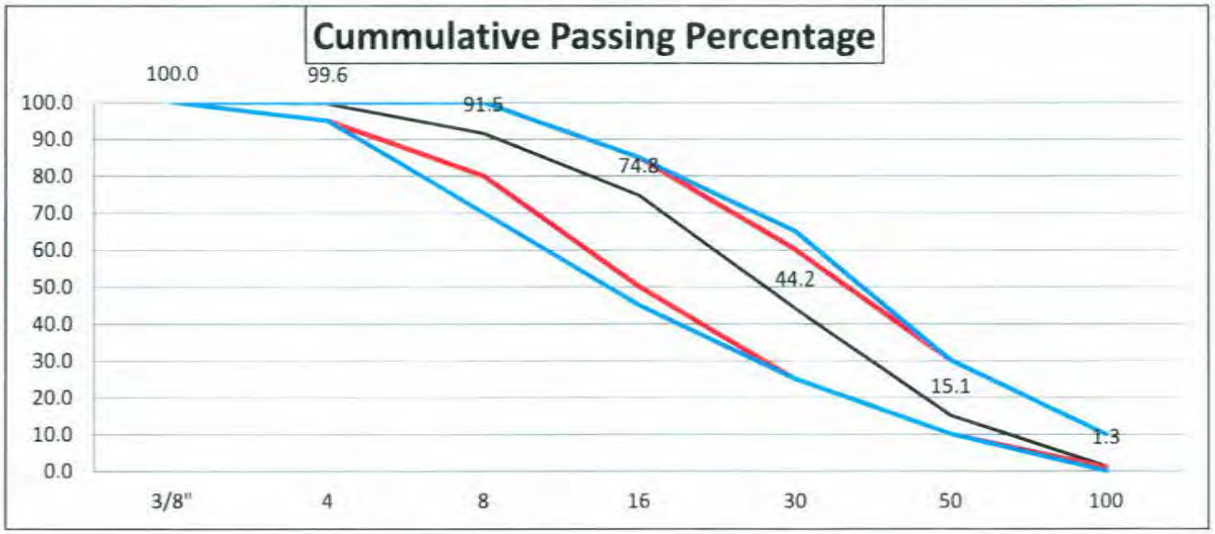
Location: PLANT 2 - Crossroads Stockpile **Type:** CONCRETE SAND

Date: 8/15/2017

Customer: QC
Operator: G. O'Donnell
Description:

Sieve No.	Mesh Size (mm)	Sieve Name	Cumulative Retained		Incremental Retained (%)	ASTM C-33				Cumulative Passing	
						PENNDOT Type A		NJDOT			
			Weight (g)	%		Min	Max	Min	Max	Weight (g)	%
						% Passing		% Passing			
1	9.5	3/8"	0.0	0.0	0.0	100	100	100	100	576.5	100.0
2	4.75	4	2.3	0.4	0.0	95	100	95	100	574.2	99.6
3	2.36	8	48.8	8.5	8.1	70	100	80	100	527.7	91.5
4	1.18	16	145.2	25.2	16.7	45	85	50	85	431.3	74.8
5	0.60	30	321.6	55.8	30.6	25	65	25	60	254.9	44.2
6	0.30	50	489.2	84.9	29.1	10	30	10	30	87.3	15.1
7	0.15	100	568.9	98.7	13.8	0	10	1	10	7.6	1.3
8	silt & clay	*Pan	576.5	0.0	1.3	-	-	-	-	0.0	0.0

FM#	2.73



Specifications (Min/Max)	
NJDOT	
PENNDOT	
Product Gradation	

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TuckahoeSand-Gravel.com

INDIVIDUAL AGGREGATE GRADING

Project :	QC - Quality Control	Source :	Berks #57 Crushed Stone
Client :	Quality Control	Total wt:	22.70

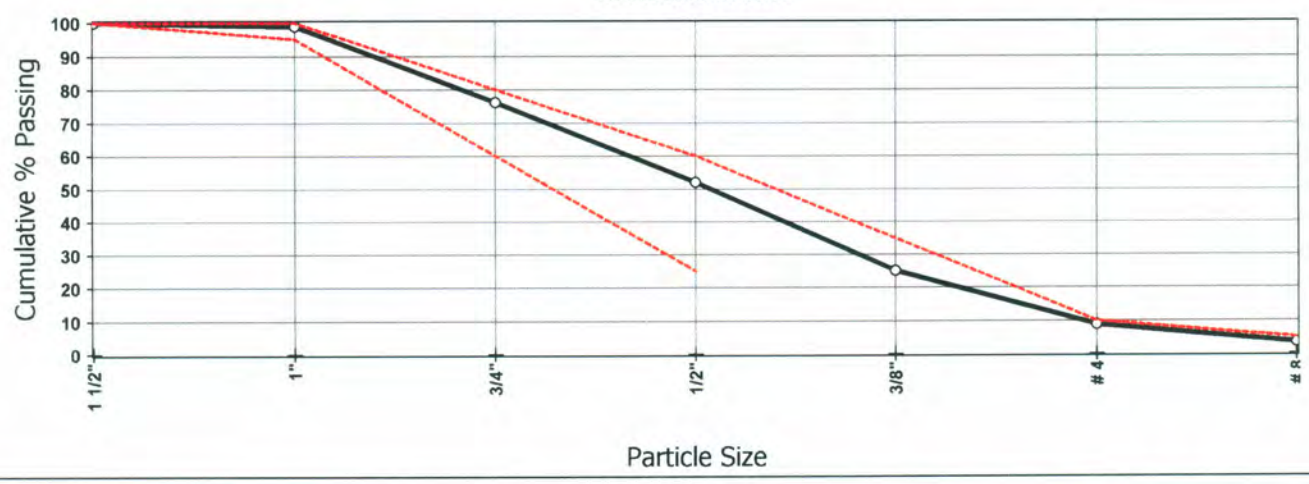
Sample Data

Sample ID :	1a	Aggregate Spec :	ASTM C-33 #57 Stone
Date sampled :	07/12/2017	Aggregate Name :	Berks #57

Grading

Sieve	Ind. Wt. Retained	Cum. Wt. Retained	Ind. % Retained	Cum. % Retained	Cum. % Passing	Cum. % passing Min. Spec.	Cum. % passing Max. Spec.
1 1/2"					100.0	100.0	100.0
1"	0.2	0.2	1	1	99	95	100
3/4"	5.2	5.4	22.9	23.8	76.2		
1/2"	5.5	10.9	24.2	48.0	52.0	25.0	60.0
3/8"	6.1	17.0	26.9	74.9	25.1		
# 4	3.7	20.7	16.3	91.2	8.8		10.0
# 8	1.2	21.9	5.3	96.5	3.5		5.0
PAN	0.6	22.5	3	99			
Total :	22.500		99				

GRADING CHART



Remarks

CLASS TYPE AGGREGATE: 4S	APPARENT SPECIFIC GRAVITY: 2.781	UNCOMPACTED VOIDS: 49
ABSORPTION %: .4%	UNIT WEIGHT: 88	ALKALI-SILICA REACTION: .13
BULK SPECIFIC GRAVITY: 2.751	DRY RODDED UNIT WEIGHT: 98	CLAY LUMPS & FRIABLES %: 0
SSD SPECIFIC GRAVITY: 2.761	LA ABRASSION: 19	ORGANIC IMPURITIES: CLEAR

Reported by : James Laus Date : 08/14/2017 Verified by : _____

INDIVIDUAL AGGREGATE GRADING

Project :	QC - Quality Control	Source :	Berks #8 Crushed Stone
Client :	Quality Control	Total wt:	24.40

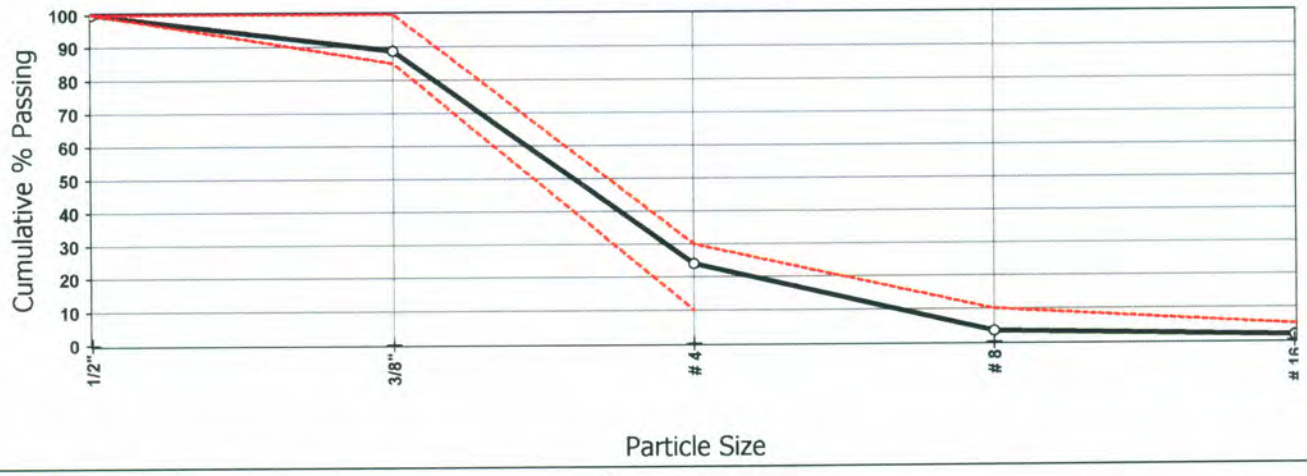
Sample Data

Sample ID :	1A	Aggregate Spec :	#8 Berks Products ASTM-C33
Date sampled :	08/04/2017	Aggregate Name :	Berks #8

Grading

Sieve	Ind. Wt. Retained	Cum. Wt. Retained	Ind. % Retained	Cum. % Retained	Cum. % Passing	Cum. % passing Min. Spec.	Cum. % passing Max. Spec.
1/2"					100.0	100.0	100.0
3/8"	2.7	2.7	11.1	11.1	88.9	85.0	100.0
# 4	15.8	18.5	64.8	75.8	24.2	10.0	30.0
# 8	5.1	23.6	20.9	96.7	3.3		10.0
# 16	0.4	24.0	1.6	98.4	1.6		5.0
PAN	0.3	24.3	1.2	99.6			
Total :	24.300		99				

GRADING CHART



Remarks

CLASS TYPE AGGREGATE: 4S	APPARENT SPECIFIC GRAVITY: 2.781	UNCOMPACTED VOIDS: 49
ABSORPTION %: .4%	UNIT WEIGHT: 88	ALKALI-SILICA REACTION: .13
BULK SPECIFIC GRAVITY: 2.751	DRY RODDED UNIT WEIGHT: 98	CLAY LUMPS & FRIABLES %: 0%
SSD SPECIFIC GRAVITY: 2.761	LA ABRASSION: 19	ORGANIC IMPURITIES: CLEAR

Reported by : James Laus Date : 08/03/2017 Verified by : _____

BASF
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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

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NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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www.master-builders-solutions.basf.us

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Canada
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Tel: 800 387-5862 ■ Fax: 905 792-0651

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete
4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

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* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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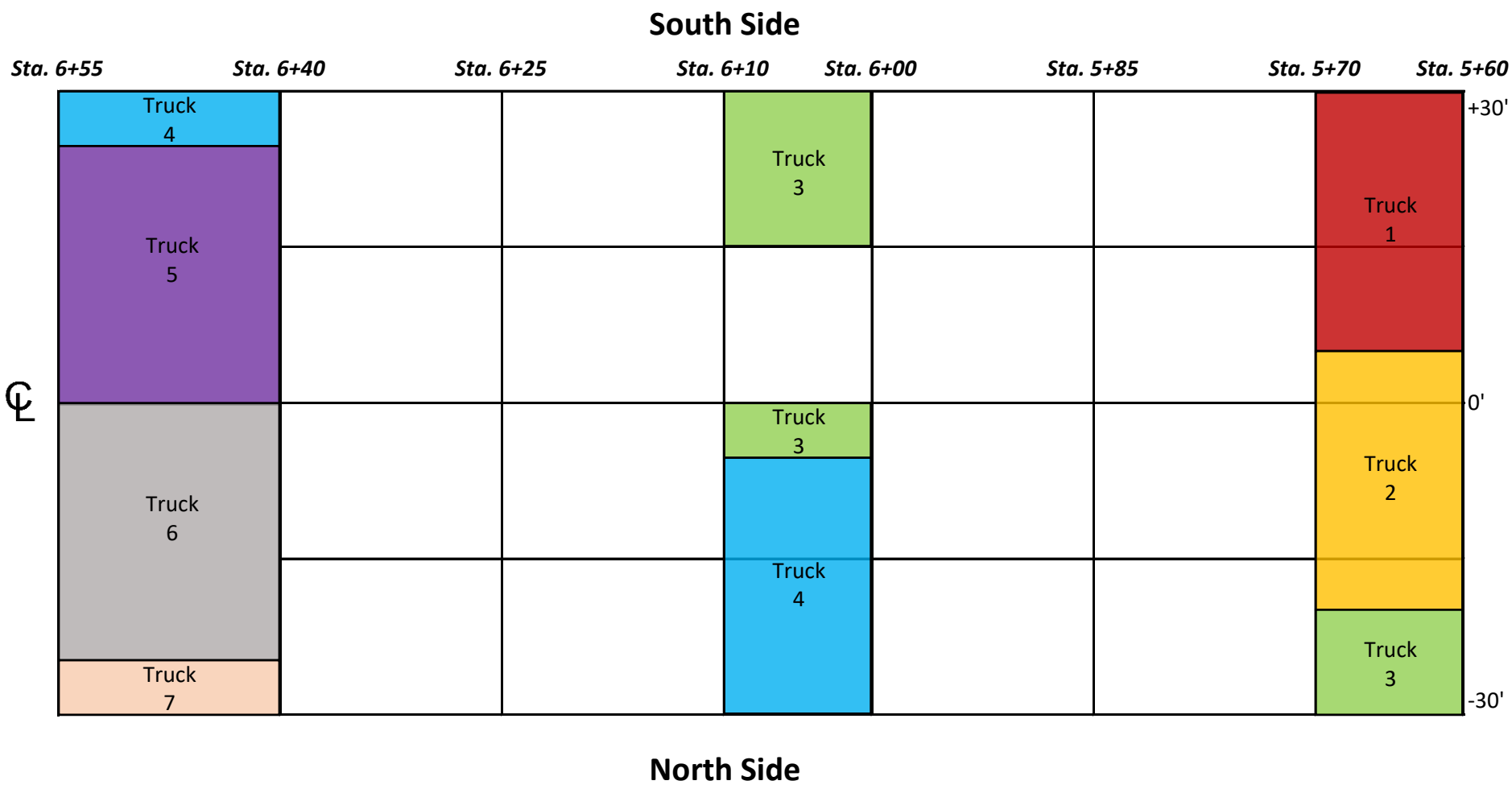
Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

P-501 Concrete Placement

Date: 10/12/2017



P-501 (900 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 10/24/2017

Placement Location = Sta. 5+70 to 6+40, See Attached Placement Map for Locations

7 Day Testing Completed on 10/31/2017

28 Day Testing Completed on 11/21/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	71.1 F	66.9 F	87%	16.1 mph SSE	9.0 miles	Overcast
2:54 PM	70.0 F	68.0 F	93%	9.2 mph S	5.0 miles	Rain

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam Strength (PSI Flex)				Cylinder Strength (PSI)			Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	28 Day	28 Day	28 Day	28 Day	28 Day	
10/24/2017	1	240	7:25 AM	7:51 AM	QC (Craig)	3	4.25	5.7	N/T	N/T	N/T	N/T	144.8	76	127	808	934	894	854	5,270	5,430	5,820	50 revs at Arrival
					QA (CSRA)		4.00	4.9	N/T	N/T	N/T	N/T	147.5	N/T			Average =		894	Average =		5,507	
10/24/2017	2	241	7:43 AM	8:09 AM	QC (Craig)	3	4.00	6.3	N/T	N/T	N/T	N/T	144.5	77	183	808	794	759	813	4,770	5,000	4,620	100 revs at Arrival
					QA (CSRA)		Concrete Not QA Tested										Average =		789	Average =		4,797	
10/24/2017	3	246	7:58 AM	8:27 AM	QC (Craig)	7	4.25	6.7	N/T	N/T	N/T	N/T	143.1	77	245	876	890	977	917	5,150	4,910	5,200	86 revs at Arrival
					QA (CSRA)		5.00	6.1	N/T	N/T	N/T	N/T	145.0	N/T			Average =		928	Average =		5,087	
10/24/2017	4	233	8:16 AM	8:50 AM	QC (Craig)	7	3.75	5.6	N/T	N/T	N/T	N/T	146.8	76	240	843	782	788	845	5,050	5,330	4,950	65 revs at Arrival
					QA (CSRA)		Concrete Not QA Tested										Average =		805	Average =		5,110	
10/24/2017	5	229	8:37 AM	9:18 AM	QC (Craig)	17	3.75	5.9	N/T	N/T	N/T	N/T	146.3	79	486	795	782	786	795	4,880	4,840	4,720	192 revs at Arrival
					QA (CSRA)		3.25	5.3	N/T	N/T	N/T	N/T	147.6	N/T			Average =		788	Average =		4,813	
10/24/2017	6	246	10:04 AM	10:30 AM	QC (Craig)	12	4.00	7.7	N/T	N/T	N/T	N/T	140.6	80	202	687	735	780	615	3,910	3,850	3,910	29 revs at Arrival
					QA (CSRA)		4.25	7.3	N/T	N/T	N/T	N/T	143.4	N/T			Average =		710	Average =		3,890	

900 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Berks #8 Stone	250	lbs.
Berks #57 Stone	1,550	lbs.
Tuckahoe Sand	910	lbs.
Water	315	lbs.
Type I Portland Cement	529	lbs.
Flyash Type F (25%)	176	lbs.
Air %	6.0	
W/C Ratio	0.45	

Batch Ticket Information

Load #	YD^3 Batch	#57 Stone	#8 Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
1	11.0	17,020	2,720	10,200	267.8	5,920	1,930	247.0	304.0
2	11.0	17,000	2,740	10,200	267.8	5,790	1,960	244.0	308.0
3	11.0	16,900	2,740	10,160	267.8	5,790	1,920	246.0	308.0
4	11.0	17,000	2,760	10,400	267.8	5,790	1,920	246.0	308.0
5	11.0	16,960	2,740	10,300	267.2	5,840	1,920	244.0	312.0
6	3.0	4,680	760	2,740	62.3	1,600	520	68.0	84.0

Prepared by: Chris Tomlinson

Checked by: Joe Gawrysiak

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - CSRA QA Field Notes C - Batch Tickets D - NAPTF Lab Testing Information E - Mix Design F - Admixture Information G - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-5

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: I. Craig, Joe Landy, Rob Barrett, Brian Hirsh, Jonathan Peacock

DATE INSPECTED: 10/24/17 REPORT NO.: CP-12

PROJECT PLANS BY: N/A DATED: N/A REVISION NO.: N/A

APPROVAL DATE: N/A

CONCRETE PLACEMENT REPORT

(compressive strength)

LOCATION: North 550 to 655

Craig Testing Laboratories, Inc. inspector arrived at site as requested by client and inspected concrete placement at the above location per the project plans and documents.

Slump (ASTM C143): * Approved Slump Range: 3" - 6"

Air Content (ASTM C231): * Approved Air % Range: 4.0% to 8%

Temperature (ASTM C1064): * Todays Yardage: 58

Concrete Supplier: Penn Jersey Approved Mix ID: 900Flex

Consolidation Method: ☑ Internal ☐ External ☐ Both ☐ None ☐ Other _____ Ambient Temperature (F): 54°F

Strength of Concrete Placed (PSI): 900Flex No. of Samples (ASTM C31): *

Specimen Type: Beams & Cylinder

Required Strength of Concrete (PSI): 900Flex On Site Curing Facilities Available ☑ Yes ☐ No
(ACI 301 - 1.6.3.2.d)

☐ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 7:00 to 12:00
☐ Work Above is in Progress and Requires Further Inspection
☑ Field Work is in Substantial Compliance with the following approved documents:
☑ Mix Designs ☐ Drawings ☐ Specifications
☐ Compressive strength samples have met the required strength
☐ ***Inspection done without approved documentation available***
☐ ***Work Deviates from Approved Plans and/or Documents, See NCR No.*** _____

Remarks: All test results recorded were provided to Albert @ United.
* See attached table for results. ** 3 yard balance needed

Reported to: Project Distribution Reviewed By: Ian Craig

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Bob Todd, Matt Martine, Joe Landy, Rob Barrett, John Peacock

DATE INSPECTED: 10/30/17 REPORT NO.:

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
240	7:58 AM	4.25	6.00	144.8	76.0	7	3
241	8:14 AM	4.00	6.60	144.5	77.0	7	3
246	8:29 AM	4.25	7.00	143.1	77.0	7	3
233	9:03 AM	3.75	5.90	146.7	76.0	7	3
229	9:23 AM	3.75	6.20	146.4	79.0	7	3
246**	10:33 AM	4.00	8.00	140.5	80.0	7	3

**3 yard balance

Remarks:

Reported to: Project Distribution Reviewed By: Ian Craig

REV 06/16

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	1	Truck #	240
Dispatch Time	7:25am	Arrival Time	7:51am
Revs @ Arrival	50 → 88	Water @ Arrival	10 gal
Concrete Temp	76°F	Can Weight	8.16 lb

Initial Slump	4.25	Water Added	3gal	Revs	
Air %	6.0	Unit Weight	44.36		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See attached placement map

Notes: 127 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	1	Truck #	240
Dispatch Time	7:25am	Arrival Time	7:51am
Revs @ Arrival	50 → 88	Water @ Arrival	10 gal
Concrete Temp	NT	Can Weight	8.62 lb

Initial Slump	4	Water Added	3gal	Revs	
Air %	5.2	Unit Weight	45.50		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes: 127 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	2	Truck #	241
Dispatch Time	7:43am	Arrival Time	8:09am
Revs @ Arrival	100 → 130	Water @ Arrival	5gal
Concrete Temp	77°F	Can Weight	8.16lb

Initial Slump	4	Water Added	3gal	Revs	
Air %	6.6	Unit Weight	44.28		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See attached placement map

Notes: 183 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	2	Truck #	241
Dispatch Time	7:43am	Arrival Time	8:09am
Revs @ Arrival	100 → 130	Water @ Arrival	5gal
Concrete Temp	NT	Can Weight	8:62 lb

Initial Slump	NT	Water Added		Revs	
Air %	NT	Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes: 183 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

2235 224

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	3	Truck #	246
Dispatch Time	7:58am	Arrival Time	8:27am
Revs @ Arrival	86 → 171	Water @ Arrival	7 gal
Concrete Temp	77°F	Can Weight	8.16 lbs

Initial Slump	4.25	Water Added	7 gal	Revs	
Air %	7.0	Unit Weight	43.94 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See attached placement map

Notes: 245 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	3	Truck #	246
Dispatch Time	7:58am	Arrival Time	8:27am
Revs @ Arrival	86 → 171	Water @ Arrival	7 gal
Concrete Temp	NT	Can Weight	8.62 lbs

Initial Slump	5	Water Added	7 gal	Revs	
Air %	6.4	Unit Weight	44.86		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes: 245 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	4	Truck #	233
Dispatch Time	8:16 am	Arrival Time	8:50am
Revs @ Arrival	65 → 110	Water @ Arrival	7gal
Concrete Temp	76°F	Can Weight	8.16 lbs

Initial Slump	3.75	Water Added	7gal	Revs	
Air %	5.9	Unit Weight	44.86		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See attached placement map

Notes: 240 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	4	Truck #	233
Dispatch Time	8:16am	Arrival Time	8:50am
Revs @ Arrival	65 → 110	Water @ Arrival	7gal
Concrete Temp	NT	Can Weight	8.62 lbs

Initial Slump	NT	Water Added		Revs	
Air %	NT	Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes: 240 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	5	Truck #	229
Dispatch Time	8:37am	Arrival Time	9:18am
Revs @ Arrival	192 → 312	Water @ Arrival	0 gal
Concrete Temp	79°F	Can Weight	8.16 lb

Initial Slump	3.75	Water Added	17 gal	Revs	
Air %	6.2	Unit Weight	44.74 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See attached placement map

Notes: 486 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	5	Truck #	229
Dispatch Time	8:37am	Arrival Time	9:18 am
Revs @ Arrival	192 → 312	Water @ Arrival	0 gal
Concrete Temp	NT	Can Weight	8.62 lb

Initial Slump	3.25	Water Added	17 gal	Revs	
Air %	5.6	Unit Weight	45.52 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes: 486 revs to conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	6	Truck #	246
Dispatch Time	10:04 am	Arrival Time	10:30am
Revs @ Arrival	29 → 134	Water @ Arrival	10 gal
Concrete Temp	80°F	Can Weight	8.16 lbs

Initial Slump	4.00	Water Added	12gal	Revs	
Air %	8.00	Unit Weight	43.30 lbs		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See attached placement map

Notes: 202 revs to conveyor

Agg Correction: *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/24/17	Air Temp	66°F
Load #	6	Truck #	246
Dispatch Time	10:04am	Arrival Time	10:30am
Revs @ Arrival	29 → 134	Water @ Arrival	10 gal
Concrete Temp	NT	Can Weight	8.62 lbs

Initial Slump	4.25	Water Added	12 gal	Revs	
Air %	7.6	Unit Weight	44.48		
2nd Slump		Water Added		Revs	
Air %	7.4	Unit Weight	44.20		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Tested on same wheelbarrow as Test 1.

Placement Location:

Notes: 202 revs to conveyor

Agg Correction: *(Air % Values above are uncorrected)*

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7073465	63853	7:25	10/24/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68557

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10230 lb	10200 lb	2.20% M
3/4STONE	1550 lb	27250 lb	27220 lb	
1/2STONE	250 lb	29970 lb	29940 lb	
TYPE1	529.0 lb	5819.0 lb	5920.0 lb	
FLYASH	176.0 lb	7856.0 lb	7850.0 lb	
WATER	37.8 gl	268.4 gl	267.8 gl	
AIR	22.30 oz	245.30 oz	247.00 oz	
HRWR	28.20 oz	310.20 oz	304.00 oz	

Actual Load 40059 lb

Num Batches: 1

Slump: 4.00 in #

Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	745
ARRIVE JOB	DEPART JOB	TIME IN
755		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
J197	1		ORDER #: 7002 TICKET #: 7073465	NET 30		10/24/17	07:25

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
INELAND NJ 08362

SHIP TO:
EST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:11	

AUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
241		user	7073466	63854	7:43	10/24/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68558

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10230 lb	10200 lb	2.20% M
3/4STONE	1550 lb	27250 lb	27200 lb	
1/2STONE	250 lb	29950 lb	29940 lb	
TYPE1	529.0 lb	5819.0 lb	5790.0 lb	
FLYASH	176.0 lb	7726.0 lb	7750.0 lb	*
WATER	37.8 gl	268.4 gl	267.8 gl	
AIR	22.30 oz	245.30 oz	244.00 oz	
HRWR	28.20 oz	310.20 oz	308.00 oz	

Actual
Load 39960 lb
Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

2

DRIVER	TRUCK NO.	TIME OUT
SBRAD	241	
ARRIVE JOB	DEPART JOB	TIME IN

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7002 TICKET #: 7073466	NET 30		10/24/17	07:43

SOLD TO:
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO
EST COAT RD, 3RD GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
		Slump: 4.00						
		SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX				CUM.	TOTAL:22	

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

M X DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

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3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
246		user	7073468	63856	7:58	10/24/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68560

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10230 lb	10160 lb	2.20% M
3/4STONE	1550 lb	27210 lb	27060 lb	
1/2STONE	250 lb	29810 lb	29800 lb	
TYPE1	529.0 lb	5819.0 lb	5790.0 lb	
FLYASH	176.0 lb	7726.0 lb	7710.0 lb	
WATER	37.8 gl	268.4 gl	267.8 gl	
AIR	22.30 oz	245.30 oz	246.00 oz	
HRWR	28.20 oz	310.20 oz	308.00 oz	

Actual Load 39780 lb

Slump: 4.00 in #

Num Batches: 1

Note: Manual feed occured

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

3

DRIVER	TRUCK NO.	TIME OUT
THAND	246	811
ARRIVE JOB	DEPART JOB	TIME IN
820		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7002 TICKET #: 7073468	NET 30		10/24/17	07:58

SOLD TO:
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO:
EST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00		cy	900FLEX	900 FLEX		11.00		
0.00								
11.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
			Slump: 4.00					
			SALESPERSON: JRICH					
			TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:33	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE;
MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND
MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND
MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY
EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions &
charges and affirm that I am authorized to accept
these terms for the purchaser.

X

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4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
233		user	7073472	63858	8:16	10/24/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68562

Material	Design Qty	Required	Batched		% Moisture
CONC	910 lb	10230 lb	10400 lb	*	2.20% M
3/4STONE	1550 lb	27450 lb	27400 lb		
1/2STONE	250 lb	30150 lb	30160 lb		
TYPE1	529.0 lb	5809.0 lb	5790.0 lb		
FLYASH	176.0 lb	7726.0 lb	7710.0 lb		
WATER	37.8 gl	268.4 gl	267.8 gl		
AIR	22.30 oz	245.30 oz	246.00 oz		
HRWR	28.20 oz	310.20 oz	308.00 oz		

Actual Load 40150 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT.
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

4

DRIVER	TRUCK NO.	TIME OUT
MIKEP	233	8:37
ARRIVE JOB	DEPART JOB	TIME IN
8:52		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
9197	1		ORDER #: 7002 TICKET #: 7073472	NET 30		10/24/17	08:16

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WEST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:44	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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5

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7073474	63859	8:37	10/24/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68563

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10210 lb	10300 lb	2.20% M
3/4STONE	1550 lb	27350 lb	27260 lb	
1/2STONE	250 lb	30010 lb	30000 lb	
TYPE1	529.0 lb	5809.0 lb	5840.0 lb	*
FLYASH	176.0 lb	7776.0 lb	7760.0 lb	
WATER	37.8 gl	268.4 gl	267.2 gl	
AIR	22.30 oz	245.30 oz	244.00 oz	
HRWR	28.20 oz	310.20 oz	312.00 oz	

Actual Load 40055 lb

Num Batches: 1

Slump: 4.00 in #

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

5

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	8:52
ARRIVE JOB	DEPART JOB	TIME IN
9:02		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
3197	1		ORDER #: 7002 TICKET #: 7073474	NET 30		10/24/17	08:39

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WEST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:55	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

RECEIVED

CUSTOMER COPY

6

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
246		user	7073481	63861	10:04	10/24/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
3.00 CYDS	900FLEX				W	68565

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	2790 lb	2740 lb	2.20% M
3/4STONE	1550 lb	7390 lb	7420 lb	
1/2STONE	250 lb	8170 lb	8180 lb	
TYPE1	529.0 lb	1587.0 lb	1600.0 lb	
FLYASH	176.0 lb	2128.0 lb	2120.0 lb	
WATER	37.8 gl	61.2 gl	62.3 gl	
AIR	22.30 oz	66.90 oz	68.00 oz	
HRWR	28.20 oz	84.60 oz	84.00 oz	

Actual Load 10830 lb

Num Batches: 1

Slump: 4.00 in #

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

6

DRIVER	TRUCK NO.	TIME OUT
THAND	246	1026
ARRIVE JOB	DEPART JOB	TIME IN

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
197	1		ORDER #: 7002 TICKET #: 7073491	NET 30		10/24/17	10:04

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
VINELAND NJ 08362

SHIP TO:
WEST COAT RD, 3RD GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
3.00 0.00		CY	900FLEX	900 FLEX		3.00		
3.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:58	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED _____ GALS _____ APPROVED BY _____

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X _____

RECEIVED

CUSTOMER COPY

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 7 day **Section:** 10/24/2017 Placement **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** LI **Date:** 10/31/2017

Sample No.	Date of Pour	Date Tested	Age	Sta.	Fre Fre (ksi)	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
1	10/24/2017	10/31/2017	7		6,199	6.05	6.00	6.00	6.00	6.00	6.00	18	8,353	692
2	10/24/2017	10/31/2017	7		5,942	6.00	6.05	6.10	6.00	6.00	6.00	18	8,451	693
3	10/24/2017	10/31/2017	7		6,255	6.00	6.05	6.10	6.05	6.10	6.05	18	9,264	751
4	10/24/2017	10/31/2017	7		6,252	6.05	6.05	6.00	6.10	6.05	6.10	18	8,893	723
5	10/24/2017	10/31/2017	7		6,028	6.00	6.05	6.10	6.00	5.95	6.00	18	8,288	681
6	10/24/2017	10/31/2017	7		5,371	6.10	6.05	6.05	5.95	5.95	6.00	18	7,182	589

Measurement to nearest 0.05 inch or 1 mm

Created 12/15/2011

Flexural Strength of Concrete Beam (Third-Point Loading)

C78

ASTM

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 10-24-17 Placement **Section:** 28 Days **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** Li **Date:** 11/22/2017

Sample No.	Date of Pour	Date Tested	Age	Sta.	Fre Fre (ksi)	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
1A	10/24/2017	11/21/2017	28		6,693	6.05	6.10	6.10	6.00	6.00	6.05	18	11,551	934
1B	10/24/2017	11/21/2017	28		6,711	6.00	6.05	6.00	6.05	6.00	6.05	18	10,850	894
1C	10/24/2017	11/21/2017	28		6,666	6.05	6.05	6.00	6.05	6.00	6.05	18	10,423	854
Average					6,690									894
2A	10/24/2017	11/21/2017	28		6,227	6.00	6.05	6.05	6.00	5.95	6.00	18	9,603	794
2B	10/24/2017	11/21/2017	28		6,513	6.00	6.05	6.05	6.00	6.00	6.05	18	9,238	759
2C	10/24/2017	11/21/2017	28		6,202	6.10	6.05	6.05	6.00	5.95	5.95	18	9,921	813
Average					6,314									789
3A	10/24/2017	11/21/2017	28		6,467	6.05	6.00	6.00	6.00	6.00	6.10	18	10,796	890
3B	10/24/2017	11/21/2017	28		6,401	6.05	6.05	6.00	5.90	5.90	5.95	18	11,688	977
3C	10/24/2017	11/21/2017	28		6,465	6.00	6.00	6.00	5.95	5.95	5.95	18	10,914	917
Average					6,444									928
4A	10/24/2017	11/21/2017	28		6,455	6.05	6.05	6.00	6.00	5.95	6.00	18	9,462	782
4B	10/24/2017	11/21/2017	28		6,316	6.00	6.05	6.05	5.95	6.00	6.00	18	9,536	788
4C	10/24/2017	11/21/2017	28		6,312	6.05	6.05	6.05	6.05	6.00	6.05	18	10,367	845
Average					6,361									805
5A	10/24/2017	11/21/2017	28		6,334	6.05	6.05	6.05	6.05	6.00	6.05	18	9,595	782
5B	10/24/2017	11/21/2017	28		6,067	6.10	6.05	6.00	6.00	6.05	6.05	18	9,647	786
5C	10/24/2017	11/21/2017	28		6,303	6.05	6.05	6.00	6.00	6.05	6.05	18	9,702	795
Average					6,235									788
6A	10/24/2017	11/21/2017	28		5,872	6.05	6.00	6.00	5.90	5.90	6.00	18	8,776	735
6B	10/24/2017	11/21/2017	28		6,272	6.05	6.05	6.05	6.00	5.95	5.95	18	9,458	780
6C	10/24/2017	11/21/2017	28		5,681	6.10	6.10	6.05	6.00	5.95	6.00	18	7,567	615
Average					5,942									710

Measurement to nearest 0.05 inch or 1 mm

Created 12/15/2011

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 Final 10/24/17 **Section:** 28 Day **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** LI **Date:** 11/22/2017

Sample No.	Date Poured	Date Tested	Age	Fre-Fre	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1A	10/24/2017	11/21/2017	28	6,405	29.00	6.05	12.05	151530	28.75	5,270	2
1B	10/24/2017	11/21/2017	28	6,484	29.08	6.00	12.05	153390	28.27	5,430	2
1C	10/24/2017	11/21/2017	28	6,603	29.26	6.01	12.15	165110	28.37	5,820	2
Average										5,507	
2A	10/24/2017	11/21/2017	28	6,044	28.58	6.01	12.14	135450	28.37	4,770	3
2B	10/24/2017	11/21/2017	28	6,236	28.68	6.03	11.98	142830	28.56	5,000	3
2C	10/24/2017	11/21/2017	28	6,114	28.68	6.00	12.11	130730	28.27	4,620	3
Average										4,797	
3A	10/24/2017	11/21/2017	28	6,267	29.06	6.02	12.07	146600	28.46	5,150	3
3B	10/24/2017	11/21/2017	28	6,181	28.84	6.01	12.04	139340	28.37	4,910	3
3C	10/24/2017	11/21/2017	28	6,385	29.10	6.03	12.06	148390	28.56	5,200	3
Average										5,087	
4A	10/24/2017	11/21/2017	28	6,566	29.22	6.04	12.22	144790	28.65	5,050	3
4B	10/24/2017	11/21/2017	28	6,523	29.18	6.00	12.08	150610	28.27	5,330	3
4C	10/24/2017	11/21/2017	28	6,361	29.14	6.01	12.09	140340	28.37	4,950	3
Average										5,110	
5A	10/24/2017	11/21/2017	28	6,175	29.14	6.02	12.03	138790	28.46	4,880	3
5B	10/24/2017	11/21/2017	28	6,228	29.1	6	12.07	136960	28.27	4,840	3
5C	10/24/2017	11/21/2017	28	6,173	29.11	6	12.05	133340	28.27	4,720	2
Average										4,813	
6A	10/24/2017	11/21/2017	28	5,551	28.38	6.01	12.09	111000	28.37	3,910	3
6B	10/24/2017	11/21/2017	28	5,647	28.58	6.01	12.12	109340	28.37	3,850	3
6C	10/24/2017	11/21/2017	28	5,642	28.44	6.02	12.12	111180	28.46	3,910	2
Average										3,890	

Capping Standard Used: ASTM C1231 ASTM C617 **Three Cap Checks :** **Last ASTM C90 Sulfur Test:**

Number of times unbonded cap used prior to testing:

PENN JERSEY BUILDING MATERIALS INC.

READY MIX CONCRETE
PROCESSED SAND & GRAVEL
BLOCK - MASONRY - BUILDING PRODUCTS

Contractor : United Concrete
Project : FAA
Location : Pomona, NJ
Use : Test Strip

Mix ID number :	900FLEX	**Design Date :**	10/12/2016
Compressive Strength :	900Flex	**Concrete Source :**	Pleasantville, NJ
Aggregate size :	#8 & #57 Blend	**Unit Weight :**	138.1
Air content :	6.0% (+/- 1.5%)	**Slump Range**	3" - 6"
Water / Cement ratio :	0.45		

Constituents :

Total Cementitious :	705				
Percentage Pozzolan Replacement :	25%				
		ASTM	**Quantity**	**Density**	**Velum**
Cement :	Lafarge Type I	*C-150*	529	3.150	2.69
Pozzolan :	STI ProAsh Type F	*C-618*	176	2.140	1.32
Fine Aggregate :	Tuckahoe Sand & Gravel Inc.	*C-33*	910	2.630	5.52
Course Aggregate :	Berks Products #57	*C-33*	1550	2.67	9.30
Course Aggregate :	Berks Products #8	*C-33*	250	2.67	1.50
Water :	Potable		315	1.000	5.05
Air :			6%		1.62
Total :			3730		27

Admixtur es :

		ASTM	**floz-cwt**	**floz/yd**	
High range water reducer:	BASF MasterGlenium 7500	*C-494*	4	28 .2	
Accelerator {Non-Chloride) :	BASF MasterSet AC 534	*C-494*	12 - 32		requested by contractor
Retarder :	BASF MasterSet R 100	*C-494*	1- 3		requested by contractor
Air-Entrainment :	BASF MasterAir AE 90	*C-260*	1.5	10.6	* or as required

Submitted By :
James Laus

rhe {o//owmg admixtures contorm1nq ro rhe project spec1J1cat1ons mav be added at the conrroctor's requesc
dm1xture dosage ratesore sub1ecr to change due ro weather and 1obs1te candit1ons as permmed bv AC/ 211.l on oropornoning
Penn-Jersey Hwlding Matenals will deliver the concrere 1n accordance co ASTM C-94
This m,x des1qn nos been des1aned ,n accordance with AC/ 318 and 301

MAILING ADDRESS
P.O. Box 991
Pleasantville NJ 08232

MAIN OFFICE
2819 Fire Road
EHT, NJ 08234
Telephone (609) 645-8135

PLANT LOCATION
2817 Fire Road
Egg Harbor Township NJ 08234
Telephone (609) 641-6994

LAFARGE CEMENT

NSF Certified to NSF/ANSI 61

Cement Mill Test Report

Month of Issue: August 2017

Plant:	**Whitehall, PA**
Product:	**Portland Cement Type I**
Silo:	**B-2**
Manufactured:	**July 2017**

ASTM C-150 and AASHTO M-85 Standard Requirements

CHEMICAL ANALYSIS

Item	Spec limit	Test Result
Rapid Method, X-Ray *(C 114)*		
SiO2 (%)	---	19.0
Al2O3 (%)		5.7
Fe2O3 (%)	6.0 max	2.7
CaO (%)	---	61.0
MgO (%)	6.0 max	2.6
SO3 (%)	3.0 max *	4.1
Loss on ignition (%)	3.5 max	2.6
Insoluble residue (%)	1.5 max	0.49
CO2 (%)	---	1.4
Limestone (%)	5.0 max	3.7
CaCO3 in Limestone (%)	70 min	85
Adjusted Potential Phase Composition *(C 150)*		
C3S (%)	---	48
C2S (%)	---	17
C3A (%)	---	11
C4AF (%)	---	8
C3S+4.75*C3A (%)	---	100
ASTM C 150-11 and AASHTO M 85-09 Optional Chemical Requirements:		
NaEq (%)	---	1.02

PHYSICAL ANALYSIS

Item	Spec limit	Test Result	
Air content of mortar (%) *(C 185)*	12 max	8	
Blaine Fineness (m2/kg) *(C 204)*	260 min	377	
-325 (%) *(C 430)*	---	97.1	
Autoclave expansion (%) *(C 151)*	0.80 max	0.03	
Compressive strength (MPa, [PSI]) *(C 109)*			
1 day	---	18.1	2625
3 days	12.0 [1740] min	27.3	3959
7 days	19.0 [2760] min	32.4	4698
28 days (Reflects previous month's data)	---	38.1	5525
Time of setting (minutes)			
Vicat Initial *(C 191)*	45 - 375	110	
Mortar Bar Expansion (%) *(C 1038)***	0.02 max	0.006	

* May exceed 3.0% SO3 maximum based on our C1038 results of <0.02% expansion at 14 days. Data available upon request.

** Current Production run not available - most recent provided

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of applicable PADOT, NYSDOT and NJDOT Specifications for Type I;
ASTM C-150 & AASHTO M-85 STANDARD SPECIFICATIONS FOR TYPE I CEMENT.

Certified By:

James Hess

James Hess - Quality Coordinator

8/2/2017

US East BU - Whitehall Plant
5160 Main St., Whitehall, PA 18052
Phone: (610) 261-3447

LAFARGE NORTH AMERICA

Certification: NSF 61

NSF Certified to NSF/ANSI 61

NewCem Mill Test Report

Month of Issue - July 2017

Plant - Sparrows Point

Manufactured - June 2017

Chemical

		Specification
Sulfide Sulfur (S), %:	0.6	**2.5 max.**
Sulfate Ion (as SO_3), %:	0.0	**4.0 max.**
Alumina (asAl2O3), %:	11.6	**n/a**

Reference Cement

*Equivalent Alkalies, %:	0.6	**0.6-0.9**
*Blaine; cm^2/g	3,900	**n/a**
Compressive Strength, psi:		
7 Day	4,580	**n/a**
28 Day	5,970	**5000 min.**

* Predetermined value

**(28d reflects previous month's data)

Physical

		Specification
Slag Activity Index, %:		
7 Day	100	**n/a**
28 Day**	122	**115**
Compressive Strength, psi:		
7 Day	4,540	**n/a**
28 Day**	7,280	**n/a**
Fineness:		
Blaine; cm^2/g	6,640	**n/a**
45 Micron:		
% retained	1	**20 max.**
Other:		
Air Content, %:	6	**12 max.**

This ground granulated blast furnace slag complies with the current specification of the chemical and physical requirements of ASTM C-989, AASHTO M-302; Grade 120. NewCem is guaranteed to meet all applicable MDOT, FDOT, GADOT, PennDOT, SCDOT, NJDOT, NY DOT and VADH specifications.

US East Region
Sparrows Point Plant
2001 Wharf Road
Baltimore, MD 21219
Telephone: (610) 261-3453

Brian Borowski
Quality Manager, US MPC

7/19/2017
Date

TUCKAHOE SAND AND GRAVEL

MAILING ADDRESS:
P.O. BOX 991
PLEASANTVILLE, NJ 08232

PLANT ADDRESS:
100 SHARP ROAD
TUCKAHOE, NJ 08250

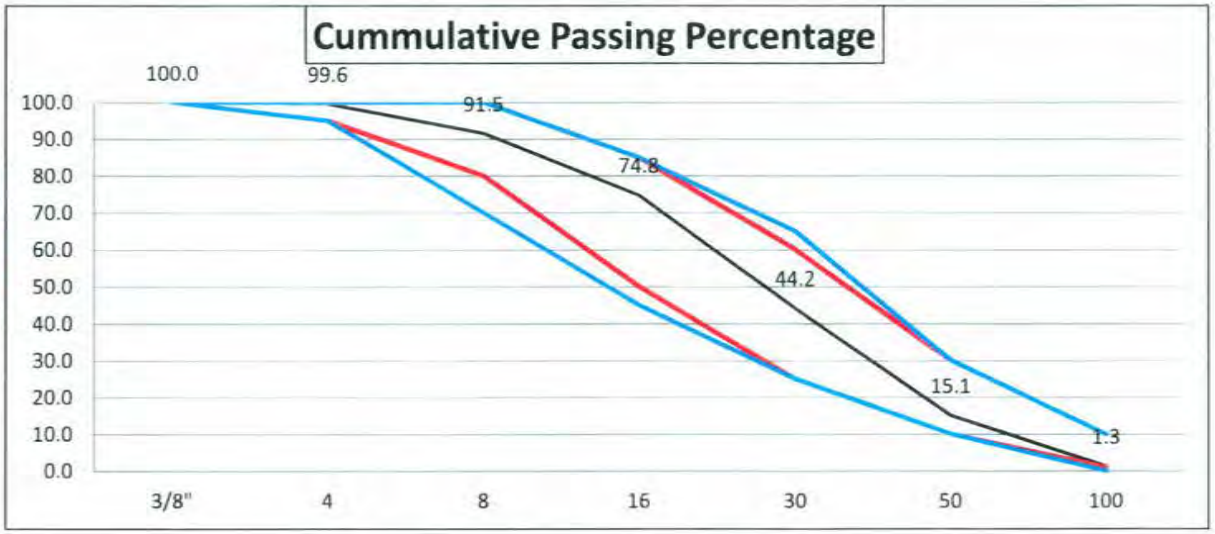
Location: PLANT 2 - Crossroads Stockpile **Type:** CONCRETE SAND

Date: 8/15/2017

Customer: QC
Operator: G. O'Donnell
Description:

Sieve No.	Mesh Size (mm)	Sieve Name	Cumulative Retained		Incremental Retained (%)	ASTM C-33				Cumulative Passing	
						PENNDOT Type A		NJDOT			
			Weight (g)	%		Min	Max	Min	Max	Weight (g)	%
						% Passing		% Passing			
1	9.5	3/8"	0.0	0.0	0.0	100	100	100	100	576.5	100.0
2	4.75	4	2.3	0.4	0.0	95	100	95	100	574.2	99.6
3	2.36	8	48.8	8.5	8.1	70	100	80	100	527.7	91.5
4	1.18	16	145.2	25.2	16.7	45	85	50	85	431.3	74.8
5	0.60	30	321.6	55.8	30.6	25	65	25	60	254.9	44.2
6	0.30	50	489.2	84.9	29.1	10	30	10	30	87.3	15.1
7	0.15	100	568.9	98.7	13.8	0	10	1	10	7.6	1.3
8	silt & clay	*Pan	576.5	0.0	1.3	-	-	-	-	0.0	0.0

FM#	2.73



Specifications (Min/Max)	
NJDOT	
PENNDOT	
Product Gradation	

Find us on: facebook

TuckahoeSand-Gravel.com

INDIVIDUAL AGGREGATE GRADING

Project :	QC - Quality Control	Source :	Berks #57 Crushed Stone
Client :	Quality Control	Total wt:	22.70

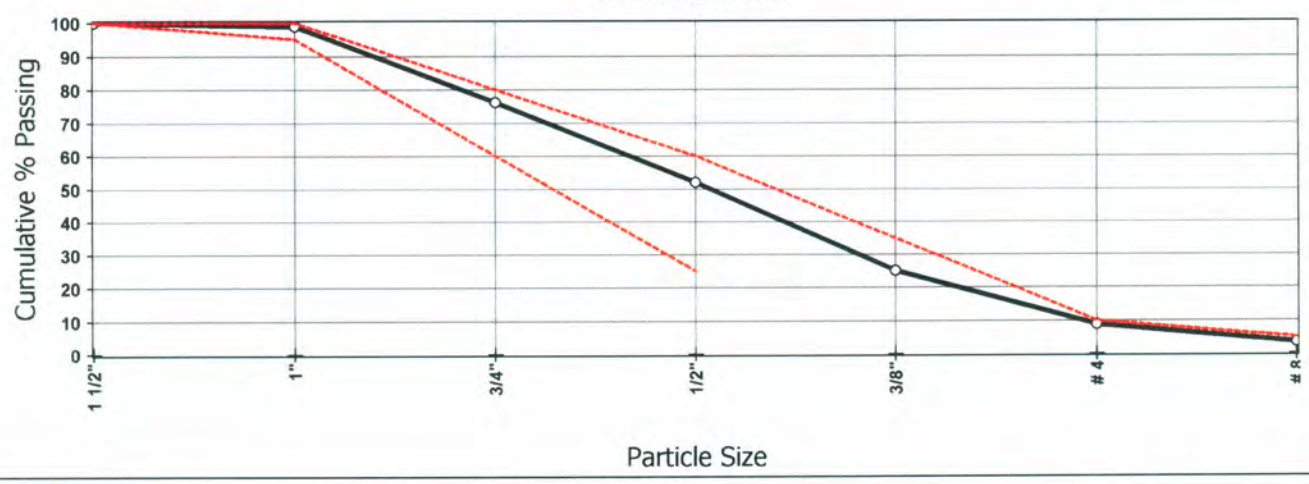
Sample Data

Sample ID :	1a	Aggregate Spec :	ASTM C-33 #57 Stone
Date sampled :	07/12/2017	Aggregate Name :	Berks #57

Grading

Sieve	Ind. Wt. Retained	Cum. Wt. Retained	Ind. % Retained	Cum. % Retained	Cum. % Passing	Cum. % passing Min. Spec.	Cum. % passing Max. Spec.
1 1/2"					100.0	100.0	100.0
1"	0.2	0.2	1	1	99	95	100
3/4"	5.2	5.4	22.9	23.8	76.2		
1/2"	5.5	10.9	24.2	48.0	52.0	25.0	60.0
3/8"	6.1	17.0	26.9	74.9	25.1		
# 4	3.7	20.7	16.3	91.2	8.8		10.0
# 8	1.2	21.9	5.3	96.5	3.5		5.0
PAN	0.6	22.5	3	99			
Total :	22.500		99				

GRADING CHART



Remarks

CLASS TYPE AGGREGATE: 4S	APPARENT SPECIFIC GRAVITY: 2.781	UNCOMPACTED VOIDS: 49
ABSORPTION %: .4%	UNIT WEIGHT: 88	ALKALI-SILICA REACTION: .13
BULK SPECIFIC GRAVITY: 2.751	DRY RODDED UNIT WEIGHT: 98	CLAY LUMPS & FRIABLES %: 0
SSD SPECIFIC GRAVITY: 2.761	LA ABRASSION: 19	ORGANIC IMPURITIES: CLEAR

Reported by : James Laus Date : 08/14/2017 Verified by : _____

INDIVIDUAL AGGREGATE GRADING

Project :	QC - Quality Control	Source :	Berks #8 Crushed Stone
Client :	Quality Control	Total wt:	24.40

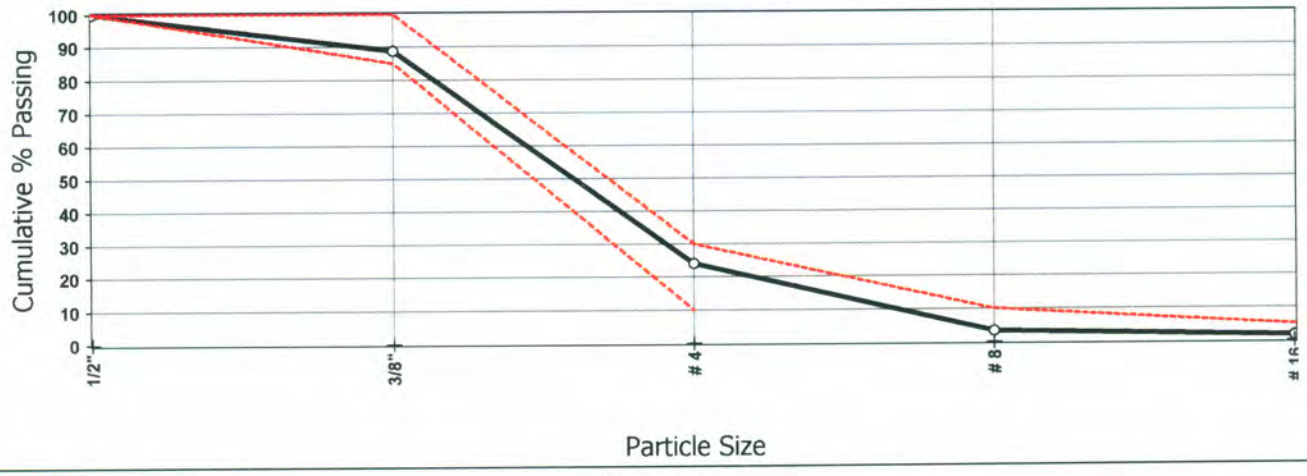
Sample Data

Sample ID :	1A	Aggregate Spec :	#8 Berks Products ASTM-C33
Date sampled :	08/04/2017	Aggregate Name :	Berks #8

Grading

Sieve	Ind. Wt. Retained	Cum. Wt. Retained	Ind. % Retained	Cum. % Retained	Cum. % Passing	Cum. % passing Min. Spec.	Cum. % passing Max. Spec.
1/2"					100.0	100.0	100.0
3/8"	2.7	2.7	11.1	11.1	88.9	85.0	100.0
# 4	15.8	18.5	64.8	75.8	24.2	10.0	30.0
# 8	5.1	23.6	20.9	96.7	3.3		10.0
# 16	0.4	24.0	1.6	98.4	1.6		5.0
PAN	0.3	24.3	1.2	99.6			
Total :	24.300		99				

GRADING CHART



Remarks

CLASS TYPE AGGREGATE: 4S	APPARENT SPECIFIC GRAVITY: 2.781	UNCOMPACTED VOIDS: 49
ABSORPTION %: .4%	UNIT WEIGHT: 88	ALKALI-SILICA REACTION: .13
BULK SPECIFIC GRAVITY: 2.751	DRY RODDED UNIT WEIGHT: 98	CLAY LUMPS & FRIABLES %: 0%
SSD SPECIFIC GRAVITY: 2.761	LA ABRASSION: 19	ORGANIC IMPURITIES: CLEAR

Reported by : James Laus Date : 08/03/2017 Verified by : _____

BASF
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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete
4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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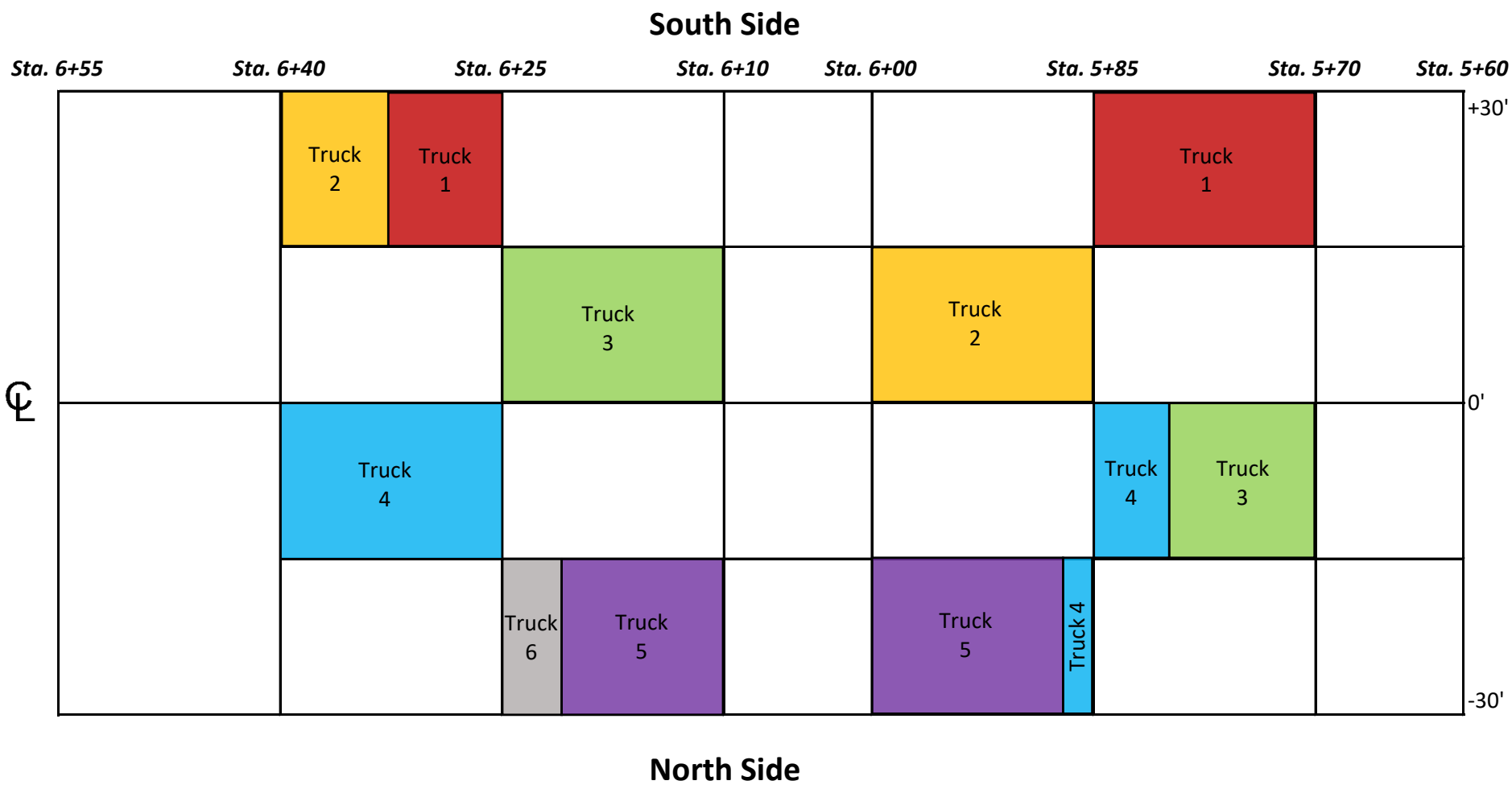
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

P-501 Concrete Placement

Date: 10/24/2017



P-501 (900 PSI Flex) Concrete Placement Report and Testing Data

National Airport Pavement Testing Facility

Placement Date = 10/30/2017

Placement Location = Sta. 5+70 to 6+40, See Attached Placement Map for Locations

7 Day Testing Completed on 11/6/2017

28 Day Testing Completed on 11/27/2017

Weather Information	Temp	Dewpoint	Humidity	Wind	Visibility	Conditions
7:54 AM	46.9 F	44.1 F	90%	15.0 mph W	10.0 miles	Light Rain
2:54 PM	57.0 F	35.1 F	44%	18.4 mph W	10.0 miles	Partly Cloudy

Date	Load #	Truck #	Time Batched	Time Arrived	Testing Responsibility	H_2O Added (Gallons)	1st Round of Testing		2nd Round of Testing		3rd Round of Testing		Unit Weight (lbs./ft^3)	Temp (Degrees F)	# of Revs	Beam Strength (PSI Flex)				Cylinder Strength (PSI)			Notes
							Slump (Inches)	Air (%)	Slump (Inches)	Air (%)	Slump (Inches)	Air (%)				7 Day	28 Day	28 Day	28 Day	28 Day	28 Day	28 Day	
10/30/2017	1	244	7:33 AM	7:55 AM	QC (Craig)	5	5.25	6.7	N/T	N/T	N/T	N/T	143.7	67	128	677	717	779	953	5,230	5,280	4,890	103 revs at Arrival
					QA (CSRA)		4.50	6.3	N/T	N/T	N/T	N/T	145.0	67			Average =		816	Average =		5,133	
10/30/2017	2	240	7:58 AM	8:25 AM	QC (Craig)	0	5.25	4.8	N/T	N/T	N/T	N/T	145.4	70	68	819	1,003	974	958	6,000	6,210	6,350	
					QA (CSRA)		Concrete Not QA Tested										Average =		978	Average =		6,187	
10/30/2017	3	253	8:21 AM	8:42 AM	QC (Craig)	3	3.50	5.2	N/T	N/T	N/T	N/T	145.6	70	125	684	905	929	997	5,750	5,460	5,610	100 revs at Arrival
					QA (CSRA)		3.50	5.0	N/T	N/T	N/T	N/T	146.6	70			Average =		944	Average =		5,607	
10/30/2017	4	246	8:38 AM	8:58 AM	QC (Craig)	5	5.50	5.7	N/T	N/T	N/T	N/T	144.2	67	202	744	921	975	917	5,600	5,890	5,940	57 revs at Arrival
					QA (CSRA)		Concrete Not QA Tested										Average =		938	Average =		5,810	
10/30/2017	5	256	8:59 AM	9:22 AM	QC (Craig)	3	5.25	7.9	4.00	6.3	N/T	N/T	144.0	66	200	789	904	761	882	5,440	5,380	5,180	86 revs at Arrival
					QA (CSRA)		4.50	7.8	4.25	5.7	N/T	N/T	146.2	66			Average =		849	Average =		5,333	
10/30/2017	6	229	9:12 AM	9:35 AM	QC (Craig)	15	5.25	8.7	3.50	7.5	N/T	N/T	142.6	69	185	721	763	839	841	5,290	5,150	5,330	135 revs Arrival, Air High so Truck Sat as
					QA (CSRA)		Concrete Not QA Tested										Average =		814	Average =		5,257	Truck #5 Unloaded, in Conveyor 10:33 AM
10/30/2017	7	236	11:08 AM	11:25 AM	QC (Craig)	0	2.75	3.2	N/T	N/T	N/T	N/T	149.0	68	88	809	926	955	970	5,780	5,940	5,270	Concrete placed before testing with No truck
					QA (CSRA)		2.50	2.7	N/T	N/T	N/T	N/T	149.9	67			Average =		950	Average =		5,663	runoff, Truck 6 empty @ 10:55 AM

900 PSI Flex - Concrete Mix Design

Penn Jersey Concrete - Egg Harbor Twp, NJ

Berks #8 Stone	250	lbs.
Berks #57 Stone	1,550	lbs.
Tuckahoe Sand	910	lbs.
Water	315	lbs.
Type I Portland Cement	529	lbs.
Flyash Type F (25%)	176	lbs.
Air %	6.0	
W/C Ratio	0.45	

Batch Ticket Information

Load #	YD^3 Batch	#57 Stone	#8 Stone	Sand	Water	Cement	Fly Ash	Air Admix[1]	HRWR Admix[2]
1	11.0	16,980	2,720	10,200	263.0	5,810	1,920	252.0	304.0
2	11.0	17,040	2,720	10,280	264.2	5,810	1,970	242.0	308.0
3	11.0	17,020	2,740	10,220	264.2	5,730	1,960	247.0	308.0
4	10.0	15,440	2,480	9,260	240.3	5,250	1,790	222.0	280.0
5	10.0	15,460	2,460	9,300	240.3	5,280	1,790	222.0	284.0
6	10.0	15,460	2,460	9,260	239.7	5,380	1,770	223.0	280.0
7	2.0	3,080	480	1,820	34.8	1,080	350	43.0	56.0

Prepared by: Chris Tomlinson

Checked by: Joe Gawrysiak

[1] Air Admixture = Master Builders - MasterAir AE90

[2] HRWR Admixture = Master Builders - MasterGlenium 7500

Appendix: A - Craig QC Test Report B - CSRA QA Field Notes C - Batch Tickets D - NAPTF Lab Testing Information E - Mix Design F - Admixture Information G - Truck Placement Location Map

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220-5

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: I. Craig, Joe Landy, Rob Barrett, Brian Hirsh, Jonathan Peacock

DATE INSPECTED: 10/24/17 REPORT NO.: CP-12

PROJECT PLANS BY: N/A DATED: N/A REVISION NO.: N/A

APPROVAL DATE: N/A

CONCRETE PLACEMENT REPORT

(compressive strength)

LOCATION: North 550 to 655

Craig Testing Laboratories, Inc. inspector arrived at site as requested by client and inspected concrete placement at the above location per the project plans and documents.

Slump (ASTM C143): * Approved Slump Range: 3" - 6"

Air Content (ASTM C231): * Approved Air % Range: 4.0% to 8%

Temperature (ASTM C1064): * Todays Yardage: 58

Concrete Supplier: Penn Jersey Approved Mix ID: 900Flex

Consolidation Method: ☑ Internal ☐ External ☐ Both ☐ None ☐ Other _____ Ambient Temperature (F): 54°F

Strength of Concrete Placed (PSI): 900Flex No. of Samples (ASTM C31): *

Specimen Type: Beams & Cylinder

Required Strength of Concrete (PSI): 900Flex On Site Curing Facilities Available ☑ Yes ☐ No
(ACI 301 - 1.6.3.2.d)

☐ Not Ready for inspection; Cancelled On-Site **Hours on Site:** 7:00 to 12:00
☐ Work Above is in Progress and Requires Further Inspection
☑ Field Work is in Substantial Compliance with the following approved documents:
☑ Mix Designs ☐ Drawings ☐ Specifications
☐ Compressive strength samples have met the required strength
☐ ***Inspection done without approved documentation available***
☐ ***Work Deviates from Approved Plans and/or Documents, See NCR No.*** _____

Remarks: All test results recorded were provided to Albert @ United.
* See attached table for results. ** 3 yard balance needed

Reported to: Project Distribution Reviewed By: Ian Craig

CRAIG
TESTING LABORATORIES, INC.
5439 Harding Highway • P.O. Box 427 • Mays Landing, NJ 08330-0427 • (609) 625-1700 • FAX (609) 625-1798

CLIENT: United Concrete, Inc. PROJECT NO.: 611220

PROJECT: FAA Test Paving Facility
Westcott Road, Pomona, New Jersey

INSPECTED BY: Bob Todd, Matt Martine, Joe Landy, Rob Barrett, John Peacock

DATE INSPECTED: 10/30/17 REPORT NO.:

CONCRETE PLACEMENT REPORT

(Testing Data)

Load / Truck No.	Arrival Time	Slump (in.)	Air (%)	Unit Wight (lbs/Cu.Ft.)	Temperature (°F)	No. of Beams Cast	No. of Cylinders Cast
240	7:58 AM	4.25	6.00	144.8	76.0	7	3
241	8:14 AM	4.00	6.60	144.5	77.0	7	3
246	8:29 AM	4.25	7.00	143.1	77.0	7	3
233	9:03 AM	3.75	5.90	146.7	76.0	7	3
229	9:23 AM	3.75	6.20	146.4	79.0	7	3
246**	10:33 AM	4.00	8.00	140.5	80.0	7	3

**3 yard balance

Remarks:

Reported to: Project Distribution Reviewed By: Ian Craig

REV 06/16

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	47°
Load #	1	Truck #	244
Dispatch Time	7:47	Arrival Time	7:55
Revs @ Arrival	103	Water @ Arrival	
Concrete Temp	67°	Can Weight	8.16

Initial Slump	5.25	Water Added	5 GAL	Revs	+25
Air %	7.0	Unit Weight	44.08		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes:

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	47°
Load #	1	Truck #	244
Dispatch Time	7:47	Arrival Time	7:55
Revs @ Arrival	103	Water @ Arrival	
Concrete Temp	67°	Can Weight	8.60

Initial Slump	4.5	Water Added	5 GAL	Revs	+25
Air %	6.6	Unit Weight	44.84		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes:

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	47°
Load #	2	Truck #	240
Dispatch Time	8:20	Arrival Time	8:25
Revs @ Arrival	68	Water @ Arrival	
Concrete Temp	70°	Can Weight	8.16

Initial Slump	5.25	Water Added	0 GAL	Revs	0
Air %	5.1	Unit Weight	144.50		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes:

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA

CC-08 Field Placement Notes for P-501

Date		Air Temp	
Load #		Truck #	
Dispatch Time		Arrival Time	
Revs @ Arrival		Water @ Arrival	
Concrete Temp		Can Weight	

Initial Slump		Water Added		Revs	
Air %		Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes:

Agg Correction: *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	47°
Load #	3	Truck #	253
Dispatch Time	8:30	Arrival Time	8:42
Revs @ Arrival	100	Water @ Arrival	
Concrete Temp	70°	Can Weight	8.16

Initial Slump	3.5	Water Added	3 GAL	Revs	+25
Air %	5.5	Unit Weight	144.56		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes:

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	47°
Load #	3	Truck #	253
Dispatch Time	8:30	Arrival Time	8:42
Revs @ Arrival	100	Water @ Arrival	
Concrete Temp	70°	Can Weight	8.60

Initial Slump	3.5	Water Added	3 GAL	Revs	+25
Air %	5.3	Unit Weight	145.24		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes:

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	47°
Load #	4	Truck #	2416
Dispatch Time	8:47	Arrival Time	8:58
Revs @ Arrival	57	Water @ Arrival	
Concrete Temp	67°	Can Weight	8.16

Initial Slump	5.5	Water Added	5 GAL	Revs	+25
Air %	6.0	Unit Weight	144.22		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes: 202 Revs into Conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA

CC-08 Field Placement Notes for P-501

Date		Air Temp	
Load #		Truck #	
Dispatch Time		Arrival Time	
Revs @ Arrival		Water @ Arrival	
Concrete Temp		Can Weight	

Initial Slump		Water Added		Revs	
Air %		Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes:

Agg Correction: *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	49°
Load #	5	Truck #	256
Dispatch Time	9:09	Arrival Time	9:22
Revs @ Arrival	86	Water @ Arrival	
Concrete Temp	1st 70° 2nd 66°	Can Weight	8.16

Initial Slump	5.25	Water Added	3 GAL	Revs	+25
Air %	8.2	Unit Weight	43.52		
2nd Slump	4.0	Water Added	0 GAL	Revs	0
Air %	6.6	Unit Weight	44.16		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes: 200 Revs into Conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	49°
Load #	5	Truck #	256
Dispatch Time	9:09	Arrival Time	9:22
Revs @ Arrival	86	Water @ Arrival	
Concrete Temp	1st 69° 2nd 66°	Can Weight	8.60

Initial Slump	4.5	Water Added	3 GAL	Revs	+25
Air %	8.1	Unit Weight	44.22		
2nd Slump	4.25	Water Added	0 GAL	Revs	0
Air %	6.0	Unit Weight	45.16		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes: 200 Revs into Conveyor

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC CRAIG
QA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	49°
Load #	6	Truck #	229
Dispatch Time	9:24	Arrival Time	9:35
Revs @ Arrival	135	Water @ Arrival	
Concrete Temp	1st 71° 2nd 69°	Can Weight	8.16

Initial Slump	5.25	Water Added	15 GAL	Revs	+50
Air %	9.0	Unit Weight	43.14		
2nd Slump	3.5	Water Added	0 GAL	Revs	0
Air %	7.8	Unit Weight	43.82		
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes: Truck was given time to rest between tests
Into Conveyor @ 10:33

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA

CC-08 Field Placement Notes for P-501

Date		Air Temp	
Load #		Truck #	
Dispatch Time		Arrival Time	
Revs @ Arrival		Water @ Arrival	
Concrete Temp		Can Weight	

Initial Slump		Water Added		Revs	
Air %		Unit Weight			
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location:

Notes:

Agg Correction: *(Air % Values above are uncorrected)*

CSRA

Testing
QC Craig
QA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	54°
Load #	7	Truck #	236
Dispatch Time	11:15	Arrival Time	11:25
Revs @ Arrival	88	Water @ Arrival	
Concrete Temp	68°	Can Weight	8.16

Initial Slump	2.75	Water Added	0 GAL	Revs	0
Air %	3.5	Unit Weight	45.42		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes: Truck 6 Emptied @ 10:55
Truck 7 Into Conveyor @ 11:34

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

CSRA

Testing
QC
QA CSRA

CC-08 Field Placement Notes for P-501

Date	10/30	Air Temp	54°
Load #	7	Truck #	236
Dispatch Time	11:15	Arrival Time	11:25
Revs @ Arrival	88	Water @ Arrival	
Concrete Temp	67°	Can Weight	8.60

Initial Slump	2.5	Water Added	0 GAL	Revs	0
Air %	3.0	Unit Weight	46.08		
2nd Slump		Water Added		Revs	
Air %		Unit Weight			
3rd Slump		Water Added		Revs	
Air %		Unit Weight			

Placement Location: See As-Built

Notes: Placed before testing was completed
to avoid cold joint
Tested without runoff

Agg Correction: 0.3 *(Air % Values above are uncorrected)*

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 1

DRIVER	TRUCK NO.	TIME OUT
MRIDD	244	747
ARRIVE JOB	DEPART JOB	TIME IN
755		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ODITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
IE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
L CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
197	1		ORDER #: 7002 TICKET #: 7073623	NET 30		10/30/17	07:26

NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO
EST COAT RD, 3 GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:11	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

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TRUCK 1

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
244		user	7073623	63947	7:33	10/30/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68652

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10260 lb	10200 lb	2.50% M
3/4STONE	1550 lb	27250 lb	27180 lb	
1/2STONE	250 lb	29930 lb	29900 lb	
TYPE1	529.0 lb	5819.0 lb	5810.0 lb	
FLYASH	176.0 lb	7746.0 lb	7730.0 lb	
WATER	37.8 gl	264.8 gl	263.0 gl	
AIR	22.30 oz	245.30 oz	252.00 oz	
HRWR	28.20 oz	310.20 oz	304.00 oz	

Actual Load 39860 lb

Num Batches: 1

Slump: 4.00 in #

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 2

DRIVER	TRUCK NO.	TIME OUT
RSEMP	240	820
ARRIVE JOB	DEPART JOB	TIME IN
830		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
2197	1		ORDER #: 7002 TICKET #: 7073624	NET 30		10/30/17	07:55

SOLD TO:
UNITED CONCRETE, INC.
P.O. BOX 831
MAYSLAND NJ 08362

SHIP TO:
WEST COAT RD, 3 GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
		Slump: 4.00						
		SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX				CUM.	TOTAL:22	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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TRUCK 2

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
240		user	7073624	63948	7:58	10/30/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68653

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10260 lb	10280 lb	2.50% M
3/4STONE	1550 lb	27330 lb	27320 lb	
1/2STONE	250 lb	30070 lb	30040 lb	
TYPE1	529.0 lb	5819.0 lb	5810.0 lb	
FLYASH	176.0 lb	7746.0 lb	7780.0 lb	
WATER	37.8 gl	264.8 gl	264.2 gl	
AIR	22.30 oz	245.30 oz	242.00 oz	
HRWR	28.20 oz	310.20 oz	308.00 oz	

Actual Load 40059 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 3

DRIVER	TRUCK NO.	TIME OUT
SVAND	253	830
ARRIVE JOB	DEPART JOB	TIME IN
842		

NOTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
THE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE AND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING MATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND ALL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES WHEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
7197	1		ORDER #: 7002 TICKET #: 7073625	NET 30		10/30/17	08:18

SOLD TO
UNITED CONCRETE, INC.
P.O. BOX 831
PINELAND NJ 08362

SHIP TO
WEST COAT RD, 3 GATE

NO EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT TO 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
11.00 0.00		cy	900FLEX	900 FLEX		11.00		
11.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:33	

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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TRUCK 3

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
253		user	7073625	63949	8:21	10/30/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
11.00 CYDS	900FLEX				W	68654

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	10260 lb	10220 lb	2.50% M
3/4STONE	1550 lb	27270 lb	27240 lb	
1/2STONE	250 lb	29990 lb	29980 lb	
TYPE1	529.0 lb	5819.0 lb	5730.0 lb	*
FLYASH	176.0 lb	7666.0 lb	7690.0 lb	*
WATER	37.8 gl	264.8 gl	264.2 gl	
AIR	22.30 oz	245.30 oz	247.00 oz	
HRWR	28.20 oz	310.20 oz	308.00 oz	

Actual Load 39910 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 4

DRIVER	TRUCK NO.	TIME OUT
THAND	246	847
ARRIVE JOB	DEPART JOB	TIME IN
858		

OTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
0197	1		ORDER #: 7002 TICKET #: 7073628	NET 30		10/30/17	08:37

S
OLD
TO
UNITED CONCRETE, INC.
P.O. BOX 831
INELAND NJ 08362

SHIP TO
WEST COAT RD, 3 GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	900FLEX	900 FLEX		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Slump: 4.00						
		SALESPERSON: JRICH				CUM.	TOTAL:43	
		TAX CODE: NEW JERSEY STATE SALES TAX						

CAUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

IX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND
MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND
MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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TRUCK 4

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
246		user	7073628	63950	8:38	10/30/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	900FLEX				W	68655

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	9328 lb	9260 lb	2.50% M
3/4STONE	1550 lb	24760 lb	24700 lb	
1/2STONE	250 lb	27200 lb	27180 lb	
TYPE1	529.0 lb	5290.0 lb	5250.0 lb	
FLYASH	176.0 lb	7010.0 lb	7040.0 lb	
WATER	37.8 gl	240.7 gl	240.3 gl	
AIR	22.30 oz	223.00 oz	222.00 oz	
HRWR	28.20 oz	282.00 oz	280.00 oz	

Actual Load 36256 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 5

DRIVER	TRUCK NO.	TIME OUT
JPARK	256	909
ARRIVE JOB	DEPART JOB	TIME IN
9:22		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
197	1		ORDER #: 7002 TICKET #: 7073629	NET 30		10/30/17	08:57

SOLD TO:
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO:
EST COAT RD, 3 GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00 0.00		cy	900FLEX	900 FLEX		10.00		
10.00 1.00			ENV F20 FSC	ENVIRONM FREIGHT FUELSC		1.00 1.00		
			Slump: 4.00					
			SALESPERSON: JRICH TAX CODE: NEW JERSEY STATE SALES TAX			CUM.	TOTAL:53	

AUTION: PREVENT BODY CONTACT WITH CONCRETE; AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

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TRUCK 5

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
256		user	7073629	63951	8:59	10/30/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	900FLEX				W	68656

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	9328 lb	9300 lb	2.50% M
3/4STONE	1550 lb	24800 lb	24760 lb	
1/2STONE	250 lb	27260 lb	27220 lb	
TYPE1	529.0 lb	5280.0 lb	5280.0 lb	
FLYASH	176.0 lb	7040.0 lb	7070.0 lb	
WATER	37.8 gl	240.7 gl	240.3 gl	
AIR	22.30 oz	223.00 oz	222.00 oz	
HRWR	28.20 oz	282.00 oz	284.00 oz	

Num Batches: 1

Actual
Load 36337 lb
Slump: 4.00 in #

DELIVERY TICKET

PENN JERSEY BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 6

DRIVER	TRUCK NO.	TIME OUT
FSTOW	229	9:24
ARRIVE JOB	DEPART JOB	TIME IN
9:35		

NOTE:
MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
ADDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
197	1		ORDER #: 7002 TICKET #: 7073630	NET 30		10/30/17	08:11

SOLD TO:
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO:
EST COAT RD, 3 GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
10.00		cy	900FLEX	900 FLEX		10.00		
0.00								
10.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Slump: 4.00						
		SALESPERSON: JRICH				CUM.	TOTAL:63	
		TAX CODE: NEW JERSEY STATE SALES TAX						

CAUTION: PREVENT BODY CONTACT WITH CONCRETE; MAY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

MIX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND MIX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.

WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

RECEIVED

CUSTOMER COPY

TRUCK 6

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
229		user	7073630	63952	9:12	10/30/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
10.00 CYDS	900FLEX				W	68657

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	9308 lb	9260 lb	2.50% M
3/4STONE	1550 lb	24760 lb	24720 lb	
1/2STONE	250 lb	27220 lb	27180 lb	
TYPE1	529.0 lb	5290.0 lb	5380.0 lb	
FLYASH	176.0 lb	7140.0 lb	7150.0 lb	
WATER	37.8 gl	240.7 gl	239.7 gl	
AIR	22.30 oz	223.00 oz	223.00 oz	
HRWR	28.20 oz	282.00 oz	280.00 oz	

Actual Load 36381 lb

Slump: 4.00 in #

Num Batches: 1

DELIVERY TICKET

PENN JERSEY
BUILDING MATERIALS CO., INC.

PENN JERSEY BLDG MTRLS - EHT
P.O. BOX 981
PLEASANTVILLE, NJ 08232
OFFICE 609-645-8135
PLANT 609-641-6994

TRUCK 7

DRIVER	TRUCK NO.	TIME OUT
PDALE	236	11:15
ARRIVE JOB	DEPART JOB	TIME IN
11:25		

OTE:
7 MINUTES PER CUBIC YARD UNLOADING TIME PERMITTED.
DDITIONAL TIME SUBJECT TO A CHARGE OF $75.00 PER HOUR.
HE SIGNED ASSUMES ALL RISK AND DOES HEREBY RELEASE
ND AGREE TO SAVE HARMLESS THE PENN JERSEY BUILDING
ATERIALS, INC., ITS EMPLOYEES AND AGENTS FROM ANY AND
LL CLAIMS WHICH MAY ARISE AS A RESULT OF DAMAGES
HEN ASKED TO DRIVE BEYOND CURB LINE.

CUSTOMER NO.	JOB NO.	PURCHASE ORDER NO.	REFERENCE	TERMS	CLERK	DATE	TIME
197	1		ORDER #: 7002 TICKET #: 7073633	NET 30		10/30/17	11:03

SOLD TO
NITED CONCRETE, INC.
.O. BOX 831
INELAND NJ 08362

SHIP TO
EST COAT RD, 3 GATE

O EXCHANGES OR REFUNDS WITHOUT THIS SLIP - RETURNS SUBJECT
O 15% HANDLING CHARGE WITHIN 30 DAYS

Project FAA TEST PAVEMENT

QUANTITY SHIPPED	QUANTITY ORDERED	UM	SKU	DESCRIPTION	SUGG	UNITS	PRICE/PER	EXTENSION
2.00		cy	900FLEX	900 FLEX		2.00		
0.00								
2.00			ENV	ENVIRONM		1.00		
1.00			F20	FREIGHT		1.00		
			FSC	FUELSC				
		Slump: 4.00						
		SALESPERSON: JRICH				CUM. TOTAL:65		
		TAX CODE: NEW JERSEY STATE SALES TAX						

AUTION: PREVENT BODY CONTACT WITH CONCRETE;
AY CAUSE IRRITATION. SELLER NOT HELD RESPONSIBLE.

IX DESIGNS BASED ON 4" SLUMP + ½" WATER ADDED BEYOND
IX DESIGN REQUIREMENTS WILL BE AT PURCHASERS RISK AND
MUST BE SIGNED FOR BY AN AUTHORIZED REPRESENTATIVE.
WATER ADDED GALS APPROVED BY

FOR TERMS AND CONDITIONS OF DELIVERY EQUIPMENT, SEE REVERSE SIDE.
I have read and understand the terms, conditions & charges and affirm that I am authorized to accept these terms for the purchaser.

X

RECEIVED
CUSTOMER COPY

TRUCK 7

Truck	Driver	User	Disp Ticket Num	Ticket ID	Time	Date
236		user	7073633	63954	11:08	10/30/17

Load Size	Mix Code	Returned	Qty	Mix Age	Seq	Load ID
2.00 CYDS	900FLEX				D	68659

Material	Design Qty	Required	Batched	% Moisture
CONC	910 lb	1888 lb	1820 lb	3.75% M
3/4STONE	1550 lb	4920 lb	4900 lb	
1/2STONE	250 lb	5400 lb	5380 lb	
TYPE1	529.0 lb	1048.0 lb	1080.0 lb	>
FLYASH	176.0 lb	1432.0 lb	1430.0 lb	
WATER	37.8 gl	33.4 gl	34.8 gl	
AIR	22.30 oz	44.60 oz	43.00 oz	
HRWR	28.20 oz	56.40 oz	56.00 oz	

Actual Load 7116 lb

Slump: 4.00 in #

Num Batches: 1

Flexural Strength of Concrete Beam (Third-Point Loading)
ASTM C78

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 **Section:** **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** LI **Date:** 11/9/2017

Sample No.	Date of Pour	Date Tested	Age	Sta.	Fre Fre (ksi)	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
1	10/30/2017	11/6/2017	7		5,912	6.00	5.95	6.00	6.05	6.05	6.05	18	8150	677
2	10/30/2017	11/6/2017	7		6,468	6.00	6.05	6.10	5.95	5.95	5.95	18	9911	819
3	10/30/2017	11/6/2017	7		6,120	6.00	5.95	6.00	5.95	6.00	6.00	18	8145	684
4	10/30/2017	11/6/2017	7		6,140	6.00	6.05	6.05	5.95	6.00	6.00	18	8998	744
5	10/30/2017	11/6/2017	7		5,944	6.05	6.05	6.00	6.00	6.10	5.95	18	9596	789
6	10/30/2017	11/6/2017	7		6,034	6.10	6.05	6.00	6.00	6.00	6.05	18	8824	721
7	10/30/2017	11/6/2017	7		6,087	6.00	6.05	6.10	6.10	6.10	6.05	18	10005	809

Measurement to nearest 0.05 inch or 1 mm

Created 12/15/2011

Flexural Strength of Concrete Beam (Third-Point Loading)

C78

ASTM

National Airport Pavement Test Facility William J. Hughes Technical Center Atlantic City International Airport NJ 08405

Project: CC8 10-30-17 28 day **Section:** Final Placement **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** LI **Date:** 11/28/2017

Sample No.	Date of Pour	Date Tested	Age	Sta.	Fre Fre (ksi)	Depth 1 (inches)	Depth 2 (Middle)	Depth 3 (inches)	Width 1 (inches)	Width 2 (Middle)	Width 3 (inches)	Span Length (inches)	Load (lbs)	Modulus of Rupture (psi)
1A	10/30/2017	11/27/2017	28		6,235	6.00	6.00	6.05	6.00	6.00	6.05	18	8,681	717
1B	10/30/2017	11/27/2017	28		6,161	6.00	6.00	6.05	6.00	5.95	5.95	18	9,352	779
1C	10/30/2017	11/27/2017	28		6,241	6.05	6.00	6.00	6.05	6.05	6.05	18	11,593	953
Average					6,212									817
2A	10/30/2017	11/27/2017			6,597	6.05	6.05	6.00	6.00	5.90	5.95	18	12,074	1003
2B	10/30/2017	11/27/2017	28		6,638	6.05	6.05	6.05	6.00	6.00	6.00	18	11,878	974
2C	10/30/2017	11/27/2017	28		6,640	6.00	6.00	6.05	6.00	6.05	6.00	18	11,592	958
Average					6,625									978
3A	10/30/2017	11/27/2017	28		6,427	6.05	6.05	6.00	6.00	6.00	6.00	18	10,983	905
3B	10/30/2017	11/27/2017	28		6,591	6.05	6.00	6.00	5.90	5.90	5.95	18	11,055	929
3C	10/30/2017	11/27/2017	28		6,457	6.00	6.00	6.05	5.90	5.95	6.00	18	11,929	997
Average					6,492									944
4A	10/30/2017	11/27/2017	28		6,563	6.00	6.05	6.05	5.95	5.90	5.90	18	11,016	921
4B	10/30/2017	11/27/2017	28		6,690	6.00	6.00	6.05	6.00	5.95	6.00	18	11,733	975
4C	10/30/2017	11/27/2017	28		6,281	6.00	6.00	6.10	6.00	6.00	6.00	18	11,127	917
Average					6,511									938
5A	10/30/2017	11/27/2017	28		6,611	6.05	6.00	6.00	6.00	6.00	6.00	18	10,913	904
5B	10/30/2017	11/27/2017	28		6,495	6.05	6.05	6.10	6.05	6.00	6.05	18	9,387	761
5C	10/30/2017	11/27/2017	28		6,419	6.00	6.05	6.00	6.05	6.05	6.05	18	10,727	882
Average					6,508									849
6A	10/30/2017	11/27/2017	28		6,258	6.05	6.05	6.05	6.05	6.05	6.05	18	9,391	763
6B	10/30/2017	11/27/2017	28		6,403	6.05	6.05	6.00	5.90	5.95	6.00	18	10,094	839
6C	10/30/2017	11/27/2017	28		6,485	6.05	6.05	6.00	6.05	6.00	6.00	18	10,231	841
Average					6,382									814
7A	10/30/2017	11/27/2017	28		6,970	5.95	6.00	6.00	6.20	6.20	6.20	18	11,421	926
7B	10/30/2017	11/27/2017	28		6,991	6.10	6.10	6.15	6.05	6.05	6.05	18	12,004	955
7C	10/30/2017	11/27/2017	28		6,894	6.00	6.00	6.00	6.20	6.15	6.10	18	11,936	970
Average					6,952									950

Measurement to nearest 0.05 inch or 1 mm

Created 12/15/2011

Compressive Strength of Concrete Cylinders
ASTM C39, C617

National Airport
Pavement Test Facility
William J. Hughes
Technical Center
Atlantic City International
Airport NJ 08405

Project: CC8 Final 10-30-17 **Section:** 28 day **Client** FAA-ATRD

Technician: MJW **Professional Engineer:** LI **Date:** 11/27/2017

Sample No.	Date Poured	Date Tested	Age	Fre-Fre	Weight (lbs)	Diameter	Length	Load (lbs)	Area (in^2)	Compressive Strength (psi)	Type of Break
1A	10/30/2017	11/27/2017	28	6140	28.64	6.00	12.09	147780	28.27	5230	3
1B	10/30/2017	11/27/2017	28	6037	28.78	6.00	12.11	149170	28.27	5280	3
1C	10/30/2017	11/27/2017	28	6100	28.50	5.99	12.03	137840	28.18	4890	3
Average				6092						5133	
2A	10/30/2017	11/27/2017	28	6619	29.22	6.00	12.07	169570	28.27	6000	3
2B	10/30/2017	11/27/2017	28	6533	29.02	5.99	12.04	174920	28.18	6210	3
2C	10/30/2017	11/27/2017	28	6491	29.06	6.00	12.07	179650	28.27	6350	3
Average				6548						6187	
3A	10/30/2017	11/27/2017	28	6372	28.74	5.98	12.07	161490	28.09	5750	3
3B	10/30/2017	11/27/2017	28	6148	28.84	6.00	12.11	154390	28.27	5460	3
3C	10/30/2017	11/27/2017	28	6251	28.60	6.01	12.02	159050	28.37	5610	3
Average				6257						5607	
4A	10/30/2017	11/27/2017	28	6185	28.50	6.01	12.02	158890	28.37	5600	3
4B	10/30/2017	11/27/2017	28	6357	28.82	6.00	12.09	166560	28.27	5890	3
4C	10/30/2017	11/27/2017	28	6270	28.72	6.00	12.05	167870	28.27	5940	3
Average				6271						5810	
5A	10/30/2017	11/27/2017	28	6256	28.78	5.99	12.19	153270	28.18	5440	3
5B	10/30/2017	11/27/2017	28	6222	28.72	6.00	12.13	152020	28.27	5380	3
5C	10/30/2017	11/27/2017	28	6194	28.78	6.00	12.05	146490	28.27	5180	3
Average				6224						5333	
6A	10/30/2017	11/27/2017	28	6224	28.90	6.01	12.10	150080	28.37	5290	3
6B	10/30/2017	11/27/2017	28	6322	28.86	5.99	12.08	144990	28.18	5150	3
6C	10/30/2017	11/27/2017	28	6241	28.8	6.01	12.06	151260	28.37	5330	3
Average				6262						5257	
7A	10/30/2017	11/27/2017	28	6713	29.38	5.99	12.05	162890	28.18	5780	3
7B	10/30/2017	11/27/2017	28	6751	29.38	6.00	12.07	167950	28.27	5940	3
7C	10/30/2017	11/27/2017	28	6651	29.52	5.99	12.05	148550	28.18	5270	3
Average				6705						5663	

Capping Standard Used: ASTM C1231 ASTM C617 **Three Cap Checks :** **Last ASTM C90 Sulfur Test:**

Number of times unbonded cap used prior to testing:

Revised 11/10/2016

PENN JERSEY BUILDING MATERIALS INC.

READY MIX CONCRETE
PROCESSED SAND & GRAVEL
BLOCK - MASONRY - BUILDING PRODUCTS

Contractor : United Concrete
Project : FAA
Location : Pomona, NJ
Use : Test Strip

Mix ID number :	900FLEX	**Design Date :**	10/12/2016
Compressive Strength :	900Flex	**Concrete Source :**	Pleasantville, NJ
Aggregate size :	#8 & #57 Blend	**Unit Weight :**	138.1
Air content :	6.0% (+/- 1.5%)	**Slump Range**	3" - 6"
Water / Cement ratio :	0.45		

Constituents :

Total Cementitious :	705				
Percentage Pozzolan Replacement :	25%				
		ASTM	**Quantity**	**Density**	**Velum**
Cement :	Lafarge Type I	*C-150*	529	3.150	2.69
Pozzolan :	STI ProAsh Type F	*C-618*	176	2.140	1.32
Fine Aggregate :	Tuckahoe Sand & Gravel Inc.	*C-33*	910	2.630	5.52
Course Aggregate :	Berks Products #57	*C-33*	1550	2.67	9.30
Course Aggregate :	Berks Products #8	*C-33*	250	2.67	1.50
Water :	Potable		315	1.000	5.05
Air :			6%		1.62
Total :			3730		27

Admixtur es :

		ASTM	**floz-cwt**	**floz/yd**	
High range water reducer:	BASF MasterGlenium 7500	*C-494*	4	28 .2	
Accelerator {Non-Chloride) :	BASF MasterSet AC 534	*C-494*	12 - 32		requested by contractor
Retarder :	BASF MasterSet R 100	*C-494*	1- 3		requested by contractor
Air-Entrainment :	BASF MasterAir AE 90	*C-260*	1.5	10.6	* or as required

Submitted By :
James Laus

rhe {o//owmg admixtures contorm1nq ro rhe project spec1J1cat1ons mav be added at the conrroctor's requesc
dm1xture dosage ratesore sub1ecr to change due ro weather and 1obs1te candit1ons as permmed bv AC/ 211.l on oropornoning
Penn-Jersey Hwlding Matenals will deliver the concrere 1n accordance co ASTM C-94
This m,x des1qn nos been des1aned ,n accordance with AC/ 318 and 301

MAILING ADDRESS
P.O. Box 991
Pleasantville NJ 08232

MAIN OFFICE
2819 Fire Road
EHT, NJ 08234
Telephone (609) 645-8135

PLANT LOCATION
2817 Fire Road
Egg Harbor Township NJ 08234
Telephone (609) 641-6994

LAFARGE CEMENT

NSF Certified to NSF/ANSI 61

Cement Mill Test Report

Month of Issue: August 2017

Plant:	**Whitehall, PA**
Product:	**Portland Cement Type I**
Silo:	**B-2**
Manufactured:	**July 2017**

ASTM C-150 and AASHTO M-85 Standard Requirements

CHEMICAL ANALYSIS

Item	Spec limit	Test Result
Rapid Method, X-Ray *(C 114)*		
SiO2 (%)	---	19.0
Al2O3 (%)		5.7
Fe2O3 (%)	6.0 max	2.7
CaO (%)	---	61.0
MgO (%)	6.0 max	2.6
SO3 (%)	3.0 max *	4.1
Loss on ignition (%)	3.5 max	2.6
Insoluble residue (%)	1.5 max	0.49
CO2 (%)	---	1.4
Limestone (%)	5.0 max	3.7
CaCO3 in Limestone (%)	70 min	85
Adjusted Potential Phase Composition *(C 150)*		
C3S (%)	---	48
C2S (%)	---	17
C3A (%)	---	11
C4AF (%)	---	8
C3S+4.75*C3A (%)	---	100
ASTM C 150-11 and AASHTO M 85-09 Optional Chemical Requirements:		
NaEq (%)	---	1.02

PHYSICAL ANALYSIS

Item	Spec limit	Test Result	
Air content of mortar (%) *(C 185)*	12 max	8	
Blaine Fineness (m2/kg) *(C 204)*	260 min	377	
-325 (%) *(C 430)*	---	97.1	
Autoclave expansion (%) *(C 151)*	0.80 max	0.03	
Compressive strength (MPa, [PSI]) *(C 109)*			
1 day	---	18.1	2625
3 days	12.0 [1740] min	27.3	3959
7 days	19.0 [2760] min	32.4	4698
28 days (Reflects previous month's data)	---	38.1	5525
Time of setting (minutes)			
Vicat Initial *(C 191)*	45 - 375	110	
Mortar Bar Expansion (%) *(C 1038)***	0.02 max	0.006	

* May exceed 3.0% SO3 maximum based on our C1038 results of <0.02% expansion at 14 days. Data available upon request.

** Current Production run not available - most recent provided

We certify that the above described cement, at the time of shipment, meets the chemical and physical requirements of applicable PADOT, NYSDOT and NJDOT Specifications for Type I;
ASTM C-150 & AASHTO M-85 STANDARD SPECIFICATIONS FOR TYPE I CEMENT.

Certified By:

James Hess

James Hess - Quality Coordinator

8/2/2017

US East BU - Whitehall Plant
5160 Main St., Whitehall, PA 18052
Phone: (610) 261-3447

LAFARGE NORTH AMERICA

Certification: NSF 61

NSF Certified to NSF/ANSI 61

NewCem Mill Test Report

Month of Issue - July 2017

Plant - Sparrows Point

Manufactured - June 2017

Chemical

		Specification
Sulfide Sulfur (S), %:	0.6	**2.5 max.**
Sulfate Ion (as SO_3), %:	0.0	**4.0 max.**
Alumina (asAl2O3), %:	11.6	**n/a**

Reference Cement

*Equivalent Alkalies, %:	0.6	**0.6-0.9**
*Blaine; cm^2/g	3,900	**n/a**
Compressive Strength, psi:		
7 Day	4,580	**n/a**
28 Day	5,970	**5000 min.**

* Predetermined value

**(28d reflects previous month's data)

Physical

		Specification
Slag Activity Index, %:		
7 Day	100	**n/a**
28 Day**	122	**115**
Compressive Strength, psi:		
7 Day	4,540	**n/a**
28 Day**	7,280	**n/a**
Fineness:		
Blaine; cm^2/g	6,640	**n/a**
45 Micron:		
% retained	1	**20 max.**
Other:		
Air Content, %:	6	**12 max.**

This ground granulated blast furnace slag complies with the current specification of the chemical and physical requirements of ASTM C-989, AASHTO M-302; Grade 120. NewCem is guaranteed to meet all applicable MDOT, FDOT, GADOT, PennDOT, SCDOT, NJDOT, NY DOT and VADH specifications.

US East Region
Sparrows Point Plant
2001 Wharf Road
Baltimore, MD 21219
Telephone: (610) 261-3453

Brian Borowski
Quality Manager, US MPC

7/19/2017
Date

TUCKAHOE SAND AND GRAVEL

MAILING ADDRESS:
P.O. BOX 991
PLEASANTVILLE, NJ 08232

PLANT ADDRESS:
100 SHARP ROAD
TUCKAHOE, NJ 08250

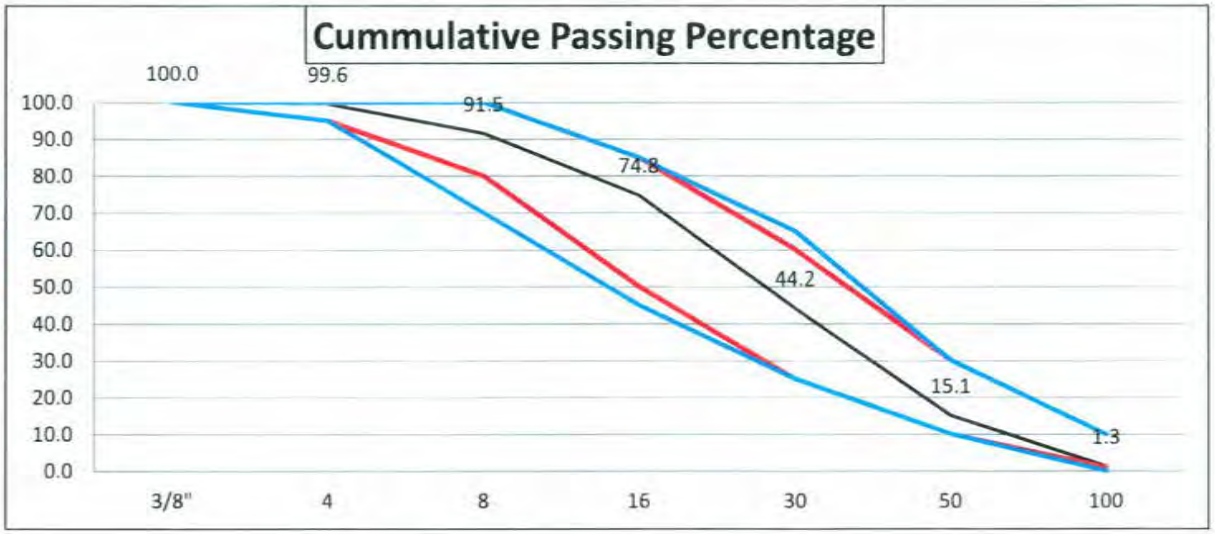
Location: PLANT 2 - Crossroads Stockpile **Type:** CONCRETE SAND

Date: 8/15/2017

Customer: QC
Operator: G. O'Donnell
Description:

Sieve No.	Mesh Size (mm)	Sieve Name	Cumulative Retained		Incremental Retained (%)	ASTM C-33				Cumulative Passing	
						PENNDOT Type A		NJDOT			
			Weight (g)	%		Min	Max	Min	Max	Weight (g)	%
						% Passing		% Passing			
1	9.5	3/8"	0.0	0.0	0.0	100	100	100	100	576.5	100.0
2	4.75	4	2.3	0.4	0.0	95	100	95	100	574.2	99.6
3	2.36	8	48.8	8.5	8.1	70	100	80	100	527.7	91.5
4	1.18	16	145.2	25.2	16.7	45	85	50	85	431.3	74.8
5	0.60	30	321.6	55.8	30.6	25	65	25	60	254.9	44.2
6	0.30	50	489.2	84.9	29.1	10	30	10	30	87.3	15.1
7	0.15	100	568.9	98.7	13.8	0	10	1	10	7.6	1.3
8	silt & clay	*Pan	576.5	0.0	1.3	-	-	-	-	0.0	0.0

FM#	2.73



Specifications (Min/Max)	
NJDOT	
PENNDOT	
Product Gradation	

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INDIVIDUAL AGGREGATE GRADING

Project :	QC - Quality Control	Source :	Berks #57 Crushed Stone
Client :	Quality Control	Total wt:	22.70

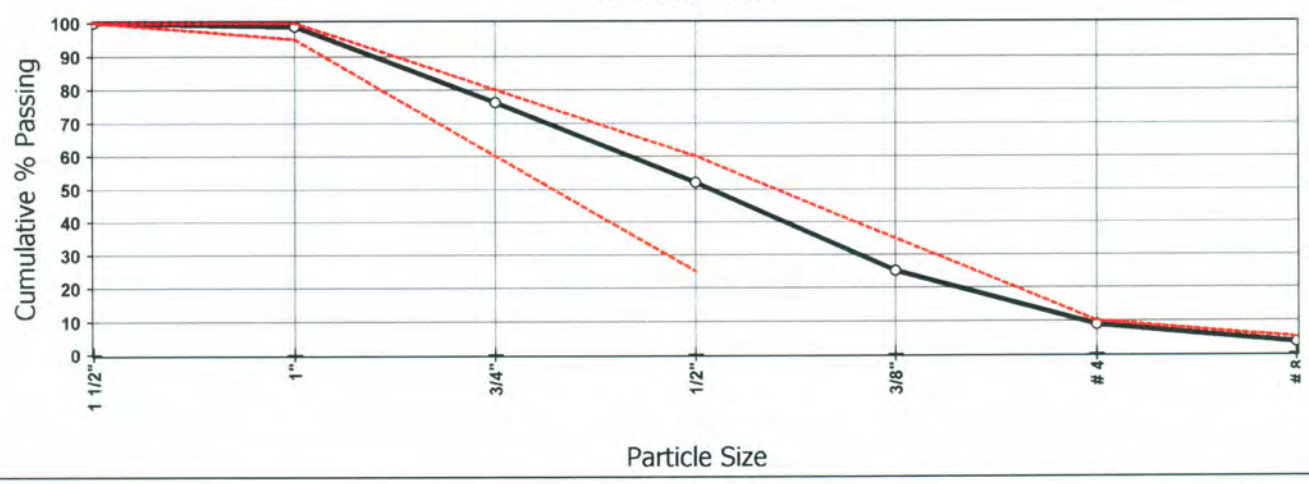
Sample Data

Sample ID :	1a	Aggregate Spec :	ASTM C-33 #57 Stone
Date sampled :	07/12/2017	Aggregate Name :	Berks #57

Grading

Sieve	Ind. Wt. Retained	Cum. Wt. Retained	Ind. % Retained	Cum. % Retained	Cum. % Passing	Cum. % passing Min. Spec.	Cum. % passing Max. Spec.
1 1/2"					100.0	100.0	100.0
1"	0.2	0.2	1	1	99	95	100
3/4"	5.2	5.4	22.9	23.8	76.2		
1/2"	5.5	10.9	24.2	48.0	52.0	25.0	60.0
3/8"	6.1	17.0	26.9	74.9	25.1		
# 4	3.7	20.7	16.3	91.2	8.8		10.0
# 8	1.2	21.9	5.3	96.5	3.5		5.0
PAN	0.6	22.5	3	99			
Total :	22.500		99				

GRADING CHART



Remarks

CLASS TYPE AGGREGATE: 4S	APPARENT SPECIFIC GRAVITY: 2.781	UNCOMPACTED VOIDS: 49
ABSORPTION %: .4%	UNIT WEIGHT: 88	ALKALI-SILICA REACTION: .13
BULK SPECIFIC GRAVITY: 2.751	DRY RODDED UNIT WEIGHT: 98	CLAY LUMPS & FRIABLES %: 0
SSD SPECIFIC GRAVITY: 2.761	LA ABRASSION: 19	ORGANIC IMPURITIES: CLEAR

Reported by : James Laus Date : 08/14/2017 Verified by : _____

INDIVIDUAL AGGREGATE GRADING

Project :	QC - Quality Control	Source :	Berks #8 Crushed Stone
Client :	Quality Control	Total wt:	24.40

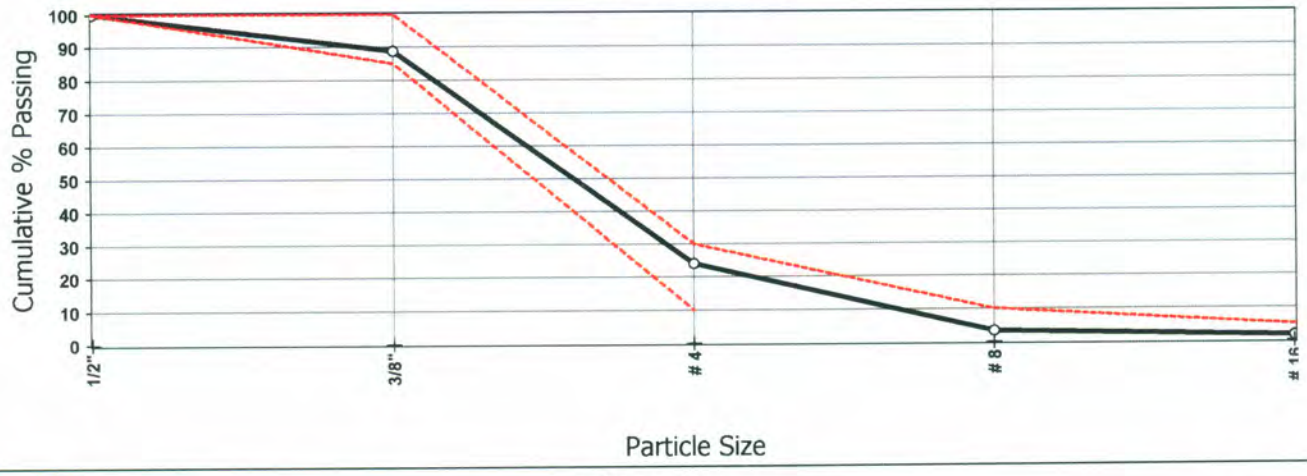
Sample Data

Sample ID :	1A	Aggregate Spec :	#8 Berks Products ASTM-C33
Date sampled :	08/04/2017	Aggregate Name :	Berks #8

Grading

Sieve	Ind. Wt. Retained	Cum. Wt. Retained	Ind. % Retained	Cum. % Retained	Cum. % Passing	Cum. % passing Min. Spec.	Cum. % passing Max. Spec.
1/2"					100.0	100.0	100.0
3/8"	2.7	2.7	11.1	11.1	88.9	85.0	100.0
# 4	15.8	18.5	64.8	75.8	24.2	10.0	30.0
# 8	5.1	23.6	20.9	96.7	3.3		10.0
# 16	0.4	24.0	1.6	98.4	1.6		5.0
PAN	0.3	24.3	1.2	99.6			
Total :	24.300		99				

GRADING CHART



Remarks

CLASS TYPE AGGREGATE: 4S	APPARENT SPECIFIC GRAVITY: 2.781	UNCOMPACTED VOIDS: 49
ABSORPTION %: .4%	UNIT WEIGHT: 88	ALKALI-SILICA REACTION: .13
BULK SPECIFIC GRAVITY: 2.751	DRY RODDED UNIT WEIGHT: 98	CLAY LUMPS & FRIABLES %: 0%
SSD SPECIFIC GRAVITY: 2.761	LA ABRASSION: 19	ORGANIC IMPURITIES: CLEAR

Reported by : James Laus Date : 08/03/2017 Verified by : _____

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

MasterAir® AE 90

Air-Entraining Admixture

Formerly MB-AE 90*

Description

MasterAir AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MasterAir AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method” or ASTM C 173/C 173M, “Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.” The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, “Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.” If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1.5%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

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Guidelines for Use

Dosage: There is no standard dosage for MasterAir AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique. The amount of MasterAir AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 0.25 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MasterAir AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MasterAir AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MasterAir AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MasterAir AE 90 admixture is required to obtain the desired air content, consult your local sales representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MasterAir AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after post-batching addition of any other materials to an air-entrained concrete mixture.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterAir AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MasterAir AE 90 admixture may be used in combination with any BASF admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MasterAir AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MasterAir AE 90 admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

Shelf Life: MasterAir AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterAir AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MasterAir AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterAir AE 90 admixture

Additional Information

For additional information on MasterAir AE 90 admixture, or its use in developing a concrete mixture with special peformance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

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NSF Certified to NSF/ANSI 61

* MB-AE 90 became MasterAir AE 90 under the Master Builders Solutions brand, effective January 1, 2014.

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Admixture Systems
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4	04 05 16	Masonry Grouting

MasterGlenium® 7500

Full-Range Water-Reducing Admixture

Formerly GLENIUM 7500*

Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

Dosage: MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

Mixing: MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

Compatibility: MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.

Storage and Handling

Storage Temperature: MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

Shelf Life: MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.

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* GLENIUM 7500 became MasterGlenium 7500 under the Master Builders Solutions brand, effective January 1, 2014.

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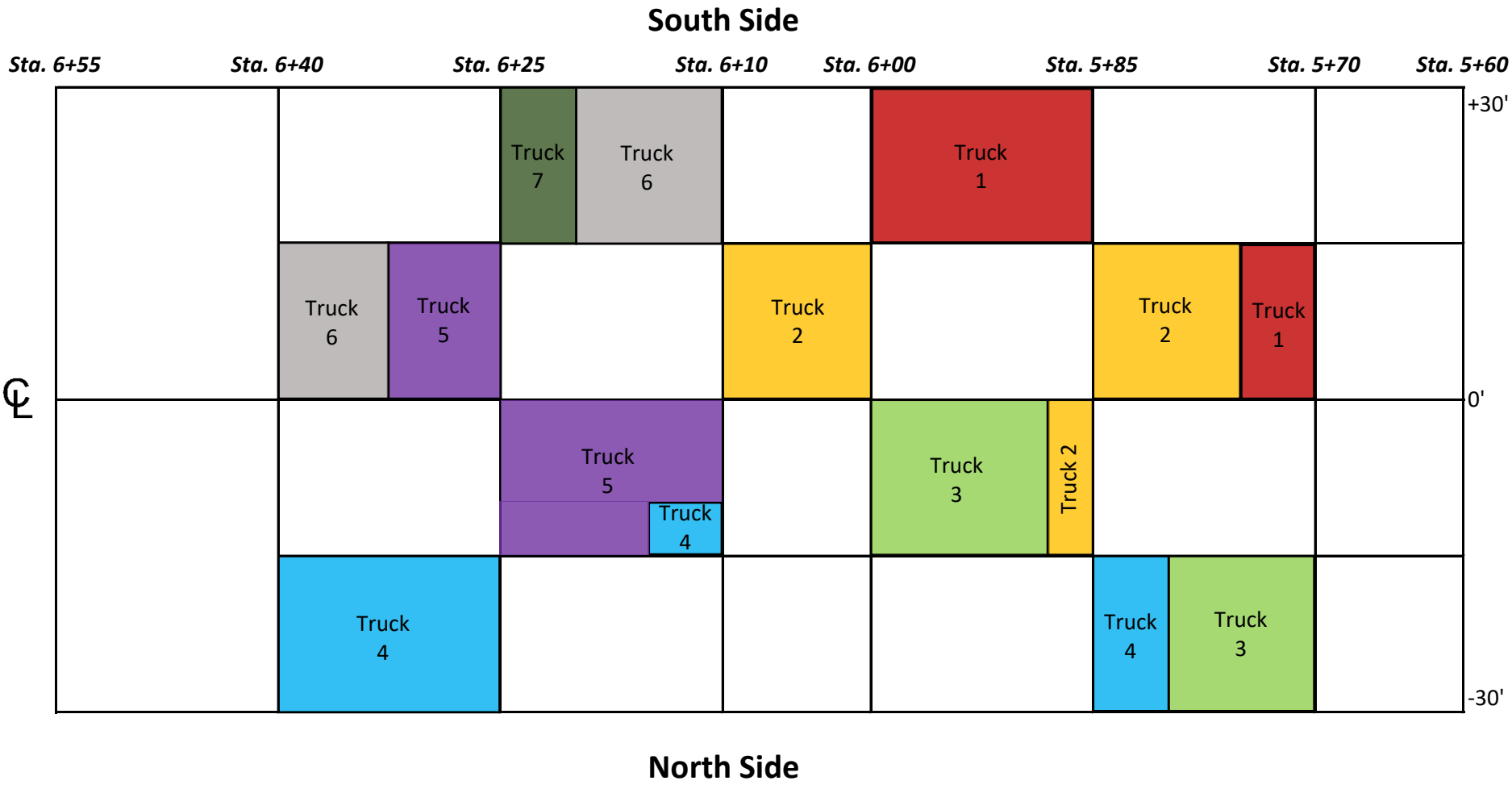
Tel: 800 387-5862 ■ Fax: 905 792-0651

P-501 Concrete Placement

Date: 10/30/2017



APPENDIX C: CC8 SUBGRADE STUDY

DEVELOPMENT OF CBR-BASED CONSTRUCTION CRITERIA FOR CC8 SUBGRADE COMPACTION AT THE NATIONAL AIRPORT PAVEMENT TEST FACILITY

DELIVERY ORDER 031 – CONSTRUCTION SUPPORT

June 2017

Carlos Cary, Ph.D.

Hao Yin, Ph.D., P.E.

Airport Technology Programs

Gemini Technologies, Inc.

INTRODUCTION

During the last subgrade test strip study, valuable data was generated with the primary purpose of developing California Bearing Ratio (CBR)-based compaction criteria for Construction Cycle 8 (CC8). Based on the data collected, both laboratory and field CBR-moisture correlations were developed which allowed for recommending a suitable target moisture content for the upcoming subgrade compaction work in CC8-Stage II. As anticipated, a discrepancy between laboratory and field correlations was encountered. A function that can be utilized in future construction cycles to convert laboratory to field CBR values is proposed.

Among the secondary objectives of the study, a pilot evaluation of potential aging effects on specific soil properties was included. Evidence in support of the hypothesis that the degree of oxidation in the stockpiled Dupont clay increases with the level of exposure to atmospheric conditions was encountered and summarized herein. The extent of the incidence that aging effects have upon the stiffness/strength characteristics of the stockpiled material yet remains uncertain. However, recurrent discrepancies between CBR-MC relationships reported over time for different construction cycles at NAPTF can be now attributed to the material heterogeneity induced by existing aging processes among other sources.

Finally, additional valuable data aiming at future development of modulus-based construction criteria for subgrade compaction at the NAPTF have been collected throughout the entire test strip field characterization effort. The data include not only material characterization but also valuable information of the climate conditions governing the moisture flux during the project timeframe. Both primary and secondary objectives of the proposed test strip study were accomplished. Nonetheless, additional research efforts on analyzing the data generated as part of the secondary objectives are strongly recommended for the near future. In the following sections a summary of the most critical findings is presented.

TIMELINE OF MATERIAL PROCESSING AND PERFORMED FIELD TESTING

A total of 13% moisture loss has been achieved at the completion of the project. Due to unfavorable climatic conditions, clay processing activities and field testing had to be to be disrupted during winter time. Thus, the activities were executed in two phases: (a) the first one from 11/14/2016 to 12/21/2016, and (b) the second one from 04/03/2017 to 05/08/2017. During the winter pause, the subgrade test strip was left compacted and covered to minimize any potential undeliberate moisture loss. Approximately 6% moisture loss was achieved during material processing and testing activities in Phase I whereas 7% was achieved in Phase II. Figures 1 and 2 show the moisture loss observed in both phases of the project. Note that the field testing dates are marked in both figures and average values for the measured moisture-density condition and CBR are provided.

In Figure 2, the horizontal black dashed line indicates the last average moisture content measured in Phase I, prior to the disruption of activities. The difference between the last moisture content measured in Phase I and the first value obtained in Phase II is minimal. This indicates that moisture loss was adequately limited by leaving the test strip compacted and covered during the winter pause. As observed, a total of seven rounds of field testing were completed. A second replicate of the entire experiment, as proposed in the original plan, was dropped due to the lack of time and funds. Nevertheless, sufficient data to achieve the set goals were generated upon completion of the project.

DRAFT

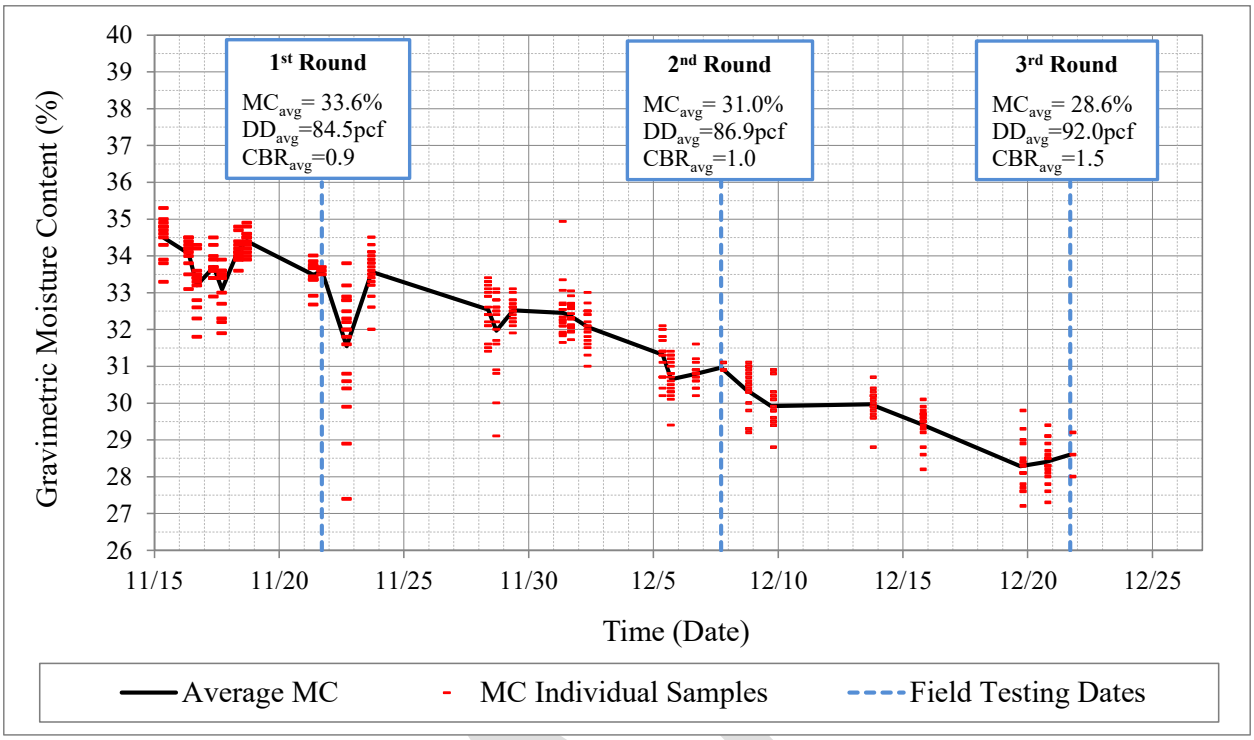


Figure 1. Moisture Loss Achieved from Subgrade Processing Activities in Phase I

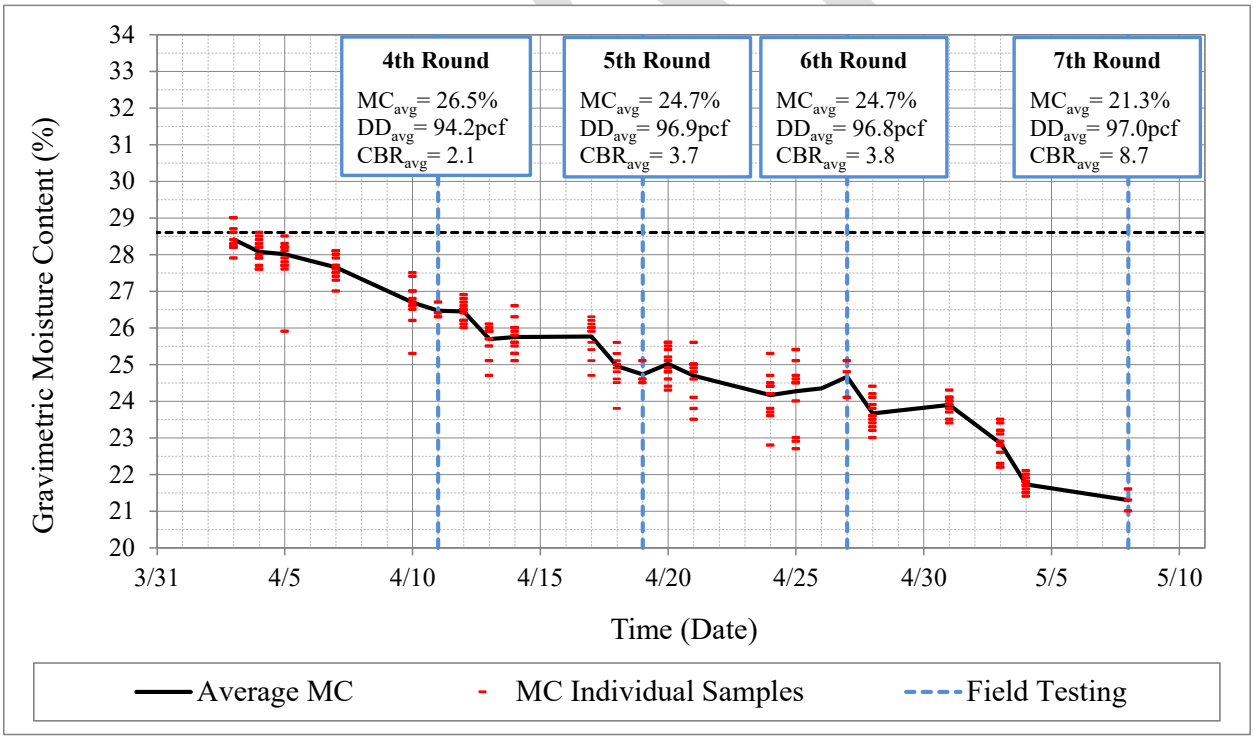


Figure 2. Moisture Loss Achieved from Subgrade Processing Activities in Phase II

The CBR-moisture values collected in seven rounds of field testing were fitted to multiple non-linear functions in an attempt to model the data. Among all the mathematical expressions considered, the "logistic dose response" (LDR) function was found to adequately model the data in a rational manner. The laboratory CBR-moisture dataset was also modeled using the same function. Figure 3 shows both datasets with their corresponding predictive curves. Although both datasets appear to satisfactorily fit the LDR function, there is an evident discrepancy between the curves. Evidently, laboratory test results give higher CBR values than field testing at any given moisture content. Therefore, using laboratory test results for developing CBR-based compaction criteria could lead to overestimating target moisture conditions for CC8 construction.

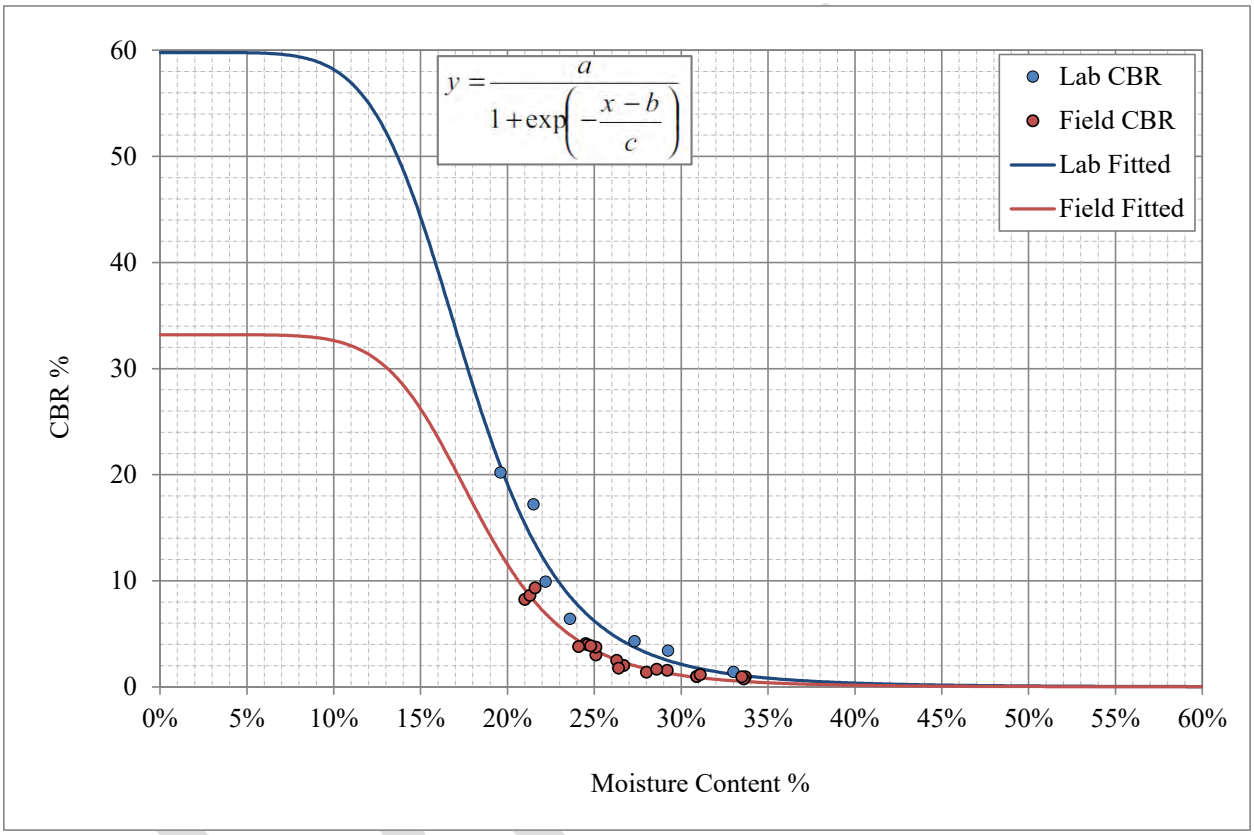


Figure 3. Curve Fitting for Field and Laboratory CBR Datasets

Figure 4 displays the same data over a narrower moisture content range. As seen in Figure 4 the data produced from both field and laboratory testing, extend over the range of interest for NAPTF research projects. If a range in moisture content from 22% to 32% is considered, it can be observed that the discrepancy between field and laboratory CBR predicted values could range between 5 and 1, respectively. This constitutes solid evidence of the impact that solely relying on laboratory values may have in the practice. Such impact translates into potential construction delays given that additional moisture loss might be needed to achieve "actual field CBR values". For instance, assuming a target CBR of 5, the corresponding target moisture content based on laboratory testing is 26%. However, it is highly likely that only a field CBR close to 3 will be achieved at 26% moisture content. Thus, approximately an extra 2.5% moisture loss will be required to reach the target based on field conditions.

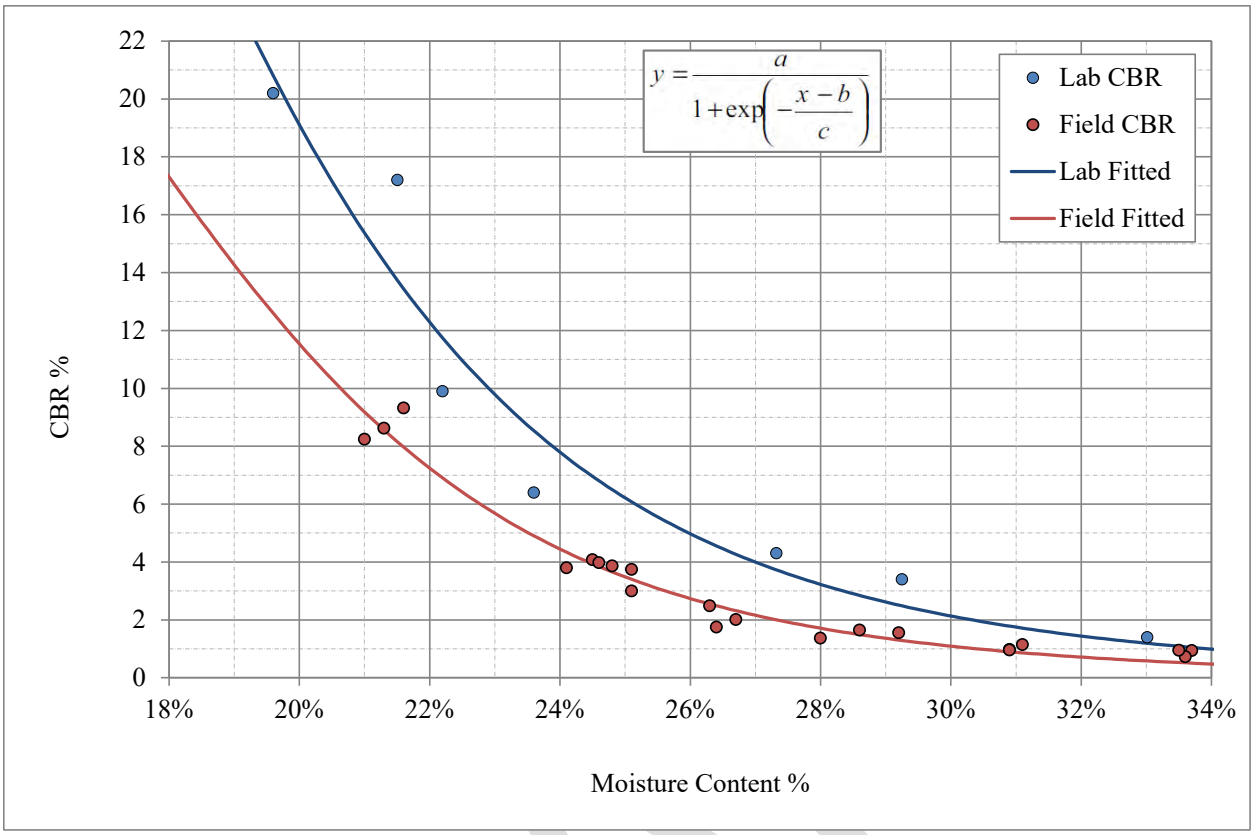


Figure 4. Close-Up to CBR Data over the Moisture Content Range of Interest for NAPTF

It is known that the target CBR range for CC8-Phase II is 3 to 4. Considering the developed CBR-moisture relationships, target moisture content ranges for both laboratory and field conditions are shown in Figure 5. Note that according to the laboratory curve a moisture content between 27% and 28.3% is required to fall within the target CBR range for construction, whereas according to the field curve the required moisture content ranges from 24.4% to 25.6%. If only the average target moisture contents indicated in Figure 5 are considered, a significant discrepancy of 2.7% is observed. Thus, the CBR-based construction criteria for CC8 subgrade compaction shall limit the moisture content of the material within a range of 24.4% to 25.6% in order to achieve a CBR between 3 and 4. Additional engineering judgement based on observations from field testing results was applied in order to provide additional recommendations as detailed in the next paragraphs.

Figure 6 shows the moisture-density condition achieved for both laboratory and field testing. As observed in the table showing compaction ratios in Figure 6, the discrepancy in dry density between laboratory specimens and field measurements increases with decreasing moisture content. This is evidenced by the compaction ratios based on the proctor curve. Starting in the 4th round of testing, the ratio dropped from 1 to 0.98; eventually reaching a ratio of 0.92 for the driest condition tested in the field. Such difficulty to achieve proctor densities in the field can be attributed to the type of compaction equipment utilized in the project. The relatively small smooth drum roller used in the test strip project imparted sufficient compactive effort at high moisture contents. However, for moisture contents below 27%, it is apparent that heavier equipment capable of kneading compaction is needed to achieve proctor densities.

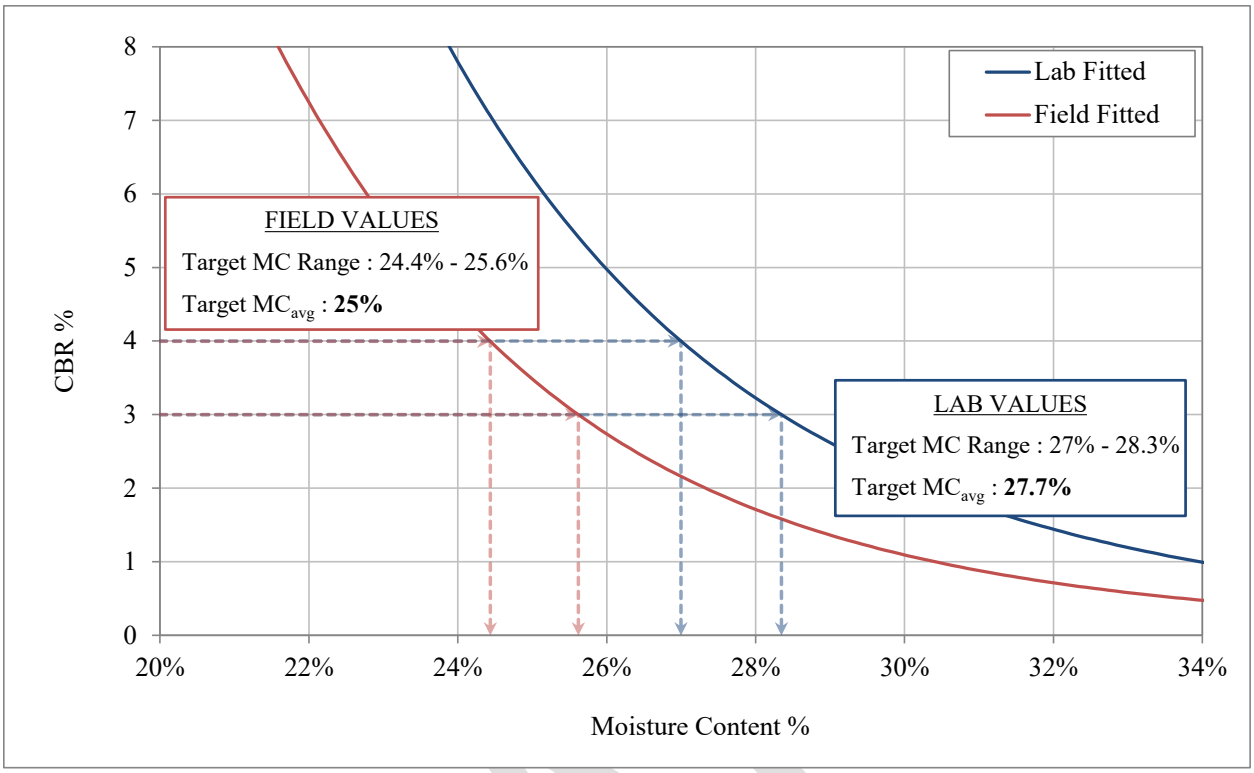
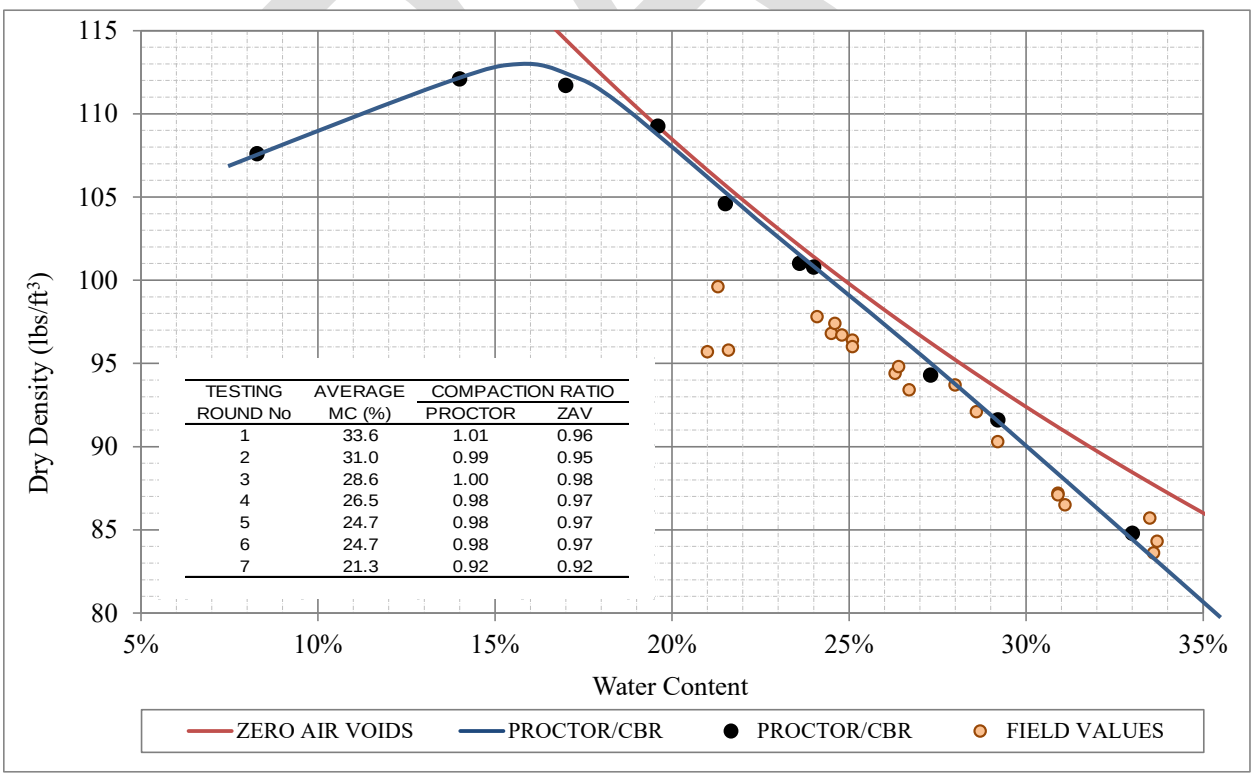


Figure 5. Target Moisture Content Ranges for CC8 Construction Based on both Field and Laboratory Test Results



TESTING ROUND No	AVERAGE MC (%)	COMPACTION RATIO PROCTOR	COMPACTION RATIO ZAV
1	33.6	1.01	0.96
2	31.0	0.99	0.95
3	28.6	1.00	0.98
4	26.5	0.98	0.97
5	24.7	0.98	0.97
6	24.7	0.98	0.97
7	21.3	0.92	0.92

Figure 6. Moisture-Density Condition Achieved for Laboratory and Field CBR Testing

Recognizing the discrepancy in dry density between laboratory and field conditions, the uncertainty associated with such inconsistency needs to be factored in when narrowing the target range to a suitable moisture content value for compaction. Figure 7 shows the apparent effect of dry density on CBR. Although it is understood there exists a moisture-dry density coupled effect, Figure 7 intends to illustrate the impact of dry density to certain extent only. As expected, increasing dry density will result in higher CBR values. Given that for moisture contents below 27%, the compaction equipment used in the project failed to produce densities matching the proctor curve; it is speculated that the proposed target range of moisture content based on field testing carries a minimal uncertainty due to dry density effects. Therefore, it is recommended that the upper bound of the proposed moisture content range be conservatively selected as target value to ensure a CBR within the required design range. In other words, based on the testing results and applying engineering judgement, it is recommended to aim at a moisture content of 25.6% for subgrade compaction.

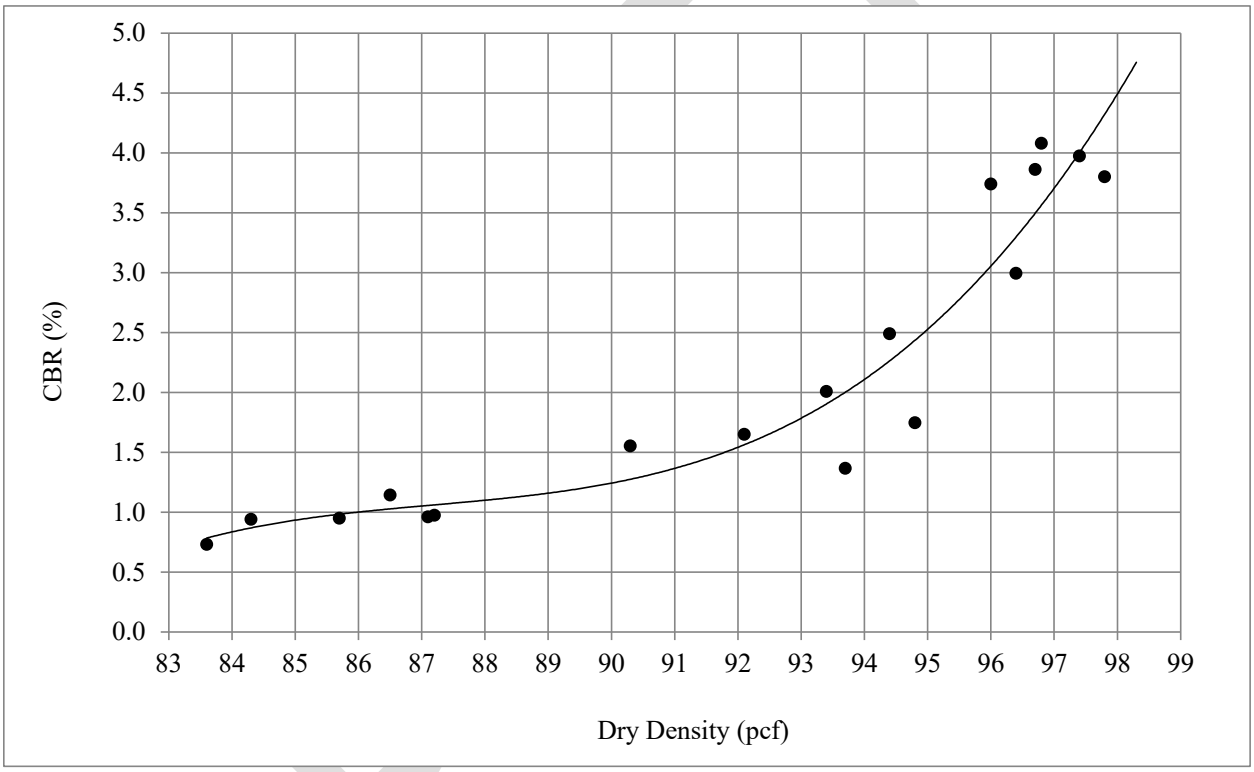


Figure 7. Effect of Dry Density on Field CBR Values

METHODOLOGY FOR CONVERTING LABORATORY TO FIELD CBR VALUES

Based on the CBR-moisture content relationships encountered for both laboratory and field conditions, a simple polynomial function of 3rd degree is proposed in Figure 8 to correct laboratory CBR values. It should be recognized that the aforementioned uncertainty associated to dry density effects is carried over in the proposed expression as well. By no means, it is intended to present this methodology as an absolute solution to the inconsistency between laboratory and field CBR values. However, considering the limited data available for this study, the proposed methodology is the best available approach at this time. It is strongly recommended that future research efforts

be directed to search historic NAPTF data (i.e. laboratory CBR-moisture relationships developed and results of their subsequent application in the field for past construction cycles) that can be incorporated into the correction methodology proposed herein. This will not only validate the proposed correction methodology but also result in a refined function capable of producing more reliable estimates.

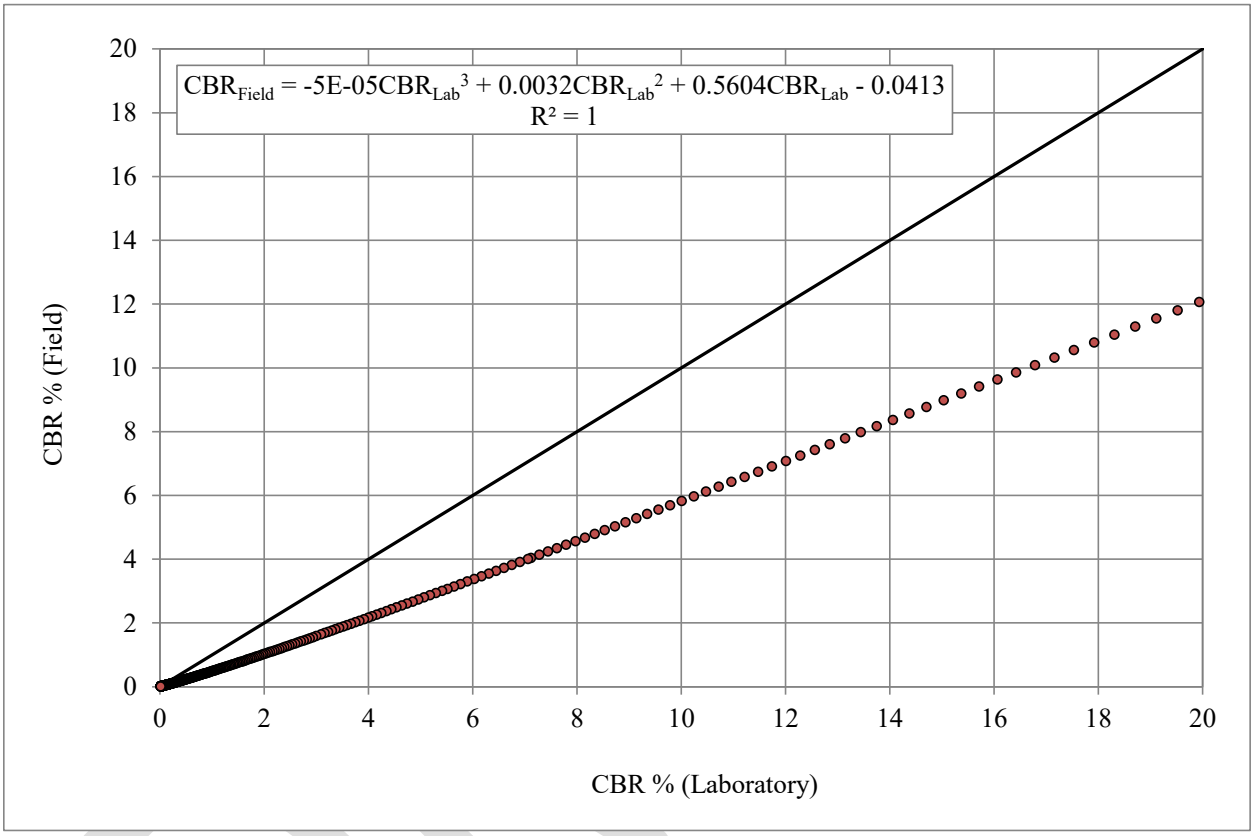


Figure 8. Proposed Function to Convert Laboratory to Field CBR Values

EVIDENCE OF AGING EFFECTS ON STOCKPILED DUPONT CLAY

Based on recurrent discrepancies between CBR-moisture content relationships reported over time for different construction cycles, it was desired to conduct a pilot investigation on the possibility of aging processes taking place in the stockpiled material. Given the high sensitivity of the CBR-moisture content relationship to changes in intrinsic properties of the subgrade soil available at the time of construction, even moderate aging processes could result in a deviation from the original relationship. As such, a small-scale stratified random sampling of the stockpile aimed at exploring aging effects was proposed as part of the study. As anticipated, the testing results provide information on the degree of oxidation attained in the different strata.

The proposed plan included soil pH and Atterberg Limits as potential candidates to evaluate aging effects. It was anticipated to find increasing degree of oxidation with increasing level of exposure to the climate regime or, in other words, with decreasing distance to the stockpile surface. Therefore, a gradient in both changes in soil pH and Atterberg Limits with depth would evidence the effects of aging. Figure 9 and 10 shows the changes in soil pH and plasticity index

(PI) with depth from the stockpile surface, respectively. In general, both soil pH and PI increase with depth from the stockpile surface, indicating a property gradient most likely produced by oxidation of the material due to exposure to the environment.

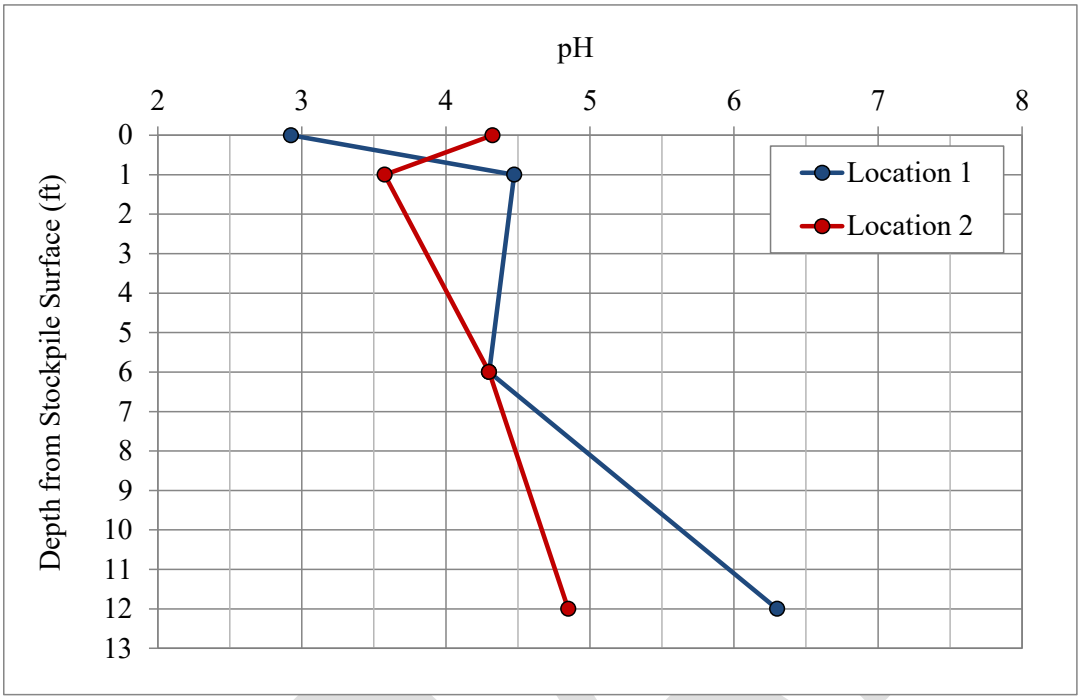


Figure 9. Soil pH Profile at Two Different Locations within the Stockpile

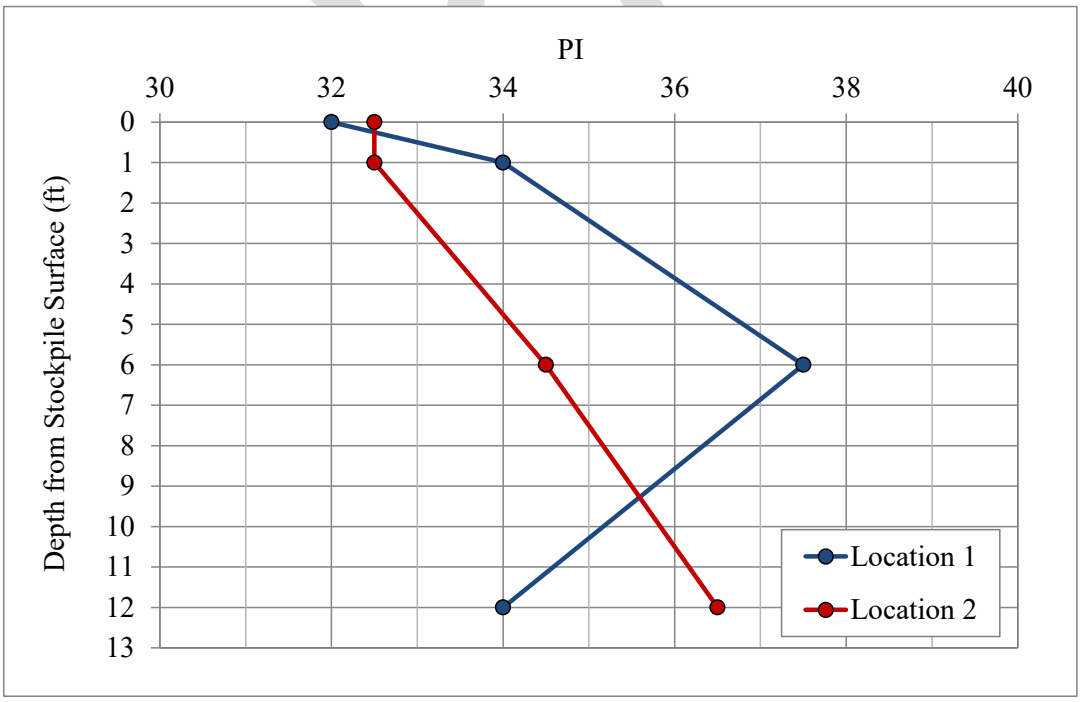


Figure 10. Plasticity Index Profile at Two Different Locations within the Stockpile

The evidence shown corroborates the ongoing aging process in the Dupont clay stockpile. The extent aging effects have upon the stiffness/strength of the material remains unknown. However, there is strong evidence to believe that such changes in the material properties is among the sources for recurrent inconsistencies observed in the CBR-moisture content relationships over time. Further investigation of this phenomenon may not be the most practical approach at this time. Focusing on refining material processing practices aimed at achieving high material homogeneity in preparation for construction, along with enhancement of the correction function for laboratory CBR values appear to be a promising approach to overcome aging effects.

CONCLUDING REMARKS

- Both primary and secondary objectives of the subgrade test strip study were successfully achieved at the completion of the first experiment replicate. The second replicate of the experiment was dropped due to time and funding constrains. Although the objectives were accomplished, it is recommended to consider directing future research efforts to further analyze the valuable data generated in this project.
- The main objective of the project aimed at developing CBR-based construction criteria for CC8 subgrade compaction was accomplished. It is recommended a moisture content range between 24.4% and 25.6% in order to obtain target CBR values between 3 and 4. Furthermore, based on the testing results observed and applying engineering judgement, it is suggested to consider the upper bound of the proposed moisture content range (i.e. target value of 25.6%) in order to account for the potential uncertainty introduced by insufficient compaction of the test strip at relatively dry conditions.
- Based on the data generated in the subgrade test strip study, a correction methodology to convert laboratory to field CBR values has been developed and proposed.
- Evidence of aging effects on the properties of stockpiled Dupont clay was obtained as part of the small-scale testing program. It was proved that increasing the level of exposure (i.e. decreasing depth from stockpile surface) results in increasing the degree of material oxidation. Such changes are believed to be responsible for the variation in stiffness/strength properties of Dupont clay observed over time. Is concluded that additional research on aging effects may not be the most practical approach to handle this challenge. Alternative recommendations are given in the following section for overcoming aging effects.
- Along with CBR and moisture-density condition, valuable data has been collected during the subgrade test strip project. Among measured material properties the data include D-PSPA, LWD, DCP, vane shear, moisture content from Decagon 5-TM probes, and moisture-density condition using the Humboldt EDG gauge. In addition, data of the climate regime during the study were collected using an environmental station. Completion of data analysis was not possible due to unavailability of time and funds.

RECOMMENDATIONS

- Given the potential for additional moisture loss from transportation, placement and preparation for compaction in the order of 1%, it is recommended that the moisture content of the material at the processing facility be brought down to 26.5-27% prior to be transported to the NAPTF building.
- It is highly recommended to revise historic NAPTF data in search of both laboratory and field CBR-moisture content relationships developed for past construction cycles. These data can be analyzed and incorporated into the correction function for CBR laboratory values proposed in

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the present document. This will enhance the capability of the proposed methodology for extrapolating laboratory CBR values to field conditions and produce more reliable CBR estimates.

- In order to overcome the inconsistencies in the CBR-moisture content relationship observed for different construction cycles over time, it is recommended that aging effects be addressed by refining material processing practices so that high homogenization is achieved prior to compaction. Also, refinement of the correction function for laboratory CBR values should be included as part of the twofold approach for dealing with aging effects without involving the complexities of investigating the effect of soil oxidation on the stiffness/strength of the material.
- It is strongly recommended to direct future research efforts to complete the analysis of the data generated as part of the study. Material property data can be potentially used in the development of modulus-based compaction criteria to be implemented in future construction cycles at the NAPTF. Undisturbed soil samples collected using Shelby tubes are also available for the determination of the actual resilient modulus of material used in the test strip. The environmental data collected can be correlated to moisture content changes in order to investigate the rate of indoor moisture loss for Dupont clay.

DRAFT

APPENDIX D: CUT SHEETS

DAYTON SUPERIOR

HD-50™

RAPID SETTING HEAVY DUTY FLOWABLE REPAIR MORTAR

PRODUCT DESCRIPTION:
HD-50 is a fast setting, fiber reinforced, latex modified, heavy duty concrete repair mortar designed for areas where a rapid strength gain is required to minimize downtime. HD-50 is a cement based compound having similar characteristics to normal portland cement mixes and is bondable and compatible with portland cement concrete. It does not contain chlorides or magnesium phosphates.
HD-50 is a one component product requiring only water to mix and apply, simplifying restoration of concrete surfaces. Areas repaired with HD-50 can be opened to traffic within one hour because the compressive strength of the patch is already in excess of 2,000 psi.

PURPOSE:
HD-50 is a rapid setting, cement based concrete mortar designed for the repair of heavy duty surfaces such as concrete highways, bridge decks, parking structures, airport runways, freezer rooms, industrial and warehouse floors, and loading docks.
HD-50 is a flowable material and is not designed for vertical and overhead patching, unless the repair is formed. HD-50 can be installed in weather as cold as 10°F (-12°C), provided cold weather instructions are followed.

ADVANTAGES:
- Can be opened to use or traffic within 60 minutes.
- High compressive strength quickly – over 2,000 psi in one hour.
- Resists salt penetration and damage from freeze/thaw cycles.
- Contains no chlorides or magnesium phosphate (not a chemical concrete).
- Meets ASTM C-928; Specification for Very Rapid Hardening Cementitious Repair Materials.
- Can be applied in cold temperatures down to 10°F (-12°C), if cold weather instructions are followed.
- Non Corrosive.
- Bondable and compatible with portland cement concrete.
- Aggregate Extension – Up to 60% on repairs greater than 2 inches (5cm) deep.

SPECIFICATIONS:
Meets ASTM C-928: As a Type R-3 mortar which includes the following tests:

1. Compressive Strength – ASTM C-109

	At 75°F (24°C)	At 40°F (4°C)	At 100°F (38°C)
1 Hour	2500 psi (17.2 MPa)	–	–
3 Hours	3500 psi (24.1 MPa)	2700 psi (18.5 MPa)	5100 psi (35.1 MPa)
1 Day	6145 psi (42.4 MPa)	6100 psi (42.0 MPa)	6300 psi (43.4 MPa)
7 Days	7370 psi (50.8 MPa)	6860 psi (47.3 MPa)	7300 psi (50.3 MPa)
28 Days	7990 psi (55.1 MPa)	7800 psi (53.8 MPa)	8500 psi (58.6 MPa)

2. Bond Strength ASTM C-882
   1 day 1,950 psi (13.4 MPa)
   7 days 2,250 psi (15.5 MPa)

3. Length Change of Hardened Cement Mortar and Concrete ASTM C-928

Change	Water Storage	Air Storage	Differential
28 Days	+.051%	-.082%	.133%
ASTM C-928	Max. to .15%	Max. to -.15%	Max. .20%

4. Scaling Resistance (Freeze/Thaw) - ASTM C-672
   Average of 3 specimens:
   Scaling Resistance - .71 lbs./ft^2 (3.5 kg/m^2)
   ASTM C-928 Spec. - 1.0 lbs. /ft^2 (4.9 kg/m^2)

5. Rapid Freeze/Thaw Test: ASTM C-666
   At 300 Cycles - No loss.

6. Chloride Ion Permeability - ASTM C-1202
   Elapsed Time - 360 minutes
   Chloride Permeability Rating - Very Low

SURFACE PREPARATIONS:
For best results follow the ACI standards for concrete preparation, removing all residue, grease, dirt, oil, etc. from the surfaces to be in contact with the repair material. All loose concrete must be removed until firm substrate is exposed. Saw cut the perimeter of the repair to a maximum depth of 1/2" (1.3 cm). Best results will be obtained by saw cutting the area to be repaired, providing uniform depth, a high surface profile and firm bonding areas. Minimum repair depth of 1/2" (1.3 cm) is required. All surfaces to be repaired should be in a saturated surface dry (SSD) condition with no standing water on the surface. Using freshly mixed HD-50, scrub a thin layer onto the saturated-surface-dry (SSD) substrate with a stiff fiber brush and place the HD-50 before the scrub coat dries. In certain

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Technical Assistance: (866) 329-8724

conditions the use of an approved bonding agent, i.e. J-40, J-58, may be required. Contact Technical Services for further information.

PLACEMENT INSTRUCTIONS:
When mixing less than a full bag, always first agitate the bag so that a representative sample is obtained. HD-50 requires only water for mixing at the rate of 3.25 qts. (3L) per 50 lbs. (22.7 kg) of material. Place water into the mixing container and then add the repair material to the water. The product can be mixed with a mud paddle in a 5 gal. (18.9L) container, or can be mixed in a mortar mixer, preferably with rubber-tipped blades. Continue mixing until the material is free of lumps (approx. 3-5 minutes). Mix as close as possible to the area to be repaired. Do not allow material to build up on equipment and wash periodically with water. Do not re-temper the mixed material or use admixtures. Place immediately after mixing, working the material firmly into the sides and bottom to eliminate air pockets and assure maximum bond. Where practical, work from one side to the other and screed to the level of the surrounding concrete. Trowel the surface or provide a desired finish. Working time is 15 minutes. HD-50 should be extended up to 60% by weight with clean saturated-surface-dry (SSD) 3/8" (1.0 cm) pea gravel on patches deeper than 2" (5 cm). For aggregate extension greater than 60%, contact Dayton Superior. On hot or windy days, a moist cure for 1 hour is recommended, or apply one of Dayton Superior water based curing compounds, such as J-18 or J-11-W.

HOT AND COLD WEATHER APPLICATIONS:
COLD - HD-50 can be applied in temperatures down to 10°F (-12°C), provided these instructions are followed. When applied in cold weather (below 40°F, 4°C), heat the surrounding concrete until warm to the touch. Warm the repair material and use approx. 90°F (33°C) mixing water. After placement, the repaired patch should be covered with a construction insulating blanket for a minimum 1-3 hours to keep material from freezing and to assure proper set and bond.

HOT - When placing the material in hot weather, cold water should be used as a mixing agent. Ambient and water temperatures will affect the setting time. Colder temperatures will extend the setting time, and warmer temperatures will shorten the setting time. At 70°F (21°C), the initial setting time is between 15 and 20 minutes. In applications where temps. are above 90°F (33°C) it is recommended the repair area be soaked with water, or use of an approved bonding agent like Dayton Superior Ad Bond (J-40) be applied to prevent the rapid loss of the moisture in the patch material. The repair area should be covered with wet burlap or one of Dayton Superior water based curing compounds, such as J-18 or J-11-W.

YIELD:
.42 cubic ft. per 50 lb. (.012 m^3/ 22.7 kg) bag
.60 cubic ft. per 50 lb.(.017 m^3/22.7 kg) bag with 60% extension (30 lbs. or 13.6 kg) with 3/8" (1 cm) pea gravel.

PACKAGING:
50 lb. (22.7 kg) bags

LIMITATIONS:
Do not attempt to retemper HD-50 after initial mixing. Do not add other cements or admixtures. HD-50 is a fast-setting product and mixing equipment should be cleaned with water at the earliest time. Shelf life of this material is approx. one year. Store on pallets in a cool, dry area and free from direct sunlight.

WARNING:
Skin is sensitive to cement. Wearing protective gloves and goggles is recommended. Avoid contact with eyes. Avoid prolonged contact with skin. Contains portland cement. Wash exposed skin promptly with water. May cause skin irritation as well as cement burns. In case of eye contact, flush eyes repeatedly with clean water and contact a physician. Harmful if ingested. Read MSDS before using product.

MANUFACTURER
Dayton Superior Corporation
7777 Washington Village Dr., Ste. 130
Dayton, OH 45459
Customer Service: 888-977-9600
Technical Services: 866-329-8724
Website: www.daytonsuperior.com

WARRANTY
Dayton Superior Corporation ("Dayton") warrants for 12 months from the date of manufacture or for the duration of the published product shelf life, whichever is less, that at the time of shipment by Dayton, the product is free of manufacturing defects and conforms to Dayton's product properties in force on the date of acceptance by Dayton of the order. Dayton shall only be liable under this warranty if the product has been applied, used, and stored in accordance with Dayton's instructions, especially surface preparation and installation, in force on the date of acceptance by Dayton of the order. The purchaser must examine the product when received and promptly notify Dayton in writing of any non-conformity before the product is used and no later than 30 days after such non-conformity is first discovered. If Dayton, in its sole discretion, determines that the product breached the above warranty, it will, in its sole discretion, replace the non-conforming product, refund the purchase price or issue a credit in the amount of the purchase price. This is the sole and exclusive remedy for breach of this warranty. Only a Dayton officer is authorized to modify this warranty. The information in this data sheet supersedes all other sales information received by the customer during the sales process. THE FOREGOING WARRANTY SHALL BE EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER WARRANTIES OTHERWISE ARISING BY OPERATION OF LAW, COURSE OF DEALING, CUSTOM, TRADE OR OTHERWISE.

LIMITATION OF LIABILITY
Dayton shall not be liable in contract or in tort (including, without limitation, negligence, strict liability or otherwise) for loss of sales, revenues or profits; cost of capital or funds; business interruption or cost of downtime, loss of use, damage to or loss of use of other property (real or personal); failure to realize expected savings; frustration of economic or business expectations; claims by third parties (other than for bodily injury), or economic losses of any kind; or for any special, incidental, indirect, consequential, punitive or exemplary damages arising in any way out of the performance of, or failure to perform, its obligations under any contract for sale of product, even if Dayton could foresee or has been advised of the possibility of such damages. The Parties expressly agree that these limitations on damages are allocations of risk constituting, in part, the consideration for this contract, and also that such limitations shall survive the determination of any court of competent jurisdiction that any remedy provided in these terms or available at law fails of its essential purpose.

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Version: July 9, 2013

MAPEI®

Novoplan® 2 Plus

Professional Self-Leveling Underlayment

DESCRIPTION

Novoplan 2 Plus is a high-strength, self-leveling cement-based underlayment and repair mix with quicker curing time, for interior concrete and engineer-approved floors.

- For leveling, smoothing and repairing interior floors
- Ready for tile in 24 hours

WHERE TO USE

Novoplan 2 Plus is well-suited for leveling, smoothing and repairing interior floors before the installation of floor coverings. Ceramic tile and natural stone can be installed 24 hours after application. Suitable floor coverings – such as carpet, vinyl sheet goods, vinyl tile, vinyl composition tile (VCT), homogenous PVC, rubber and engineered wood plank – can be installed 1 to 3 days after application, depending on the thickness of application.

LIMITATIONS

- Do not install over substrates containing asbestos.
- Fluid once mixed, *Novoplan 2 Plus* can easily be installed from 1/8" to 1" (3 mm to 2,5 cm) in a single lift. *Novoplan 2 Plus* is ready to accept installation of ceramic tile and natural stone after 24 hours. After 2 to 3 days, it can accept installation of such floor coverings as carpet, vinyl sheet goods, vinyl tile, VCT, homogenous PVC, rubber and engineered wood plank.
- *Novoplan 2 Plus* has a compressive strength greater than 1,250 psi (8,62 MPa) after 1 day, 2,700 psi (18,6 MPa) after 7 days and 4,200 psi (29,0 MPa) after 28 days.
- *Novoplan 2 Plus* is compatible with a wide variety of floor-covering adhesives, epoxy adhesives, polyurethane adhesives, and tile and stone installation mortars.
- *Novoplan 2 Plus* also can provide an ideal level substrate for cement and epoxy terrazzo flooring systems.
- Before application of *Novoplan 2 Plus*, always properly prepare the surface and prime with a suitable MAPEI primer. See MAPEI's "Primers for Self-Leveling Materials" product selection guide and the current Technical Data Sheet (TDS) for the recommended primer.
- *Novoplan 2 Plus* is for use in dry, interior areas only. For exterior use or for areas subject to prolonged exposure to moisture, use an exterior-rated MAPEI topping or screed and consider applicability of a waterproof membrane.
- *Novoplan 2 Plus* should only be used between 50°F and 85°F (10°C and 29°C).
- Provide for expansion and control joints where specified, including the perimeter of the room, columns, supports and equipment pedestals. Do not bridge expansion and control joints.

SUITABLE SUBSTRATES

- Properly prepared, sound, dimensionally stable, fully cured concrete that is at least 28 days old and free from hydrostatic pressure. Consult the floor-covering or coating manufacturer's recommendations regarding the maximum allowable moisture vapor emission rate (MVER) and retained moisture content in the substrate. For substrates with an MVER exceeding 5 lbs. per 1,000 sq. ft. (2,27 kg per 92,9 m²) per 24 hours, using a calcium

chloride test (reference ASTM F1869), install a suitable MAPEI moisture-reduction barrier.

Note: The maximum allowable MVER is always determined by the complete system installed, including primers, underlayments/toppings, floor coverings and sealers. The wide variety of substrate conditions, floor coverings and adhesives available requires careful analysis of the intended final floor use, as well as compliance with each manufacturer's recommendations for MVER, retained moisture content and adhesive selections.

- Plywood subfloors must be properly prepared, bonded, and free from dirt and dust (see the "Surface Preparation" section for details).
- Ceramic tile, VCT, cement terrazzo and thin layers of old cutback adhesive residue that are well-bonded and dimensionally stable. Surfaces must be properly prepared, bonded, primed, and free from dirt and dust.
- Steel decking can be resurfaced with *Novoplan 2 Plus* if the decking is sound, stable, free of bond-breaking materials and properly primed. See MAPEI's "Primers for Self-Leveling Materials" product selection guide and the current TDS for the primer recommended.
- Do not install *Novoplan 2 Plus* over particleboard, chipboard, Masonite, Lauan, metal, asbestos, gypsum-based patching materials or any other nondimensionally stable materials.

Always install several correctly located test areas to ensure compatibility, bond strength and performance of the complete flooring system. Contact MAPEI's Technical Service Department for installation recommendations regarding substrates or conditions not listed.

SURFACE PREPARATION

1. All substrates must be structurally sound, stable and solid.
2. Thoroughly clean the surface of any substance that could interfere with the bond of the installation material, including dirt, paint, tar, asphalt, wax, oil, grease, latex compounds, sealers, curing compounds, form release agents, laitance, loose toppings, foreign substances and adhesive residue.
3. Concrete surfaces must be mechanically profiled and prepared by shotblasting, sandblasting, water-jetting, scarifying, diamond-grinding or other engineered-approved methods (reference International Concrete Repair Institute concrete surface profile [ICRI CSP] #3 standards for acceptable profile height).
4. After cleaning and mechanically profiling the substrate, test for MVER using calcium chloride test reference ASTM F1869. When using *Novoplan 2 Plus* as an underlayment with other finished floor systems (such as resilient, VCT and ceramic), always follow manufacturers' recommendations regarding maximum allowable moisture content and MVER before installation. Refer to the "Suitable Substrates" section for details regarding MVER conditions and treatments. In cases where the MVER exceeds 5 lbs. per 1,000 sq. ft. (2,27 kg per 92,9 m^2) per 24 hours, using a calcium chloride test (reference ASTM F1869), install a suitable MAPEI moisture-reduction barrier. Apply a small test area to ensure compatibility with the moisture-reduction barrier before general installation. Once the barrier is cured, apply a suitable MAPEI primer before the application of *Novoplan 2 Plus*.
5. Concrete substrate and ambient room temperatures must be between 50°F and 85°F (10°C and 29°C) before application. Temperatures must be maintained within this range for at least 72 hours after the installation of *Novoplan 2 Plus*.
6. Fill in deep areas, holes and cracks with appropriate concrete restoration materials, especially when installing on a second-story floor or above where fluid material could leak to a floor below (contact MAPEI's Technical Services Department for details).
7. Do not apply primer over standing water.
8. *Novoplan 2 Plus* can be used over subfloors of engineer-approved plywood or oriented strand board (OSB) subfloors in accordance with the most recent edition of Tile Council of North America's F185 specification.
9. Subfloors must be properly prepared, bonded, and free from dirt and dust. When MAPEI underlayments are applied to plywood flooring, installation requirements (finished flooring, load, use and/or deflection) may require the utilization of *Mapelath*™ or diamond mesh (meeting the requirements of ASTM C847) on top of the primed surface before the application of the underlayment. In all cases, one can anticipate better performance when utilizing lath, particularly over OSB. Refer to the current *Mapelath* TDS for installation instructions. Differential or excessive movement within plywood substrate may lead to hairline cracks at plywood joints.
10. To install over properly prepared ceramic tile, VCT, cement or epoxy terrazzo, or thin layers of old cutback adhesive residue, the surface must be properly prepared, bonded, free of dirt and dust, and primed. Prime by applying appropriate primer; see MAPEI's "Primers for Self-Leveling Materials" product selection guide and the primer's current TDS.

MIXING

- General mixing

Into a clean mixing container, pour the required amount of cool, clean potable water. If available water is not cool, chill water to 70°F (21°C). Add *Novoplan 2 Plus* powder while slowly stirring. Mix water and *Novoplan 2 Plus* powder to a mixing ratio of 5 to 5.28 U.S. qts. (4,73

to 5,0 L) water per 50-lb. (22,7-kg) bag of *Novoplan 2 Plus*. The mixing ratio must remain consistent. Do not overwater material.

- Barrel mixing

  Using the mixing ratio in the "General mixing" instructions, mix using a high-speed mixer (at about 1,100 rpm) with an "egg-beater" mixing paddle. Mix to a homogenous, lump-free consistency (about 2 minutes). Do not overmix. Overmixing or moving the mixer up and down during the mixing process could trap air, which could shorten the pot life or cause pinholing during application and curing.

- Pump mixing

  Novoplan 2 Plus can be mechanically mixed, using the mixing ratio in the "General mixing" instructions, with a continuous mixer and pump (with at least 140 ft. [42,7 m] of hose) or with a batch mixer and pump (with at least 110 ft. [33,5 m] of hose). Mixer and pump must be in good working condition. Periodic cleaning of pumping equipment is required per the manufacturer's instructions. Be sure to pressure-test the rotor and stator for proper mixing. Use a mesh screen "sock" at the end of the hose to catch any foreign material that could enter the hopper of the mixer. Apply to a small test area before general application to ensure a successful installation.

Note: Choose all appropriate safety equipment before use. Refer to the Material Safety Data Sheet (MSDS) for more information.

PRODUCT APPLICATION

1. Read all installation instructions thoroughly before installation.
2. Before installation, close doors and windows, and turn off HVAC systems to prevent drafts during application and until floor is cured. Protect areas from direct sunlight.
3. Make sure the concrete substrate and ambient room temperatures are between 50°F and 95°F (10°C and 35°C) before application. Temperatures must be maintained within this range for at least 72 hours after the installation of *Novoplan 2 Plus*. In cooler conditions, use indirect auxiliary heaters to maintain the ambient and substrate temperatures within the required range. For temperatures above 85°F (29°C), follow ACI hot-weather application guidelines to ensure a successful installation.
4. Application of *Novoplan 2 Plus* over large areas can be made easier and more efficient by using conventional piston, rotor-stator or underlayment-type pumps (contact MAPEI's Technical Services Department for recommendations).
5. For best results, work as a team to provide a continuous flow of wet material to avoid trapping air or creating a cold joint.
6. Set the width of the pour at a distance that is ideal for maintaining a wet edge throughout placement. Quickly pour or pump *Novoplan 2 Plus* onto the properly prepared and primed surface in a ribbon pattern. If a wet edge cannot be maintained, reduce the width of the pour.
7. *Novoplan 2 Plus* has an approximate flow time of 15 minutes at 73°F (23°C), is self-leveling and can be applied from 1/8" to 1" (3 mm to 2,5 cm) in a single application. Temperature and humidity affect the working time, flowability and setting time. Apply enough material to adequately cover all high spots.
8. Immediately after placing the *Novoplan 2 Plus*, spread the material with a gauge rake. After achieving the desired depth, smooth the surface with a smoother to obtain an even surface. Do not overwork the material, which could trap air.
9. *Novoplan 2 Plus* hardens and is ready to accept installation of ceramic tile and natural stone in 24 hours. Suitable floor coverings – such as carpet, vinyl sheet goods, vinyl tile, VCT, homogenous PVC, rubber and engineered wood plank – can be installed 2 to 3 days after application. Protect the surface from contaminants until the final flooring installation is complete. Applications of greater depths (more than 1" [2,5 cm]) and in cooler temperatures may require extra curing time before the installation of covering surfaces.
10. *Novoplan 2 Plus* may be extended with 1/4" to 3/8" (6 to 10 mm) of clean, saturated surface-dry (SSD) aggregate on the primed surface at no more than half of the total pour depth. Pour *Novoplan 2 Plus* over placed aggregate and rake aggressively to ensure full contact and bond with substrate. Immediately pour 1/4" (6 mm) of *Novoplan 2 Plus* over the raked aggregate to provide a smooth, level surface. Alternately, one may add aggregate (up to 30% by weight) directly to the *Novoplan 2 Plus* when mixing; in this case, add the aggregate after reaching a homogenous mix of *Novoplan 2 Plus* and water.

Note: Use only clean, nonreactive aggregates.

EXPANSION AND CONTROL JOINTS

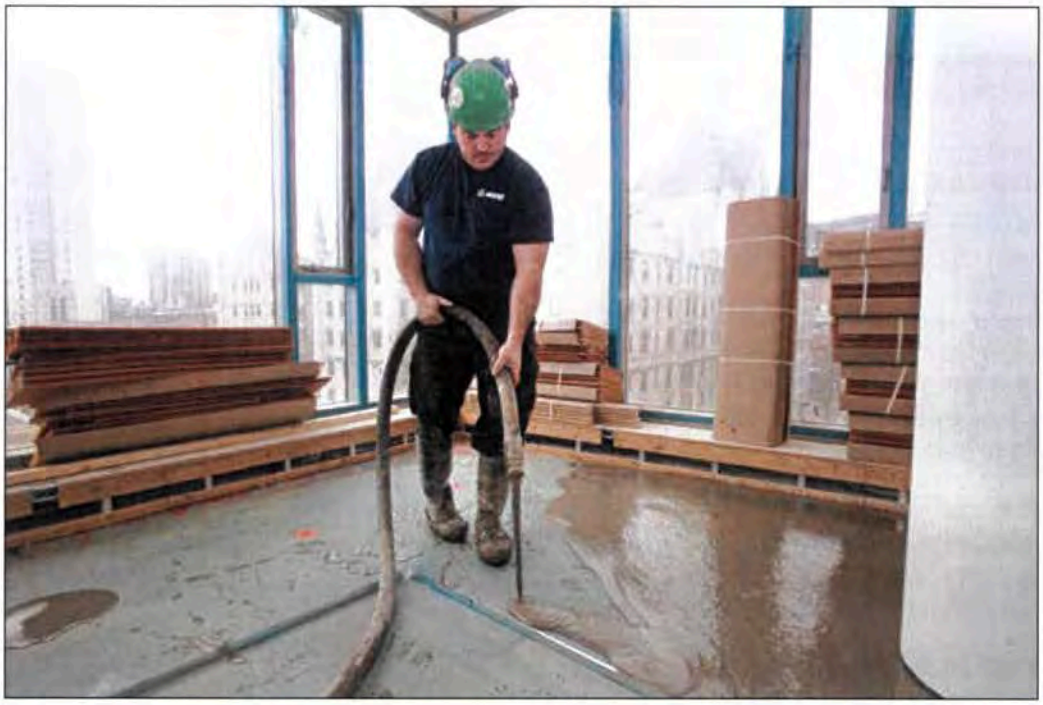
1. Provide for expansion and control joints where specified, including the perimeter of the room, columns, supports and equipment pedestals. If control and expansion joints do not exist in the substrate, provide for them in the system.
2. Do not bridge the substrate's expansion and control joints. Ensure that such joints are honored completely through *Novoplan 2 Plus* and the primer.
3. Cut joints in *Novoplan 2 Plus* at least 1/4" (6 mm) wide within 24 hours of placement.

CURING

1. *Novoplan 2 Plus* is self-curing; do not use a damp-curing method or curing and sealing compounds.
2. Protect *Novoplan 2 Plus* from excessive heat or draft conditions during curing. Turn off all forced ventilation and radiant-heating systems. Protect for up to 24 hours after completion.
3. Avoid walking on the installed surface for at least 24 hours after installation, depending on temperature and humidity conditions.
4. Protect installation from traffic, dirt and dust from other trades until *Novoplan 2 Plus* has completely cured and the final flooring has been installed.
5. Do not expose *Novoplan 2 Plus* to rolling dynamic loads, such as forklifts or scissor lifts, for at least 72 hours after installation.
6. Before application, test all installation materials on a small sample area to ensure the desired results.

CLEANUP

Wash hands and tools with water promptly before material hardens. Cured material must be mechanically removed.



Product Performance Properties

Laboratory Tests	Results
***Novoplan 2 Plus* (before mixing)**	
Physical state	Powder
Color	Gray
***Novoplan 2 Plus* (mixed)**	
Mixing ratio	5 to 5.28 U.S. qts. (4,73 to 5,0 L) of water per 50 lbs. (22,7 kg) of powder
Cured density	About 128 lbs. per cu. ft. (2,1 kg per L)
pH	11
Application temperature range	50°F to 85°F (10°C to 29°C)
Pot life at 73°F (23°C)	60 minutes
Flowing time at 73°F (23°C)	Up to 10 minutes
Final set at 73°F (23°C)	4 to 5 hours
Dry time before installation of floor coverings at 70°F (21°C)	16 to 24 hours after application is complete
Data relating to *Novoplan 2 Plus* (material and hardening conditions at 73°F [23°C] and 50% relative humidity, mixed with 5.1 U.S. qts. [4,83 L] water)	
Compressive strength – ASTM C349	
1 day	> 1,250 psi (8,62 MPa)
7 days	> 2,700 psi (18,6 MPa)
28 days	> 4,200 psi (29,0 MPa)
Flexural strength – ASTM C348 (CAN/CSA-A23.2-8C)	
1 day	> 500 psi (3,45 MPa)
7 days	> 570 psi (3,93 MPa)
28 days	> 1,050 psi (7,24 MPa)
Pull-out strength (Direct Tensile Bond test – rupture in concrete substrate) (CAN/CSA-A23.2-6B)	
3 days	> 260 psi (1,79 MPa)
7 days	> 300 psi (2,07 MPa)
28 days	> 350 psi (2,41 MPa)

Provide for heated storage on site and deliver all materials at least 24 hours before work begins.

Shelf Life and Application Properties

Shelf life	6 months in paper bag in dry, heated and covered area

CSI Division Classification

Cast Underlayment	03 54 00

Packaging

Product Code	Size
1785156	Bag: 50 lbs. (22,7 kg)

Approximate Product Coverage per thickness for a 50-lb. (22,7-kg) bag

Thickness	Yield
1/8" (3 mm)	48 sq. ft. (4,46 m^2)
1/4" (6 mm)	24 sq. ft. (2,23 m^2)
1/2" (12 mm)	12 sq. ft. (1,11 m^2)
1" (2,5 cm)	6 sq. ft. (0,56 m^2)

** Coverage/thickness data shown are given for estimating purposes only. Actual jobsite coverages may vary according to substrate conditions, type of equipment, thickness applied and application methods used.*

For the appropriate primer, see MAPEI's product selection guide titled "Primers for Self-Leveling Materials," and refer to the primer's current TDS.

Novoplan® 2 Plus

MAPEI®

Novoplan® 2 Plus

RELATED DOCUMENTS

Primers for Self-Leveling Materials product selection guide*	RGC0609

Refer to the MSDS for specific data related to VOCs, health and safety, and handling of product.

STATEMENT OF RESPONSIBILITY

Before using, user shall determine the suitability of the product for its intended use and user alone assumes all risks and liability whatsoever in connection therewith. **ANY CLAIM SHALL BE DEEMED WAIVED UNLESS MADE IN WRITING TO US WITHIN FIFTEEN (15) DAYS FROM DATE IT WAS, OR REASONABLY SHOULD HAVE BEEN, DISCOVERED.**

We proudly support the following industry organizations:

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Edition Date: April 2, 2013
PR: 6714 MKT: 6339

For the most current BEST-BACKED™ product data and warranty information, visit www.mapei.com.

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Version Feb. 28, 2012

MAPEI®

Primer L™

Advanced-Technology Acrylic Latex Primer for Concrete

GREEN INNOVATION

Primer L is green for easy identification.

DESCRIPTION

Primer L is a concentrated, solvent-free acrylic primer used before the installation of underlayments and topping materials. It is green for easy identification. *Primer L* improves the bond between a properly prepared and profiled concrete substrate, and self-leveling underlayment or topping materials.

INDUSTRY STANDARDS AND APPROVALS

LEED Points Contribution	LEED Points
MR Credit 5, Regional Materials*	Up to 2 points
IEQ Credit 4.2, Low-Emitting Materials – Paints & Coatings	1 point

* *Using this product helps contribute to LEED certification of projects in the categories shown above. Points are awarded based on contributions of all project materials.*

WHERE TO USE

Use *Primer L* when applying a self-leveling underlayment or topping on a properly prepared and profiled concrete surface. For best results with *Ultratop*® and topping materials, use MAPEI's premium-grade primer *Primer E*™.

LIMITATIONS

- Do not install over substrates containing asbestos.
- *Primer E* or *Primer L* must be used before the installation of toppings. For best results with toppings, use *Primer E*.
- *Primer L* or an alternate MAPEI primer must be used before the installation of *Ultraplan*® self-leveling underlayments and toppings, and *Novoplan*® self-leveling underlayments.
- *Primer L* can only be used when concrete substrate and ambient room temperatures are between 50°F and 95°F (10°C and 35°C). Maximum open time to recoat or to apply topping and underlayment is 18 hours. Do not apply underlayment or topping before at least 3 hours of curing.

SUITABLE SUBSTRATES

- Properly prepared, sound, dimensionally stable, fully cured concrete at least 28 days old. Consult the floor-covering or coating manufacturer's recommendations regarding the maximum allowable moisture vapor emission rate (MVER) and retained moisture content in substrate. For substrates with an MVER exceeding 5 lbs. per 1,000 sq. ft. (2,27 kg per 92,9 m^2) per 24 hours, using a calcium chloride test (reference ASTM F1869), install MAPEI's *Planiseal*™ *EMB* or *Planiseal VS* moisture-reduction barrier. Consult MAPEI's Technical Services Department for specific primer and installation recommendations for *Planiseal EMB* and *Planiseal VS*.

  Note: The maximum allowable MVER is always determined by the components of the complete system installed, including primers, underlayment/topping, floor coverings and sealers. The wide variety of substrate conditions, floor coverings and adhesives available today requires careful analysis of the intended final floor use as well as compliance with each manufacturer's recommendations for MVER, retained moisture content and adhesive selections. Always install several correctly located test areas to ensure compatibility, bond strength and performance of the complete flooring system.
- For plywood substrates, tile and other nonporous substrates, see MAPEI's "Primers for Self-Leveling Materials" product selection guide for concrete restoration systems.

SURFACE PREPARATION

- All substrates must be structurally sound, stable and solid. Concrete substrates must have tensile strength of at least 175 psi (1,21 MPa).
- Thoroughly clean the surface and remove substances that could interfere with the bond of the installation material. These include dirt, paint, tar, asphalt, wax, oil, grease, latex compounds, sealers, curing compounds, form release agents, laitance, loose toppings, foreign substances and adhesive residue.
- Concrete surfaces must be mechanically profiled and prepared by shotblasting, sandblasting, water-jetting, scarifying, diamond-grinding or other engineer-approved methods (reference ICRI CSP 3 or greater standards for acceptable profile height).
- Porous concrete may be subject to "outgassing," the release of trapped air from concrete. Outgassing is visually undetectable and could cause surface defects with the installation.

  Outgassing may be aggravated by mechanical preparation of the substrate. To address this, wait 48 hours after proper mechanical preparation of the substrate before applying the first coat of primer. Vacuum all dust from the surface before applying the primer. If a project does not permit waiting 48 hours, some surfaces may be primed with *Primer E*. Perform a mockup test to confirm results before pouring (see *Primer E* Technical Data Sheet for details). For use with underlayments and other finished floor systems – such as resilient, vinyl composition tile (VCT) and ceramic – consult the manufacturer regarding the maximum allowable moisture content and MVER prior to installation. For the best performance of finished floor systems that comprise self-leveling toppings, substrates exhibiting an MVER exceeding 5 lbs. (2,27 kg) should be treated by installing *Planiseal EMB* or *Planiseal VS*.

MIXING

Note: Choose all appropriate safety equipment before use. Refer to Material Safety Data Sheet (MSDS) for more information.

1. Dilute 1 part of *Primer L* with 1 to 3 parts of clean potable water. Porous concrete may require additional coats (at the same dilution rate) to avoid surface defects in the finished leveler application. Do not apply at lower dilution rates (1-to-1, or 1-to-2); rather, use multiple coats at a 1-to-3 ratio for priming the substrate.
2. Stir using a low-speed mixer (at 300 to 500 rpm) and a "jiffy" mixing paddle. Do not overmix at high speeds, which could cause the product to foam.

PRODUCT APPLICATION

1. Read all installation instructions thoroughly before installation.
2. Make sure concrete substrate and ambient room temperatures are between 50°F and 95°F (10°C and 35°C) before application. Temperatures must be maintained within this range for at least 72 hours after the installation of primer and finished material. In cooler conditions, use indirect auxiliary heaters to maintain ambient and substrate temperatures within the required range.
3. Apply primer, working it into the substrate with a push broom or brush. Do not use roller to apply. Additional coats may be required over extremely porous concrete.
4. Broom out any puddles of primer. Install MAPEI self-leveling underlayments or topping materials after *Primer L* has turned to a green, transparent film (with no milky spots) after about 3 hours at 73°F (23°C). Lower substrate temperatures and/or humid conditions could extend the drying time before application of leveler. The maximum open time between coats or before applying a leveler is 18 hours.

Product Performance Properties

Laboratory Tests	Results
Drying time	About 3 hours
Flammability	Not applicable
Storage	Store in a cool, dry place. Protect from freezing.

Shelf Life and Application Properties

Shelf life	2 years

CSI Division Classifications

Concrete Topping	03 53 00
Cast Underlayment	03 54 00

Packaging

Product Code	Size
36053000	Jug: 1 U.S. gal. (3,79 L) (2 jugs per case)
36068000	Pail: 5 U.S. gals. (18,9 L)

Approximate Product Coverage*

Size	Coverage
1 U.S. gal. (3,79 L) diluted at 3:1 (water:primer)	600 to 800 sq. ft. (55,7 to 74,3 m^2)

** Coverage shown i for estimating purposes only. Actual jobsite coverages may vary according to substrate conditions, type of equipment, thickness applied and applications methods used.*

Primer L™

Refer to MAPEI's MSDS for specific data related to VOCs, health and safety, and handling of product.

STATEMENT OF RESPONSIBILITY

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For the most current BEST-BACKED™ product data and warranty information, visit www.mapei.com.

TECHNICAL DATA SHEET

Geomembrane HDPE Smooth

Solmax International Inc., 2801 Boul. Marie-Victorin, Varennes, Qc, Canada, J3X 1P7
Tel.: (450) 929-1234 Fax: (450) 929-2550 www.solmax.com

PROPERTY	TEST METHOD	FREQUENCY (1)	UNIT Imperial	Solmax 430-1000
SPECIFICATIONS				
Thickness (min. avg.)	ASTM D-5199	Every roll	mils	30.0
Thickness (min.)	ASTM D-5199	Every roll	mils	27
Resin Density	ASTM D-1505	1/Batch	g/cc	> 0.932
Melt Index - 190/2.16 (max.)	ASTM D-1238	1/Batch	g/10 min.	1.0
Sheet Density	ASTM D-1505	Every 2 rolls	g/cc	> 0.94
Carbon Black Content	ASTM D-4218	Every 2 rolls	%	> 2.0 / < 3.0
Carbon Black Dispersion	ASTM D-5596	Every 6 rolls	Category	Cat. 1 & Cat. 2
Oxidation Induction Time (min. ave)	ASTM D-3895	1/Batch	min.	100
Tensile Properties (min. avg) (2)	ASTM D-6693	Every 2 rolls		
Strength at Yield			ppi	66
Elongation at Yield			%	13
Strength at Break			ppi	122
Elongation at Break			%	700
Tear Resistance (min. avg.)	ASTM D-1004	Every 6 rolls	lbs	21
Puncture Resistance (min. avg.)	ASTM D-4833	Every 6 rolls	lbs	60
Dimensional Stability	ASTM D-1204	Every 6 rolls	%	± 2
Stress Crack Resistance (SP-NCTL)	ASTM D-5397	1/Batch	hr.	300
Oven Aging - % retained after 90 days	ASTM D-5721	Per formulation		
HP OIT (min. avg.)	ASTM D-5885		%	80
UV Resistance - % retained after 1600 hr	GRI-GM-11	Per formulation	%	
HP-OIT (min. avg.)	ASTM D-5885			50
SUPPLY SPECIFICATIONS *(Roll dimensions may vary ±1%)*				
Roll Dimension - Width			ft	22.3
Roll Dimension - Length			ft	1,000
Area (Surface/Roll)			sf	22,300

NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).
2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.

* All values are nominal test results, except when specified as minimum or maximum.
* The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsability of the user. SOLMAX assumes no liability in connection with the use of this information.

MICRO-EPSILON

More Precision

eddyNCDT // Eddy current sensors for displacement and position

eddyNCDT 3001

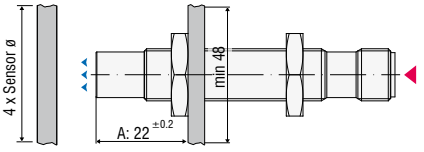
- *Compact M12 sensor design with integrated controller*
- *Bandwidth 5kHz (-3dB)*
- *Sensor for ferro- and non-ferromagnetic targets*
- *Temperature compensation up to 70°C*
- *Easy to use (plug & play)*
- *Robust design to IP67*

Robust miniature eddy current sensor

The eddyNCDT 3001 is a new, efficient eddy current sensor whose compact dimensions have to date only been reserved for inductive sensors and proximity sensors. This compact sensor comes with integrated electronics including temperature compensation, offering an outstanding price/performance ratio, as well as easy operation. Therefore, the sensor is ideally suited to OEM integration and mechanical engineering applications. The temperature-compensated design provides high stability even in fluctuating ambient temperatures. The sensor is factory-calibrated for ferromagnetic and non-ferromagnetic materials, which eliminates the need for on-site linearisation of the sensor. The robust construction combined with the eddy current measuring principle enables measurements in harsh industrial environments (oil, pressure, dirt). In addition, the eddyNCDT 3001 is suitable for offshore/ marine applications (salt water).

Installation instructions

The relative size of the measurement object to the sensor and the position of the mounting nut have effects on the linearity deviation for eddy current sensors.



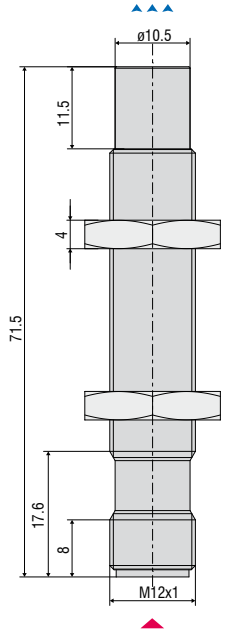
Please note:

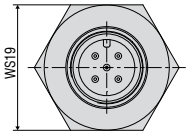
- Depending on the sensor model, the measurement object geometry shall be 4 times the sensor diameter.
- The mounting nut should not exceed the indicated dimension A.

Model	DT3001-U2A-SA	DT3001-U2M-SA	DT3001-U4A-SA	DT3001-U4M-SA	DT3001-U4A-Cx	DT3001-U4M-Cx
Measurement object [1]	aluminum	steel	aluminum	steel	aluminum	steel
Measuring range	2mm		4mm			
Offset distance	0.4mm					
Linearity	28µm					
Resolution [2]	4µm					
Bandwidth	5kHz (-3 dB)					
Temperature stability	0.03% FSO / °C					
Temperature compensation range	0°C …+70°C					
Ambient temperature	0°C …+70°C					
Installation	unshielded					
Recommended measurement object geometry (flat)	48mm					
Connection	connector 5-pin M12				integrated cable, 5-pin, length 3/6/9m	
Output	0.5 ... 9.5V				0.5 ... 4.5V	
Power supply	12V … 32V					
Protection class	IP67 (connected)				IP67	
Weight	25g				60g (3m) 100g (6m) 140g (9m)	

FSO = of full scale output
[1] Steel: ST37 DIN 1.0037 / aluminium: AlCuMgPb3.1645
[2] RMS noise relates to centre of measuring range with a bandwith of 5kHz

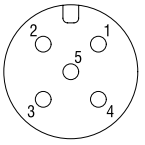
DT3001-SA



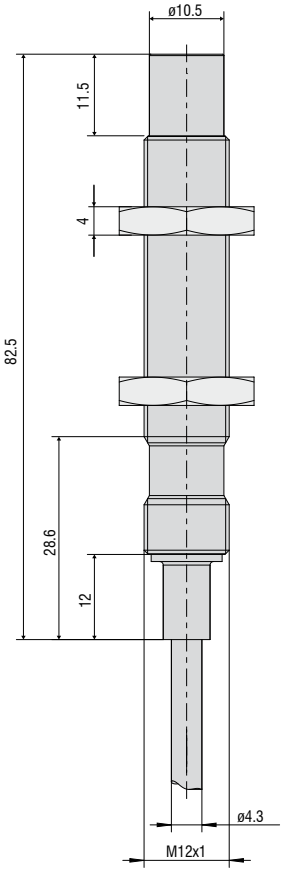


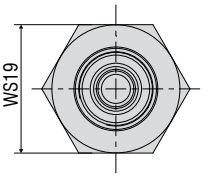
Pin assignment 5-pin M12-connector

Pin	Description
1	supply +24V
2	displacement signal
3	ground
4	internal
5	internal



DT3001-Cx





Pin assignment

Color	Description
brown	supply +24V
green	displacement signal
white	ground
yellow	internal
grey	internal

Articel	Description	eddyNCDT 3001	eddyNCDT 3005	eddyNCDT 3010	eddyNCDT 3100	eddyNCDT 3300
PC3/8	Power- and output cable, 3m, 8 pin			•		
PC5/5	Power- and signal cable	•	•			
SC30	Synchronization cable, 30cm			•		
CSP 301	Digital signal processing and display unit up to 2 channels			•		
PC3100-3/6/BNC	Outputcable and supply unit, 3m				•	
PS2020	Power Supply 24V / 2.5A; Input 100-240 VAC; Output 24 VDC / 2.5A; DIN rail mounting; 35mm x 7.5mm, DIN 50022				•	•
MC2.5	Micrometer calibration fixture, range 0 to 2.5 mm, division 1 µm, for sensors EPU05 to EPS2, adjustable offset (zero)			•	•	•
MC25D	Micrometer calibration fixture, range 0 to 25mm, division 1 µm, for sensors EPU05 to EPU15, adjustable offset (zero)			•	•	•
ECx	Sensor cable, length selectable up to 15m					•
ECx/90	Sensor cable with 90° connector (sensor-sided) length selectable up to 15m					•
ECx/1	Extension cable for solder connection					•
ECx/2	Extension cable for plug connection					•
SCA3/5	Signal cable analog, 3m					•
SCA3/5/BNC	Signal cable analog with BNC connector, 3m					•
SCD3/8	Signal cable digital (switch input/outout), 3m (also for supply 11 - 32VDC); for DT3301					•
SIC3(07)	Signal cable with BNC connector for direct operation with oscilloscope					•
PSC30	Power / Synchronization cable, 0.3m, for DT3300					•
ESC30	Synchronization cable, 0.3m, for DT3301					•
PS300/12/5	Power supply Input 100 - 240VAC; Output ≤12VDC / 5.2VDC integrated cable 1.5m; for max. 4x DT3300					•
MBC300	Mounting base for controller DT330x, fixing through M4 threaded holes 166x108x60mm					•
MCT304-SM	Tower for max. 4 controller DT 3300; supply 100 - 240VAC					•
MCT304(01)	Tower for max. 4 controller DT 3301; supply 11 - 32VDC					•

High performance sensors made by Micro-Epsilon

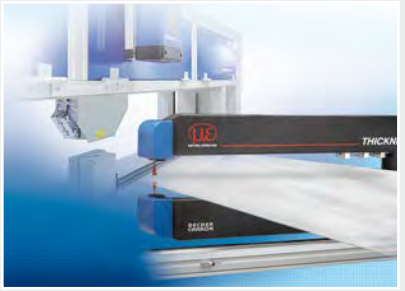
Sensors and systems for displacement and position

Sensors and measurement devices for non-contact temperature measurement

2D/3D profile sensors (laser scanner)

Optical micrometers, fiber optic sensors and fiber optics

Color recognition sensors, LED analyzers and color online spectrometer



Measurement and inspection systems

Modifications reserved / Y9766509-B051107GKE

MICRO-EPSILON

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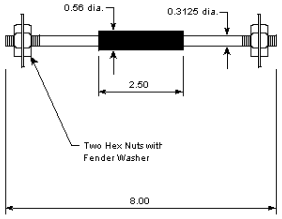
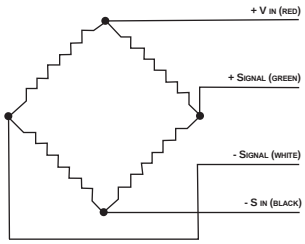
www.CTLGroup.com

Concrete Strain Gages

SERVICE | *at-a-glance*





General Specifications

Bridge Completion ..... Full bridge, no completion required
Gage Resistance ..... 350 Ohm
Excitation ..... up to 10 Volts
Output ..... ≈ 2 mV/V @ 1500 µstrain
Calibration Factor ..... Individually provided
Grid Area ..... 0.133cm^2
Gage Area .....1.22 cm^2 overall
Fatigue Life ..... <10^5 repetitions @ +/- 1500 µstrain
Cell Material ..... Steel 5/16-in. diameter with 5/16-in. x 18 threaded ends
Coating ..... Two-part polysulfide liquid polymer, encapsulated in silicone with butyl rubber outer core

Quality Assurance

Temperature..... -34ºC (-30ºF) to 204ºC (400ºF)
Lead Wire ..... 30 ft of 22 AWG shielded, twisted-pair four wire

Background Information

CTLGroup's Concrete Strain Guages feature a field-proven design that uses durable materials to ensure accurate long-term data collection. Its full-bridge configuration reduces costs by eliminating the need for expensive data-acquisition and signal-conditioning systems to provide bridge completion. Shielded, twisted-pair design protects the lead wire from electrical noise. This all leads to longer sensor life and long-term savings, by reducing redundancy in your instrumentation plan.

HEADQUARTERS | LABORATORIES
847.965.7500
5400 Old Orchard Road
Skokie, IL 60077

AUSTIN TX OFFICE
512.219.4075

NAPERVILLE IL OFFICE
630.995.3949

DECAGON® DEVICES
2365 NE Hopkins Ct / Pullman, WA 99163 USA

5TM Sensor

Volumetric Water Content and Temperature

APPLICATIONS

- Volumetric water content measurement.
- Soil water balance
- Irrigation management
- Soil temperature measurement
- Modeling processes that are affected by temperature.

ADVANTAGES

- Digital sensor communicates two measurements over a serial interface.
- Robust thermistor for accurate temperature measurements.
- Low input voltage requirements.
- Low power design supports battery-operated data loggers.
- Robust epoxy overmold to resist corrosive environments.
- Supports SDI-12 or DDI-Serial 1-wire serial communications protocols.
- Modern design optimized for low-cost sensing.
- Small size makes it easy to install.
- Use SDI-12 to easily integrate with systems manufactured by other companies.

DESCRIPTION

The Decagon 5TM sensor is a low-cost, accurate tool for monitoring volumetric water content and temperature in soils. As with all ECH_2O sensors, the 5TM determines volumetric water content (VWC) by measuring the dielectric constant of the media using capacitance/frequency domain technology. The sensor uses a 70 MHz frequency, which minimizes textural and salinity effects, making the 5TM accurate in most soils. The 5TM measures temperature using an onboard thermistor.

AUDIENCE

Decagon provides the information in this integrators guide to help 5TM customers establish communication between these sensors and their data acquisition equipment or field data loggers. Customers using data loggers that support SDI-12 sensor communications should consult the user's manual for their data logger. These sensors are fully integrated into Decagon's system of plug-and-play sensors, cellular-enabled data loggers, and data analysis software.

MEASUREMENT SPECIFICATIONS

	Volumetric Water Content	Temperature
Accuracy	Generic calibration equation: ± 0.03 m^3/m^3 (± 3% VWC) typ Medium Specific Calibration: ± 0.02 m^3/m^3 (± 2% VWC)	± 1°C
Resolution	0.0008 m^3/m^3 (0.08% VWC) from 0 – 50% VWC	0.1°C
Range	0 – 1 m^3/m^3 (0 – 100% VWC)	- 40°C to + 50°C

PHYSICAL CHARACTERISTICS

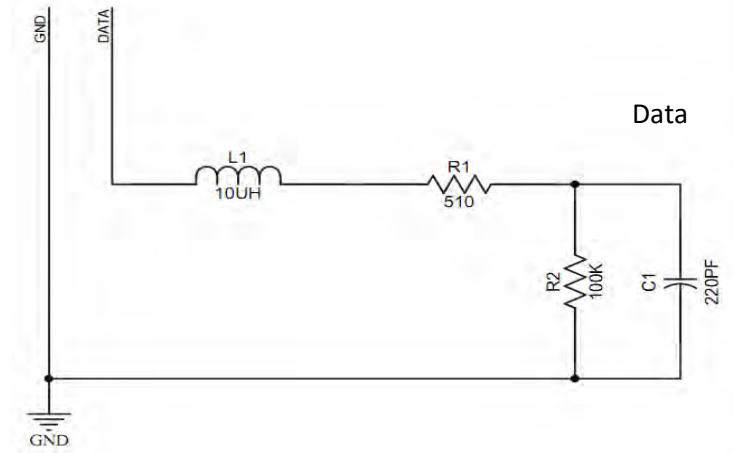
SENSOR IMAGE	
SENSOR NAME	5TM Sensor
DIMENSIONS	10 cm X 3.2 cm
CABLE LENGTH*	5 meters

* Custom cable lengths are available for an additional cost.

ELECTRICAL AND TIMING CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNITS
Supply Voltage (VCC) to GND	3.6		15	V
Digital Input Voltage (logic high)	2.8	3	3.9	V
Digital Input Voltage (logic low)	-0.3	0	0.8	V
Power Line Slew Rate	1			V/mS
Current Drain (during measurement)	0.5	3	10	mA
Current Drain (while asleep)		0.03		mA
Operating Temperature Range	-40		50	°C
Power Up Time (DDI-Serial)			100	mS
Power Up Time (SDI-12)	100	150	200	mS
Measurement duration		150	200	mS
Cable Capacitance / meter		250		pF
Cable Resistance / meter		35		mΩ

EQUIVALENT CIRCUIT DIAGRAM



NOTE: This is a low impedance variant of the recommended SDI-12 Specification. This allows up to 62 sensors to be maintained on a bus.

CONNECTION TYPES

PIGTAIL CABLE

STEREO CABLE

⚠ SAFETY PRECAUTIONS

Our probes are built to the highest standards but misuse or improper protection or improper installation may break your sensor and possibly void the manufacturer's warranty. Before integrating your sensors into your sensor network, make sure you have followed the recommended installation instructions and have the proper protections in place to safeguard your sensor from damaging interference.

LIGHTNING AND SURGE PROTECTION

Probes have built in circuitry that protects them against common surge conditions. Installations in lightning-prone areas, however, require special precautions, especially when probes are connected to a well-grounded third party logger.

Visit our website and read the following application note for more information:
Lightning Surge Suppression And Standard Grounding Practices

POWER AND GROUNDING

Older sensor versions start measurements as soon as they are powered. For older sensors, ensure that there is sufficient power to support the maximum sensor current drain for all the sensors on the bus simultaneously.

Our sensor protection circuitry may be insufficient if your data logger is improperly powered or grounded. Refer to your data logger's installation instructions. Improper grounding may affect the sensor output as well as the sensor performance.

For Decagon loggers, visit our website and read the following article for more information:
Lightning Surge Suppression And Standard Grounding Practices

CABLE PROBLEMS

Cable problems can lead to severed cables or disconnected sensors. Rodent damage, driving over sensor cables, tripping over the cable, not leaving enough cable slack during installation or poor sensor wiring connections are just some of many factors that can cause cabling issues.

SENSOR COMMUNICATION TYPES

Decagon digital sensors feature a 1-wire serial interface for communicating sensor measurements. The sensor supports two different protocols: SDI-12 and DDI-Serial. Both interfaces are documented in this guide. Each protocol has advantages and implementation challenges. There are differences in voltage levels, logic levels, and signal timing for each protocol. Please contact Decagon with your specific requirements if the protocol choice for your application is not obvious.

SDI-12 INTRODUCTION

SDI-12 is a standards-based protocol for interfacing sensors to data loggers and data acquisition equipment. Multiple sensors with unique addresses can share a common 3-wire bus (power, ground, and data). Two-way communication between the sensor and logger are possible by sharing the data line for transmit and receive as defined by the standard. Sensor measurements are triggered by protocol command.

DDI-SERIAL INTRODUCTION

The DDI-Serial protocol is the method used by the Decagon's family of data loggers for collecting data from the sensor. This protocol uses the data line configured to transmit data from the sensor to the receiver only (simplex). Typically the receive side is a microprocessor UART or a general-purpose IO pin using a "bit-bang" method to receive data. Sensor measurements are triggered by applying power to the sensor.

INTERFACING THE SENSOR TO A PC

The serial signals and protocols supported by the sensor require some type of interface hardware to be compatible with the serial port found on most personal computers (or USB-to-Serial adapters). There are several SDI-12 interface adapters available in the marketplace; however, Decagon has not tested any of these interfaces and cannot make a recommendation of which adapters work with Decagon sensors. Decagon's Em50 data logger and ProCheck hand-held both are able to operate as a computer-to-sensor interface for making on-demand sensor measurements.

SDI-12 COMMUNICATION

SDI-12 is a common bus communication protocol that allows you to connect multiple sensors to a common data line. The SDI-12 protocol requires a unique alpha numeric sensor address for each sensor on the bus so that a data logger can send and receive readings to specific sensors.

Visit www.sdi-12.org to download the latest SDI-12 Specification or find out more information about the standard.

DECAGON'S SDI-12 IMPLEMENTATION

Decagon's sensors use a low impedance variant of the SDI-12 standard sensor circuit (see the *Equivalent Circuit Diagram*). This allows for up to 62 sensors to be connected onto the bus at one time instead of the 10 that is stated in the standard. Keep in mind that the more sensors you have on a bus, the more difficult it will be to isolate and remove the faulty sensor and restore communication to the remaining sensors on your SDI-12 bus.

Out of the factory, all Decagon sensors start with SDI-12 address zero and print out the DDI-Serial string during the power up time specified in the *Electrical and Timing Characteristics* section (See the start up sequence diagram in the DDI-Serial section for a detailed diagram). This can be interpreted by non-Decagon SDI-12 sensors as a pseudo-break condition followed by a random series of bits. To circumvent this issue, sensors with firmware version 3.29 and newer omit the DDI-Serial string when their SDI-12 address is non-zero. Simply changing the sensor addresses on the SDI-12 bus to non-zero values will prevent any race conditions on the data line during sensor power up.

After the power up time, our sensors are fully compatible with all the commands listed in the SDI-12 Specification v1.3 except for the continuous measurement commands (aR0 – aR9 and aRC0 – aRC9).

SENSOR BUS CONSIDERATIONS

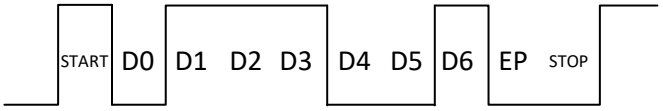
An SDI-12 bus isn't something you can set up and just walk away. Sensor buses require regular checking, sensor upkeep, and sensor trouble-shooting. If one sensor goes down, that may take down the whole bus even if the remaining sensors are functioning normally. Power cycling the SDI-12 bus when a sensor is failing is okay but we do not recommend scheduling power cycling events on an SDI-12 bus more than once or twice a day.

Many factors influence the effectiveness of your bus configuration and many questions should be answered: How often should data be checked? How is the data delivered to the end user? How do I isolate a faulty sensor?

Visit our website and read our application note and view our virtual seminars on Best Practices for SDI-12 Sensor Networks.

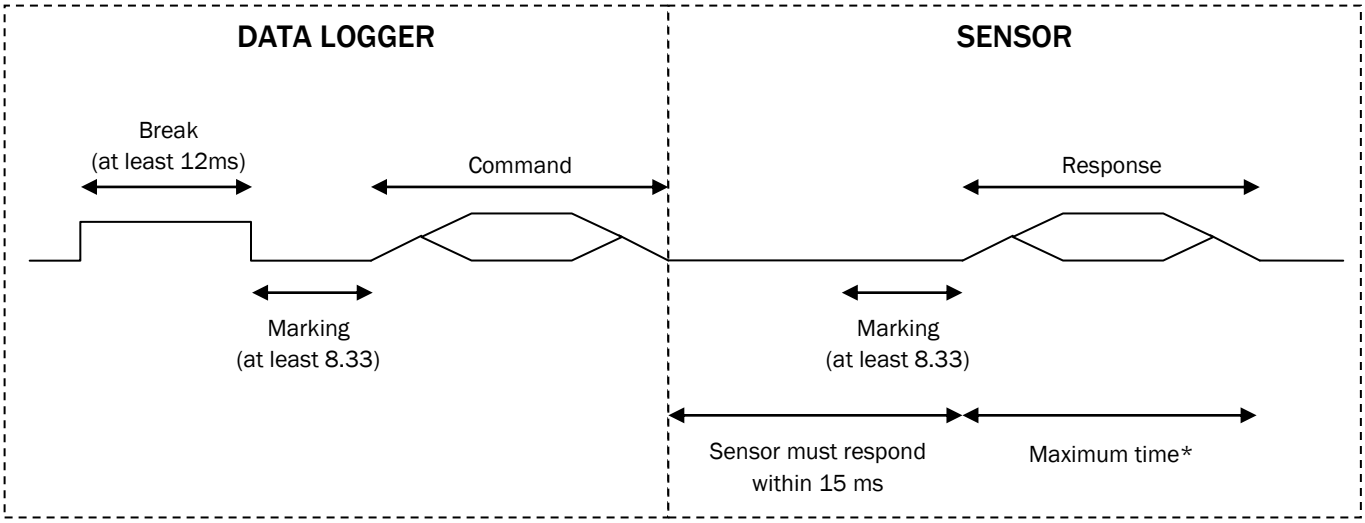
SDI-12 TIMING

SDI-12 communication sends characters at 1200 bits per second. Each character has 1 start bit, 7 data bits (LSB first), 1 even parity bit, and 1 stop bit (Active low or inverted logic levels):



Example SDI-12 transmission of the character '1' (0x31)

All SDI-12 commands and response must adhere to the following format on the data line. Both the command and response are preceded by an address and terminated by a carriage return line feed combination.



***MAXIMUM TIME**

380 mS	Most Commands
780 mS	For a D command after a concurrent measurement
810 mS	For a D command after a concurrent measurement, with CRC

COMMON SDI-12 COMMANDS

Below is a list of common SDI-12 commands that are often used in an SDI-12 system and the corresponding responses from our sensors:

INFO COMMAND (**aI!**)

The information command can be used to obtain a variety of detailed information about the sensor you are connected to. Here is an example output from one of our sensors (the logger command is in **bold**):

1I!113 DECAGON 5TM 329631800001

PARAMETER	FIXED LENGTH*	DESCRIPTION
1I!	3 Chars	Request from the data logger asking for information from sensor address 1.
1	1 Char	Sensor Address. Pre-pended on all responses, this allows you to know which sensor on your bus is returning the following information.
13	2 Chars	Indicates that the target sensor supports SDI-12 Specification v1.3
DECAGON	8 Chars	The Vendor Identification String. The parameter is the same for all our Decagon sensors.
5TM	6 Chars	The Sensor Model String. This string is specific to the sensor type. For 5TM Sensors, the string is "5TM"
329	3 Chars	The Sensor Version. This number is divided by 100 to give our sensor version. In this case the Decagon sensor version is 3.29
631800001	Up to 13 Chars	The Sensor Serial Number. This is a variable length field. For older sensors this may be omitted. Newer sensors may contain serial number information here.

* In the event that the fixed length is longer than the parameter, the trailing characters will be populated with space characters.

MEASUREMENT COMMAND† (**aM!**)

The measurement command can be used to begin a sensor measurement. Here is an example output from one of our sensors (the logger command is in **bold**):

1M!10012

PARAMETER	FIXED LENGTH	DESCRIPTION
1M!	3 Chars	Request from the data logger asking the sensor with address 1 to begin a measurement
1	1 Char	Sensor Address. Pre-pended on all responses, this allows you to know which sensor on your bus is returning the following information.
001	3 Chars	The measurement data will be available after this specified time in seconds. If a sensor finishes early, it will initiate a service request (SDI-12 address and a return character line feed).
2	1 Char	Number of values that will be returned.

† The measurement and corresponding data command are intended to be used back to back. If you would like to start a measurement on more than one sensor at a time, you must use the concurrent command. See the SDI-12 Specifications v1.3 document for more information.

DATA COMMAND† (**aD0!**)

The data command is used to retrieve the measurement response from the sensor. Each value is delimited by the sign of the value that can be either positive or negative. Here is an example output from one of our sensors (the logger command is in **bold**):

1D0!1+1.60+24.1

PARAMETER	FIXED LENGTH	DESCRIPTION
1D0!	4 Chars	Request from the data logger asking the sensor with address 1 to return the response from a measurement. (A measurement command must be sent prior to sending the data command).
1	1 Char	Sensor Address. Pre-pended on all responses, this allows you to know which sensor on your bus is returning the following information.
+1.60	Variable	Dielectric ε. To convert to VWC in mineral soil, we recommend the well known Topp equation (Topp et al, 1980): $\theta = 4.3X10^{-6} * \varepsilon^3 - 5.5X10^{-4} * \varepsilon^2 + 2.92X10^{-2} * \varepsilon - 5.3X10^{-2}$ *Note: For other soil types, refer to the sensor user manual.*
+24.1	Variable	Temperature measurement in °C

† The measurement and corresponding data command are intended to be used back to back. If you would like to start a measurement on more than one sensor at a time, you must use the concurrent command. See the SDI-12 Specifications document for more information.

CHANGE ADDRESS COMMAND (**aAb!**)

The change address command is used to change a sensor's address to a new address. All other commands support the wild card character as the target sensor address except for this command. All of Decagon's sensors have a default address of 0 (zero) out of the factory. In order to use more than one of our sensors on a bus system, you must change the addresses so that they are all unique. Supported addresses are alpha numeric (i.e. a – z, A – Z, and 0 – 9). Changing address while connected to a bus is not recommended. Here is an example output from one of our sensors (the logger command is in **bold**):

1A0!0

PARAMETER	FIXED LENGTH	DESCRIPTION
1A0!	4 Chars	Request from the data logger asking the sensor to change the address of sensor with address 1 to a new address of 0 (zero).
0	1 Char	New Sensor Address. For all subsequent commands, this new address will be used for the target sensor.

ADDRESS QUERY COMMAND (**?!**)

While disconnected from a bus, the address query command can be used to determine which sensor you are currently communicating with. Sending this command over a bus will cause a bus contention where all the sensors will respond simultaneously and corrupt the data line. This command is helpful if you are trying to isolate a failed sensor. Here is an example output from one of our sensors (the logger command is in **bold**):

?!0

PARAMETER	FIXED LENGTH	DESCRIPTION
?!	2 Chars	Request from the data logger asking for a response from any sensor listening on the data line.
0	1 Char	Sensor Address. Returns the sensor address to the currently connected sensor.

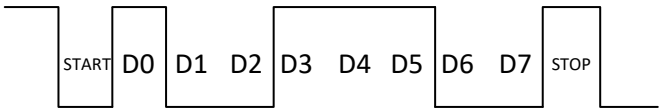
DDI-SERIAL COMMUNICATION

The DDI-Serial communications protocol is ideal for systems that have dedicated serial signaling lines for each sensor or use a multiplexer to handle multiple sensors. The serial communications are compatible with many TTL serial implementations that support active-high logic levels using 0-3.6 volts signal levels. When the sensor is first powered, it automatically makes measurements of the integrated transducers then outputs a response over the data line. Systems using this protocol control the sensor excitation to initiate data transfers from the sensor. This protocol is subject to change as Decagon improves and expands our line of digital sensors and data loggers.

NOTE: Out of the factory, all Decagon sensors start with SDI-12 address zero and print out the startup string when power cycled. On sensors with firmware version 3.29 and newer the start up string is omitted when the address is non-zero.

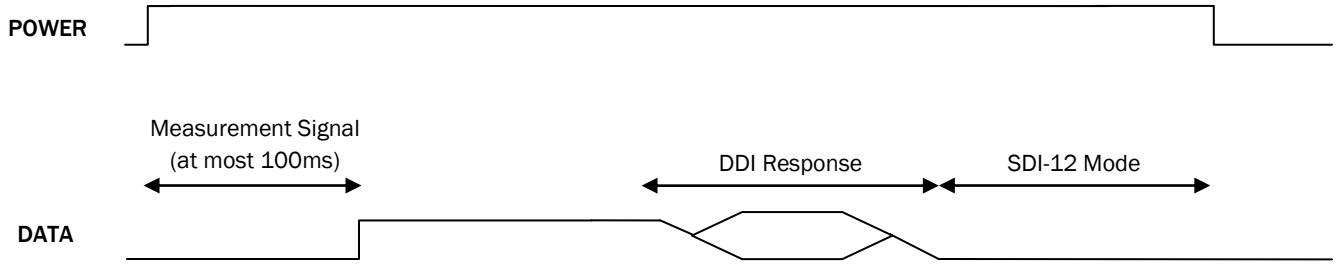
DDI-SERIAL TIMING

DDI-serial communication sends characters at 1200 bits per second. Each character has 1 start bit, 8 data bits (LSB first), no parity bit, and 1 stop bit. (Active high or non-inverted logic levels)



Example serial transmission of the character ‘9’ (0x39)

Upon power up, the sensor will pull the data line high within 100 mS to indicate that the sensor is taking a reading. When the reading is complete, the sensor begins sending the serial signal out the data line. Once the data is transmitted, the sensor goes into SDI-12 communication mode. In order to get another serial signal, the sensor must be power cycled.



Note: Sometimes the signaling from the sensor can confuse typical microprocessor UARTs. The sensor holds the data line low while it takes measurements. It raises the line high to signal the logger that it will send a measurement as documented above. Then the sensor may take some additional measurements before starting to clock out the first data byte starting with a typical start bit (low). Once the first start bit is sent, typical serial timing is valid; however, the signal transitions before this point are not serial signaling and may be misinterpreted by the UART.

DDI- SERIAL RESPONSE

The data string output by the sensor should be in a format similar to the one below:

```
56 0 645<0D>x_<0D><0A>
```

PARAMETER	DESCRIPTION
56	Raw dielectric output in the format raw output = dielectric * 50. To convert to VWC in mineral soil, we recommend the well known Topp equation (Topp et al, 1980): $\theta = 4.3X10^{-6} * \varepsilon^3 - 5.5X10^{-4} * \varepsilon^2 + 2.92X10^{-2} * \varepsilon - 5.3X10^{-2}$ In this example, 56 this is the raw apparent dielectric reported. Dividing this by 50 gives a value of 1.12. This is an appropriate value for a sensor measuring air. *Note: For other soil types, refer to the user manual of the sensor.*
0	Place Holder so that the DDI-Serial response is identical to the 5TE. For the 5TM, this value is always zero.
645	Raw Temperature (T_{raw}). T_{raw} = 10*T + 400, where T is the degrees Celsius. To convert it to temperature, subtract 400 and divide by 10. In this example, 645 is the raw temperature value reported. Subtracting by 400 and dividing by 10 gives us a temperature of 24.5°C. *Note: For T_{raw} values that exceed 900, the T_{raw} needs to be decompressed prior to converting it to Celsius using the following equation:* $T_{decompressed} = 5*(T_{raw} - 900) + 900$
<0D>	This carriage return character signals the end of the measurement string and start of the meta data string.

Everything below is this line is meta data:

x	Sensor Type. This character is used to indicate the sensor type. x is used for 5TM sensors.
_	Checksum. This one character checksum is used in our instruments to ensure that the data transmitted are valid. The checksum is used for sections listed above: 56 0 645<0D>x See the following function for an example of how to implement the checksum algorithm in C.
<0D><0A>	The carriage return and line feed are used to signal the end of the meta data section and the end of the transmission.

DDI-SERIAL CHECKSUM

Here is an example of how to calculate the checksum (crc) in C. In this case, the string passed to the function would be: 56 0 645<0D>x" and the returning value would be the character '_'.

```
char CalculateChecksum(char * Response){
    int length, sum = 0, i, crc;

    // Finding the length of the response string
    length = strlen(Response);

    // Adding characters in the response together
    for( i = 0; i < length; i++ )
        sum += Response[i];

    // Converting checksum to a printable character
    crc = sum % 64 + 32;

    return crc;
}
```

APPLICATIONS

- MEDICAL EQUIPMENT
- HOSPITAL BEDS
- LINEAR ACTUATORS
- ANIMATED CHARACTERS
- GAUGING
- WOODWORKING GUIDES
- FLUID FLOW METERS
- SEISMOLOGY
- SEMI CONDUCTOR PROCESSING

MLT • *3/8 INCH DIAMETER LINEAR POSITION TRANSDUCER*

The Models MLT are small diameter linear position transducers rugged enough to withstand the hostile environment of the factory. Using a proprietary dual wiper, internal ball joint and the MystR® conductive plastic film the MLT provides usable output at high vibration levels for long periods. MLT Transducers use precious metal wipers to further enhance reliability.

Intrinsically Safe for Class I, II, and III Division 1, Groups A, B, C, D, E, F and G for Hazardous (indoor/outdoor) NEMA 4 locations. V max = 30 V, I max = 100 mA, Ci = 0, uF, Li, = 0 mH.

FEATURES

- 0.375 inch diameter
- Dual wiper design
- Extruded wiper block guides
- MystR® plastic element
- Internal spring loaded ball joint
- Anodized extruded aluminum housing
- Stainless steel shaft
- Precious metal contact
- Absolute continuous measurement

BENEFITS

- Fits into tight spaces, clamps easily to cylinders
- Improves shock and vibration performance
- Smooth quiet motion; extends operating life
- Tested up to one billion operations
- Less error from shaft misalignment
- Tolerates clamping loads
- Full performance in hostile environments
- Low noise level over entire life
- Accurate position at power up

HOW TO ORDER

MLT 0R5 N 0750 F 5 C

Model — MLT

Electrical Travel* — 0R5 = 750
001 = 1500
002 = 3000
003 = 4500
004 = 6000
005 = 7500
006 = 9000

Unit of Measure — N = Inches

Total Resistance* — 0750, 1500, 3000, 4500, 6000, 7500, 9000

Linearity — B = 0.1%
F = 1.0% (Best possible on 0.5 in. device)
D = 0.25% (Best possible on 1.0 in. device)

Shaft — 5 = 4-40 Thread

Termination — C = Cable

Note: Not all combinations are available. Minimum quantity orders apply. Contact the factory for more details.
* Note: The *Electrical Travel* correlates to the *Total Resistance (Ohms)*.

TECHNICAL SPECIFICATIONS

MECHANICAL	
Total Mechanical Travel	0.55 to 6.05 in. (min) 13.9 to 153.7 mm (min)
Starting Force	1.0 oz (max)
Shock	50 g 11 ms half sine
Vibration	20 g rms 5 Hz to 2 KHz
Life	One Billion dither operations
ELECTRICAL	
Theoretical Electrical Travel (1 inch increments)	0.5 to 6 in. (12.7 to 152.4 mm)
Independent Linearity	See How to Order
Total Resistance	1500 Ohms per inch electrical travel
Resistance Tolerance	±20%
Operating Temperature	-40° to 80°C (-40° to 176°F)
Resolution	Infinite
Insulation Resistance	500 M Ohms @ 500 Vdc
Dielectric Strength	1000 V rms
Max. Applied Voltage	30 Vdc
Backlash	0.0005 in. max
Recommended Wiper Current	<1 µA

Caution: Do not test on an Ohm Meter on the Rx 1 scale or other current devices.

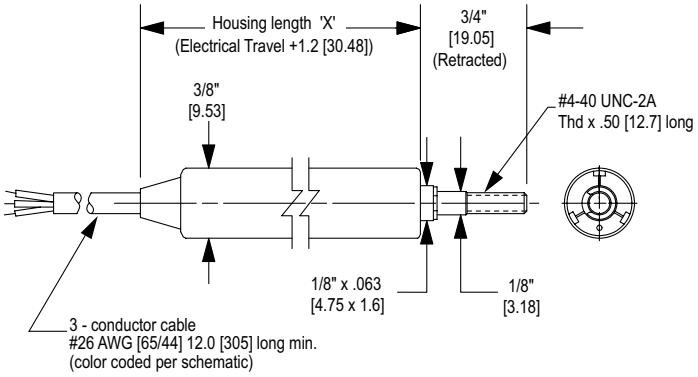
Caution: Excessive Wiper Current can cause Output errors or damage.

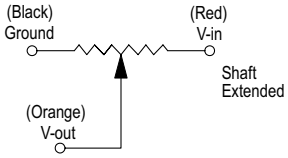
Caution: Zero shaft side load is recommended to achieve maximum life.

DIMENSIONS

xx.xx = inches

(xx.x) = mm





Connect to High Impedance Circuit

Model	Electrical Travel in inches	Total Resistance Ohms	Housing Length 'X' in inches	Weight in grams
MLT0R5	0.5	750	1.7	11
MLT001	1.0	1500	2.2	14
MLT002	2.0	3000	3.2	20
MLT003	3.0	4500	4.2	23
MLT004	4.0	6000	5.2	28
MLT005	5.0	7500	6.2	30
MLT006	6.0	9000	7.2	31

SPECIALS AND ACCESSORIES

- *Other Mechanical Travels*
- *Other Electrical Travels*
- *Other Resistance Values*
- *Rod-end bearing*
- *Metric Shaft Adapter*

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Contact your local sales office for warranty information. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace without charge those items it finds defective. The foregoing is Buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Rev. 050107

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The World Leader in Vibrating Wire Technology

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E-mail: geokon@geokon.com
http://www.geokon.com

Instruction Manual

Model 3500 Series

Earth Pressure Cells

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(Doc Rev P, 10/9/17)

Warranty Statement

Geokon, Inc. warrants its products to be free of defects in materials and workmanship, under normal use and service for a period of 13 months from date of purchase. If the unit should malfunction, it must be returned to the factory for evaluation, freight prepaid. Upon examination by Geokon, if the unit is found to be defective, it will be repaired or replaced at no charge. However, the WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion or current, heat, moisture or vibration, improper specification, misapplication, misuse or other operating conditions outside of Geokon's control. Components which wear or which are damaged by misuse are not warranted. This includes fuses and batteries.

Geokon manufactures scientific instruments whose misuse is potentially dangerous. The instruments are intended to be installed and used only by qualified personnel. There are no warranties except as stated herein. There are no other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and of fitness for a particular purpose. Geokon, Inc. is not responsible for any damages or losses caused to other equipment, whether direct, indirect, incidental, special or consequential which the purchaser may experience as a result of the installation or use of the product. The buyer's sole remedy for any breach of this agreement by Geokon, Inc. or any breach of any warranty by Geokon, Inc. shall not exceed the purchase price paid by the purchaser to Geokon, Inc. for the unit or units, or equipment directly affected by such breach. Under no circumstances will Geokon reimburse the claimant for loss incurred in removing and/or reinstalling equipment.

Every precaution for accuracy has been taken in the preparation of manuals and/or software, however, Geokon, Inc. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages or losses that result from the use of the products in accordance with the information contained in the manual or software.

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1. INTRODUCTION

1.1 Theory of Operation

Earth Pressure Cells, sometimes called Total Pressure Cells or Total Stress Cells are designed to measure stresses in soil or the pressure of soil on structures. Cells will respond not only to soil pressures but also to ground water pressures or to pore water pressure, hence the term total pressure or total stress. A simultaneous measurement of pore water pressure (μ), using a piezometer, is necessary to separate the effective stress (σ') from the total stress (σ) as defined by Terzaghi's principle of effective stress where;

$$\sigma' = \sigma - \mu$$

These parameters coupled with the soil strength characteristics will determine soil behavior under loads.

Earth pressure cells of the type described here are the hydraulic type: two flat plates are welded together at their periphery and are separated by a small gap filled with a hydraulic fluid. The earth pressure acts to squeeze the two plates together thus building up a pressure inside the fluid. If the plates are flexible enough, i.e. if they are thin enough relative to their lateral extent, then at the center of the plate the supporting effect of the welded periphery is negligible and it can be stated that at the center of the cell the external soil pressure is exactly balanced by the internal fluid pressure.

This is true only if the deflection of the plates is kept to a minimum and thus it is important that the cell be stiff. This in a practical sense means that the fluid inside the cell should be as incompressible as possible and that the pressure transducer required to measure the fluid pressure should also be stiff having very little volume change under increasing pressure.

Tests conducted by various researchers (as reported by Dunnicliff, 1988) have shown that the introduction of a flat stress cell into a soil mass will alter the stress field in a way dependent on the relative stiffness of the cell with respect to the soil and also with respect to the aspect ratio of the cell, i.e. the ratio of the width of the cell to its thickness. A thick cell will alter the stress more than a thin cell. Hence, for these reasons, a thin, stiff cell is best and studies have shown an aspect ratio of at least 20 to 1 to be desirable.

Ideally, the cell ought to be as stiff (compressible) as the soil. But in practice this is difficult to achieve. If the cell is stiffer (less compressible) than the soil then it will over register the soil pressure because of a zone of soil immediately around the cell which is "sheltered" by the cell so that it does not experience the full soil pressure. This can be represented schematically as shown in Figure 1.

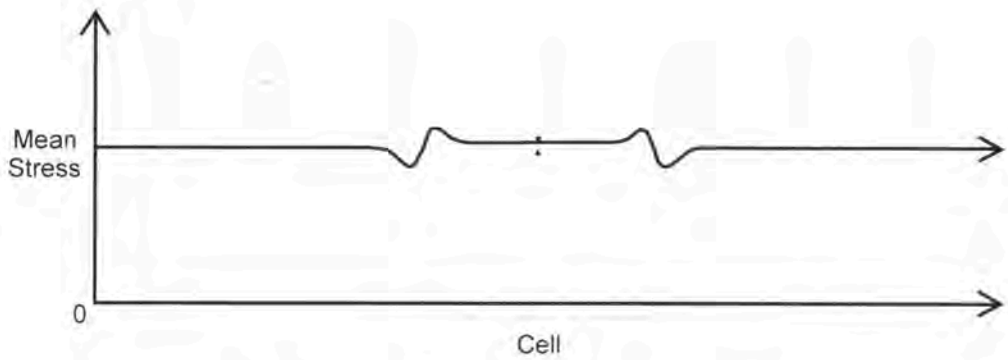

Figure 1 - Stress Redistribution, Weak Soil with Stiff Cell

As can be seen there is a stress concentration at the rigid rim but in the center of the cell the soil stress is only slightly higher than the mean soil stress, i.e. only slightly higher than the stress which would obtain were the cell not present.

In a stronger soil the destressed zone around the edge of the cell is more extensive and hence at the center of the cell the degree of *over registration* of the mean stress is greater. This is represented schematically in Figure 2.

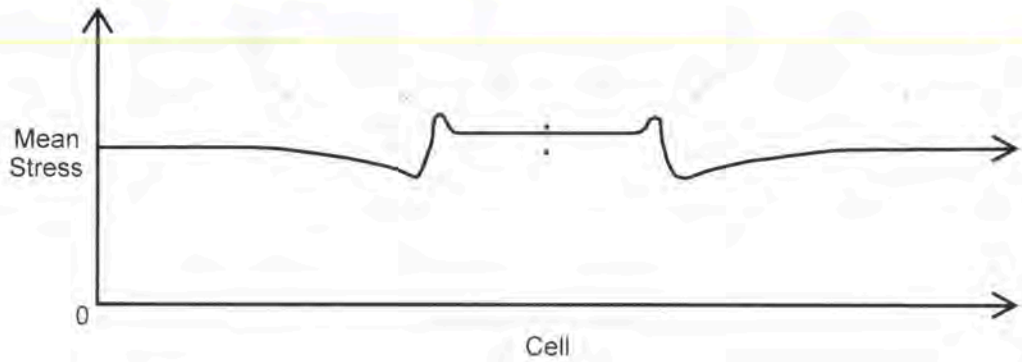

Figure 2 - Stress Redistribution, Strong Soil with Stiff Cell

In a stiff soil the cell may be less stiff (more compressible) than the soil, in which case the cell will *under register* the mean soil stress as the stresses in the soil tend to "bridge" around the cell. This is represented schematically in Figure 3.

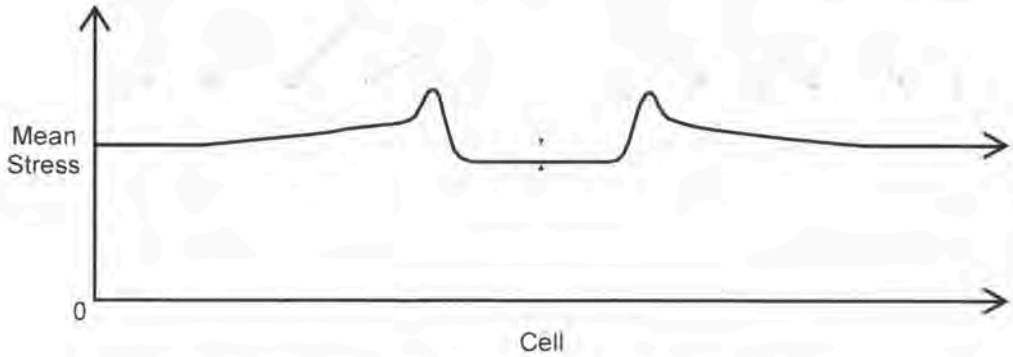

Figure 3- Stress Redistribution, Stiff Soil with Weak Cell

Tests conducted at the University of Ohio (Ohio, USA) with several different soil types have shown that for Geokon cells the maximum degree of over or under registration amounts to 15% of the mean soil stress.

Other factors should be kept in mind. The inherent variability of soil properties which give rise to varying soil stresses at different locations, and a corresponding difficulty in getting a good sample of the mean stress from a limited number of cell locations. Also, the response of the cell to its immediate surroundings depends very largely on how closely the soil mass immediately around the cell has the same stiffness or compressibility or the same degree of compaction as the undisturbed soil mass. Installation methods will need to pay particular attention to this detail.

The Model 3500 Total Pressure Cell is used primarily where rapidly changing pressures are to be measured such as the measurement of live traffic loads on roadbeds or railway beds, or the response of structures to blasting vibrations.

1.2 Earth Pressure Cell Design

Earth Pressure Cells are constructed from two stainless steel plates welded together around the periphery so as to leave a narrow space between them. This space is completely filled with de-aired hydraulic oil that is connected hydraulically to a pressure transducer where the oil pressure is converted to an electrical signal which is transmitted through a signal cable to the readout location.

In general Geokon Earth Pressure Cells use an all welded construction so that the space confining the oil is entirely metal not requiring 'O' rings which tend to trap air and reduce the cell stiffness. The oil is de-aired using a Nold DeAerator™ which materially improves the fluid stiffness and the performance of the cell. The pressure transducer normally employed is a semiconductor type that is available in several different pressure ranges. The cable is attached to the transducer in a sealed, water-resistant manner. For earth pressure cells located inside a soil mass the cable may be armored and provided with strain relief at the cell to reduce the likelihood of pullout.

Pressure transducers with voltage (0-100 mV, 0-5 VDC, 0-10 VDC) or current (4-20 mA) output are available for dynamic readout capability. Consult the factory for additional information. A thermistor may also be included inside the transducer housing for measurement of temperature at the cell location.

The readout cable for remote sense uses four individually shielded pairs of cable. Two pairs are connected to the semiconductor bridge and one pair is used for remote sensing when there are long cables (>50m). As an option, one pair can be used for connection to a thermistor. For shorter cables or 4-20mA outputs, a two pair construction can be used.

Wiring diagrams are shown in Appendix D.

1.3 Earth Pressure Cell Construction

1.3.1 Model 3500 Earth Pressure Cell

Model 3500 Earth Pressure Cells may be rectangular or circular in shape. The standard size for the rectangular Model 3500 is 150 mm × 250 mm (6" × 10"), for the circular it is 230 mm (9") in diameter. Standard thickness for both styles is 6 mm (aspect ratio > 20). For laboratory tests smaller, thinner cells can be manufactured. Contact the factory for additional information.

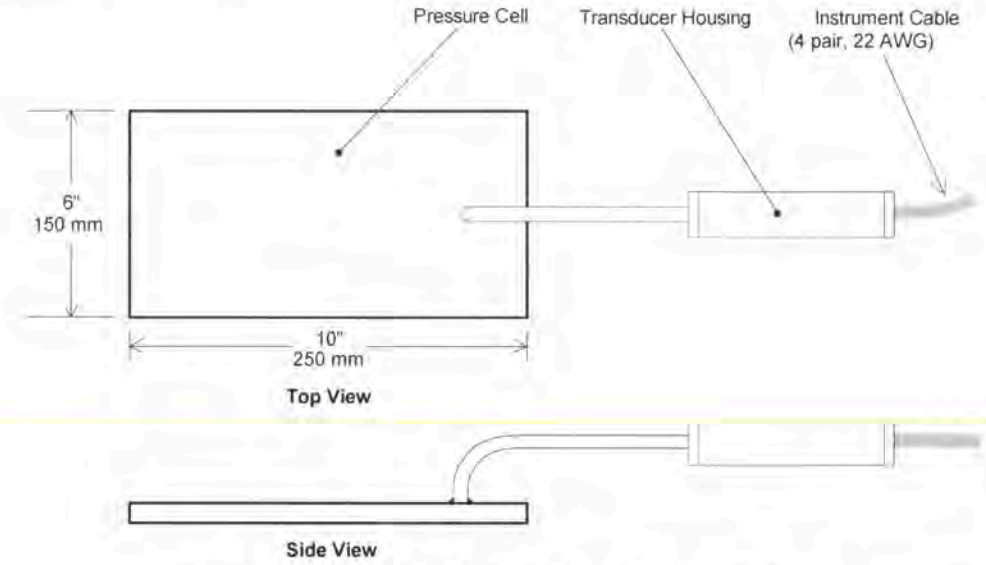

Figure 4 - Model 3500 Rectangular Earth Pressure Cell

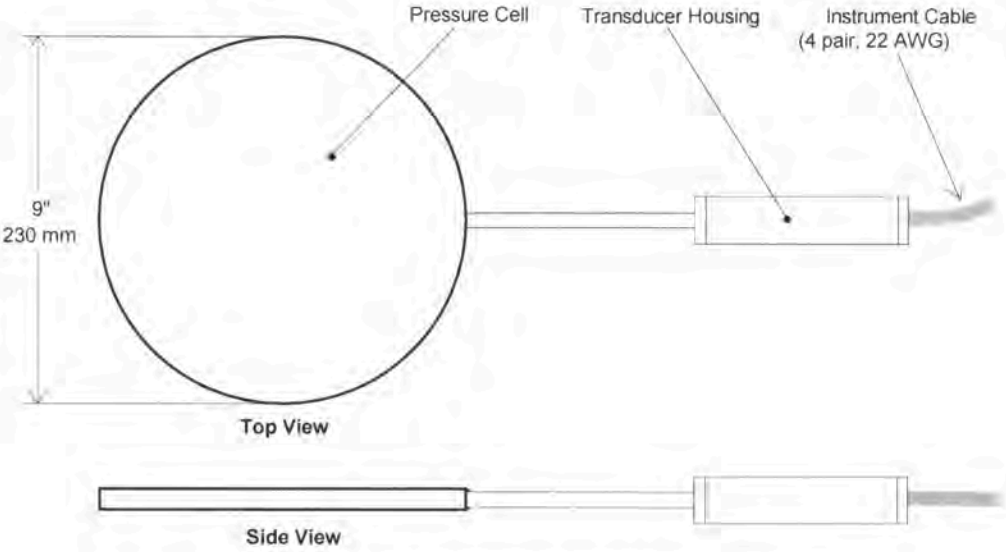

Figure 5 - Model 3500 Circular Earth Pressure Cell

1.3.2 Model 3510 Contact ("Fat Back") Pressure Cell

Model 3510 Earth Pressure Cells are designed for measuring dynamic soil pressures on structures. One of the plates is thick and designed to bear against the external surface of the structure in a way that will prevent flexure of the cell. The other plate is thin and reacts to the soil pressure.

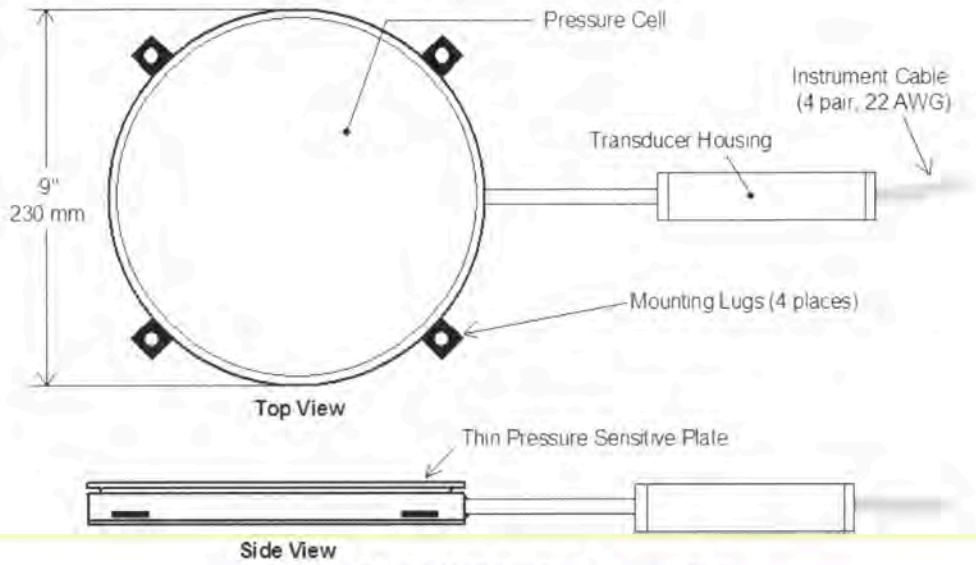

Figure 6 - Model 3510 Contact Pressure Cell

1.3.3 Model 3515 Granular Materials Pressure Cell

Model 3515 Granular Materials Pressure Cells are the best choice for the measurement of dynamic pressure changes in railroad ballast. In this configuration both plates are thick so that they will not deflect locally under the point loads from surrounding gravel and rocks. The pressure transducer housing is connected directly to the edge of one of the thick back plates

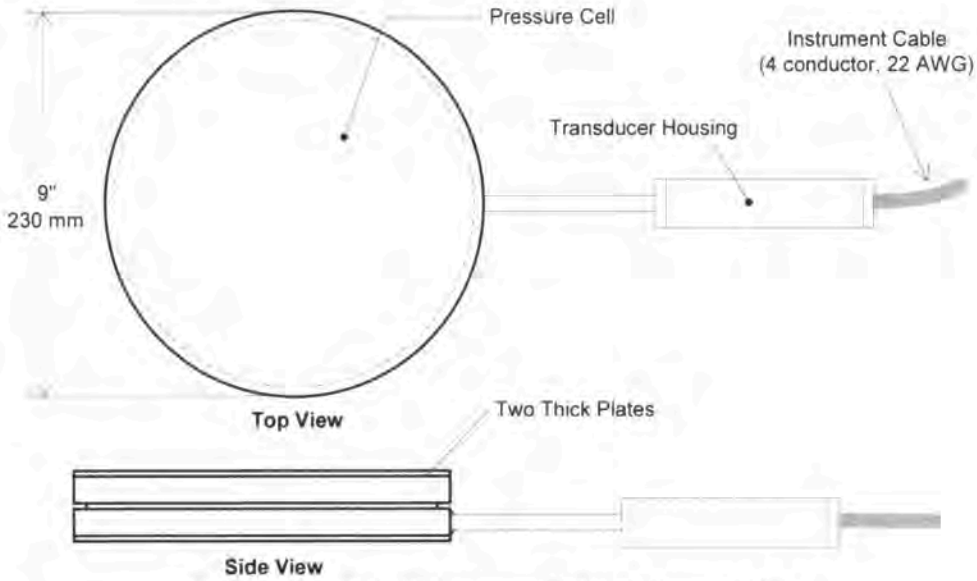

Figure 7 - Model 3515 Granular Materials Pressure Cell

1.3.4 Model 3600 Earth Pressure Cell

Model 3600 Earth pressure cells are designed for measuring earth pressures beneath slabs and footings. They are designed to be installed inside the concrete of the slab or footing and the distinguishing feature here is the pinch tube that is used to reinflate the cell after the concrete has cured. This is required because as the concrete cures the temperature rises causing the cell to expand. On cooling the cell contracts and can lose contact with the surrounding concrete.

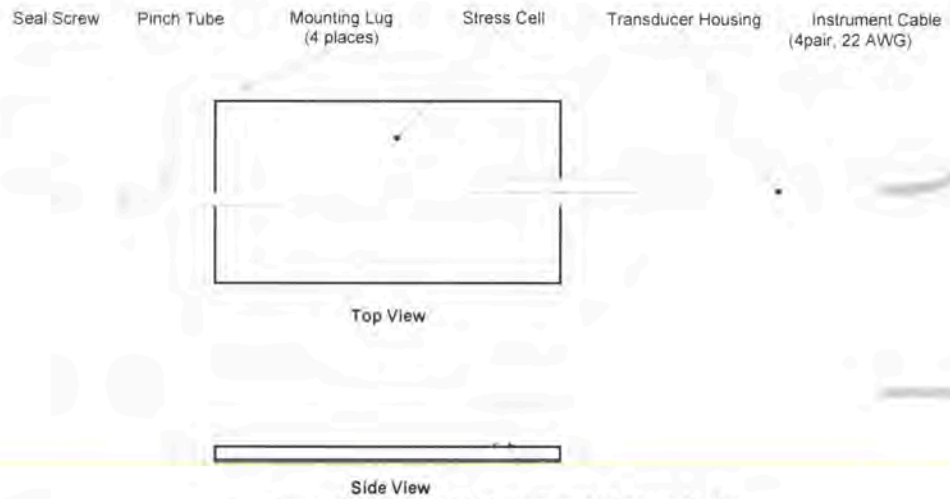

Figure 8 - Model 3600 Concrete Stress Cell

1.3.5 Model 3530 Push-In Pressure Cell

Model 3530 Push-In Pressure Cells are designed to be pushed in place for the measurement of total pressures in soils and earth fills. The semiconductor pressure transducer enables measurement of dynamic pressures. A thread is provided on the end of the cell to allow for installation using lengths of pipe or drill rods.

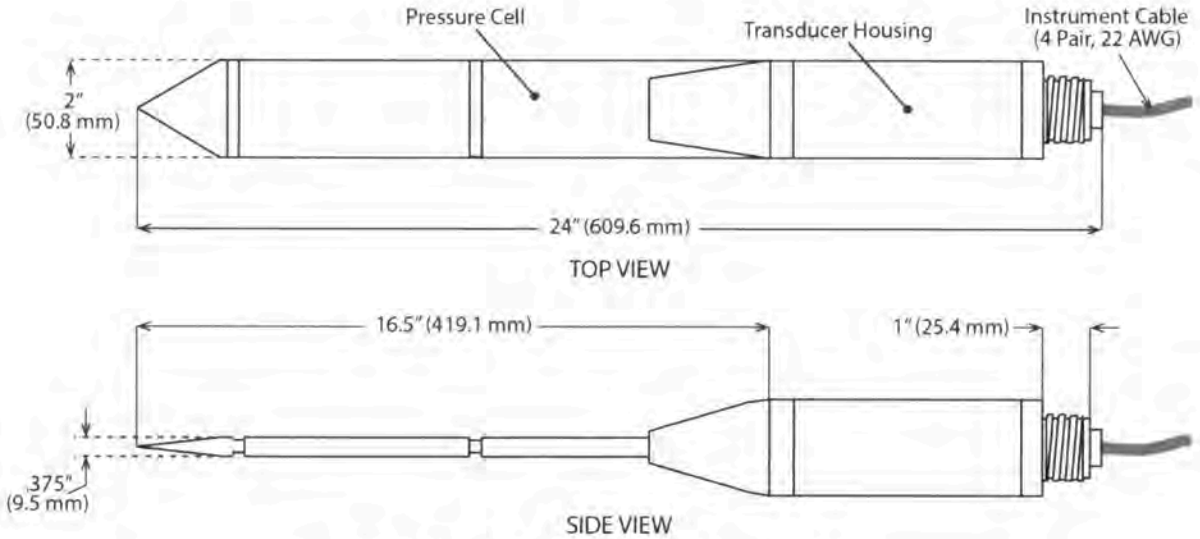

Figure 9 - Model 3530 Push-In Pressure Cell

2. INSTALLATION

2.1 Preliminary Tests

It is always wise, before installation commences, to check the cells for proper functioning. Each cell is provided with a no load zero reading. The cell electrical leads are connected to a readout box (see Section 3) and the zero reading given on the sheet is now compared to a current zero reading. The two readings should not differ by more than 1% F.S. after due regard to corrections made for different temperatures, barometric pressures and height above sea level and actual cell position (whether standing up or laying down).

By pressing on the cell it should be possible to change the readout digits, causing them to increase as the pressure is increased.

Checks of the insulation can also be made using an ohmmeter. Resistance between any conductor and the shield should exceed 50 megohms. The thermistor inside the cell can also be checked.

2.2 Pressure Cell Installation

2.2.1 Installation of Model 3500 Earth Pressure Cells Inside Fills & Embankments

(See also Appendix C.)

This section details installation instructions for the Model 3500 Earth Pressure Cell for the measurement of total stress in earth or rock fills and embankments. These procedures are only for cells totally surrounded by earth. Where contact stresses between earth and a structure are required see Sections 2.2.2 and 2.2.4. Earth pressure cells are normally installed with the flat surfaces horizontal to measure vertical stresses. However, they can be placed at other orientations, inside the fill, to measure stresses in other directions i.e. a cell placed with the flat surfaces vertical will measure horizontal stresses in a direction perpendicular to the plates of the cell.

The position and orientation of the cells can be maintained during installation by means of plywood templates. These templates can be removed by hand after the sand or fine material immediately surrounding the cells has been placed and carefully hand compacted.

When installing the cells it is important to avoid direct contact with large rocks. Such contact could locally deform the plates to such an extent that the two plates are pinched together so that the external pressure is no longer transmitted entirely to the interior fluid. For this reason, all chunks larger than 10 mm (≈0.5") should be removed from the material immediately surrounding the cell. It is preferable to surround the cell using the material of the fill rather than another material (e.g. sand) since the stiffness, if the compaction is performed properly, will conform better to the rest of the fill. In areas containing appreciable coarse material, the lenses of fine material should be enclosed in transitional layers of successively coarser material in order to establish a graduation outward to the maximum size material.

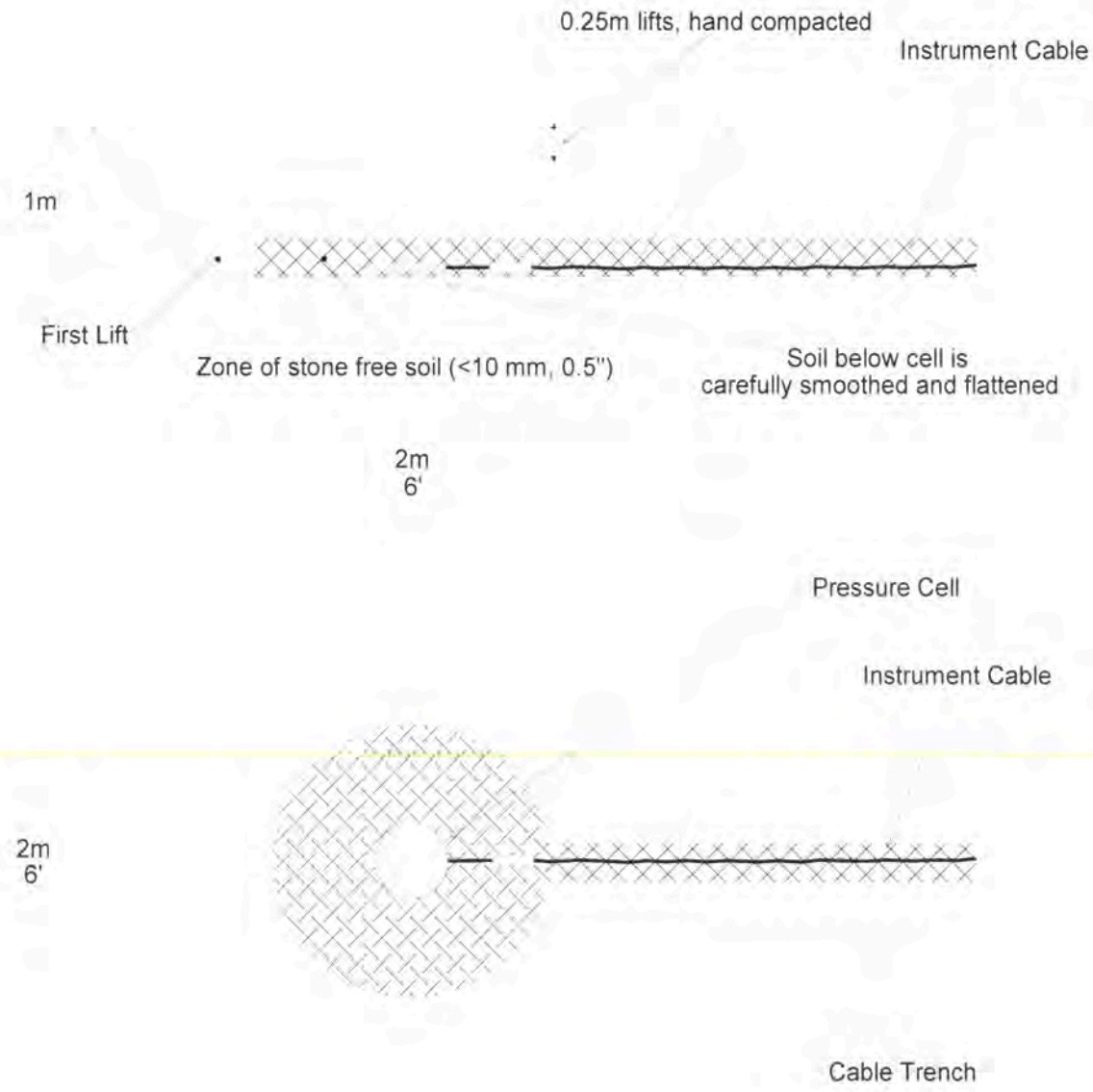

Figure 10 - Model 3500 Earth Pressure Cell Installation

Cable installation details are described later. The precautions to be observed in protecting the cable from damage by heavy vibratory compaction equipment should also be observed in connection with the cell clusters. In general, all fine material in the instrument lenses should be placed by hand and compacted with pneumatic or gasoline backfill tampers. The first layers of transitional material over the lenses should be placed in 250 mm (≈10") lifts and similarly compacted until at least 500 mm (18") of material had been placed. At that time equipment with rubber tires can cross the lens location, but no vibratory rollers should be permitted across the lens until it is protected by a compacted thickness of at least one meter (≈ three feet).

Earth Pressure Cells clusters, placed according to the methods outlined above, may be installed either in trenches, below the temporary embankment grade, or in ramps above the temporary embankment grade. In dams, for example, it is usually convenient to install in trenches in the impervious rolled fill core, and in ramps in the filter zones and compacted rockfill shell zones. In earth embankments it is convenient to install in trenches. By doing so, adequate degrees of compaction of the backfill can be more easily obtained without damage to the cell clusters or cable arrays. As the cells are being covered and compacted, repeated readings should be taken to ensure that the cells are continuing to function properly.

In embankments, cables may be embedded in a protective covering of sand or selected fine embankment materials. A typical installation might, for example, comprise the positioning of a series of cables on a prepared layer consisting of not less than 200 mm (8") of compacted selected fine material. In order to establish an acceptable grade without undue interference with construction operations, the prepared layer may be located either in a trench or on an exposed ramp. In rockfill dams with earthfill cores, for example, it is frequently convenient to install cable in trenches in the core and fine filter zones, and in ramps in the coarse filter and compacted rock fill shell zones. Individual cables should be spaced not less than 12 mm (0.5") apart, and no cable should be closer than 150 mm (6") to the edge of the prepared layer. In instances in which cables must cross each other, or in which more than one layer of cables must be placed in a given array, the cables should be separated from each other by a vertical interval of not less than 50 mm (2") of hand compacted sand or selected fine embankment material. Since the elongation capability of electrical cable is quite substantial, it is <u>not</u> necessary to place the cable with "S" shaped meanders, which in any case serve no purpose.

During the backfill of trenches in earth dams, a plug, approximately 0.5 meter (2 feet) in width, made of a mixture of 5% bentonite (by volume) from an approved source and exhibiting a free swell factor of approximately 600%, and 95% embankment material, can be placed in the trenches at intervals of not greater than 20 meters (50 feet). The purpose of the bentonite plugs is to reduce the possibility of water seepage through the embankment core along the back filled trenches.

The cable may be marked by using Mylar cable labels. For an individual cable the identification number should be taped near the end of the cable. Additional cable labels might be specified at regular intervals along the cable to aid in identification if cables need to dug up for splicing, etc.

2.2.2 Installation of Model 3510 Contact ("Fat Back") Pressure Cell

This section details installation instructions for the Model 3510 Earth Pressure Cells, which are used for the measurement of earth pressures on structures. In backfills for piers, piles, bridge abutments, retaining walls, culverts and other structures the cells may be installed either inside a concrete structure being poured or directly on the surface of an existing structure.

Installation in Poured Concrete:

When pouring concrete the cells can be held to the forms using nails through the lugs welded to the edge of the cell. Position the cell so that the thin pressure sensitive plate is directly against the concrete form. Nail the plates to the form lightly in such a manner that they engage the concrete sufficiently so that they do not pull out of the concrete when the forms are removed. Route the cable inside the concrete to a convenient readout location or to a block out inside where excess cable can be coiled. Protect the cable from damage during concrete placement and vibration, by tying it to adjacent rebars. See Figure 11.

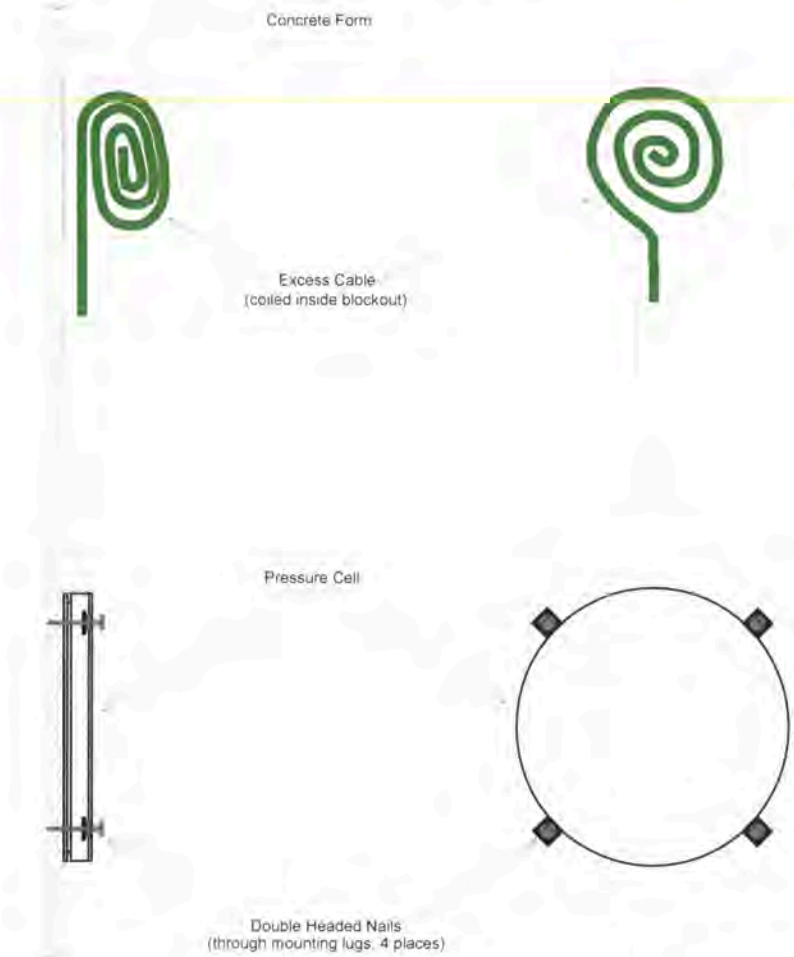

Figure 11 - Attachment of Model 3510 to Concrete Form

Installation on Existing Structures:

Again the lugs welded to the edge of the cell can be used to hold the cell against the structure using nails, lag bolts, tie wire, etc. Even if the surface is smooth, but especially where the surface is rough or irregular a mortar pad between the cell and the structure is required. See Figure 12.

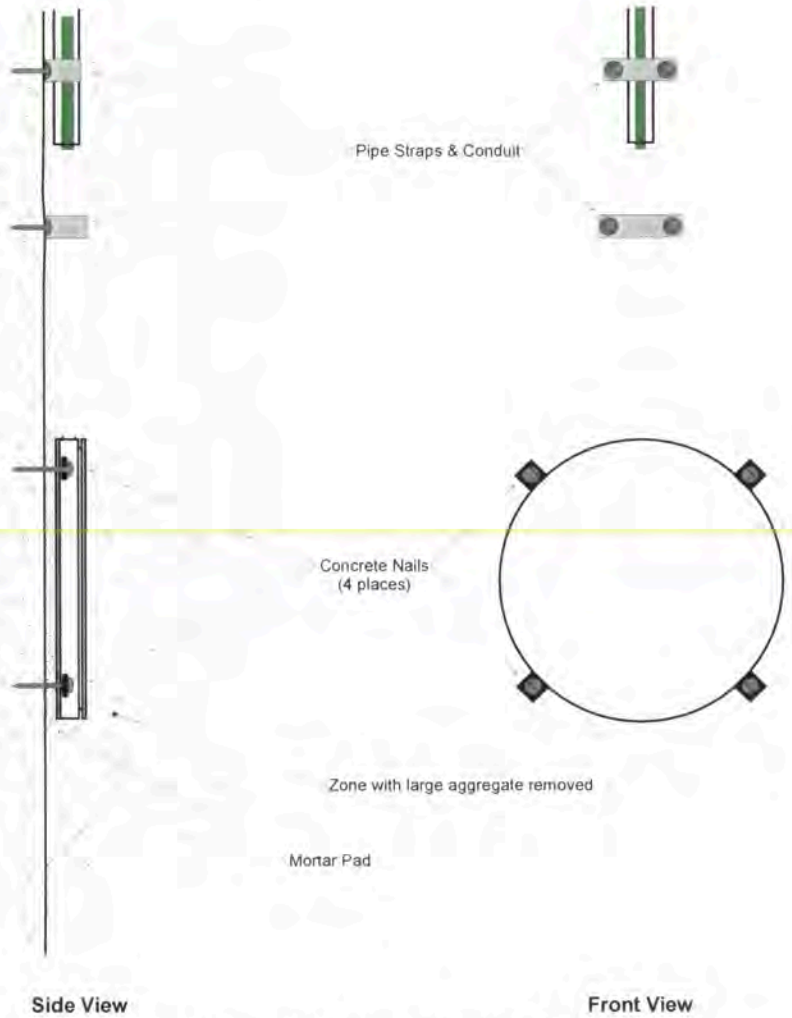

Figure 12 - Model 3510 Contact Pressure Cell Installation

Use the lugs on the cell as a template to locate the position for drilling holes for the installation of expanding anchors or install the anchors nearby and use wire to hold the cells in place. Alternately the cell may be nailed in place using the lugs as a guide. First, mix up some quick setting cement mortar or epoxy cement. Trowel this onto the surface then push the cell into the cement so that the excess cement extrudes out of the edges of the cell. Hold the cell in place while the cement sets up then complete the installation by adding the lag bolts (using the expansion anchors) and tightening or nailing the cell in place. Protect the cell, transducer housing and cable from direct contact with large chunks of rock by covering them with fine grained fill material from which all pieces larger than about 10 mm (0.5") have been removed. This fine material is kept next to the cell and cable as the fill is placed. Additional cable protection can be achieved by using metal conduit strapped to the surface of the structure.

2.2.3 Installation of Model 3515 Granular Materials Pressure Cell

In the railroad ballast application the pressure cell is placed in the ballast directly below one or both of the tracks.

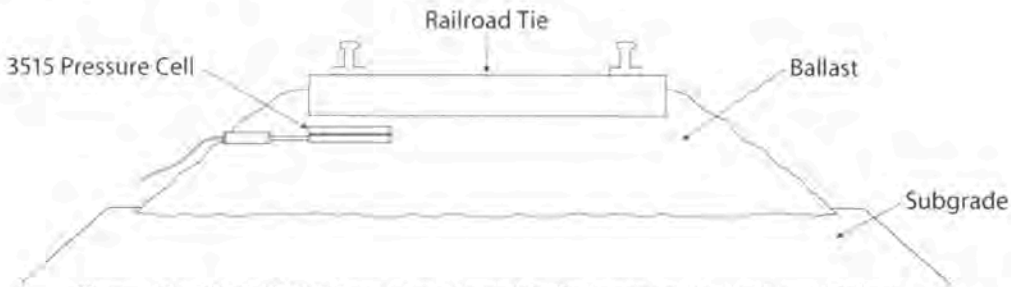

Figure 13 - Model 3515 Granular Materials Pressure cell in Railroad Ballast

2.2.4 Installation of Model 3600 Cells to Measure Earth Pressure at the Base of Footings, Floor Slabs, Pavements, Etc.

Experience has shown that attempts to measure contact earth pressures on the base of footings, floor slabs, pavements, etc., frequently meets with failure. The problem is twofold: First, the contact stress distribution can be inherently variable due to varying properties of the ground and varying degrees of compaction of the ground. Thus the contact stress at one location may not be typical of the surrounding locations. Secondly, a cell installed as described in Section 2.2.1, could result in the creation of an anomalous zone immediately around the cell where there may be a different, finer grained material, under a lesser degree of compaction. (The material around the cell may be poorly compacted because of the need to avoid damage to the cell.)

In an earth fill, this zone of poor compaction would not be a problem, since the earth above would simply move downwards to fill the voids and consolidate the ground. However, where there is a concrete slab immediately above the cell this consolidation may not take place and in fact, under the influence of rain water and vibration, the spaces around the cell may grow so that the cell becomes completely decoupled from the concrete above. In such a situation the concrete slab bridges over the gap and the loads in the concrete simply go around the cell instead of through it. The cell registers only a very low pressure, which does not change as the loads increase.

The best way to avoid the problem, if at all possible, is to cast the cell inside the concrete. This can often be done when the initial concrete bonding layer is spread over the surface of the ground. At this time a Model 3600 Concrete Stress Cell with a pinch tube, is pressed into the bonding layer so that it rests against the ground below. A weighted tripod can be used to hold the stress cell in place until the concrete hardens. The pinch tube is arranged to protrude above the bonding layer and, when the concrete has hardened, it is used to pressurize the cell and ensure good contact between the cell and the surrounding concrete. See Figure 14 below.

The advantage of this method lies in its simplicity and in that it permits the ground below the concrete to be completely compacted in the normal way.

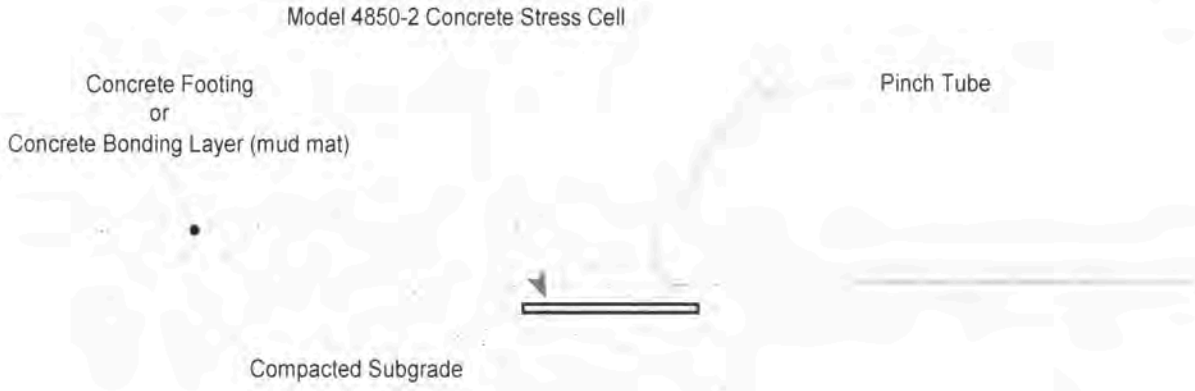

Figure 14 - Model 3600 Floor slabs and Footings Installation

2.2.5 Installation of Model 3530 Push-in Pressure Cells to Measure lateral Earth Pressures.

The Model 3530 is designed to be pushed into soft soils using available drill rods, usually AW. Unless the ground is very soft it is recommended that a borehole be drilled to within about two feet of the desired location and then push the cell the rest of the way.

A couple of things to note and be aware of:

1) **Temperature effects:**

This pressure cell is relatively stiff due to the geometry and the need for a robust construction for pushing into the ground. It is always advisable to obtain the pre-installation zero pressure readings in the borehole at the borehole temperature. It may take a significant amount of time for the sensor to come to thermal equilibrium but this is an important measurement and if it is not possible to take this reading in the borehole it may be possible to take the reading in a bucket of water that is at the ground temperature.

2) **Overpressure:**

When pushing the cell into the ground it is possible that pressures in excess of the sensors full scale range can be generated causing the sensor to experience a zero shift or even permanent damage. To prevent this, readings should be taken as the sensor is pushed. When the indicated pressure approaches 150% of full scale the pushing operation should be terminated until the sensor output comes back within its calibrated range.

2.3 Cable Installation

Cable placement procedures vary with individual installations. In general, however, all installations have in common the following requirements:

1) The cable must be protected from damage by angular particles of the material in which the cable is embedded.
2) The cable must be protected from damage by compaction equipment.
3) In earth and rock embankments and backfills, the cable must be protected from stretching as a result of differential compaction of the embankment.
4) In concrete structures, the cable must be protected from damage during placement and vibration of the concrete.

2.4 Cable Splicing

The Model 3500 utilizes a bonded resistance strain gage transducer and, as such, has very low level output signals. If cables are damaged or improperly spliced, the outputs can be seriously degraded. Therefore, it is absolutely necessary to provide a high degree of cable protection and if cables must be spliced only recognized high quality techniques should be used. The splice should be waterproofed completely – use 3M Scotchcast model 82-A1. These kits are available from the factory.

2.5 Electrical Noise

Care should be exercised when installing instrument cables to keep them as far away as possible from sources of electrical interference such as power lines, generators, motors, transformers, arc welders, etc. Cables should never be buried or run with AC power lines. The instrument cables will pick up the 50 or 60 Hz (or other frequency) noise from the power cable and this will likely cause a problem obtaining a stable reading. Contact the factory concerning filtering options available for use with the Geokon dataloggers and readouts should difficulties arise.

2.6 Initial Readings

Initial readings must be taken and carefully recorded along with the barometric pressure and temperature at the time of installation. Take the initial readings while the cell is in position, just prior to it being covered by fill and pouring of concrete. ***Again, it is imperative that initial readings at zero load are taken!***

3. READOUT PROCEDURES

3.1 Reading Pressure

The Model 3500 uses a semiconductor strain gage type transducer with an output of either 0-100mV (Model 3500-1), 0-5 volts (Model 3500-2), or 4-20 mA (Model 3500-3).
For the 100mV type, the output voltage is directly proportioned to both pressure and input voltage, therefore it is very important that the input voltage be accurately controlled @ 10V DC. If any other voltage is used, the gage factor G must be adjusted accordingly. The 0-5 volt and 4-20mA sensors require an unregulated input of 7-35 VDC.

3.1.1 Calibration

Calibration Sheets for the three types of Model 3400 piezometers are supplied with the sensors. Typical calibration sheets are shown in Figure 15, Figure 16, and Figure 17.

3.2 Measuring Temperatures

Each pressure cell is equipped with a thermistor for reading temperature. The thermistor gives a varying resistance output as the temperature changes. Appendix D shows which cable conductors are connected to the thermistor. These conductors should be connected to a digital ohmmeter.

A table for converting the measured resistance into temperatures is given in Appendix B (Table 3). Alternately, the temperature can be calculated using Equation 2 in Appendix B. For example, a resistance of 3400 ohms is equivalent to 22° C. When long cables are used the cable resistance may need to be taken into account. Standard 22 AWG stranded copper lead cable is approximately 14.7Ω/1000' or 48.5Ω/km, multiply by two for both directions.

GEOKON 48 Spencer St. Lebanon, N.H. 03766 USA

Pressure Transducer Calibration Report

Model Number: 3500-1

Serial Number: 1232779

Pressure Range: 600 kPa

Date of Calibration: October 09, 2012

Temperature: 22.7 °C

Barometric Pressure: 1002 mbar

Calibration Instruction: CI-VW Pressure Transducers

Technician:

Applied Pressure (kPa)	Gage Reading (mV) 1st Cycle	Gage Reading (mV) 2nd Cycle	Average Gage Reading	Change	Linearity (%FS)	Polynomial Fit (%FS)
0	-0.067	-0.069	-0.068		0.07	0.00
120	20.102	20.092	20.097	20.17	0.01	-0.01
240	40.245	40.231	40.238	20.14	0.06	0.00
360	60.330	60.320	60.325	20.09	0.06	0.00
480	80.380	80.370	80.375	20.05	0.02	0.00
600	100.380	100.370	100.375	20.00	0.07	0.00

Linear Gage Factor (G): 5.973 (kPa / mV) **Regression Zero: 0.000**

Polynomial Gage Factors: A: 3.14E-04 B: 5.9417 C: 0.4233

Calculated Pressures: **Linear, $P = G(R_1 - R_0) \times 10/V_1$**

Polynomial, $P = AR_P^2 + BR_P + C$ $[R_P = R_1 \times 10/V_1]$

Input Voltage, V_1: 10 VDC

Wiring Code: See manual for further information.

The above instrument was found to be In Tolerance in all operating ranges.

The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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Figure 15 - Typical Calibration Sheet for Model 3400-1 with 100mV output

GEOKON 48 Spencer St. Lebanon, N.H. 03766 USA

Pressure Transducer Calibration Report

Model Number: 3500-2

Serial Number: 1303292

Pressure Range: 250 kPa

Date of Calibration: February 20, 2013

Temperature: 21.1 °C

Barometric Pressure: 991.2 mbar

Calibration Instruction: CI-VW Pressure Transducers

Technician:

Applied Pressure (kPa)	Gage Reading (Volts) 1st Cycle	Gage Reading (Volts) 2nd Cycle	Average Gage Reading	Change	Linearity (%FS)	Polynomial Fit (%FS)
0	0.011	0.011	0.011		0.26	0.01
50	1.026	1.027	1.027	1.02	0.03	-0.03
100	2.036	2.038	2.037	1.01	0.22	0.00
150	3.040	3.039	3.040	1.00	0.25	0.03
200	4.029	4.030	4.030	0.99	0.03	-0.02
250	5.015	5.015	5.015	0.99	0.28	0.00

Linear Gage Factor (G): 49.95 (kPa / Volt) **Regression Zero: 0.0242**

Polynomial Gage Factors: A: 2.07E-01 B: 48.91 C: -0.502

Calculated Pressures: **Linear, $P = G(R_1 - R_0)$**

Polynomial, $P = AR_1^2 + BR_1 + C$

Factory Zero Reading: Input Voltage: 24 VDC

Wiring Code: See manual for further information.

The above instrument was found to be In Tolerance in all operating ranges.

The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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Figure 16 - Typical Calibration Sheet for Model 3400-2 with 0 to 5 Volt output

GEOKON 48 Spencer St. Lebanon, N.H. 03766 USA

Pressure Transducer Calibration Report

Model Number: 3500-3

Date of Calibration: October 12, 2012

Serial Number: 1234237

Temperature: 22.8

Pressure Range: 100 kPa

†Barometric Pressure: 997.1

Calibration Instruction: CI-VW Pressure Transducers

Technician:

Applied Pressure (kPa)	Gage Reading (mA) 1st Cycle	Gage Reading (mA) 2nd Cycle	Average Gage Reading	Change	Linearity (%FS)	Polynomial Fit (%FS)
0	3.981	3.980	3.981		-0.03	-0.01
20	7.188	7.190	7.189	3.21	0.03	0.02
40	10.383	10.392	10.388	3.20	0.02	0.01
60	13.586	13.575	13.581	3.19	-0.02	-0.03
80	16.784	16.789	16.787	3.21	0.02	0.02
100	19.985	19.976	19.981	3.19	-0.02	0.00

Linear Gage Factor (G): **6.25** **(kPa/ mA)** **Regression Zero:** **3.985**

Polynomial Gage Factors: A: **4.63E-04** **B:** **6.24** **C:*** **-24.86**

Calculated Pressures: **Linear, $P = G(R_1 - R_0)$**

Polynomial, $P = AR_1^2 + BR_1 + C$

Input Voltage: 24 VDC

Wiring Code: See manual for further information.

The above instrument was found to be In Tolerance in all operating ranges.

The above named instrument has been calibrated by comparison with standards traceable to the NIST, in compliance with ANSI Z540-1.

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Figure 17 - Typical Calibration Sheet for Model 3400-3 with 4 to 20mA output

4. DATA REDUCTION

4.1 Pressure Calculation

Formulas for converting readout voltages to pressure are shown on the calibration sheets. Both linear and polynomial expressions are shown. For better accuracy the polynomial expression should be used with this proviso that the value for the C coefficient be derived in the field by taking an initial reading when the sensor is subject to atmospheric pressures only as described in Section 3.1. Then substituting this initial value into the formula and setting the value of P to zero will yield the correct value for C.

The pressure applied to the cell is determined by the following using the linear calibration factor

$$P=(R_1 - R_0)\,G$$

Equation 1 - Pressure Calculation

Where;
P is the applied pressure in kPa, Mpa or psi.
$\mathbf{R_1}$ and $\mathbf{R_0}$ are the current and initial output readings in millivolts, volts or milliamps.
G is the gage factor, as shown on the calibration sheet.
(Note that gage factor is for an excitation of 10 volts. For any other excitation voltage ,V, the gage factor shown must be multiplied by 10/V)

Example:

Model 3500 –1 - 600 kPa (from Figure 15)

$\mathbf{R_0}$	=	-0.68 mV
$\mathbf{R_1}$	=	60.325 mV
G	=	5.973 kPa/mV
P	=	(60.325 – (– 0.68)) x 5.973 = 364.38 kPa

The Initial Reading (R_0) is normally obtained during installation immediately prior to loading the cell. Make sure that the pressure cell has achieved temperature stability. Shield it from direct sunlight and wait until the reading has stabilized after handling it.

Alternatively the polynomial can be used for greater accuracy

For example $\mathbf{R_1}$ = 60.325mV/V

$P = 3.14E04(60.325)^2 + 5.9417(60,325) + 0.4233 = 360$ kPa

Which can be seen is a more accurate solution.

To convert the output to other engineering units, multiply the Calibration Factor by the conversion multiplier listed in Table 1.

From → To ↓	psi	"H_2O	'H_2O	mm H_20	m H_20	"HG	mm HG	atm	mbar	bar	kPa	MPa
psi	1	.036127	.43275	.0014223	1.4223	.49116	.019337	14.696	.014503	14.5039	.14503	145.03
"H_2O	27.730	1	12	.039372	39.372	13.596	.53525	406.78	.40147	401.47	4.0147	4016.1
'H_2O	2.3108	.08333	1	.003281	3.281	1.133	.044604	33.8983	.033456	33.4558	.3346	334.6
mm H_20	704.32	25.399	304.788	1	1000	345.32	13.595	10332	10.197	10197	101.97	101970
m H_20	.70432	.025399	.304788	.001	1	.34532	.013595	10.332	.010197	10.197	.10197	101.97
"HG	2.036	.073552	.882624	.0028959	2.8959	1	.03937	29.920	.029529	29.529	.2953	295.3
mm HG	51.706	1.8683	22.4196	.073558	73.558	25.4	1	760	.75008	750.08	7.5008	7500.8
atm	.06805	.0024583	.0294996	.0000968	.0968	.03342	.0013158	1	.0009869	.98692	.009869	9.869
mbar	68.947	2.4908	29.8896	.098068	98.068	33.863	1.3332	1013.2	1	1000	10	10000
bar	.068947	.0024908	.0298896	.0000981	.098068	.033863	.001333	1.0132	.001	1	.01	10
kPa	6.8947	.24908	2.98896	.0098068	9.8068	3.3863	.13332	101.320	.1	100	1	1000
MPa	.006895	.000249	.002988	.00000981	.009807	.003386	.000133	.101320	.0001	.1	.001	1

Table 1 - Engineering Units Multiplication Factors

4.2 Temperature Correction

Corrections for temperature are not easily quantified because the pressure cell, when in use is surrounded and confined by soil or soil and concrete each with its own (different) temperature coefficient of expansion. Commercially it is not practical to measure the overall effect without incurring huge expenses. Suffice to say that the effect is usually small, especially at depths where the temperature is fairly constant. **If temperature fluctuations are great, then the thermistor should be used to measure temperatures. By observing the cell output versus temperature variation over short periods of time, when it can be reasonably assumed that the load on the cell is not changing, it is often possible to derive empirically the temperature correction factor**. (See also Appendix E).

4.3 Barometric Correction

The pressure transducer used in Geokon Model 3500 Earth Pressure Cells is sealed and will respond to barometric pressure fluctuation. However, since the magnitudes are only on the order of ±3 kPa, correction is generally not required. If a correction for these fluctuations is required then it is necessary to record the barometric pressure at the time of each reading.

5. TROUBLESHOOTING

Maintenance and troubleshooting of Model 3500 Pressure Cells is confined to periodic checks of cable connections. Once installed, the cells are usually inaccessible and remedial action is limited. Consult the following list of problems and possible solutions should difficulties arise. Consult the factory for additional troubleshooting help.

Symptom: Pressure Cell Readings are Unstable

✓ Is there a source of electrical noise nearby? Most probable sources of electrical noise are motors, generators, transformers, arc welders and antennas. Make sure the shield drain wire is connected to ground whether using a portable readout or datalogger.

✓ Does the readout work with another pressure cell? If not, the readout may have a low battery or be malfunctioning. Consult the appropriate readout manual for charging or troubleshooting directions.

Symptom: Pressure Cell Fails to Read

✓ Is the cable cut or crushed? This can be checked with an ohmmeter. If the resistance reads infinite or very high (megohms), a cut wire must be suspected. If the resistance reads very low (<100Ω), a short in the cable is likely.

✓ Does the readout or datalogger work with another pressure cell? If not, the readout or datalogger may be malfunctioning. Consult the readout or datalogger manual for further direction.

APPENDIX A. SPECIFICATIONS

Specifications	Model 3500, 3510
Input	
Pressure Range	Vacuum to 400 bar (6000 psi)
Proof Pressure	2 x Full Scale(FS) (1.5 x FS for 400 bar, >=5000 psi)
Burst Pressure	>35 x FS <= 6 bar (100 psi) >320 x FS <= 60 bar (1000 psi) >5 x FS <= 400 bar (6000 psi)
Fatigue Life	Designed for more than 100 million FS cycles
Performance	
Long Term Drift	0.2% FS/year (noncumulative)
Accuracy[1]	0.25% FS (Dependent on readout instrument)
Thermal Error	1.5% FS typical (optional 1% FS)
Compensated Temperatures	-20° to 80° C (-5° to 180° F)
Operating Temperatures	-40° to 125° C ((-22° to 260°) for elec. codes A, B, C, 1 -20° to 80° C (-5° to 180° F) for elec. codes 2, D, G, 3 -20° to 50° C (-5° to 125° F) for elec. codes F, M, P Amplified units > 100C maximum 24 Vdc supply
Zero Tolerance	1% of span
Span Tolerance	1% of span
Mechanical Configuration	
Pressure Port	see ordering chart
Wetted Parts	17-4 PH Stainless Steel
Electrical Connection	see ordering chart
Enclosure	316 ss, 17-4 PH ss IP65 for elec. codes A, B, C, D, G, 1, 2, 3 IP67 for elec. code "F" IP68 for elec. codes M, P IP30 for elec. code "3" with flying leads
Vibration	35 g peak sinusoidal, 5 to 2000 Hz
Acceleration	100 g steady acceleration in any direction 0.032% FS/g for 1 bar (15 psi) range decreasing logarithmically to 0.0007% FS/g for 400 bar (6000 psi) range.
Shock	Withstands free fall to IEC 68-2-32 procedure 1
Approvals	CE
Weight	Approximately 100 grams (additional cable; 75 g/m)
Individual Specifications	
Millivolt Output Units	
Output	100mV ± 1mV
Supply Voltage (VS)	10Vdc (15Vdc max.) Regulated
Bridge resistance	2600-6000 ohms
Voltage Output Units	
Output	see ordering chart
Supply Voltage (Vs)	1.5 Vdc above span to 35 Vdc @6mA
Supply Voltage Sensitivity	0.01% FS/Volt
Min. Load Resistance	(FS output / 2) kohms
Current Output Units	
Output	4-20mA (2 wire)
Supply Voltage(VS)	24 Vdc, (7-35 Vdc)
Supply Voltage Sensitivity	0.01% FS/Volt
Max Loop Resistance	(Vs-7) x 50 ohms.

Table 2 - Earth Pressure Cell Specifications

[1]0.1% F.S. available on request. The stated accuracy is the accuracy of the pressure transducer itself. The system accuracy depends on many factors as discussed in Section 1.1 of the manual.

APPENDIX B. THERMISTOR TEMPERATURE DERIVATION

Thermistor Type: YSI 44005, Dale #1C3001-B3, Alpha #13A3001-B3
Resistance to Temperature Equation:

$$T=\frac{1}{A+B(LnR)+C(LnR)^3}-273.2$$

Equation 2 - Resistance to Temperature

Where;
T = Temperature in °C.
LnR = Natural Log of Thermistor Resistance
$A = 1.4051 \times 10^{-3}$
$B = 2.369 \times 10^{-4}$
$C = 1.019 \times 10^{-7}$
Note: Coefficients calculated over the –50 to +150° C. span.

Ohms	Temp	Ohms	Temp	Ohms	Temp	Ohms	Temp	Ohms	Temp
201.1K	-50	16.60K	-10	2417	+30	525.4	+70	153.2	+110
187.3K	-49	15.72K	-9	2317	31	507.8	71	149.0	111
174.5K	-48	14.90K	-8	2221	32	490.9	72	145.0	112
162.7K	-47	14.12K	-7	2130	33	474.7	73	141.1	113
151.7K	-46	13.39K	-6	2042	34	459.0	74	137.2	114
141.6K	-45	12.70K	-5	1959	35	444.0	75	133.6	115
132.2K	-44	12.05K	-4	1880	36	429.5	76	130.0	116
123.5K	-43	11.44K	-3	1805	37	415.6	77	126.5	117
115.4K	-42	10.86K	-2	1733	38	402.2	78	123.2	118
107.9K	-41	10.31K	-1	1664	39	389.3	79	119.9	119
101.0K	-40	9796	0	1598	40	376.9	80	116.8	120
94.48K	-39	9310	+1	1535	41	364.9	81	113.8	121
88.46K	-38	8851	2	1475	42	353.4	82	110.8	122
82.87K	-37	8417	3	1418	43	342.2	83	107.9	123
77.66K	-36	8006	4	1363	44	331.5	84	105.2	124
72.81K	-35	7618	5	1310	45	321.2	85	102.5	125
68.30K	-34	7252	6	1260	46	311.3	86	99.9	126
64.09K	-33	6905	7	1212	47	301.7	87	97.3	127
60.17K	-32	6576	8	1167	48	292.4	88	94.9	128
56.51K	-31	6265	9	1123	49	283.5	89	92.5	129
53.10K	-30	5971	10	1081	50	274.9	90	90.2	130
49.91K	-29	5692	11	1040	51	266.6	91	87.9	131
46.94K	-28	5427	12	1002	52	258.6	92	85.7	132
44.16K	-27	5177	13	965.0	53	250.9	93	83.6	133
41.56K	-26	4939	14	929.6	54	243.4	94	81.6	134
39.13K	-25	4714	15	895.8	55	236.2	95	79.6	135
36.86K	-24	4500	16	863.3	56	229.3	96	77.6	136
34.73K	-23	4297	17	832.2	57	222.6	97	75.8	137
32.74K	-22	4105	18	802.3	58	216.1	98	73.9	138
30.87K	-21	3922	19	773.7	59	209.8	99	72.2	139
29.13K	-20	3748	20	746.3	60	203.8	100	70.4	140
27.49K	-19	3583	21	719.9	61	197.9	101	68.8	141
25.95K	-18	3426	22	694.7	62	192.2	102	67.1	142
24.51K	-17	3277	23	670.4	63	186.8	103	65.5	143
23.16K	-16	3135	24	647.1	64	181.5	104	64.0	144
21.89K	-15	**3000**	**25**	624.7	65	176.4	105	62.5	145
20.70K	-14	2872	26	603.3	66	171.4	106	61.1	146
19.58K	-13	2750	27	582.6	67	166.7	107	59.6	147
18.52K	-12	2633	28	562.8	68	162.0	108	58.3	148
17.53K	-11	2523	29	543.7	69	157.6	109	56.8	149
								55.6	150

Table 3 - Thermistor Resistance versus Temperature

APPENDIX C. ALTERNATIVE METHOD FOR INSTALLING EARTH PRESSURE CELLS IN FILLS

The method described in Section 2.2.1 suffers from the drawback that it is very difficult, if not impossible, to get perfect compaction of the soil around the cells without running the risk of damaging the cells.

An alternative method, used successfully in South Africa, [1], essentially uses the techniques described in Section 2.2.3:

Installation of the cells begins when the fill has reached a height of 800 mm above the instrument level. The Instrument location and the cable trenches are excavated 500 mm deep, a pocket, with 45° sloping sides, of only a further 300 mm depth is required to be excavated at the instrument location. The cells, (Model 3600 complete with pinch tubes), are positioned on a thin layer of non-shrink sand-cement grout and are nailed in position using the lugs on the cells provided for this purpose. The excavated pocket is then backfilled with a weak concrete (19 mm aggregate), in 100 mm layers, vibrated with a poker vibrator. After 24 hours the cells are pressurized, by pinching the pinch tubes until the pressure in the cell, displayed on a connected Readout Box, starts to change.

The instrument location containing the grouted cells and the cable trench is then backfilled in 100 mm layers, using the techniques described in Section 2.2.1. Each layer is compacted by a vibratory trench roller. After this, standard construction filling and compaction practices can continue.

[1]. Oosthuizen, C., Naude, P.A. & Hattingh, L.C. 2003. Total and Pore Cells: Method in the Madness. Proceedings of the 6th International Symposium on Field Measurements in Geomechanics 2003, Oslo, Norway, 2003. Balkema.

APPENDIX D. WIRING CHARTS

Model # 3500

mV/V output:

Geokon Cable #04-375V9 (Violet)	Internal Sensor Wiring	Function / Description
Red	Red	Power +
Red's Black	Black	Power -
White	White	Signal +
White's Black	Black	Signal -
Green	Red	Remote Sense +
Green's Black	Black	Remote Sense -
Blue	N/C	Thermistor
Blue's Black	N/C	Thermistor
Shields (5)	N/C	Ground

Note: Input voltage for Model # 3500-1, mV/V output is 10V d.c.
(Power -, Signal -, Remote Sense -, are connected internally.)

0–5VDC output:

Geokon Cable #04-375V9 (Violet)	Internal Sensor Wiring	Function / Description
Red	Red	Power +
Red's Black	Black	Power -
White	White	Signal +
White's Black	Black	Signal -
Blue	N/C	Thermistor
Blue's Black	N/C	Thermistor
Shields (5)	N/C	Ground

Input voltage for Model # 3500-2, 0–5VDC output is 6.5–35V d.c.

4–20mA output:

Geokon Cable #02-250V6 (Blue)	Internal Sensor Wiring	Function / Description
Red	Red	Power +
Black	Black	Power -
White	N/C	Thermistor
Green	N/C	Thermistor
Shields (1)	N/C	Ground

Note: Input voltage for Model # 3500-3, 4–20mA output is 6.5–35V d.c.

APPENDIX E. TEMPERATURE EFFECT ON EARTH PRESSURE AND CONCRETE STRESS CELLS

The following theoretical treatment is by no means rigorous — there are some questionable assumptions and approximations — but it should give some idea of the magnitude of the thermal effect to be expected on hydraulic earth pressure cells, buried in soil, or installed at the contact between soil and structure, and on concrete stress cells embedded in concrete.

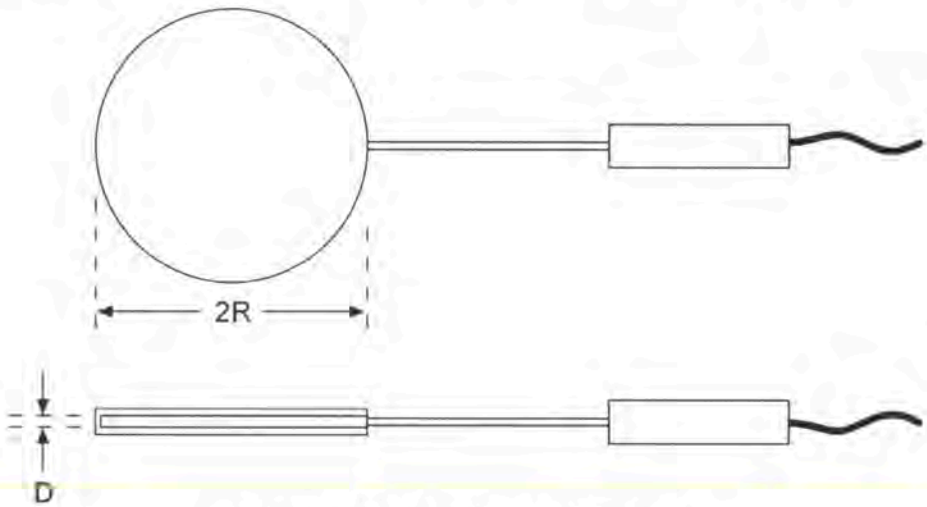


Figure 18 - Radius (R) and Thickness (D)

E.1 Formulas

Consider a circular cell of radius (R) containing a liquid film of a thickness (D), coefficient of thermal expansion Kppm/°C, and bulk modulus (G).

For a temperature rise of 1° C the expansion (Y_T) of the liquid film is given by the equation:

$$Y_T = KD$$

Equation 3 - Expansion of Liquid for a Temperature Rise of 1° C

Expansion of the liquid is resisted by the confinement of the surrounding medium (soil or concrete) and this causes a pressure rise (P) in the liquid, as well as a compression of the liquid (Y_c) given by the equation:

$$Y_c = PD/G$$

Equation 4 - Compression of Liquid

The net expansion (Y) of the cell is equal to:

$$Y = D\,(K - P/G)$$

Equation 5 - Expansion of Liquid

Liquid pressure inside the cell causes deformation of the surrounding medium. The amount of deformation can be quantified by modification of formula found in Equation 3, where the deformation (Y), produced by a uniform pressure (P), acting on a circular area, (R) radius, on the surface of a material with modulus of elasticity (E) and Poisson's ratio (ν), is given by:

At the center of the cell:

$$Y = \frac{2\,PR\,(1-\nu^2)}{E}$$

Equation 6 - Deformation at the Center

At the edge of the cell:

$$Y = \frac{4\,PR\,(1-\nu^2)}{\pi\,E}$$

Equation 7 - Deformation at the Edge

The difference being:

$$PR\,(1-\nu^2)\,(2 - 4/\pi)/E$$

Equation 8 - Difference in Deformation

The above formulas apply to pressures acting on a free surface. However, in the confined case, Y, at the edge of the cell, can be assumed to be nearly zero. Therefore, Y, at the center, is assumed to be the same as shown in Equation 8.

If the average Y across the cell is assumed to be half this value, and if the deformation of the medium on either side of the cell is assumed to be the same, then the average total expansion of the cell is given by:

$$Y = 0.73\,PR\,(1-\nu^2) \times 0.5 \times 2/E = 0.73\,PR\,(1-\nu^2)/E$$

Equation 9 - Average Total Expansion of the Cell

Equating Equation 5 and Equation 9 gives:

$$P\,(D/G + 0.73\,R\,(1-\nu^2)/E) = KD$$

Equation 10 - Combined Equations

If one side of the cell lies in contact with a rigid structure, e.g. a concrete retaining wall or a concrete bridge footing, then;

$Y = 0.73\ PR\ (1-v^2) \times 0.5/E = 0.36\ PR\ (1-v^2)/E$

And

$P\ (D/G + 0.36\ R\ (1-v^2)/E) = KD$

Where (E) pertains to the soil material.

Since these expressions are only approximate they can be simplified even further:

For all $E < 10 \times 10^6$ psi the term D/G is negligible so long as the cell is designed and constructed properly, i.e., G is large, (no air trapped inside the cell), and D is small. Also, the term $(1-v^2)$ can be replaced by 0.91 since v usually lies between 0.25 and 0.35.

Hence, the total embedment is given by:

$$P = 1.5\ EKD/R \qquad \text{psi} / {}^{\circ}\text{C}$$

Equation 11 - Total Embedment

And for contact pressure cells:

$$P = 3\ EKD/R \qquad \text{psi} / {}^{\circ}\text{C}$$

Equation 12 - Total Embedment for Contact Pressure Cells

Some typical values of the various parameters are:

Liquid	**K x 10^{-6} / °C**	**G x 10^6 psi**
Oil	700	0.3
Mercury	180	3.6
Water	170	0.3
Glycol	650	0.26
50/50 Glycol/Water	400	0.28
Embedment Material	**E x 10^6 psi**	**v**
Plastic Clay	0.003	
Soil	0.001 to 0.02 [Ref 2]	0.25 to 0.45
Sand	0.02 to 0.06 [Ref 3]	0.28 to 0.35
Compacted Ottawa Sand	0.2	
Weathered Rock	0.04 to 0.11 [Ref 4]	
Concrete	5.0	0.25

Table 4 - Typical Values of Various Cell Parameters

E.2 Examples

For an oil-filled cell, nine inches diameter and D = 0.060 inches, totally embedded in:
(For contact pressure cells, multiply the values for P by two.)

Plastic Clay:

E = 3000 psi
$\nu = 0.3$
P = 0.042 psi / °C

Soil, medium stiffness:

E = 10000 psi
$\nu = 0.3$
P = 0.138 psi / °C

Coarse Sand:

E = 50000 psi
$\nu = 0.3$
P = 0.69 psi / °C

For an oil-filled concrete stress cell, nine inch diameter and D=0.020 inches totally embedded in:

Concrete:

$E = 5 \times 10^6$ psi
$\nu = 0.25$
P = 22.7 psi / °C

Completely rigid medium:

P = 210 psi / °C

For the same cell, filled with mercury instead of oil:

Concrete:

P = 5.8 psi / °C

Completely rigid medium:

P = 650 psi / °C

References:

[1] Roark, R.J. and Young, W.C. " Formulas for Stress and Strain," McGraw Hill, fifth edition, 1982, p 519.

[2] Weiler, W.A. and Kulhawy, F.H. " Factors Affecting Stress Cell Measurement in Soil" J. Geotech. Eng. Div. ASCE . Vol. 108, No. GT12, Dec., pp1529-1548.

[3] Lazebnik, G.E., "Monitoring of Soil-Structure Interaction." Chapman & Hall. pp 224.

[4] Fujiyasu, Y. and Orihara, K. "Elastic Modulus of Weathered Rock." Proc. of the 5th Intl. Symp. on Field Measurements in Geomechanics - Singapore 1999. p 183.

POLYESTER STRAIN GAUGES series P/PF

Operating temperature range
−20°C ——— +80°C
Temperature compensation range
+10°C ——— +80°C

Suffix code for temperature compensation materials
-11: Mild steel

For ordering, the above suffix code should be added to the basic gauge type.

C concrete **M** mortar **R** rock

Applicable adhesives

CN-E	−20 ~ +80°C
RP-2	−20 ~ +80°C
PS	−20 ~ +80°C

STEEL, CONCRETE, MORTAR MATERIAL USE

Gauge pattern	Basic type	Gauge size L	Gauge size W	Backing L	Backing W	Resistance Ω

series P

CE

These are wire strain gauges utilizing a transparent plastic backing impregnated with polyester resin. The gauge length is available in 3 ranges of 60, 90 and 120mm, so it is suited to the measurement of concrete strain. Since the backing is transparent, the bonding position can easily be checked in the installation works.

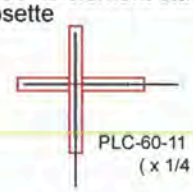
Example of type number designation.
PL-60 -11 -3LJC-F
- -3LJC-F: CE compliant integral leadwire
- -11: Self-temperature-compensation for Mild steel
- PL-60: Basic strain gauge type

Integral leadwire is available only for single element PL, but not for 2-element PLC and 3-element PLR.

Single element

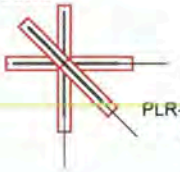
PL-60-11

0°/90° 2-element stacked Rosette



PLC-60-11 (x 1/4)

0°/45°/90° 3-element stacked Rosette



PLR-60-11 (x 1/4)

Single-element					Each package contains 10 gauges.
PL-60-11	60	1	74	8	120
PL-90-11	90	1	104	8	120
PL-120-11	120	1	134	8	120

Each package contains 10 gauges.

0°/90° 2-element stacked Rosette					
PLC-60-11	60	1	74	74	120
0°/45°/90° 3-element stacked Rosette					
PLR-60-11	60	1	74	74	120

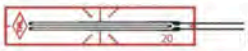
series PF

CE

These are foil strain gauges utilizing a polyester resin backing which is the same as the P series. The gauge length is available in 3 ranges of 10, 20 and 30mm, so it is suited mainly to strain measurement on concrete or mortar. The backing is transparent and the installation is easy.

Single element

PFL-10-11



PFL-20-11

PFL-30-11

0°/90° 2-element stacked Rosette

PFLC-20-11 (x 1/2)

0°/45°/90° 3-element stacked Rosette

PFLR-20-11 (x 1/2)

Single element					Each package contains 10 gauges.
PFL-10-11	10	0.9	17.5	5	120
PFL-20-11	20	1.2	28	6	120
PFL-30-11	30	2.3	40	7	120

Each package contains 10 gauges.

0°/90° 2-element stacked Rosette					
PFLC-20-11	20	1.2	28	28	120
PFLC-30-11	30	2.3	40	40	120
0°/45°/90° 3-element stacked Rosette					
PFLR-20-11	20	1.2	28	28	120
PFLR-30-11	30	2.3	40	40	120

Recommendable integral leadwire for P/PF series with single element.
No integral leadwire is available for rosette element PLC, PLR, PFLC and PFLR.

Application	Leadwires	Operating temperature (°C)	Leadwire code exampled
General use (temperature unchanged during measurement)	Paralleled vinyl -LJB-F/ -LJC-F	-20~ +80	PL-60-11-3LJB-F PFL-10-11-3LJC-F
General use	3-wire paralleled vinyl -LJBT-F/-LJCT-F	-20~ +80	PL-60-11-3LJBT-F PFL-10-11-3LJCT-F
1-gauge 4-wire measurement	0.08mm² polypropyrene 4-wire paralleled -LQM-F	-20~ +100	PL-60-11-3LQM-F

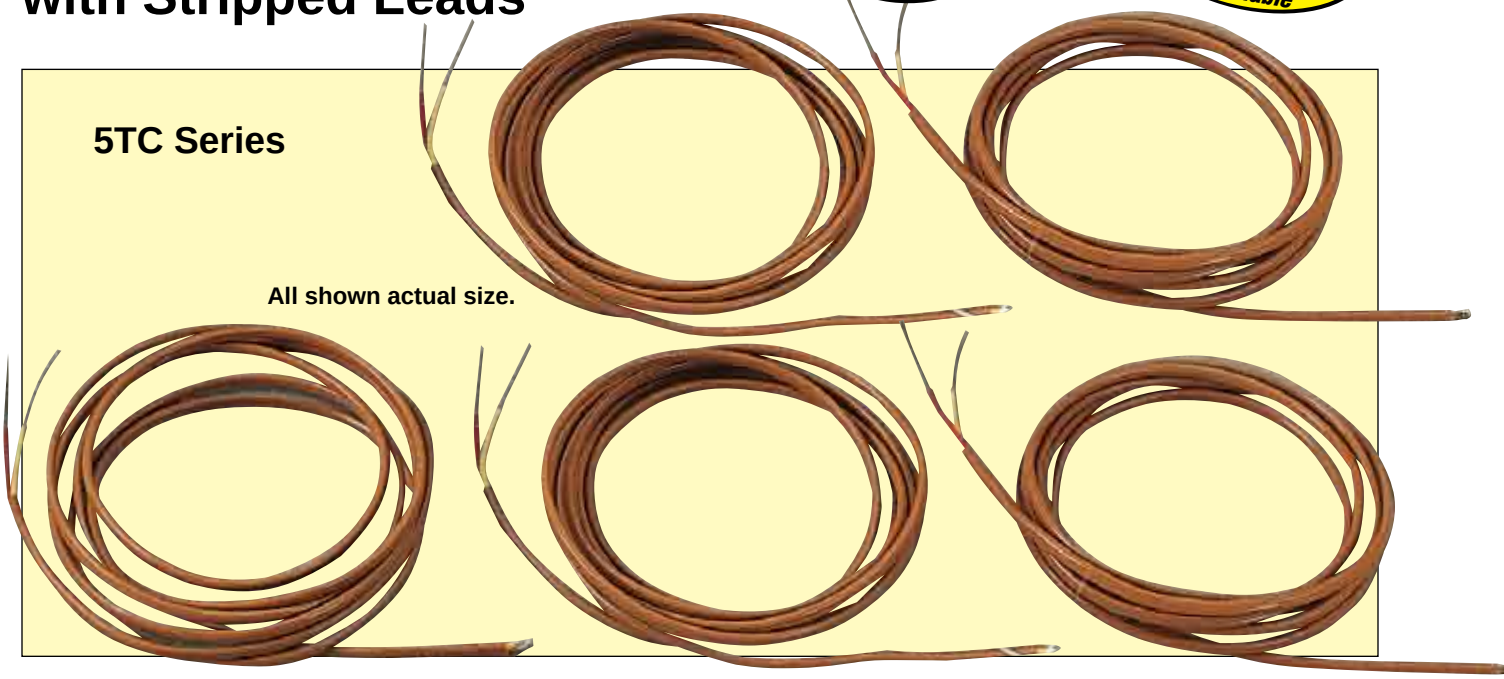
Ready-Made Insulated Thermocouples
with Stripped Leads

OMEGA®

MEETS OR EXCEEDS SPECIAL LIMITS OF ERROR (SLE) AND EN 60584-2: Tolerance Class 1

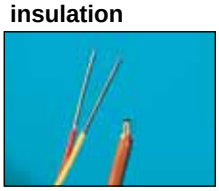
Convenient Packages of 5

Custom Lengths, Insulations, and Configurations Available



- Available from Stock in Convenient 5-Packs
- PFA, Kapton®, or Glass Braid Insulation
- 20, 24, 30, 36 and 40 AWG Wires
- 1 and 2 m (40 and 80") Lengths Standard
- NIST Calibration Available
- OEM Quantities Available

"TT" PFA insulation



"GG" Glass braid insulation

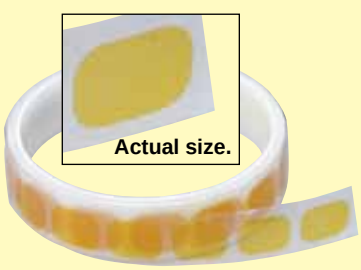
Fine 40-Gage PFA Wire

KAPTON® Insulation

Also Available TAP Adhesive Labels

Thermocouple Adhesive Labels secure wire probes to surfaces. **TAP** adhesive labels have a thickness of 0.064 mm (0.0022") and can be used at a maximum temperature of 180°C (356°F). They are made of a polymide film with a silicone pressure sensitive adhesive.

Visit us online for details and ordering information.



Model TAP, roll of 100 adhesive labels, shown smaller than actual size.

To Order

Model No. ANSI Color Code	AWG Gage	Diameter mm (in)	Insulation
5TC-GG-(*)-20-(**)	20	0.81 (0.032)	Glass Braid
5TC-GG-(*)-24-(**)	24	0.51 (0.020)	Glass Braid
5TC-GG-(*)-30-(**)	30	0.25 (0.010)	Glass Braid
5TC-GG-(*)-36-(**)	36	0.13 (0.005)	Glass Braid
5TC-TT-(*)-20-(**)	20	0.81 (0.032)	PFA
5TC-TT-(*)-24-(**)	24	0.51 (0.020)	PFA
5TC-TT-(*)-30-(**)	30	0.25 (0.010)	PFA
5TC-TT-(*)-36-(**)	36	0.13 (0.005)	PFA
5TC-TT-(*)-40-(**)	40	0.08 (0.003)	PFA
5TC-KK-(*)-20-(**)	20	0.81 (0.032)	Kapton®
5TC-KK-(*)-24-(**)	24	0.51 (0.020)	Kapton®
5TC-KK-(*)-30-(**)	30	0.25 (0.010)	Kapton®

** Insert calibration **J, K, T,** or **E.** ** Specify length, insert **"36"** for 1 m or **"72"** for 2 m length.*

***Note:** For GG or TT wire, additional cost per additional 300 mm (12") per package of 5.*
For KK wire, additional cost per additional 300 mm (12") per package of 5.
*For a male straight M8 plug add **"M8-S-M"** to the model number for additional cost, for a male straight M12 plug add **"M12-S-M"** to the model number for additional cost.*
*For a male right-angled M8 plug add **"M8-R-M"** to the model number for additional cost, for a male right-angled M12 plug add **"M12-S-M"** to the model number for additional cost.*

***Ordering Example: 5TC-TT-K-30-36**, 5 pack, PFA insulated thermocouples, Type K calibration (CHROMEGA®-ALOMEGA®), 30 AWG, 1 m (40") long, stripped lead termination.*