SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION REPORT

Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
May 25, 2018

Submitted to:
Michael Baker International
Norcross, Georgia

Submitted by:
Willmer Engineering Inc.
Project No. ATL-71.4259

May 25, 2018

VIA EMAIL

Mr. Michael J. Reiter, PE
Michael Baker International
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Norcross, Georgia 30092

SUBJECT: **Report of Subsurface Exploration and Geotechnical Engineering Evaluation**
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. ATL-71.4259

Dear Mr. Reiter:

Willmer Engineering Inc. (Willmer) is pleased to provide this subsurface exploration and geotechnical engineering evaluation report for the proposed Runway 1/19 and Partial Parallel Taxiway Extension project at the Richard B. Russell Regional Airport in Rome, Floyd County, Georgia. This work was performed in general accordance with our Subconsultant Agreement for Professional Services with Michael Baker International (Michael Baker), dated November 14, 2017.

This report presents our understanding of the proposed project, methods of exploration, site and subsurface conditions, and our conclusions and recommendations related to the design of the project.

We appreciate the opportunity to be of service on this project. Please contact us if you have any questions concerning this report or require further assistance.

Sincerely,

WILLMER ENGINEERING INC.

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TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY 1

1.0 PROJECT INFORMATION 2

1.1 Project Description and Site Location 2
1.2 Existing Site Conditions and Proposed Grading 2
1.3 Objectives and Scope of Present Work 2

2.0 FIELD EXPLORATION 3

2.1 Pavement Coring 3
2.2 Air-Track Borings 3
2.3 Standard Penetration Test Borings 3
2.4 Auger Borings 4
2.5 Soil Sampling 4

3.0 LABORATORY TESTING 5

3.1 General 5
3.2 Unified Soil Classification Test 5
3.3 Modified Proctor Compaction Test 5
3.4 California Bearing Ratio 5
3.5 One-Dimensional Consolidation Test 6
3.6 Corrosivity Testing 6
3.7 Lime Stabilization Study 6

4.0 SITE AND SUBSURFACE CONDITIONS 7

4.1 Area Geology 7
4.2 Subsurface Conditions 7
4.2.1 Existing Pavement 8
4.2.2 Top Soils 8
4.2.3 Fill Soils 8
4.2.4 Alluvium 8
4.2.5 Residuum 8
4.2.6 Partially Weathered Rock 8
4.2.7 Auger Refusal Material 8
4.2.8 Groundwater Table 9
4.3 Borrow Area Evaluation 9
4.3.1 Borrow Area 2 9
4.3.2 Borrow Area 3 9
4.3.3 Borrow Area 4 9
4.3.4 Borrow Area 5 10

TABLE OF CONTENTS (cont'd)

5.0 GEOTECHNICAL CONCLUSIONS AND RECOMMENDATIONS 11

5.1 Site and Subgrade Preparation 11
5.2 Structural Fill 12
5.3 Lime Stabilization and Pavement Subgrade Recommendations 12
5.4 Drainage and Groundwater Management 13
5.5 Settlement of Fill Soils and Waiting Period 13

Tables

Table 1 Summary of Subsurface Conditions
Table 2 Summary of Pavement Cores
Table 3a Summary of Air-Track Borings – Area 2
Table 3b Summary of Air-Track Borings – Area 3
Table 3c Summary of Air-Track Borings – Area 4
Table 3d Summary of Air-Track Borings – Area 5
Table 4 Summary of Modified Proctor and CBR Test Results – Phase I
Table 5a Summary of Modified Proctor and CBR Test Results – Borrow Area 3
Table 5b Summary of Modified Proctor and CBR Test Results – Borrow Area 4
Table 5c Summary of Modified Proctor and CBR Test Results – Borrow Area 5
Table 5d Summary of Modified Proctor and CBR Test Results – Lime Stabilization Study
Table 6 Summary of One-Dimensional Consolidation Test Results

Figures

Figure 1 Project Location Map
Figure 2 Boring and Coring Location Plan (Sheets 1 and 2)
Figure 3 Subsurface Profiles (AA', BB', CC' and DD')

Appendices

Appendix I Boring Records Legend
Unified Soil Classification System Reference Sheet
Soil Boring Logs
Appendix II Pavement Core Photographs
Appendix III Laboratory Test Results
Appendix IV Site Photographs
Appendix V Important Information About Geotechnical Report

Executive Summary

The following summary highlights significant aspects of the geotechnical exploration and recommendations. Readers are referred to the remaining text for additional details.

- This project consists of the extension of Runway 1/19 and Partial Parallel Taxiway. The proposed runway and taxiway extension will be at the northern end of the runway. The proposed runway extension length is approximately 1,260 feet.
- Based on the provided grading plan, up to 15 feet of fill will be required at the site to reach the proposed final grade.
- Four potential borrow areas, designated Borrow Area 2, 3, 4 and 5, were evaluated as part of this investigation using air-track borings, auger borings, and laboratory testing.
- The field exploration for this project consisted of 27 Standard Penetration Test (SPT) borings for proposed extension area, 64 Air-Track Borings and 28 auger borings for the borrow areas, and 11 pavement cores from the existing runway, taxiways, and Jones Mill road.
- Asphalt pavement and underlying graded aggregate base (GAB) or soil-cement were encountered at all core locations. The thickness of asphalt at the runway and taxiway core locations ranged from 4.25 to 12 inches. The thickness of GAB at these core locations ranged from 5 to 12 inches.
- Based on our subsurface exploration, soils in the proposed extension area and the borrow areas generally consist of sandy lean and fat clays and clayey sands. Because of the high moisture content and high plasticity of the soils in the borrow areas, we recommend that the borrow soils be treated with lime.
- For all structural fill up to one foot below the top of subgrade, the percentage of lime required to help dry and improve the workability of the soils should be determined by the contractor based on the natural moisture content and plasticity of the soil encountered during construction. Based on the laboratory test results, we anticipate that a minimum 4 percent lime (by dry weight of soil) will be required.
- For the upper one foot of subgrade, we recommend that a minimum 6 percent lime (by dry weight of soil) be used to help the drying process and improve the workability and subgrade support characteristics of the soils. A higher percentage of lime may be required depending on the moisture content of the soil encountered during construction.
- With lime-stabilized subgrade described above, we recommend a CBR value of 20 for use in pavement design.
- Settlement under the proposed fill is estimated to range from 0 to 15 inches. The highest settlement will be in the runway safety area.
- We recommend a waiting period of 120 days between the completion of fill placement and the beginning of pavement construction in fill areas. The waiting period can be reduced to about 60 days by placing a 2 feet thick layer of drainage blanket before placement of any fill material.

1.0 Project Information

1.1 Project Description and Site Location

This project consists of the extension of Runway 1/19 and Partial Parallel Taxiway Extension at the Richard B. Russell Regional Airport located in Rome, Floyd County, Georgia. The proposed runway and taxiway extension will be at the northern end of the runway. The runway extension length is approximately 1,260 feet. The airport is considering four borrow areas near the runway as potential sources of fill material required for the extension of the runway. A project location map is presented in Figure 1 and the proposed grading plan is presented in Figure 2.

1.2 Existing Site Conditions and Proposed Grading

The site for the proposed extension is currently grassed with moderate to heavy undergrowth at the lower elevations near Jones Mill Road. The existing ground surface ranges in elevation between approximately elevation 590 feet near Jones Mill Road and 625 feet at the north end of existing Runway 1/19. The low point of the site is located near the end of the proposed runway safety area. Based on the provided grading plan, we understand that the elevations of Runway 1/19 and Partial Parallel Taxiway extensions will need to match the elevations of existing runways and taxiways. Therefore, up to 15 feet of fill will be required to reach proposed final grade.

1.3 Objectives and Scope of Present Work

The primary objectives of the study reported herein were to obtain geotechnical information and provide recommendations for site grading, subgrade preparation, and pavements for the proposed runway and taxiway extensions. To achieve these objectives, Willmer performed the following major tasks:

- Review and compilation of aerial photographs and geologic literature pertaining to the subject site.
- Planning and performance of a field exploration program consisting of: (i) a visual reconnaissance of the site to document existing topography and land use, above-ground utilities, accessibility for drilling equipment, and other features relevant to the field exploration work, (ii) coordination with Georgia Utilities Protection Center and a private utility locator for subsurface utility clearance at boring locations, (iii) coring eleven asphalt pavement cores, (iv) drilling twenty seven Standard Penetration Test (SPT) borings, (v) drilling sixty four Air-Track borings in the borrow areas, (vi) drilling twenty eight auger borings in Borrow Areas 3,4 and 5, and (vii) obtaining bulk and undisturbed samples for laboratory testing.
- Performance of a laboratory testing program consisting of classification and engineering property tests on representative soil samples, and performance of lime stabilization study on samples obtained from Borrow Area 5.
- Preparation of this report summarizing all relevant field and laboratory test data, the results of our analyses and evaluation, and our recommendations for site grading, subgrade preparation, and pavements.

2.0 Field Exploration

The field exploration for this project was conducted in two phases. Phase I consisted of pavement coring, air-track boring for preliminary evaluation of proposed borrow areas, Standard Penetration Test (SPT) borings for the runway and taxiway extension areas, and soil sampling from the SPT borings. Phase II consisted of additional exploration of borrow areas using auger borings in Borrow Areas 3,4 and 5, and soil sampling for use in laboratory tests.

2.1 Pavement Coring

The field exploration included eleven pavement cores (C-1 through C-11) on existing pavements. Three cores were collected on the existing Runway 1/19, six cores were collected on the existing taxiways and two cores were collected on Jones Mill Road located north of the airport. The cores were collected to determine the thickness/type of pavement structure. The core locations are shown on Figure 2. The thickness of each core was measured in the field. All of the pavement core locations were selected by Michael Baker and located in the field by our engineer using a hand-held GPS device and references from existing site features. A summary of pavement cores is presented in Table 2.

2.2 Air-Track Borings

Air-track borings were conducted in proposed Borrow Areas 2, 3, 4 and 5 to determine approximate depths to partially weathered rock and bedrock to assess feasibility of using these areas as possible borrow materials for fill sections of the runway and taxiway extension areas. All of the air-track boring locations were selected by Michael Baker and located in the field by our engineer using a hand-held GPS device and references from existing site features. Drilling of the air-track borings was accomplished using a track-mounted HCR-900 air-track rig. A total of sixty-four (64) air-track borings in the four borrow areas were performed, and the borings were extended to top of rock. Air-track borings were advanced to depths ranging from 11 to 35 feet below existing ground surface based on the approximate cut depths in the borrow areas as estimated by Michael Baker. The air-track borings were extended to at least 5 feet into rock to confirm that the borings ended in bedrock. The results of the air track borings for the four borrow areas (A-2, A-3, A-4 and A-5 series) are presented in Tables 3a, 3b, 3c and 3d.

2.3 Standard Penetration Test Borings

A total of twenty-seven Standard Penetration Test (SPT) borings (R-1 through R-27) were performed across the proposed runway and taxiway extension site. The depth of the borings ranged from 5 to 15 feet. The boring locations are shown on Figure 2.

The borings were drilled using an all-terrain vehicle (ATV)-mounted rotary drill rig to advance continuous hollow-stem augers. All work was performed under the observation of our geotechnical engineers. The SPT borings were performed in general accordance with ASTM Standard D1586. The Standard Penetration Test is a widely accepted method for *in situ* testing of soils. A 2-foot long, 2-inch outside-diameter split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The blows required for the first 6 inches of penetration are allowed for seating the sampler into any loose cuttings, and the sum of the blows required for penetration of the second and third 6-inch increments constitutes the penetration

resistance or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties including consistency, relative density, strength, compressibility, and potential for difficult excavation. Correlations between the N-value and the relative density of cohesionless soils (sands) and consistency of cohesive soils (clays/silts) are included in Appendix I. Results of the SPT borings are summarized in Table 1, and presented in the form of individual boring logs in Appendix I, along with a list of the legends used in the boring logs, and a reference sheet describing the Unified Soil Classification System.

2.4 Auger Borings

Twenty-eight auger borings (B3-1 through B3-7, B4-1 through B4-14 and B5-1 through B5-7) were performed in the Borrow Areas 3, 4 and 5. All of the auger boring boring locations were selected by Michael Baker and located in the field by our engineer using a hand-held GPS device and references from existing site features. The depth of the borings was selected by Michael Baker. Auger refusal in the auger borings ranged from 4 to 30 feet. The boring locations are shown on Figure 2.

The borings were drilled using a track-mounted rotary drill rig to advance continuous hollow-stem augers. All work was performed under the observation of our geotechnical engineers.

2.5 Soil Sampling

Representative soil samples were collected from the runway and taxiway extension areas and Borrow Areas 3,4 and 5 for laboratory characterization of soils. In addition, representative soil samples were collected from Borrow Area 5 for lime stabilization study. Borrow area 5 was selected by Michael Baker for lime stabilization study as bulk of the soil for structural fill for the runway and taxiway extension area would likely come from Borrow Area 5.

Soil samples (split-spoon and bulk samples) collected during the field exploration program were classified by our geotechnical engineer. The split-spoon samples were obtained from all the runway and taxiway extension borings and placed in glass jars. Bulk samples collected in the field were placed in plastic bags with a sealed jar for natural moisture content measurement. Split spoon samples and bulk samples obtained were transported to our laboratory for further classification and laboratory testing.

3.0 Laboratory Testing

3.1 General

A laboratory testing program was performed by Willmer to determine the engineering properties of soils for use in our analyses and recommendations for the project. The laboratory testing program consisted of: (i) modified Proctor compaction tests, (ii) California bearing ratio tests, and (iii) one-dimensional consolidation tests (iv) consolidated undrained triaxial compression tests, and (iv) pH and resistivity of soils, and (v) lime stabilization study. All laboratory tests were performed in general accordance with appropriate ASTM standards.

3.2 Unified Soil Classification Test

Classification and index tests were performed to aid in the characterization of soil samples. Tests were conducted on three composite samples obtained from runway and taxiway extension area, three samples from Borrow Area 3, four samples from Borrow Area 4 and three samples from Borrow Area 5. The tests included visual classification in the laboratory, grain size distribution analyses (ASTM D 422), and Atterberg Limits determination (ASTM D 4318). Results of these tests are summarized in Table 4 and Tables 5a, 5b and 5c, and the individual test results are included in Appendix III. As shown in Tables 4 and Tables 5a, 5b and 5c, the tested samples were clayey sand, lean clay and fat clay with natural moisture contents ranging from 6.1 to 32.5 percent. The percent fines of the samples ranged from 39.5 to 93.4 percent, the liquid limits ranged from 30 to 69 percent, and the plasticity indices ranged from 14 to 44 percent.

3.3 Modified Proctor Compaction Test

Modified Proctor compaction tests were performed on three composite samples obtained from runway and taxiway extension area and two composite samples each from representative soil samples obtained from Borrow Areas 3, 4 and 5. Results of these tests are summarized in Table 4 and Tables 5a, 5b and 5c, and the individual test results are included in Appendix III. The modified Proctor maximum dry density for these samples ranged from 106.8 to 119.6 lb/ft^3, and the optimum moisture content ranged from 11.9 to 20.8 percent. The natural moisture content for these samples ranged from 6.1 to 32.5 percent.

3.4 California Bearing Ratio

California Bearing Ratio (CBR) tests were performed on three composite samples obtained from runway and taxiway extension area and two composite samples each from representative soil samples obtained from Borrow Areas 3, 4 and 5. CBR tests were conducted on samples selected for compaction testing to determine the subgrade-support characteristics of these soils. The CBR tests were performed on specimens molded to 95 percent of the Modified Proctor maximum dry density at a moisture content approximately equal to the optimum moisture content. The resulting CBR values are summarized in Table 4 and 5a, 5b and 5c, and the individual test results are included in Appendix III. As shown in Table 4 and 5a, 5b and 5c, the CBR values ranged from 3.5 to 19.

3.5 One-Dimensional Consolidation Test

A one-dimensional consolidation test (ASTM D 2435) was performed on an undisturbed soil sample obtained from boring R-15 to assess the compressibility characteristics of these soils and estimate settlements under stresses from fill. Results of the consolidation tests are summarized in Table 6, and the individual test results are presented in the form of void ratio, strain versus pressure, and coefficient of consolidation versus effective vertical stress plots in Appendix III. As shown in Table 6, the compression index was 0.03 and the pre-consolidation pressure was approximately 1800 lb/ft^2. The coefficient of consolidation for the applicable stress level was from 0.7 ft^2/day.

3.6 Corrosivity Testing

Corrosivity testing including pH and resistivity tests (ASTM G 57/G187) were performed on a soil sample obtained from boring R-25. The test results are presented in Appendix III. The pH of the sample was 4.9 and the resistivity was 8740 ohms-cm.

3.7 Lime Stabilization Study

Upon completion of the laboratory tests on bulk soil samples obtained during Phase I field exploration, it was determined that earthwork and compaction of the on-site soils could be difficult due to high natural moisture content and high plasticity of these soils. It was assessed that lime stabilization would potentially decrease the moisture content and improve the workability and subgrade support characteristics of these soils. Subsequently, as part of Phase II, a lime stabilization study was conducted on representative bulk soil samples obtained from Borrow Area 5. Laboratory testing was performed at 0, 4, 8 and 12 percent lime additive to evaluate the beneficial effects of lime treatment and determine the required percentage of lime for subgrade construction. The results of lime stabilization tests are summarized in Table 5d, and individual test results are attached in Appendix III. As shown in Tables 5d, the tested sample was fat clay with a natural moisture content of 26%. The percent fine of the sample was 82.7 percent, the liquid limit was 57 percent, and the plasticity index was 32 percent. The modified Proctor maximum dry density was 106.5 lb/ft^3, and the optimum moisture content was 20.3 percent. CBR test performed on a specimen molded to 95 percent of the Modified Proctor maximum dry density at a moisture content approximately equal to the optimum moisture content yielded a CBR value of 8.8.

As shown in Table 5d, lime stabilization improved the workability and subgrade support characteristics of the soil. For example, at a lime content of 8%, the plasticity index was reduced to 15%, and the CBR value was increased to 24.

4.0 Site and Subsurface Conditions

4.1 Area Geology

The project site is in the Ridge and Valley Physiographic Province of Georgia. The Ridge and Valley is bounded to the north by Cumberland Plateau and Lookout Mountain and to the south and east by the Great Smokey (Cartersville) Fault. The Ridge and Valley Province is comprised of folded, faulted, stratified rock ranging in age from Lower Cambrian to Upper Pennsylvanian, or roughly 600 to 280 million years old. The rocks of the area are shale, limestone, dolomite, and sandstone. All these rocks were originally deposited as sediments carried by running water from Blue Ridge upland on the southeast side into the Paleozoic Sea and then spread as horizontal sheets covering the sea bottom. These loose sediments were later compressed westward and tilted, creating faults fractures and joints. Tilting exposed some of the more erodible rock, enhancing weathering. The compression, tilting and erosion resulted in a series of northeast to southwest trending ridges and valleys which gave the area its name.

The rocks have weathered in-place to form residual over-burden soils including clays, silts and sands, some of which contain chert fragments ranging from gravel to boulder sizes. Due to the interbedding, tilting and weathering, relatively hard, sound rock layers can be underlain by soils or voids, creating complex foundation conditions. The subject site is underlain by undifferentiated Floyd Shale of Mississippian Age.

4.2 Subsurface Conditions

Pavement core results are presented in Table 2 with photographs included in Appendix II. Results of the SPT borings, auger borings and air-track borings within the current area of exploration are presented in the form of individual boring logs in Appendix I, and a summary of the boring records is presented in Table 1 and Tables 3a through 3d. The stratification lines shown on the boring logs represent our interpretation of the field logs and laboratory test results, in accordance with generally accepted geotechnical engineering practice. The stratification lines represent approximate boundaries between soil types; actual transitions between soil types are typically expected to be gradual. Although individual test borings are representative of the subsurface conditions at the precise boring locations on the dates shown, they are not necessarily indicative of the subsurface conditions at other locations or at other times. Also, in the absence of foreign substances, it is difficult to distinguish between virgin (undisturbed) residual soils and clean soil fill; the soil was classified as fill only at locations and depths where the fill material was visually distinguishable from residual soils.

The subsurface profile within the present study area can be generally characterized as a surficial pavement layer, then fill underlain by a natural soil profile consisting of alluvial deposits (only at some locations near Jones Mill Road) underlain by residual soils, partially weathered rock (PWR), and parent bedrock. However, at some locations, no PWR was encountered above rock. A generalized discussion of the soil types encountered during the current exploration is presented in the following paragraphs. For the purpose of this discussion, partially weathered rock (PWR) is characterized for engineering purposes as residual soils exhibiting N-values in excess of 50 blows for 6 inches of penetration. Auger refusal is typically indicative of the top of bedrock; however, auger refusal may also occur in dense residual soils, PWR, and boulders.

4.2.1 Existing Pavement

Asphalt pavement and underlying graded aggregate base (GAB) or soil-cement were encountered at all core locations (C-1 through C-11). The thickness of asphalt at the core locations ranged from 3.5 to 12 inches. The pavement thickness for the runway ranged from 8.25 to 11 inches, and the pavement thickness for the taxiway ranged from 4.25 to 12 inches. Soil cement was encountered on Jones Mill Road in cores C-1 and C-2 and had a thickness of 7 and 6.5 inches respectively. The thickness of GAB at the core locations ranged from 5 to 12 inches. The individual thicknesses obtained at each core location are provided in Table 2.

4.2.2 Top Soils

Top soils were encountered in all our SPT and auger borings and ranged in thickness from 3 to 4 inches with an average thickness of approximately 3 inches.

4.2.3 Fill Soils

Fill soils consisting mostly of sandy clay were encountered at many locations. The thickness of fill soils varied from about 3 to greater than 5 feet. SPT N-values for the fill soils typically ranged between 2 and 19 blows per foot.

4.2.4 Alluvium

Alluvial soils were encountered below topsoil or at borings R-13, R-14, R-15 and R-25, and they consisted mostly of sandy clay with organics. All these borings were located just south of Jones Mill road near an existing water channel. The thickness of the alluvial layer ranged from 3 to 11 feet. SPT N-values in the alluvium layer ranged from 1 to 9 blows per foot.

4.2.5 Residuum

Residual soils were encountered at all the boring locations except R-6, R-10, R-13, R-14 and R-18. They consisted mostly of clayey sand and sandy lean or fat clay. Relic banding/structure from the parent rock material was clearly visible in many of the soil samples. The thickness of residual soils ranged from about 2 to 12 feet. The relative density of residual soils varied widely with SPT N-values ranging from 4 to 27 blows per foot.

4.2.6 Partially Weathered Rock

Partially weathered rock (PWR), directly overlying parent bedrock, was encountered at boring R-14. This location is south of Jones Mill Road. The total thickness of PWR was 1.5 feet at auger refusal location and was sampled as very dense fine sand. The SPT N-values in the PWR was 50 blows for 1 inch of penetration.

4.2.7 Auger Refusal Material

Auger refusal material was encountered at borings R-13, R-14, R-15, B4-2, B4-3, B4-4, B4-6, B4-8 and B4-11. All these boring locations were just north or south of Jones Mill Road. Auger refusal is typically indicative of the top of bedrock; however, auger refusal may also occur on dense residual soils, PWR, and boulders. The depth to auger refusal ranged from 4 to 11 feet below the existing ground surface. No rock coring was included in our scope of work for this project.

4.2.8 Groundwater Table

Groundwater was encountered at borings R-13, B4-1, B4-2, B4-7, B4-8, B4-9, B4-10 and B5-2 at the end of boring completion at a depth ranging from 0 to 24 feet below the existing ground surface. The groundwater elevations are shown in the individual boring logs in Appendix I. It should be noted that groundwater levels are expected to fluctuate with seasonal variations.

4.3 Borrow Area Evaluation

Borrow area evaluation was conducted in two phases. In Phase I, sixty-four air-track borings were performed in Borrow Areas 2, 3, 4 and 5. The results of the air track borings for the four borrow areas are presented in the form of tables for each borrow area in Tables 3a through 3d. In Phase 2, twenty-eight auger borings were performed using a track-mounted drill rig in Borrow Areas 3, 4 and 5. Additionally, representative soil samples were collected from Borrow Areas 3, 4 and 5 for laboratory tests. Subsurface conditions in each borrow area and laboratory test results are discussed in the following sections.

4.3.1 Borrow Area 2

Twenty (20) air-track probes were conducted in Borrow Area 2. Soils consisting mostly of sandy lean or fat clays and clayey sands were encountered. The thickness of soils varied from about 3 to 13 feet and the thickness of PWR varied from about 1 to 12 feet. Rock was encountered at depths ranging from 7 to 21 feet below the ground surface. No groundwater was encountered at the time of boring completion. At the end of Phase I, our air-track boring results were presented to Michael Baker and they decided not to proceed with Borrow Area 2 during Phase II.

4.3.2 Borrow Area 3

Fifteen (15) air-track probes and seven (7) auger borings were conducted in Borrow Area 3. In air-track borings, soils consisting mostly of sandy lean or fat clays and clayey sands were encountered. The thickness of soils varied from about 1 to 21 feet and the thickness of PWR varied from about 3 to 28 feet. Rock was encountered at depths ranging from 10 to 34 feet below the ground surface. Auger borings were conducted in a revised borrow area. The revised boundary of the borrow area and the auger boring locations were provided by Michael Baker. In auger-borings, the soil thicknesses ranged from 10 to 15 feet and soils consisting mostly of sandy clays and clayey sands were encountered. No groundwater was encountered at the time of boring completion. Based on the lab test results, Borrow Area 3 was found generally suitable for structural fill; however, the soils exhibited high plasticity index and moisture content. Therefore, we recommend lime treatment of the Borrow Area 3 soils to reduce moisture content and improve workability and subgrade support characteristics of these soils.

4.3.3 Borrow Area 4

Seventeen (17) air-track probes and fourteen (14) auger borings were conducted in Borrow Area 4. In air-track borings, soils consisting mostly of sandy clay and clayey sands were encountered. The thickness of soils varied from about 4 to 10 feet and the thickness of PWR varied from about 0 to 14 feet. Rock was encountered at depths ranging from 6 to 25 feet below the ground surface. Auger borings were conducted in a revised borrow area. The revised boundary of the borrow area and the auger boring locations were provided by Michael Baker. In auger-borings, the soil thicknesses ranged from 4 to 25 feet and soils consisting mostly of sandy clays, fat clays, and clayey sands were encountered. Auger refusal was encountered in B4-2, B4-3, B4-4, B4-6, B4-8 and B4-11 at depths ranging between 4 to 7 feet. All the

shallow auger refusal locations are near Jones Mill Road. It should be noted that auger refusal is typically indicative of the top of bedrock; however, auger refusal may also occur on dense residual soils, PWR, and boulders. Groundwater was encountered at depths ranging from 0 feet to 15 feet below the existing ground surface. Based on the lab test results, Borrow Area 4 was found generally suitable for structural fill; however, shallow auger refusal near Jones Mill Road, low CBR values, and high PI and moisture contents were observed. Therefore, we recommend lime treatment of the Borrow Area 4 soils to reduce moisture content and improve workability and subgrade support characteristics of these soils.

4.3.4 Borrow Area 5

Twelve (12) air-track probes and seven (7) auger borings were conducted in Borrow Area 5. In air-track borings, soils consisting mostly of sandy clay and clayey sands were encountered. The thickness of soils varied from about 17 to 35 feet. Rock was encountered at a depth of 33 feet boring in A5-11. Auger borings were conducted in a revised borrow area. The revised boundary of the borrow area and the auger boring locations were provided by Michael Baker. In auger-borings, the soil thicknesses ranged from 4 to 25 feet and soils consisting mostly of sandy clays, fat clays, and clayey sands were encountered. Groundwater was encountered at 24 feet below the existing ground surface at B5-2. Based on the lab test results, Borrow Area 5 was found generally suitable for structural fill, however, the soil exhibited high plasticity index and moisture contents were observed in our tests. Therefore, we recommend lime treatment of the Borrow Area 5 soils to reduce moisture content and improve workability and subgrade support characteristics of these soils.

5.0 Geotechnical Conclusions and Recommendations

The following conclusions and recommendations are based on the soil boring data gathered during this exploration, our understanding of the proposed construction, our experience with similar site and subsurface conditions found from our previous geotechnical studies at this airport, and generally accepted principles and practices of geotechnical engineering. This report and the conclusions and recommendations provided herein are intended for the sole use of Michael Baker International and their designated subconsultants for use in the design of the Runway 1/19 and Partial Parallel Taxiway Extension at the Richard B. Russell Regional Airport. This report should not be relied upon by other third parties.

We request that we be advised of any significant changes to the proposed development from that described in this report so that we may amend our recommendations accordingly. In addition, we request the opportunity to review the geotechnical related portions of the project documents.

5.1 Site and Subgrade Preparation

Prior to fill placement, site and subgrade preparation should begin with the removal of all surface vegetation, organic-laden soils, topsoil, and any other deleterious materials within the proposed construction area. Any construction debris should be removed and disposed offsite. Asphalt/concrete materials broken/crushed into pieces of 3 inches or smaller may be reused as engineered fill material in the bottom portions of deep fill areas.

After stripping, site preparation, and excavation in cut areas, the newly exposed subgrade should be evaluated by the project geotechnical engineer. This evaluation will confirm that all soft, unstable, or undesirable materials have been removed. During this evaluation, we recommend that all proposed pavements and areas that are to receive structural fill be proof-rolled using a loaded tandem-axle dump truck (20-ton minimum) or similar rubber-tired vehicle. Proof-rolling will help identify areas of low-strength soils. If areas exhibiting excessive deflection or pumping are detected during proof-rolling, an appropriate remedial measure should be recommended by the project geotechnical engineer. Remedial measures may include undercutting of the soft soil to firm material and replacement with structural fill or stone, in-place stabilization of the soil by mechanical manipulation and compaction, and in-situ stabilization using lime or cement. Generally, lime-stabilization is not effective for highly micaceous soils, but can be effective for soils with little or no mica. Proof-rolling should not be attempted within several days after a heavy rain as the equipment will rut and damage the subgrade.

If localized undercutting and backfilling becomes necessary during construction, structural fill must be used for backfilling. The structural fill should meet the requirements of Section 5.2. It should be noted that undercutting and/or stabilization of soft alluvial soils will likely be required in the area just south of Jones Mill Road. The extent of undercut/stabilization should be evaluated by the project geotechnical engineer during construction.

5.2 Structural Fill

As mentioned previously, up to 15 feet of fill will be required to achieve final grade at the site. Structural fill should be free of significant organic matter or debris, have a uniform composition, and be free of rock fragments greater than three inches in diameter. Soils selected for use as structural fill material should also have a Plasticity Index (PI) less than 30 percent and a modified Proctor (ASTM D 1557) maximum dry density of at least 95 pcf.

Structural fill must be brought to the proposed subgrade elevation by placing and compacting approved fill materials upon a subgrade approved by the geotechnical engineer. Compaction of engineered fill must be accomplished by placing the fill material in vertical lifts of eight inches maximum loose thickness and compacting each lift with a sheepsfoot compactor to a dry density that corresponds to at least 92 percent of the Modified Proctor (ASTM D 1557) maximum dry density of the fill soil. The upper 12 inches of structural fill beneath pavement should be compacted to at least 95 percent of the maximum dry density. In confined areas, such as utility trenches where large compaction equipment cannot be used, portable compaction equipment and the use of a thinner lift (i.e., 4 inches of loose thickness) may be necessary to achieve the specified level of compaction. In addition to the requirement for dry density, the engineered fill must be placed at a moisture content ±3 percent of the optimum moisture content, as determined by the Modified Proctor compaction test.

Care must be exercised during grading and fill placement operations. The combination of heavy construction equipment traffic and excess surface moisture can cause pumping and deterioration of the near-surface silty soils. Once wet, these soils hold moisture and are difficult to dry. The severity of this potential problem depends to a great extent on the weather conditions prevailing during construction. The contractor must exercise discretion when selecting equipment sizes and make a concerted effort to control surface water while the subgrade soils are exposed. If such problems do arise, the operations in the affected area must be halted and the geotechnical engineer contacted to evaluate the condition.

We strongly recommend that the placement and compaction of engineered fill be monitored on a full-time basis by a soil technician working under the supervision of the project geotechnical engineer. The technician should observe each lift of engineered fill placed and compacted to confirm the project specifications are met.

5.3 Lime Stabilization and Pavement Subgrade Recommendations

As shown in Tables 4 and 5a through 5c, the soil in the runway and taxiway extension area and in the borrow areas consist primarily of sandy lean clay and fat clay. The natural moisture contents of the tested samples were as much as 16 percent higher than the corresponding Modified Proctor optimum moisture contents, and the plasticity indices of these soils were as high as 44 percent. Therefore, significant drying of the soils will be required during placement and compaction, and drying would be difficult due to high plasticity of the soils. We recommend that lime be used to help the drying process and improve the workability and subgrade support characteristics of the soils.

As described in Section 3.8, a lime stabilization study consisting of laboratory tests on soils mixed with different percentages of lime was performed to determine the lime percentage that will be required during construction. Hydrated lime was used in the laboratory tests, and with 4 to 12 percent lime (i.e., percent of lime by dry weight of soil) the moisture content was reduced by about 7 percent in

approximately 48 hours after mixing with lime. We anticipate that quick lime (i.e., as opposed to hydrated lime) will result in a greater reduction in moisture content. The type of lime (i.e., quick lime or hydrated lime) to be used for this project should be determined by the contractor depending on the natural moisture content of the soil encountered during construction.

For all structural fill up to one foot below the top of subgrade, the percentage of lime required to help the drying process and improve the workability of the soils should be determined by the contractor based on the natural moisture content and plasticity of the soil encountered during construction. Based on the laboratory test results, we anticipate that a minimum 4 percent lime (by dry weight of soil) will be required. The compaction density and moisture content should be as recommended in Section 5.2.

For the upper one foot of subgrade, we recommend that a minimum 6 percent lime (by dry weight of soil) be used to help the drying process and improve the workability and subgrade support characteristics of the soils. It should be noted that a higher percentage of lime may be required depending on the moisture content of the soil encountered during construction. All materials, mixing, curing, placement, and compaction of the lime-treated subgrade should be in accordance with the Federal Aviation Administration (FAA) Specifications P-155. The compaction density and moisture content should be as recommended in Section 5.2. With lime-stabilized subgrade described above, we recommend a CBR value of 20 for use in pavement design.

5.4 Drainage and Groundwater Management

The proposed construction areas must be provided with adequate drainage measures to maintain the integrity of the silty subgrade soils, especially during wet-weather conditions. When free water is allowed to stand on a stable subgrade, the soils can absorb water, soften, swell and experience a reduction in their support capability. Without adequate drainage provisions, site preparation activities during wet-weather periods may result in subgrade conditions that will necessitate undercutting or other subgrade stabilization measures. Therefore, we recommend that the site be graded to provide positive drainage away from the proposed pavement subgrade areas, and toward suitable drainage handling areas such as a perimeter ditch, french drain, or culvert.

Proper drainage of the finished pavements and ground surfaces is also important to maintain the integrity of the subgrade soils after construction is completed. Therefore, all finished grades must be sloped to prevent any ponding of surface water adjacent to structures and pavements.

Highest groundwater was encountered at an elevation of 608.5 feet in our borings. However, we note that groundwater elevations fluctuate with seasonal and climatic variations and may be different at other times.

5.5 Settlement of Fill Soils and Waiting Period

As shown on the soil profiles in Figure 3, and discussed in section 4, sandy clay, fat clay, and clayey sand were encountered in the proposed fill areas. Significant delayed settlement is expected in these areas after placement of the required fill. The magnitude of settlement is expected to vary over the site since the required height of fill varies from 0 to 15 feet. We estimate the settlement under the proposed fill areas to range for 0 to approximately 15 inches. The highest settlement will be in the runway safety area. The resulting differential settlement can be detrimental to the runway safety area. Settlement can also have

adverse effects on any proposed or existing underground utilities, and the effect of settlement on underground utilities should be evaluated prior to beginning of fill placement.
The progress of settlement with time during construction will depend on the rate of fill placement. We anticipate that most of the primary consolidation settlement will be completed within about 120 days after completion of embankment construction. We recommend a waiting period of 120 days between the completion of fill placement and the beginning of any pavement construction in fill areas to minimize post-construction differential settlement due to primary consolidation. Settlement plates should be installed and surveyed weekly and provided to Willmer to monitor the progress of settlement with time. The length of the waiting period may be increased or decreased based on the results of the settlement monitoring data, at the discretion of the project geotechnical engineer.

The progress of settlement can be accelerated by placing a 2 feet thick layer of drainage blanket (clean sand) over the existing ground surface prior to placement of any fill material. With the drainage blanket, the waiting period will be reduced to about 60 days. The progress of settlement can be further accelerated and waiting period further reduced by using wick drains. Details of wick drain design will be discussed with Michael Baker if further reduction in waiting period is desired.

TABLES

Table 1 Summary of Subsurface Conditions
Table 2 Summary of Pavement Cores
Table 3a Summary of Air-Track Boring – Area 2
Table 3b Summary of Air-Track Boring – Area 3
Table 3c Summary of Air-Track Boring – Area 4
Table 3d Summary of Air-Track Boring – Area 5
Table 4 Summary of Modified Proctor and CBR Test Results – Phase I
Table 5a Summary of Modified Proctor and CBR Test Results – Borrow Area 3
Table 5b Summary of Modified Proctor and CBR Test Results – Borrow Area 4
Table 5c Summary of Modified Proctor and CBR Test Results – Borrow Area 5
Table 5d Summary of Modified Proctor and CBR Test Results – Lime Stabilization Study
Table 6 Summary of One-Dimensional Consolidation Test Results

Table 1
Summary of Subsurface Conditions
Subsurface Exploration & Geotechnical Investigation
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Engineering Project No. 71.4259

Boring Number	Surface Elev. (ft)	Groundwater Depth and Elevation Time of Boring (ft)		Stabilized Groundwater Depth and Elevation (ft)		Approximate Depths and Elevations to Top of Layer[1] (ft)								Layer Thickness (ft)			
						Fill		Alluvium		Residuum		Boring Termination / Auger Refusal		Fill	Alluvium	Residuum	PWR[2]
		Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation				
R-1	615	--	--	--	--	0	615	--	--	3	612	5	610	3	--	2	--
R-2	619	--	--	--	--	0	619	--	--	3	616	5	614	3	--	2	--
R-3	618	--	--	--	--	0	618	--	--	3	615	5	613	3	--	2	--
R-4	615	--	--	--	--	--	--	--	--	0	615	5	610	--	--	5	--
R-5	617	--	--	--	--	--	--	--	--	0	617	5	612	--	--	5	--
R-6	618	--	--	--	--	0	618	--	--	--	--	5	613	≥ 5	--	--	--
R-7	617	--	--	--	--	0	617	--	--	6	612	15	602	5	--	10	--
R-8	615	--	--	--	--	0	615	--	--	3	612	5	610	3	--	2	--
R-9	618	--	--	--	--	--	--	--	--	0	618	5	613	--	--	5	--
R-10	621	--	--	--	--	0	621	--	--	--	--	5	616	≥ 5	--	--	--
R-11	596	--	--	--	--	0	596	--	--	3	593	5	591	3	--	2	--
R-12	596	--	--	--	--	0	596	--	--	4	592	5	591	4	--	2	--
R-13	600	9	591	3	597.0	--	--	0	600	--	--	11[3]	589	--	11	--	--
R-14	596	--	--	--	--	--	--	0	596	--	--	9.5[3]	587	--	8.5	--	1.0
R-15	595	--	--	--	--	--	--	0	595	3	592	9[3]	586	--	9	6	--
R-16	610	--	--	--	--	0	610	--	--	3	607	5	605	3	--	2	--
R-17	610	--	--	--	--	0	610	--	--	3	607	5	605	3	--	2	--
R-18	615	--	--	--	--	0	615	--	--	--	--	5	610	≥ 5	--	--	--
R-19	617	--	--	--	--	0	617	--	--	3	614	5	612	3	--	2	--
R-20	618	--	--	--	--	--	--	--	--	0	618	5	613	--	--	5	--
R-21	618	--	--	--	--	0	618	--	--	3	615	5	613	3	--	2	--
R-22	614	--	--	--	--	--	--	--	--	0	614	5	609	--	--	5	--
R-23	617	--	--	--	--	--	--	--	--	0	617	5	612	--	--	5	--
R-24	620	--	--	--	--	0	620	--	--	3	617	5	615	3	--	2	--
R-25	595	--	--	--	--	--	--	0	595	3	592	5	590	--	--	2	--
R-26	623	--	--	--	--	0	623	--	--	3	620	15	608	3	--	12	--
R-27	623	--	--	--	--	0	623	--	--	3	620	15	608	3	--	12	--

Notes:

1 Depth and elevation are approximate and are rounded to the nearest foot
2 PWR - Partially Weathered Rock
3 Auger Refusal

Table 2
Summary of Pavement Cores
Subsurface Exploration & Geotechnical Investigation
Runway 1/19 & Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Floyd County, Georgia
Willmer Project No. ATL-71.4259

Core No.	Location	Asphalt Pavement Thickness (in)	Soil Cement (in)	GAB[1] (in)	Total Pavement Thickness (Asphalt + Base) (in)	Comments
C-1	NWB[2] Jones Mill RD	3.5	7	--	10.5	1" of Asphalt in between layers of Soil Cement
C-2	SEB[2] Jones Mill RD	4	6.5	--	10.5	--
C-3	Taxiway	9.5	--	12	21.5	--
C-4	Taxiway	5.25	--	12	17.25	--
C-5	Runway	11	--	12	23	--
C-6	Runway	9.75	--	5	14.75	The GAB appeared to have been contaminated with soil.
C-7	Runway	8.25	--	12	20.25	--
C-8	Taxiway	12	--	11	23	--
C-9	Taxiway	9.75	--	12	21.75	--
C-10	Taxiway	8	--	12	20	--
C-11	Taxiway	4.25	--	12	16.25	2-3" of hard compacted soil below GAB

NOTES:
1. GAB = Graded Aggregate Base. GAB thickness was measured using a hammer drill.
2. NWB = North West Bound; SEB = South East Bound

Table 3a. Summary of Air-Track Borings - Area 2
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. 71.4259

Boring Number	Ground Surface Elevation (ft)	Groundwater Depth and Elevation (ft)		Thickness of Soil (ft)	Bottom of Soil/ Top of PWR[1] (ft)		Thickness of PWR (ft)	Bottom of PWR[1]/ Top of Rock (ft)		Boring Termination Depth (ft)	Rock Penetration Depth (ft)
		Depth	Elevation		Depth	Elevation		Depth	Elevation		
A2-1	637	-	-	5	5	632	2	7	630	15	8
A2-2	638	-	-	6	6	632	6	12	626	17	5
A2-3	639	-	-	8	8	631	5	13	626	18	5
A2-4	633	-	-	11	11	622	10	21	612	26	5
A2-5	646	-	-	10	10	636	1	11	635	17	6
A2-6	633	-	-	5	5	628	4	9	624	15	6
A2-7	638	-	-	3	3	635	7	10	628	15	5
A2-8	634	-	-	7	7	627	6	13	621	18	5
A2-9	633	-	-	5	5	628	6	11	622	16	5
A2-10	637	-	-	7	7	630	5	12	625	18	6
A2-11	642	-	-	6	6	636	4	10	632	15	5
A2-12	637	-	-	8	8	629	12	20	617	25	5
A2-13	636	-	-	4	4	632	8	12	624	17	5
A2-14	637	-	-	4	4	633	4	8	629	15	7
A2-15	643	-	-	3	3	640	9	12	631	17	5
A2-16	644	-	-	6	6	638	7	13	631	18	5
A2-17	642	-	-	10	10	632	2	12	630	17	5
A2-18	636	-	-	13	13	623	3	16	620	21	5
A2-19	630	-	-	8	8	622	4	12	618	17	5
A2-20	632	-	-	12	12	620	2	14	618	19	5

NOTES
1. PWR - Partially Weathered Rock

Table 3b. Summary of Air-Track Borings - Area 3
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. 71.4259

Boring Number	Ground Surface Elevation (ft)	Groundwater Depth and Elevation (ft)		Thickness of Soil (ft)	Bottom of Soil/ Top of PWR[1] (ft)		Thickness of PWR (ft)	Bottom of PWR[1]/ Top of Rock (ft)		Boring Termination Depth (ft)	Rock Penetration Depth (ft)
		Depth	Elevation		Depth	Elevation		Depth	Elevation		
A3-1	646	-	-	10	10	636	9	19	627	25	6
A3-2	639	-	-	7	7	632	8	15	624	20	5
A3-3	643	-	-	7	7	636	7	14	629	20	6
A3-4	649	-	-	7	7	642	14	21	628	26	5
A3-5	644	-	-	6	6	638	28	34	610	35	1
A3-6	632	-	-	7	7	625	6	13	619	18	5
A3-7	638	-	-	7	7	631	3	10	626	18	6
A3-8	638	-	-	8	8	630	5	13	625	20	7
A3-9	642	-	-	8	8	634	9	17	625	22	5
A3-10	639	-	-	5	5	634	8	13	626	20	7
A3-11	645	-	-	6	6	639	7	13	632	20	7
A3-12	646	-	-	21	21	625	4	25	621	30	5
A3-13	652	14	638	1	1	651	9	10	642	18	8
A3-14	637	-	-	8	8	629	3	11	626	16	5
A3-15	644	-	-	5	5	639	7	12	632	17	5

NOTES
1. PWR - Partially Weathered Rock

Table 3c. Summary of Air-Track Borings - Area 4
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. 71.4259

Boring Number	Ground Surface Elevation (ft)	Groundwater Depth and Elevation (ft)		Thickness of Soil (ft)	Bottom of Soil/ Top of PWR[1] (ft)		Thickness of PWR (ft)	Bottom of PWR[1]/ Top of Rock (ft)		Boring Termination Depth (ft)	Rock Penetration Depth (ft)
		Depth	Elevation		Depth	Elevation		Depth	Elevation		
A4-1	607	1.5	605.5	5	5	602	4	9	598	16	7
A4-2	603	14	589	6	6	597	6	12	591	20	8
A4-3	598	15	583	8	8	590	0	8	590	13	5
A4-4	615	14	601	7	7	608	7	14	601	20	6
A4-5	603	-	-	6	6	597	0	6	597	11	5
A4-6	625	10	615	6	6	619	11	17	608	22	5
A4-7	605	-	-	7	7	598	6	13	592	18	5
A4-8	599	1	598	9	9	590	0	9	590	14	5
A4-9	615	7	608	5	5	610	2	7	608	12	5
A4-10	608	1	607	6	6	602	10	16	592	22	6
A4-11	618	8	610	6	6	612	5	11	607	16	5
A4-12	613	8	605	21	21	592	4	25	588	30	5
A4-13	613	14	599	7	7	606	4	11	602	16	5
A4-14	601	-	-	4	4	597	6	10	591	15	5
A4-15	603	12	591	10	10	593	2	12	591	17	5
A4-16	610	13	597	8	8	602	6	14	596	19	5
A4-17	622	10	612	7	7	615	14	21	601	27	6

NOTES
1. PWR - Partially Weathered Rock

Table 3d. Summary of Air-Track Borings - Area 5
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. 71.4259

Boring Number	Ground Surface Elevation (ft)	Groundwater Depth and Elevation (ft)		Boring Termination Depth and Elevation (ft)		Thickness of Soil to Boring Termination Depth (ft)	Rock Penetration Depth[2] (ft)
		Depth	Elevation	Depth	Elevation		
A5-1	625	-	-	21	604	21	-
A5-2	623	-	-	35	588	35	-
A5-3	624	-	-	26	598	26	-
A5-4	616	-	-	27	589	27	-
A5-5	625	-	-	35	590	35	-
A5-6	617	-	-	35	582	35	-
A5-7	622	10[1]	612	34	588	34	-
A5-8	617	-	-	27	590	27	-
A5-9	619	-	-	27	592	27	-
A5-10	617	-	-	17	600	17	-
A5-11	620	13[1]	607	35	585	33	2
A5-12	628	-	-	25	603	25	-

NOTES

1. Caved level at the time of boring completion
2. Rock was encountered within the boring depth at only one location.

No Partially Weathered Rock was encountered at any of the borings.

Table 4
Summary of Modified Proctor Compaction and CBR Test Results
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. ATL-71.4259

Sample No.	Boring No.	Sample Depth Below Ground Surface (ft)	Soil Description	Fines Content (%)	Liquid Limit (%)	Plasticity Index (%)	Natural Moisture Content (%)	Modified Proctor Compaction Test Results		CBR Test Results	
								Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Compaction (%)	CBR Value
B-1 (R-4, R-9)	R-4 R-9	0-5	Tan brown fat clay (CH)	93.4	67	37	32.2	106.8	20.8	95	11
B-2 (R-2, R-7)	R-2 R-7	0-5	Brown fat clay (CH)	89.9	51	25	29.6	109.9	17.6	95	19
B-3 (R-19, R-24)	R-19 R-24	0-5	Brown fat clay (CH)	92.3	69	39	27.6	108.4	19.8	95	15

Abbreviations:

CBR – California Bearing Ratio
pcf – pounds per cubic foot

Table 5a
Summary of Modified Proctor Compaction and CBR Test Results – Borrow Area 3
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. ATL-71.4259

Sample No.	Boring No.	Sample Depth Below Ground Surface (ft)	Soil Description	Fines Content (%)	Liquid Limit (%)	Plasticity Index (%)	Natural Moisture Content (%)	Modified Proctor Compaction Test Results		CBR Test Results	
								Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Compaction (%)	CBR Value (%)
Composite Sample -1	B3 – 1 B3 – 2	5 – 10 5 – 10	Tan/light brown sandy lean clay (CL)	63.9	39	19	17.3	112.7	16.9	95	8.5
Composite Sample -2	B3 – 3 B3 – 4	7 – 12 7 – 12	Tan/light brown sandy lean clay (CL)	66.7	44	23	19.5				
Composite Sample -3	B3 – 5 B3 – 7	10 – 15 10 – 15	Brown and gray sandy lean clay (CL)	52.3	35	16	16.1	118.8	11.9	95	7.2

Notes:
Composite samples 1 and 2 were combined for Modified Proctor compaction and CBR tests.

Abbreviations:
CBR – California Bearing Ratio
pcf – pounds per cubic foot

Table 5b
Summary of Modified Proctor Compaction and CBR Test Results – Borrow Area 4
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. ATL-71.4259

Sample No.	Boring No.	Sample Depth Below Ground Surface (ft)	Soil Description	Fines Content (%)	Liquid Limit (%)	Plasticity Index (%)	Natural Moisture Content (%)	Modified Proctor Compaction Test Results		CBR Test Results	
								Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Compaction (%)	CBR Value (%)
Composite Sample - 4	B4 – 3 B4 – 4 B4 – 5	1 – 5 1 – 6 5 – 10	Tan/light brown fat clay (CH)	89.8	53	38	27.8	119.6	13.5	95	3.5
Composite Sample - 5	B4 – 1 B4 – 11 B4 – 12	10 – 15 1 – 6 1 – 6	Tan/light brown fat clay (CH)	88.7	61	44	29.6				
B4-7	B4 – 7	12 – 17	Gray clayey sand (SC)	39.5	30	14	6.1	--	--	--	--
Composite Sample - 6	B4 – 13 B4 – 14	7 – 12 7 – 12	Orange lean clay(CL)	92.9	48	30	21.4	114.9	16.3	95	13.8

Notes:
Composite samples 4 and 5 were combined for Modified Proctor compaction and CBR tests.

Abbreviations:
CBR – California Bearing Ratio
pcf – pounds per cubic foot

Table 5c
Summary of Modified Proctor Compaction and CBR Test Results – Borrow Area 5
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. ATL-71.4259

Sample No.	Boring No.	Sample Depth Below Ground Surface (ft)	Soil Description	Fines Content (%)	Liquid Limit (%)	Plasticity Index (%)	Natural Moisture Content (%)	Modified Proctor Compaction Test Results		CBR Test Results	
								Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Compaction (%)	CBR Value (%)
B5-3	B5-3	15 – 20	Yellow/brown fat clay with sand (CH)	82.6	50	26	25.9	113.4	18.3	95	15.4
B5-4	B5-4	13 – 18	Reddish/brown fat clay with sand (CH)	81.7	50	24	25.8	114.3	16.5	95	13.8
B5-5	B5-5	20 – 25	Reddish/brown fat clay with sand (CH)	83.3	55	27	32.5				

Notes:
Samples B5-4 and B5-5 were combined for Modified Proctor compaction and CBR tests.

Abbreviations:
CBR – California Bearing Ratio
pcf – pounds per cubic foot

Table 5d
Summary of Modified Proctor Compaction and CBR Test Results – Lime Stabilization Study
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. ATL-71.4259

Sample No.	Percent Lime Added (%)	Soil Classification[1]	Fines Content (%)	Percent Clay (%)	Optimum Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Total Volume Change (%)	Dry Density (pcf)	CBR
LS-0	0	Reddish brown fat clay with sand (CH)	82.7	54	20.3	57	32	9.5	106.5	8.8
LS-4	4	Reddish brown sandy elastic silt (MH)	59.4	24	20.8	56	23	9.2	105.9	24.2
LS-8	8	Reddish brown sandy elastic silt (MH)	61.1	18	22.8	51	15	2.2	102.3	24.4
LS-12	12	Reddish brown sandy elastic silt (MH)	61.3	17	21.8	61	28	2.5	102.8	32.5

Note:

1. Soil Classification after mixing with lime.

Table 6
Summary of One-Dimensional Consolidation Test Results
Runway 1/19 and Partial Parallel Taxiway Extension
Richard B. Russell Regional Airport
Rome, Floyd County, Georgia
Willmer Project No. 71.4259

Sample Number	Sample Depth[1] (feet)	Soil Description	SPT N Value[2]	Natural Moisture Content (%)	Initial Void Ratio	σ_p' (psf)	C_c	C_v (ft^2/day)
R-15	1-3	Gray and brown sandy clay	1	16.3	0.45	1800	0.03	0.7

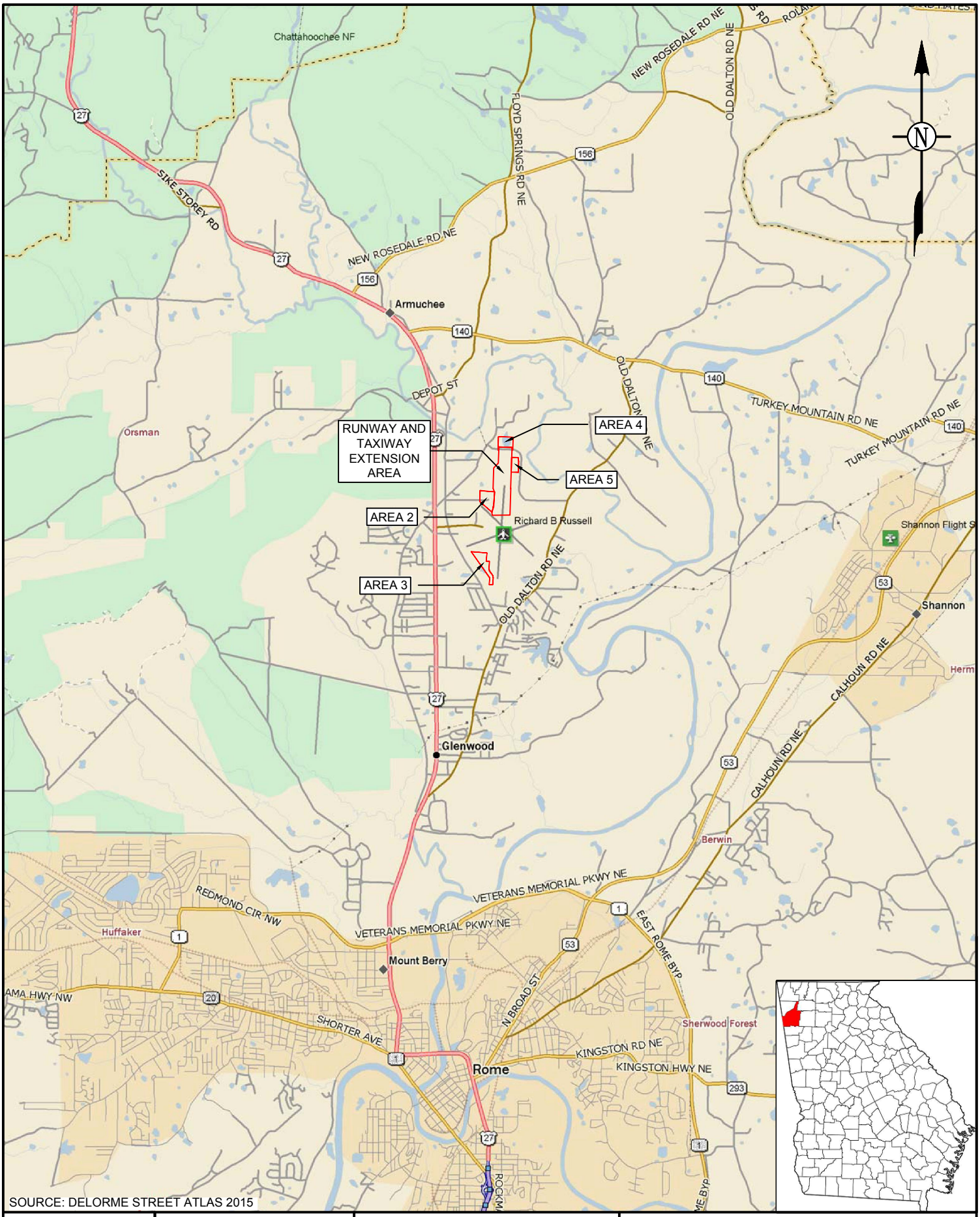
Abbreviations: LL – Liquid Limit
PI – Plasticity Index
NP – Non-Plastic
σ_p' – Pre-consolidation Pressure
C_c – Compression Index
C_r – Recompression Index
C_v – Coefficient of Consolidation

Notes:

1. Sample depths are measured from the existing ground surface at the time of the subsurface exploration.
2. SPT N values are for samples taken just above or closest to the undisturbed sample.

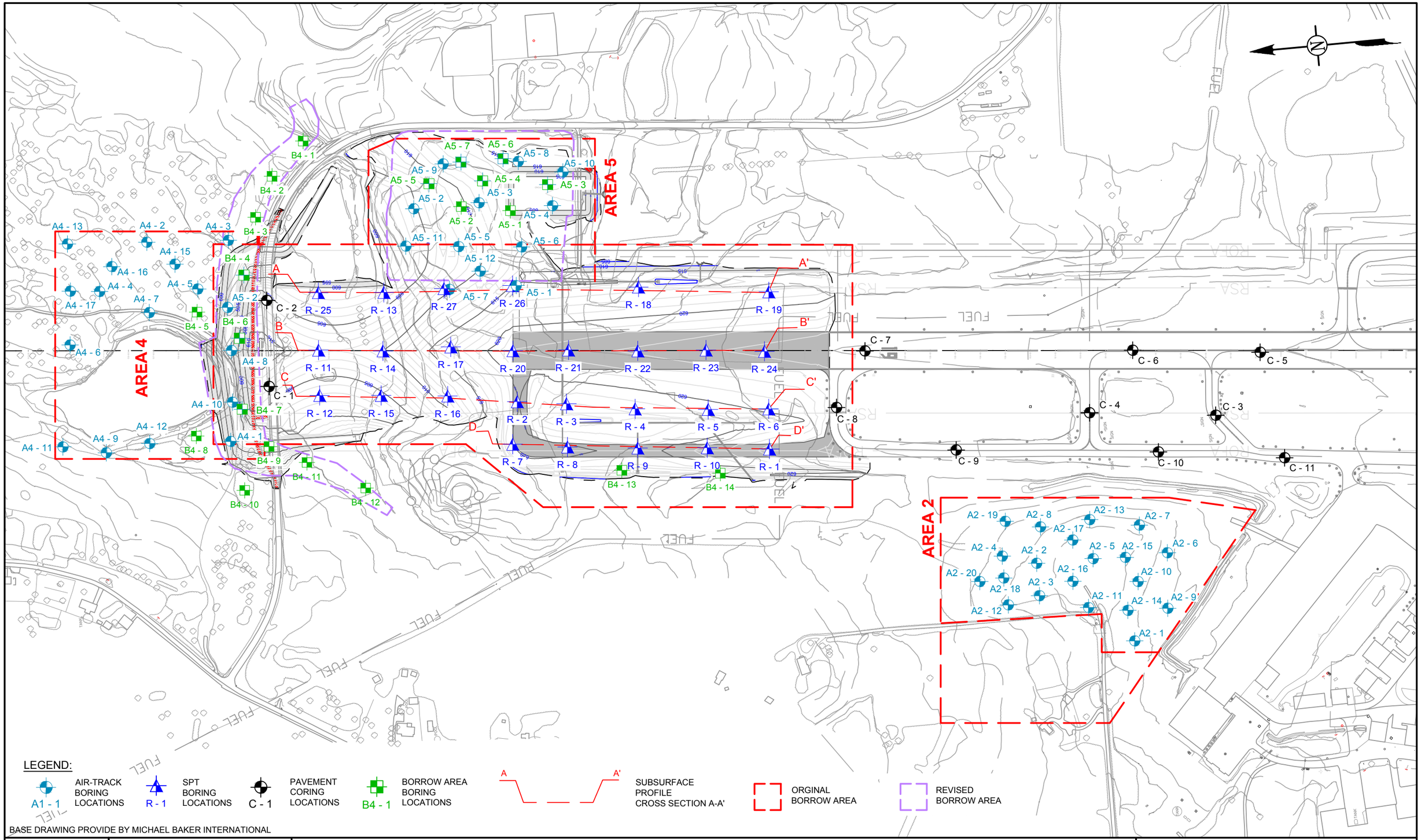
FIGURES

Figure 1 Project Location Map
Figure 2 Boring and Coring Location Plan (Sheets 1 and 2)
Figure 3 Subsurface Profiles (AA', BB', CC' and DD')



SCALE: 1" = 1.5 MILES	WILLMER Engineering	GEOTECHNICAL ENGINEERING CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 1: PROJECT LOCATION MAP SUBSURFACE EXPLORATION & GEOTECHNICAL INVESTIGATION RICHARD B. RUNWAY 1/19 & PARTIAL PARALLEL TAXIWAY EXTENSION RUSSELL REGIONAL AIRPORT ROME, FLOYD COUNTY, GEORGIA WILLMER PROJECT No. 71.4259
DATE: 11/27/2017			
DRAWN BY: JC			
REVIEWED BY: AB			

P:\4259 Floyd Co. Michael Baker Richard B. Russell Regional Airport Runway Extension\CADD\Fig 1 Project Location.dwg



LEGEND:

- A1 - 1 — AIR-TRACK BORING LOCATIONS
- R - 1 — SPT BORING LOCATIONS
- C - 1 — PAVEMENT CORING LOCATIONS
- B4 - 1 — BORROW AREA BORING LOCATIONS
- A — A' — SUBSURFACE PROFILE CROSS SECTION A-A'
- ORGINAL BORROW AREA
- REVISED BORROW AREA

BASE DRAWING PROVIDE BY MICHAEL BAKER INTERNATIONAL

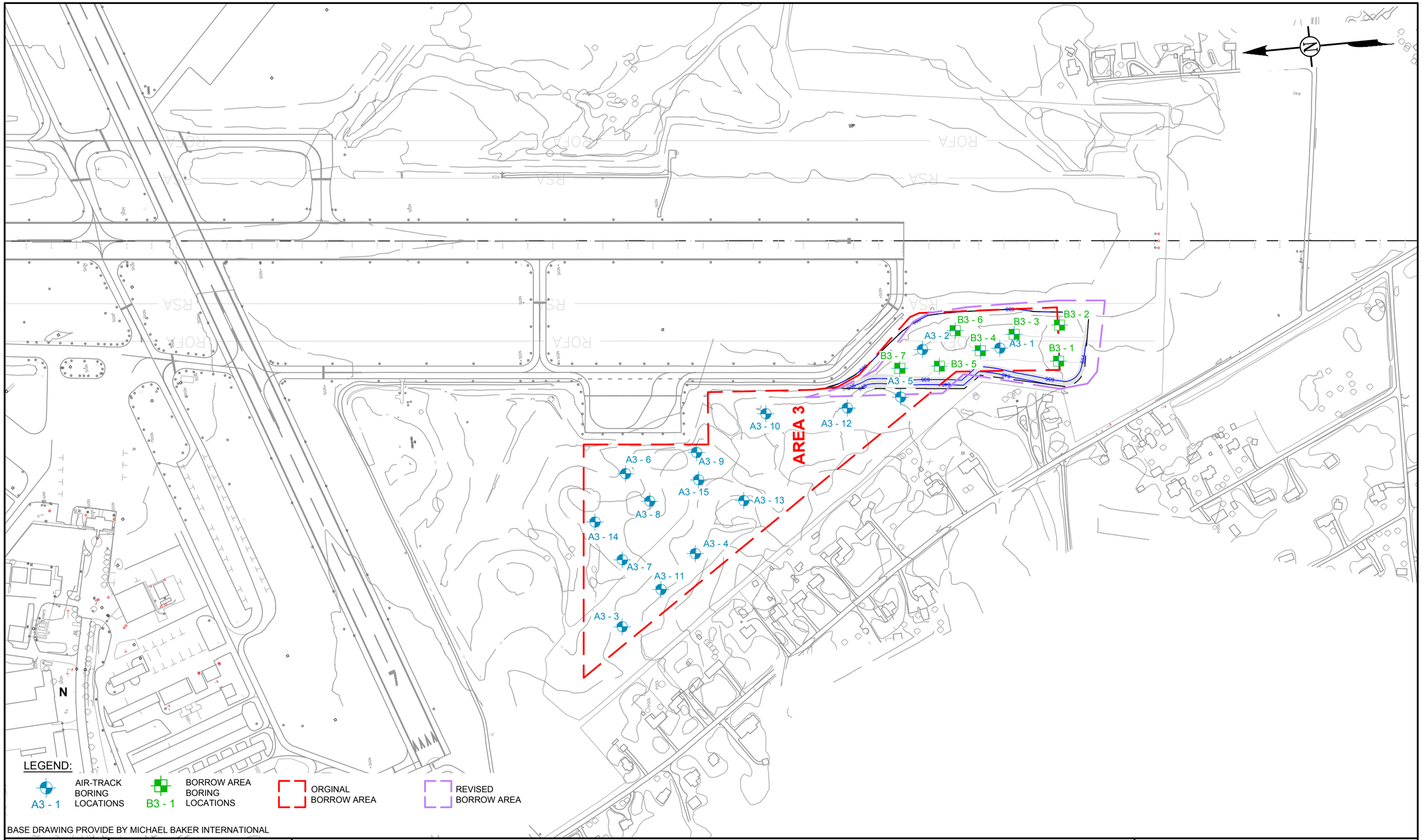
SCALE: 1" = 350'	
DATE: 5/25/2018	
DRAWN BY: JC	
REVIEWED BY: AB	

WILLMER Engineering

GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2: BORING & CORING LOCATION PLAN
(SHEET 1 OF 2)
SUBSURFACE EXPLORATION & GEOTECHNICAL ENGINEERING EVALUATION
RUNWAY 1/19 & PARTIAL PARALLEL TAXIWAY EXTENSION
RICHARD B. RUSSELL REGIONAL AIRPORT
ROME, FLOYD COUNTY, GEORGIA
WILLMER PROJECT No. 71.4259

P:\4259 Floyd Co. Michael Baker Richard B. Russell Regional Airport Runway Extension\CADD\UPDATED Boring Location.dwg



BASE DRAWING PROVIDE BY MICHAEL BAKER INTERNATIONAL

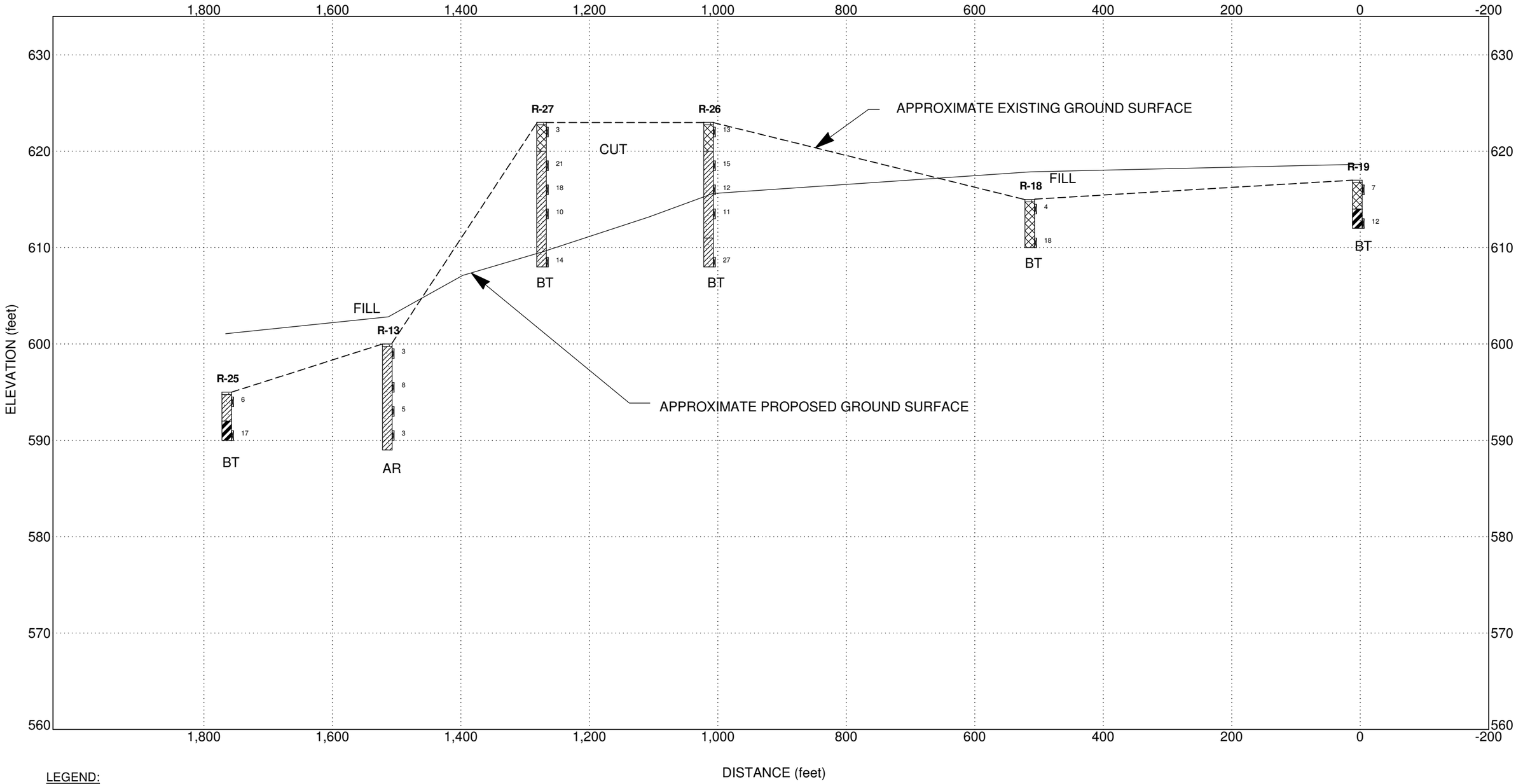
SCALE: 1" = 350'	
DATE: 5/25/2018	
DRAWN BY: JC	
REVIEWED BY: AB	

WILLMER Engineering

GEOTECHNICAL ENGINEERING ¤ CONSTRUCTION SERVICES
ENVIRONMENTAL SERVICES AND ENGINEERING
3772 PLEASANTDALE ROAD - SUITE 165
ATLANTA, GA 30340-4270

FIGURE 2: BORING & CORING LOCATION PLAN
(SHEET 2 OF 2)
SUBSURFACE EXPLORATION & GEOTECHNICAL ENGINEERING EVALUATION
RUNWAY 1/19 & PARTIAL PARALLEL TAXIWAY EXTENSION
RICHARD B. RUSSELL REGIONAL AIRPORT
ROME, FLOYD COUNTY, GEORGIA
WILLMER PROJECT No. 71.4259

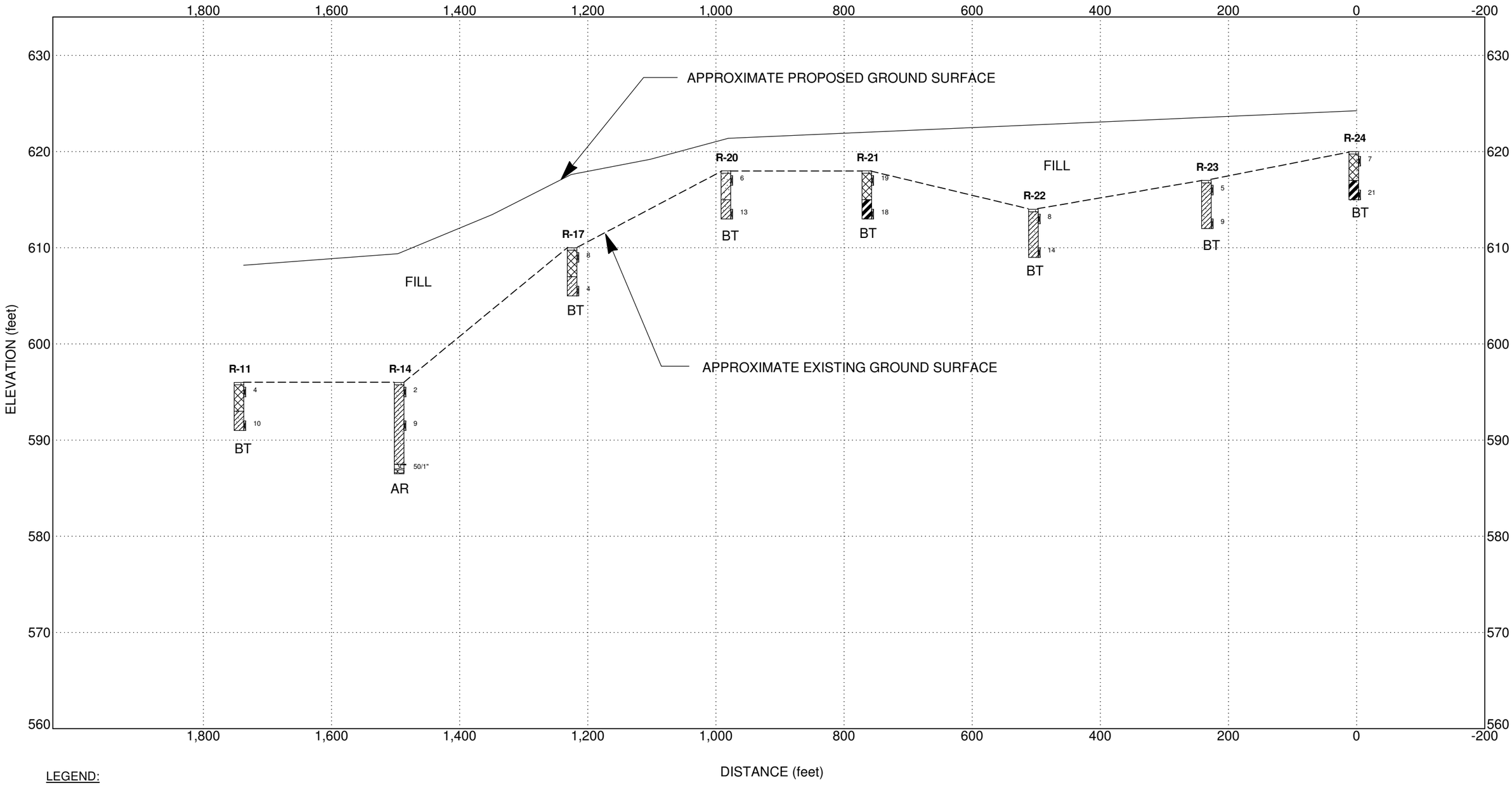
P:\4259 Floyd Co. Michael Baker Richard B. Russell Regional Airport Runway Extension\CADD\UPDATED Boring Location.dwg



LEGEND:

ST -Shelby Tube
BT -Boring Termination
AR -Auger Refusal

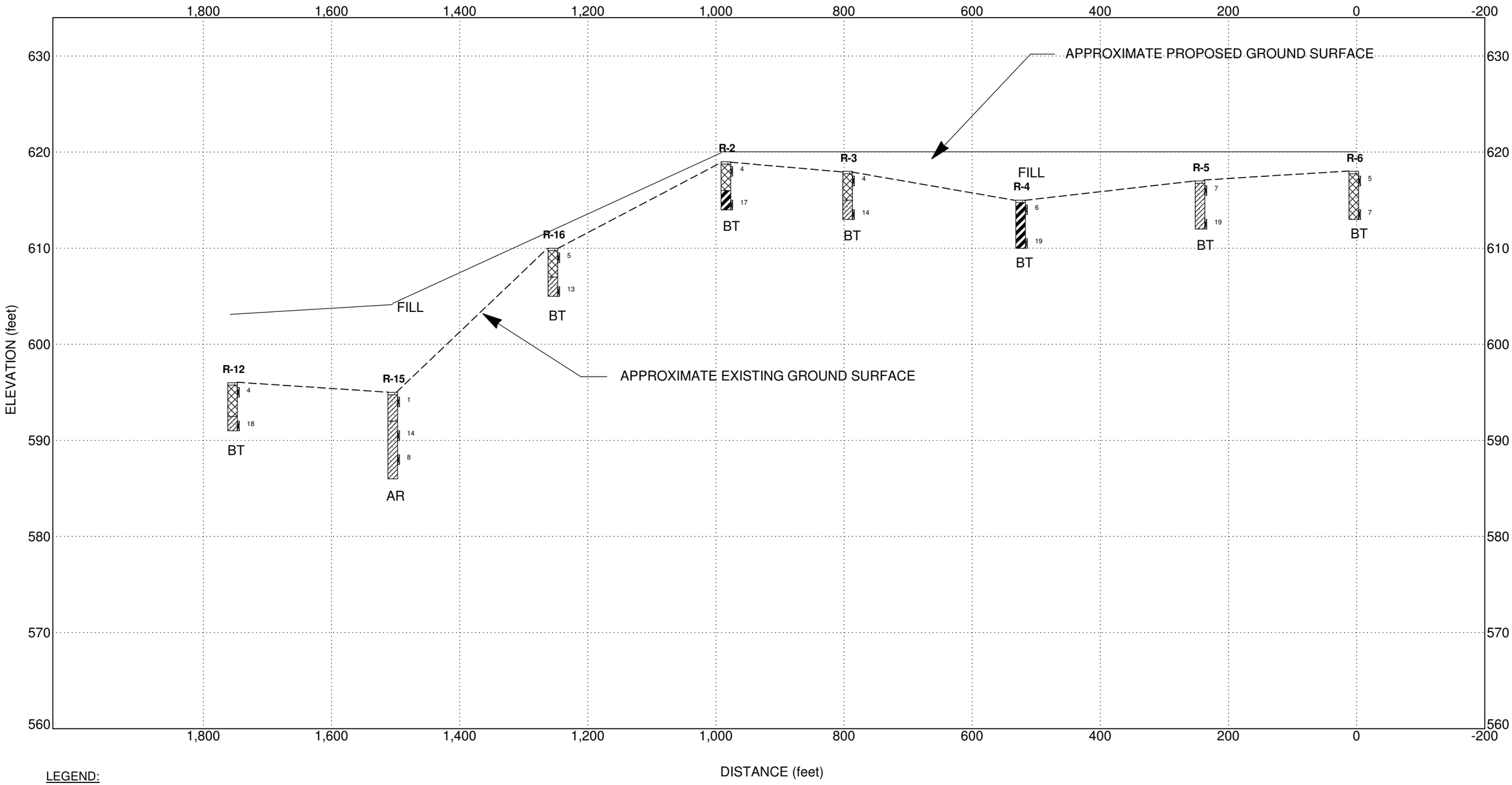
SCALE: 1" = 10' VERTICAL 1" = 150' HORIZONTAL DATE: 01/09/18 DRAWN BY: AB REVIEWED BY: SKB	WILLMER Engineering	GEOTECHNICAL ENGINEERING | CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 3 (SHEET 1 OF 4) GENERALIZED SUBSURFACE PROFILE AA' SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION RUNWAY 1/19 and PARTIAL PARALLEL TAXIWAY EXTENSION ROME, FLOYD COUNTY, GEORGIA WILLMER PROJECT No. 71.4259



LEGEND:

- ▽ - Groundwater Table @ Time of Boring
- ▼ - Groundwater Table
- ST - Shelby Tube
- BT - Boring Terminated
- AR - Auger Refusal

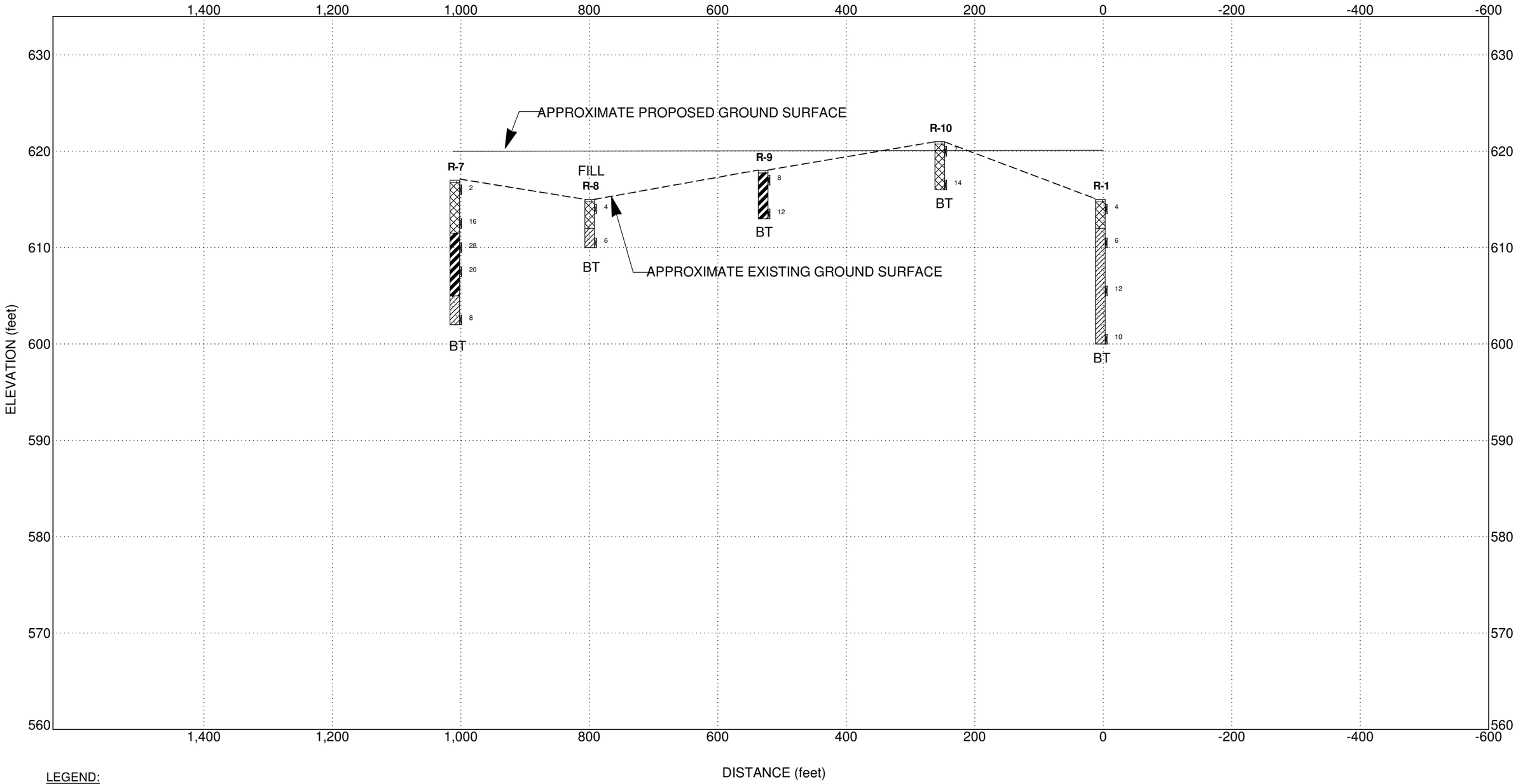
SCALE: 1" = 10' VERTICAL 1" = 150' HORIZONTAL DATE: 01/09/18 DRAWN BY: AB REVIEWED BY: SKB	WILLMER Engineering	GEOTECHNICAL ENGINEERING | CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 3 (SHEET 2 OF 4) GENERALIZED SUBSURFACE PROFILE BB' SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION RUNWAY 1/19 and PARTIAL PARALLEL TAXIWAY EXTENSION ROME, FLOYD COUNTY, GEORGIA WILLMER PROJECT No. 71.4259



LEGEND:

- ▽ - Groundwater Table @ Time of Boring
- ▼ - Groundwater Table
- ST - Shelby Tube
- BT - Boring Terminated
- AR - Auger Refusal

SCALE: 1" = 10' VERTICAL 1" = 150' HORIZONTAL DATE: 01/09/18 DRAWN BY: AB REVIEWED BY: SKB	WILLMER Engineering	GEOTECHNICAL ENGINEERING | CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270	FIGURE 3 (SHEET 3 OF 4) GENERALIZED SUBSURFACE PROFILE CC' SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION RUNWAY 1/19 and PARTIAL PARALLEL TAXIWAY EXTENSION ROME, FLOYD COUNTY, GEORGIA WILLMER PROJECT No. 71.4259



LEGEND:

- ▽ - Groundwater Table @ Time of Boring
- ▼ - Groundwater Table
- ST - Shelby Tube
- BT - Boring Terminated
- AR - Auger Refusal

SCALE: 1" = 10' VERTICAL 1" = 150' HORIZONTAL DATE: 01/09/18 DRAWN BY: AB REVIEWED BY: SKB	WILLMER Engineering	GEOTECHNICAL ENGINEERING | CONSTRUCTION SERVICES ENVIRONMENTAL SERVICES AND ENGINEERING 3772 PLEASANTDALE ROAD - SUITE 165 ATLANTA, GA 30340-4270

FIGURE 3 (SHEET 4 OF 4)
GENERALIZED SUBSURFACE PROFILE DD'
SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION
RUNWAY 1/19 and PARTIAL PARALLEL TAXIWAY EXTENSION
ROME, FLOYD COUNTY, GEORGIA
WILLMER PROJECT No. 71.4259

APPENDIX I

Boring Records Legend
Unified Soil Classification System Reference Sheet
Soil Boring Logs

Willmer Engineering Inc.
3772 Pleasantdale Road, Suite 165
Atlanta, Georgia 30340

UNIFIED SOIL CLASSIFICATION SYSTEM REFERENCE SHEET

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED #4 SIEVE	CLEAN GRAVELS LITTLE OR NO FINES	**(GW)**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			(GP)	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES APPRECIABLE AMOUNT OF FINES	**(GM)**	SILTY GRAVELS and GRAVEL-SAND-SILT MIXTURES
			(GC)	CLAYEY GRAVELS and GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING #4 SIEVE	CLEAN SAND LITTLE OR NO FINES	**(SW)**	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			(SP)	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES APPRECIABLE AMOUNT OF FINES	**(SM)**	SILTY SANDS and SAND-SILT MIXTURES
			(SC)	CLAYEY SANDS and SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		**(ML)**	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR VERY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			(CL)	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			(OL)	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		**(MH)**	INORGANIC ELASTIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
			(CH)	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			(OH)	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			**(PT)**	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

BORING RECORD LEGEND

SM, CL, etc: - GROUP SYMBOL based on Unified Soil Classification System.
(Refer to ASTM D-2488 and Table 1 of D-2487)

N-VALUE: BLOWS PER FOOT- Standard Penetration Resistance (SPT) blow count ,
the sum of the second and third 6-inch increments of the SPT test.
(Refer to ASTM D-1586)

CONSISTENCY / RELATIVE DENSITY Correlated with SPT Blow Count, N:

SILTS AND CLAYS

N (blows per foot)	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Firm
9 - 15	Stiff
16 - 30	Very Stiff
31 - 50	Hard
> 50	Very Hard

SANDS

N (blows per foot)	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
> 50	Very Dense

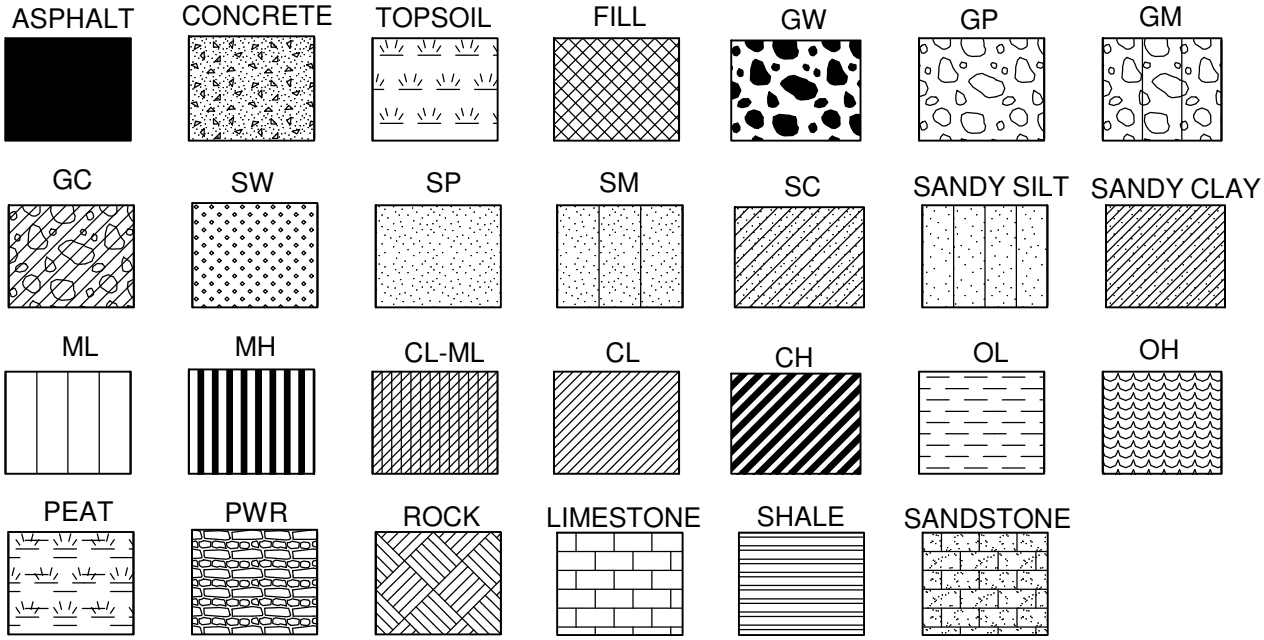
NOTES:

Groundwater Measurements:

Water level at 24 hours

Water level at time of boring

Caved level



WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-1**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **615.00** Station: **NA**

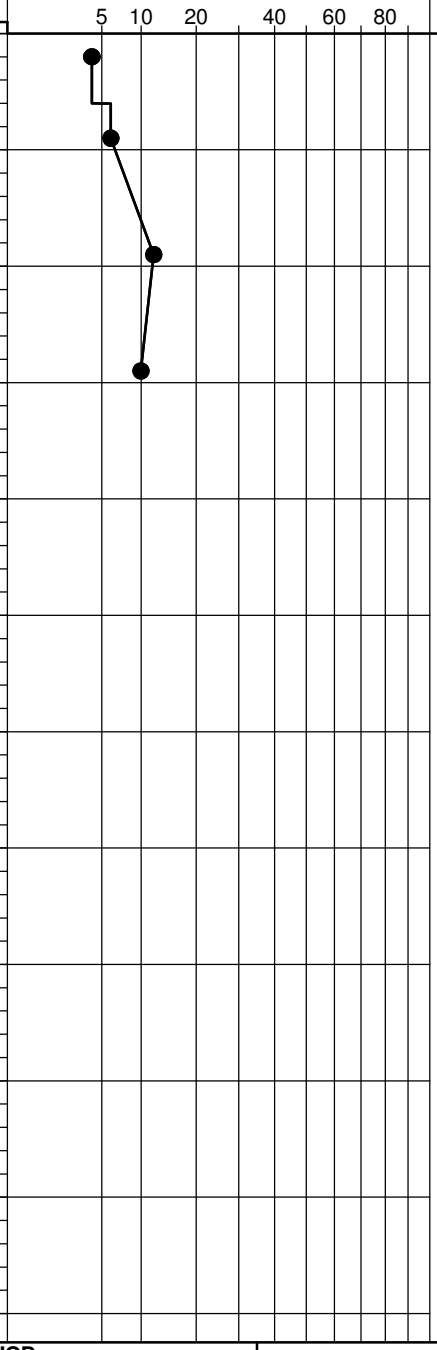
Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **4** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3"	CL	615.0	4
					FILL: Soft brown medium to fine sandy **CLAY**	CL		
5		SS			RESIDUUM: Firm to stiff orange and white medium to fine sandy **CLAY**		610	6
10		SS					605	12
15		SS					600	10
					Boring was terminated at 15 feet below the existing ground surface.			
					No groundwater was encountered at the time of boring completion.			
20							595	
25							590	
30							585	
35							580	
40							575	
45							570	
50							565	
55							560	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-1**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-2**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **619.00** Station: **NA**

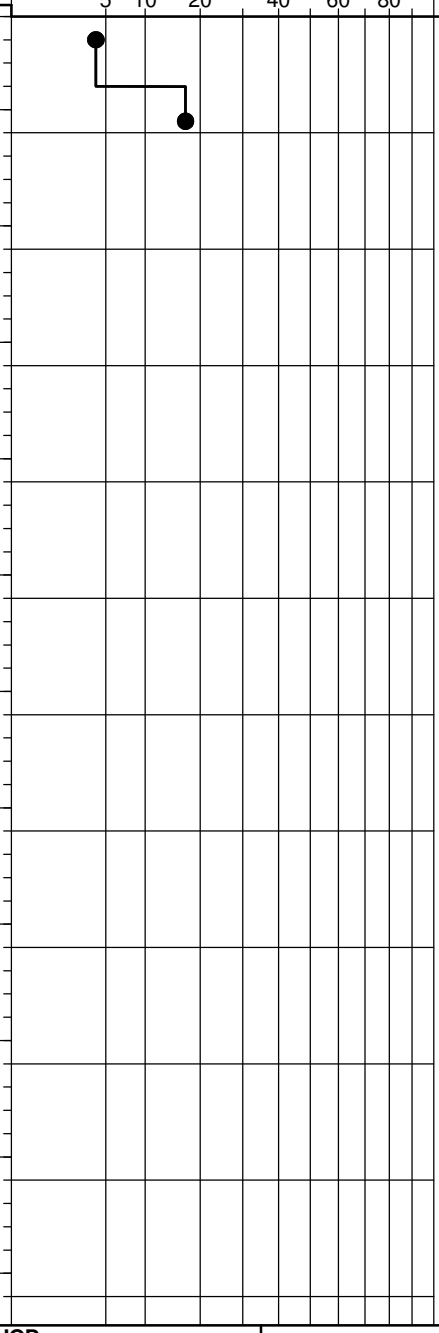
Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3"	CH	619.0	4
		BULK			FILL: Soft reddish-brown medium to fine sandy fat **CLAY**	CH	615	17
5		SS			RESIDUUM: Very stiff reddish-orange medium to fine sandy fat **CLAY**			
					Boring was terminated at 5 feet below the existing ground surface.		610	
10					No groundwater was encountered at the time of boring completion.		605	
15							600	
20							595	
25							590	
30							585	
35							580	
40							575	
45							570	
50							565	
55								

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-2**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-3**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **618.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	CL	618.0		4
					FILL: Soft gray and tan medium to fine sandy **CLAY**	CL	615		
5		SS			RESIDUUM: Stiff tan and brown medium to fine sandy **CLAY**				14
					Boring was terminated at 5 feet below the existing ground surface.		610		
10					No groundwater was encountered at the time of boring completion.		605		
15							600		
20							595		
25							590		
30							585		
35							580		
40							575		
45							570		
50							565		
55									

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-3**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-4**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

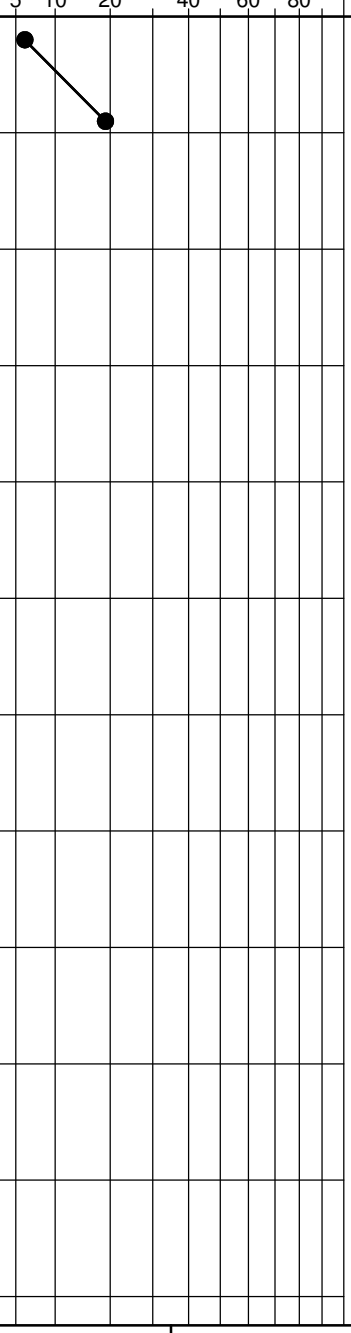
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **615.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3" CH	615.0		6
		BULK			RESIDUUM: Firm to very stiff tan and red medium to fine sandy fat **CLAY**			
		SS						19
5					Boring was terminated at 5 feet below the existing ground surface.	610		
10					No groundwater was encountered at the time of boring completion.	605		
15						600		
20						595		
25						590		
30						585		
35						580		
40						575		
45						570		
50						565		
55						560		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-4**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-5**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

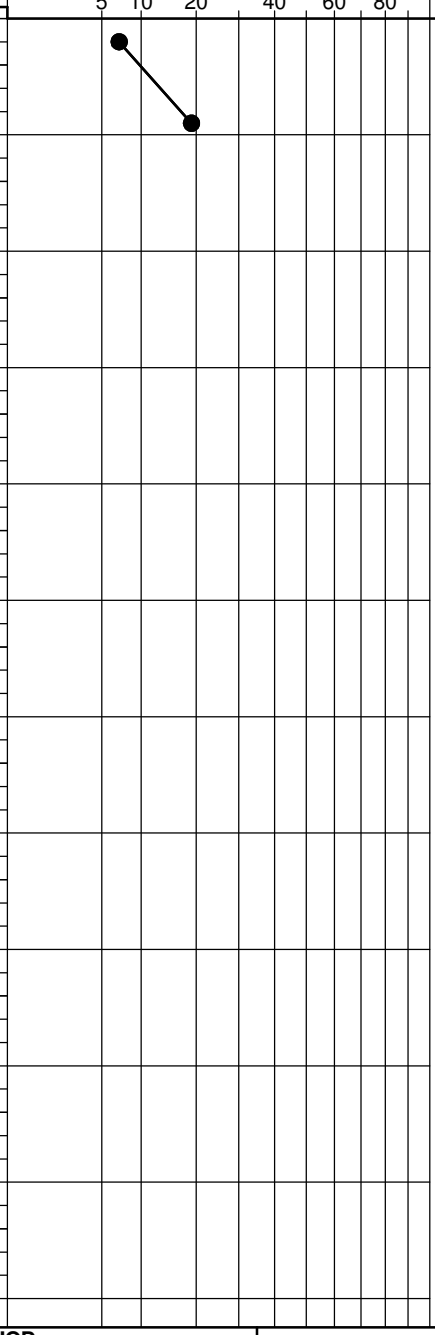
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **617.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	617.0		
		SS			RESIDUUM: Firm to very stiff reddish-orange medium to fine sandy **CLAY**	615		7
5		SS						19
					Boring was terminated at 5 feet below the existing ground surface.	610		
10					No groundwater was encountered at the time of boring completion.	605		
15						600		
20						595		
25						590		
30						585		
35						580		
40						575		
45						570		
50						565		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-5**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-6**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

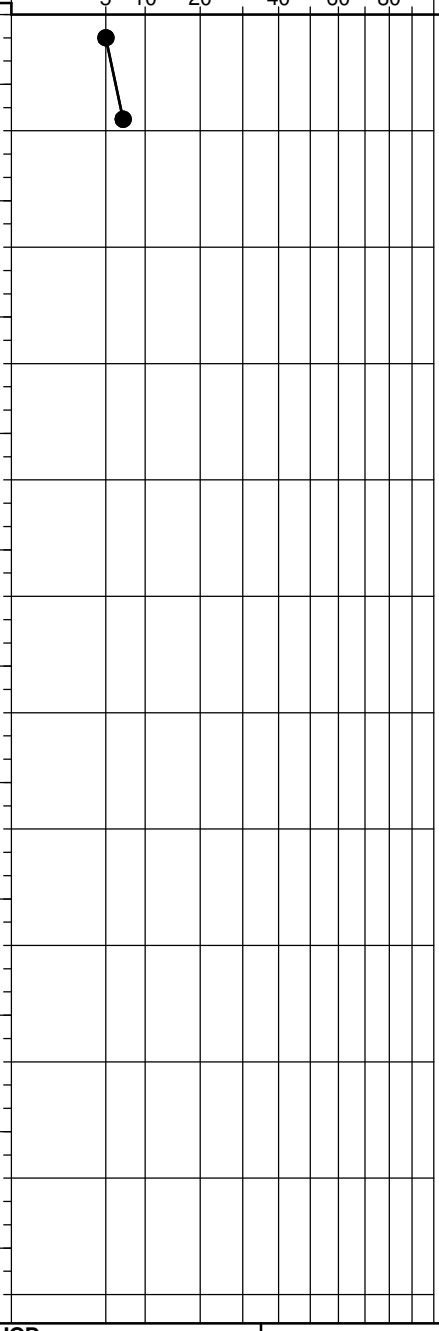
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **618.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	618.0		
		SS			FILL: Firm reddish-brown and gray medium to fine sandy **CLAY**	615		5
5		SS			Boring was terminated at 5 feet below the existing ground surface.	610		7
10					No groundwater was encountered at the time of boring completion.	605		
15						600		
20						595		
25						590		
30						585		
35						580		
40						575		
45						570		
50						565		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-6**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-7**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **617.00** Station: **NA**

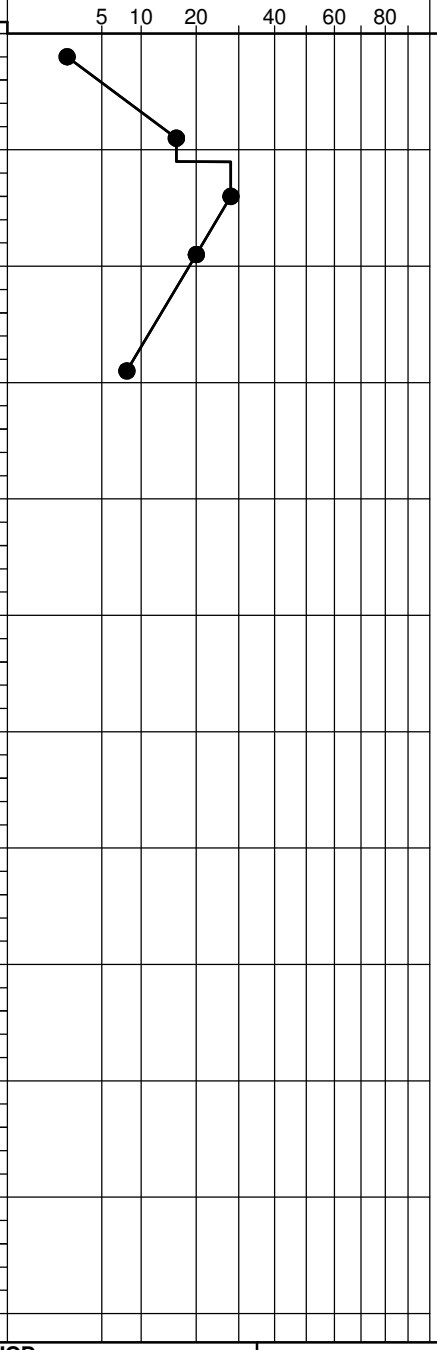
Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **5** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3"	CH	617.0	
		BULK			FILL: Very soft to very stiff brown medium to fine sandy **CLAY**		615	2
5		SS						16
		SS			RESIDUUM: Very stiff reddish-orange medium to fine sandy fat **CLAY**	CH	610	28
10		SS						20
					Firm brown and orange medium to fine sandy **CLAY**	CL	605	
15		SS						8
					Boring was terminated at 15 feet below the existing ground surface.		600	
20					No groundwater was encountered at the time of boring completion.		595	
25							590	
30							585	
35							580	
40							575	
45							570	
50							565	
55								

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-7**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-8**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

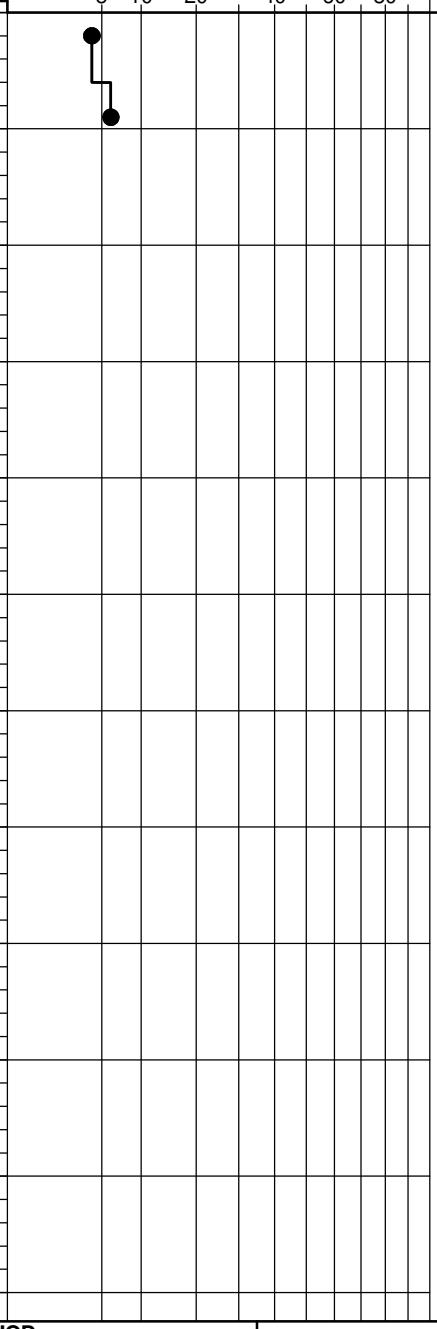
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **615.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	CL	615.0		4
					FILL: Soft gray medium to fine sandy **CLAY**	CL			
		SS			RESIDUUM: Firm tan and gray medium to fine sandy **CLAY**				6
5					Boring was terminated at 5 feet below the existing ground surface.		610		
10					No groundwater was encountered at the time of boring completion.		605		
15							600		
20							595		
25							590		
30							585		
35							580		
40							575		
45							570		
50							565		
55							560		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-8**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-9**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

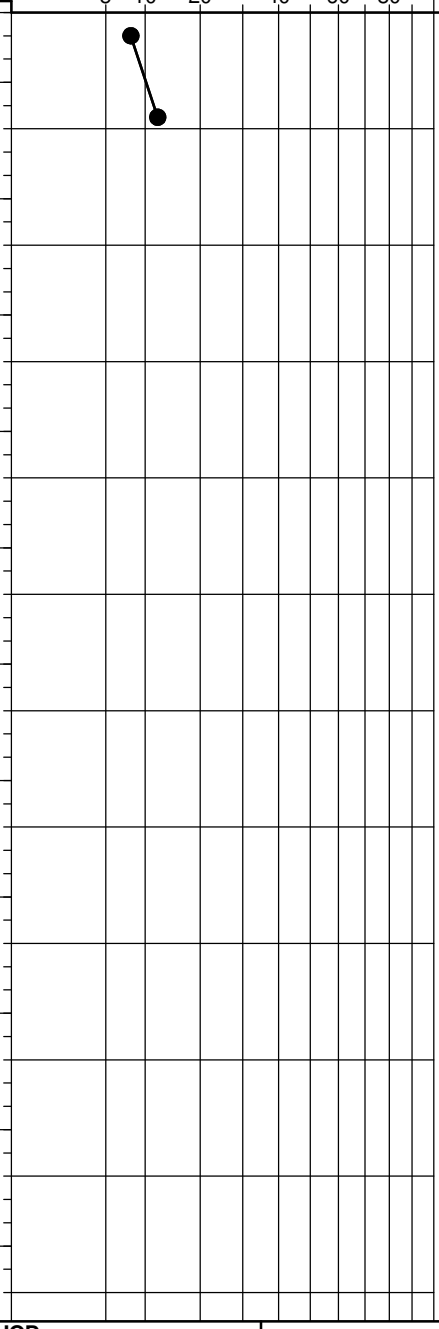
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **618.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3" CH	618.0		
		BULK			RESIDUUM: Firm to stiff tan and red medium to fine sandy fat **CLAY**	615		8
5		SS						12
					Boring was terminated at 5 feet below the existing ground surface.	610		
10					No groundwater was encountered at the time of boring completion.	605		
15						600		
20						595		
25						590		
30						585		
35						580		
40						575		
45						570		
50						565		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-9**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-10**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

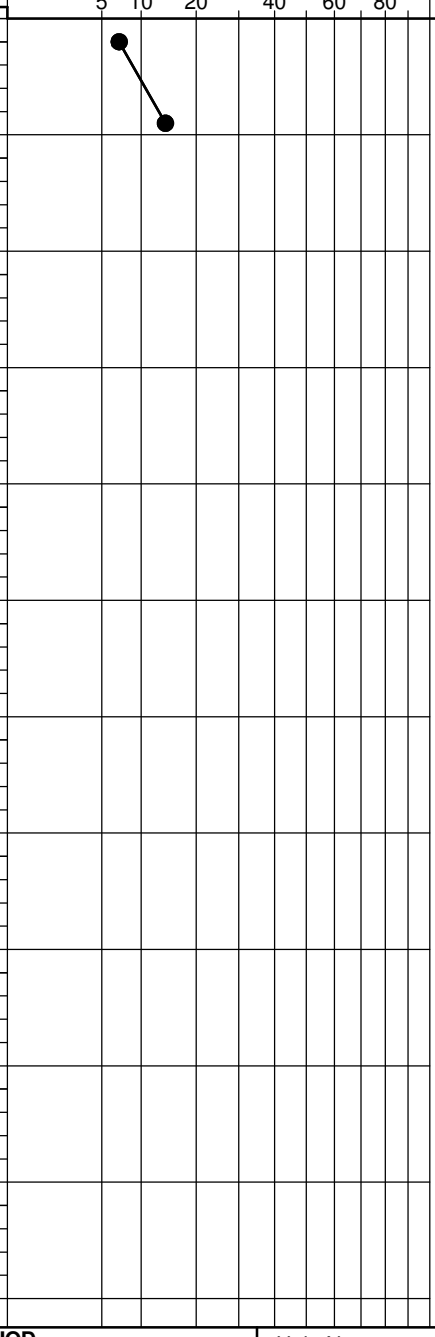
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **621.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	621.0		
		SS			FILL: Firm to stiff tan and gray medium to fine sandy **CLAY**	620		7
		SS						14
5					Boring was terminated at 5 feet below the existing ground surface.	615		
10					No groundwater was encountered at the time of boring completion.	610		
15						605		
20						600		
25						595		
30						590		
35						585		
40						580		
45						575		
50						570		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-10**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-11**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **596.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/21/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	CL	596.0		
					FILL: Soft brownish-black medium to fine sandy **CLAY**	CL	595		4
5		SS			RESIDUUM: Stiff orange and white medium to fine sandy **CLAY**		590		10
					Boring was terminated at 5 feet below the existing ground surface.				
10					No groundwater was encountered at the time of boring completion.		585		
15							580		
20							575		
25							570		
30							565		
35							560		
40							555		
45							550		
50							545		
55									

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-11**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-12**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **596.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/21/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	CL	596.0		
					FILL: Soft brown medium to fine sandy **CLAY**		595		4
		SS			RESIDUUM: Very stiff tan and brown medium to fine sandy **CLAY**	CL			18
5					Boring was terminated at 5 feet below the existing ground surface.		590		
10					No groundwater was encountered at the time of boring completion.		585		
15							580		
20							575		
25							570		
30							565		
35							560		
40							555		
45							550		
50							545		
55									

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-12**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-13**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

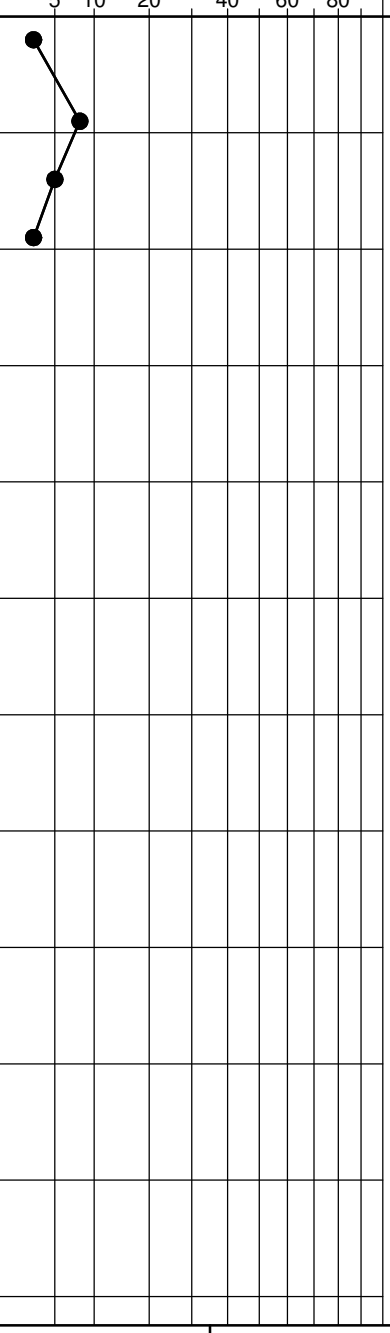
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **600.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **4** Overburden (ft): **11** Rock (ft): **NA** Total Depth (ft): **11.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3" CL	600.0		3
					ALLUVIUM: Soft and firm gray and brown medium to fine sandy **CLAY** with organics			
5		SS				595		8
		SS						5
10		SS				590		3
					Auger refusal was encountered at 11 feet below the existing ground surface.			
15					Groundwater was encountered at 9 feet and 3 feet at the time of boring completion and 20 hours after boring completion, respectively.	585		
20						580		
25						575		
30						570		
35						565		
40						560		
45						555		
50						550		
55						545		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-13**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-14**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

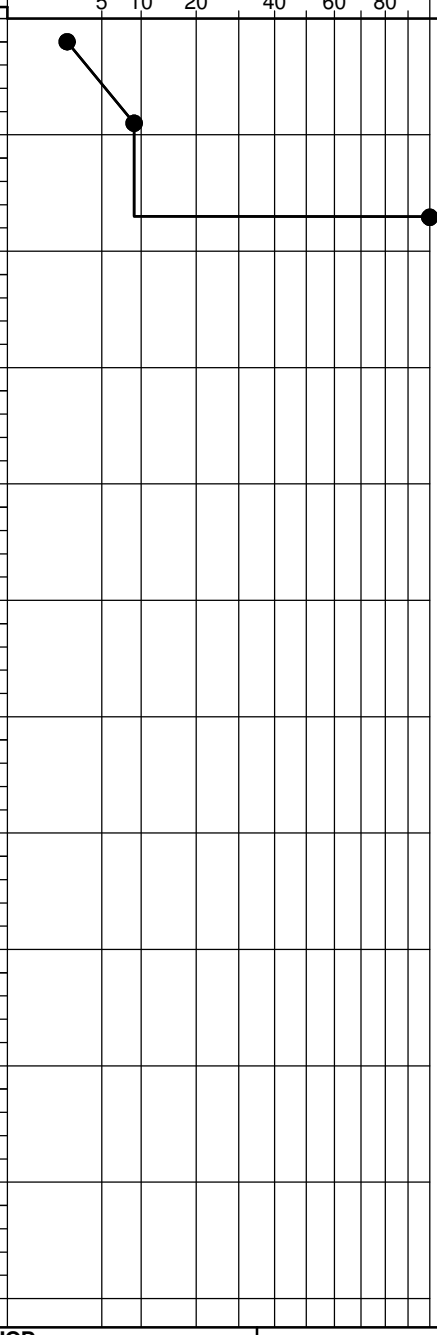
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **596.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **3** Overburden (ft): **9.5** Rock (ft): **NA** Total Depth (ft): **9.5**

Logged By: **ER** Date Drilled: **11/21/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	CL	596.0		
					ALLUVIUM: Very soft to stiff gray and brown medium to fine sandy **CLAY** with organics		595		2
5		SS					590		9
		SS			PARTIALLY WEATHERED ROCK: Sampled as very dense brown and gray medium to fine **SAND**	PWR			50/1"
10							585		
					Auger refusal was encountered at 9.5 feet below the existing ground surface.				
15							580		
					No groundwater was encountered at the time of boring completion.				
20							575		
25							570		
30							565		
35							560		
40							555		
45							550		
50							545		
55									



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-14**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-15**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **595.00** Station: **NA**

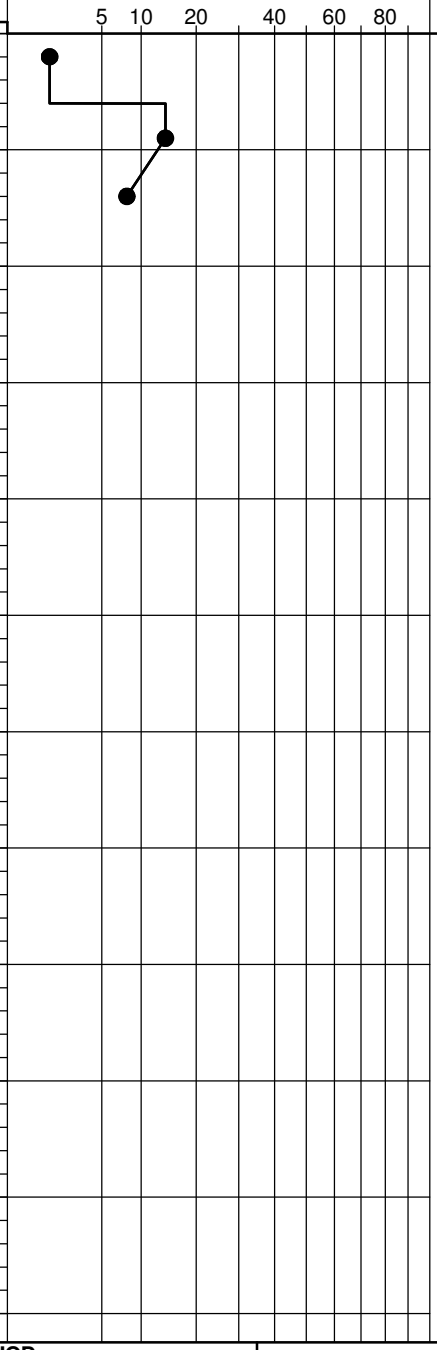
Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **3** Overburden (ft): **9** Rock (ft): **NA** Total Depth (ft): **9.0**

Logged By: **ER** Date Drilled: **11/21/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3"	CL	595.0	1
		ST			ALLUVIUM: Very soft gray and brown medium to fine sandy **CLAY** with organics	CL		
5		SS					590	14
		SS			RESIDUUM: Stiff red and tan medium to fine sandy **CLAY**			8
10					Auger refusal was encountered at 9 feet below the existing ground surface.		585	
15					No groundwater was encountered at the time of boring completion.		580	
20							575	
25							570	
30							565	
35							560	
40							555	
45							550	
50							545	
55							540	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-15**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-16**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **610.00** Station: **NA**

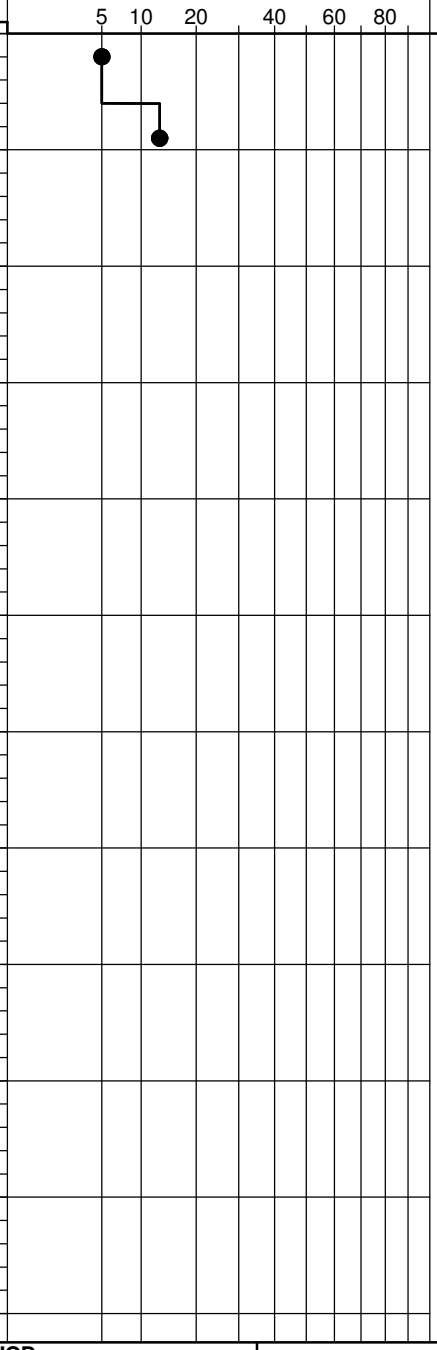
Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3"	SC	610.0	5
					FILL: Loose red clayey medium to fine **SAND**	CL		
5		SS			RESIDUUM: Stiff white and orange medium to fine sandy **CLAY**		605	13
					Boring was terminated at 5 feet below the existing ground surface.			
10					No groundwater was encountered at the time of boring completion.		600	
15							595	
20							590	
25							585	
30							580	
35							575	
40							570	
45							565	
50							560	
55							555	

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-16**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-17**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **610.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
							610.0	5 10 20 40 60 80	
		SS			TOPSOIL = 3"	SC			8
					FILL: Loose gray clayey medium to fine **SAND**	CL			
		SS			RESIDUUM: Soft tan and red medium to fine sandy **CLAY**				4
5					Boring was terminated at 5 feet below the existing ground surface.		605		
10					No groundwater was encountered at the time of boring completion.		600		
15							595		
20							590		
25							585		
30							580		
35							575		
40							570		
45							565		
50							560		
55							555		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-17**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-18**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

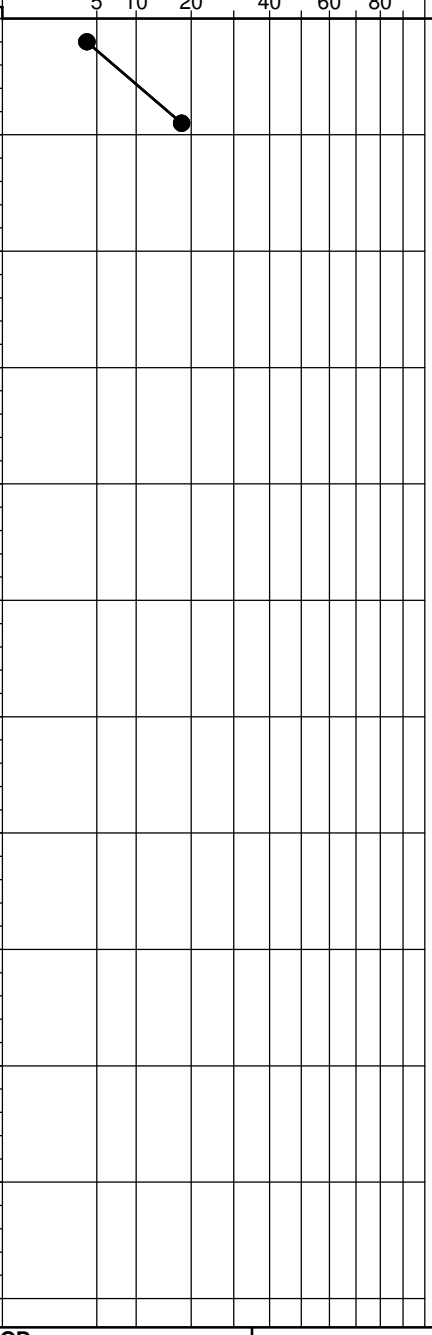
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **615.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3" CL	615.0		4
					FILL: Soft to very stiff brown medium to fine sandy **CLAY**			
		SS						18
5					Boring was terminated at 5 feet below the existing ground surface.	610		
					No groundwater was encountered at the time of boring completion.			
10						605		
15						600		
20						595		
25						590		
30						585		
35						580		
40						575		
45						570		
50						565		
55						560		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-18**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-19**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **617.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	CH	617.0		7
					FILL: Firm red medium to fine sandy fat **CLAY**	CH	615		
5		SS			RESIDUUM: Stiff red and orange medium to fine sandy fat **CLAY**				12
					Boring was terminated at 5 feet below the existing ground surface.		610		
10					No groundwater was encountered at the time of boring completion.		605		
15							600		
20							595		
25							590		
30							585		
35							580		
40							575		
45							570		
50							565		
55									

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-19**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-20**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

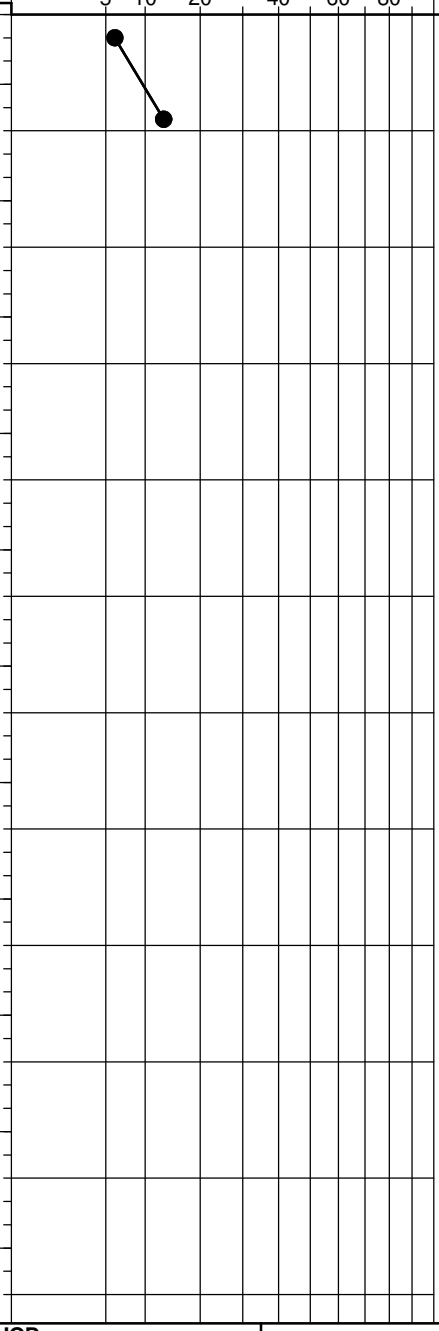
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **618.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	SC	618.0		6
					RESIDUUM: Loose orange and white clayey medium to fine **SAND**	CL	615		
5		SS			Stiff orange and white medium to fine sandy **CLAY**				13
					Boring was terminated at 5 feet below the existing ground surface.		610		
10					No groundwater was encountered at the time of boring completion.		605		
15							600		
20							595		
25							590		
30							585		
35							580		
40							575		
45							570		
50							565		
55									



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-20**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-21**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **618.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	SC	618.0		19
					FILL: Medium dense brown clayey medium to fine **SAND**	CH	615		
5		SS			RESIDUUM: Very stiff orange and red medium to fine sandy fat **CLAY**				18
					Boring was terminated at 5 feet below the existing ground surface.		610		
10					No groundwater was encountered at the time of boring completion.		605		
15							600		
20							595		
25							590		
30							585		
35							580		
40							575		
45							570		
50							565		
55									

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-21**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-22**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **614.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3" CL	614.0		8
					RESIDUUM: Firm to stiff red and tan medium to fine sandy **CLAY**	610		14
		SS						
5					Boring was terminated at 5 feet below the existing ground surface.			
					No groundwater was encountered at the time of boring completion.	605		
10								
						600		
15								
						595		
20								
						590		
25								
						585		
30								
						580		
35								
						575		
40								
						570		
45								
						565		
50								
						560		
55								

Scale: 5, 10, 20, 40, 60, 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-22**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-23**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

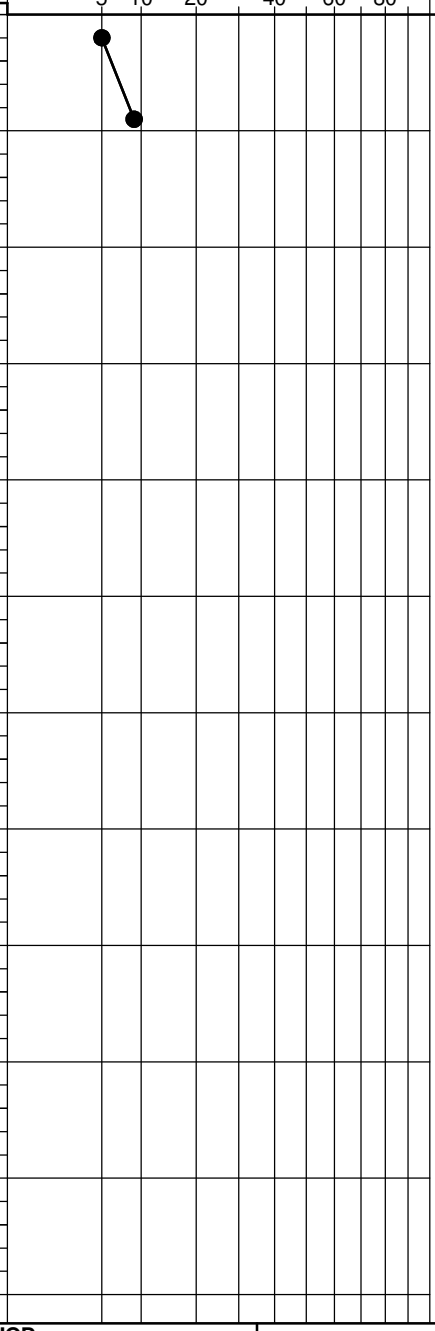
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **617.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3" CL	617.0		5
					RESIDUUM: Firm to stiff red, tan, and brown medium to fine sandy **CLAY**	615		
		SS						9
5					Boring was terminated at 5 feet below the existing ground surface.	610		
					No groundwater was encountered at the time of boring completion.			
10						605		
15						600		
20						595		
25						590		
30						585		
35						580		
40						575		
45						570		
50						565		
55								



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-23**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**
Project Number: **ATL-71.4259**

HOLE No. R-24

Sheet 1 of 1

Location: **See Figure 2**

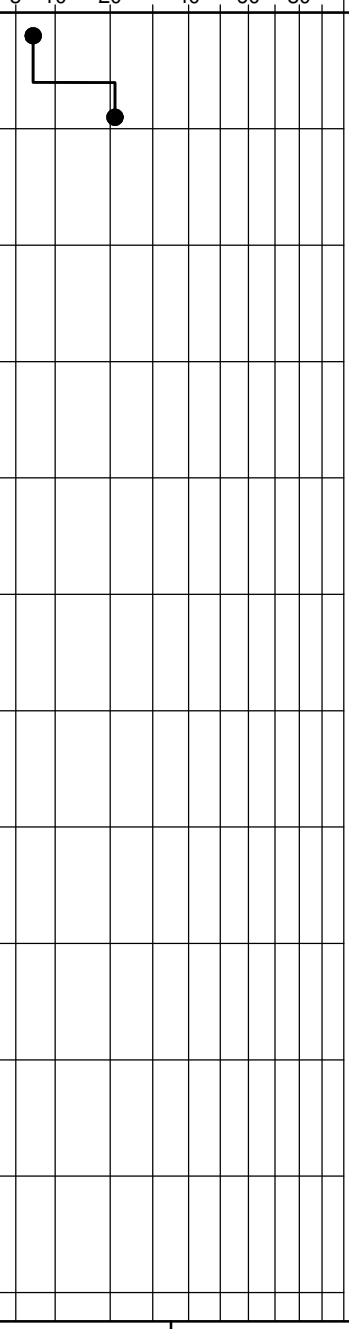
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **620.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	CH	620.0		7
					FILL: Firm red medium to fine sandy **CLAY**	CH			
5		SS			RESIDUUM: Very stiff reddish-orange medium to fine sandy **CLAY**		615		21
					Boring was terminated at 5 feet below the existing ground surface.				
10					No groundwater was encountered at the time of boring completion.		610		
15							605		
20							600		
25							595		
30							590		
35							585		
40							580		
45							575		
50							570		
55							565		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-24**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-25**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

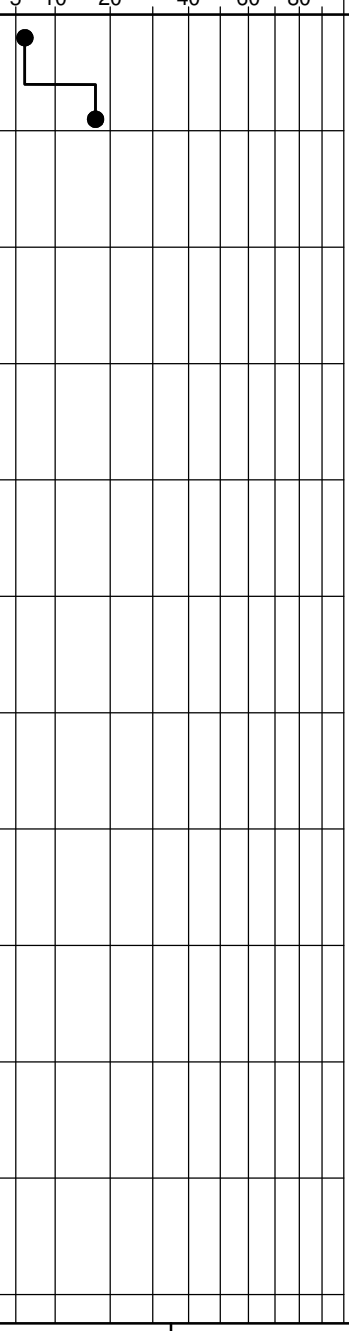
Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **595.00** Station: **NA**

Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **2** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **5.0**

Logged By: **ER** Date Drilled: **11/21/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
		SS			TOPSOIL = 3"	CL	595.0		6
					ALLUVIUM: Firm brown medium to fine sandy **CLAY**	CH			
5		SS			RESIDUUM: Very stiff gray and orange medium to fine sandy fat **CLAY**		590		17
					Boring was terminated at 5 feet below the existing ground surface.				
10					No groundwater was encountered at the time of boring completion.		585		
15							580		
20							575		
25							570		
30							565		
35							560		
40							555		
45							550		
50							545		
55							540		



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-25**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-26**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **623.00** Station: **NA**

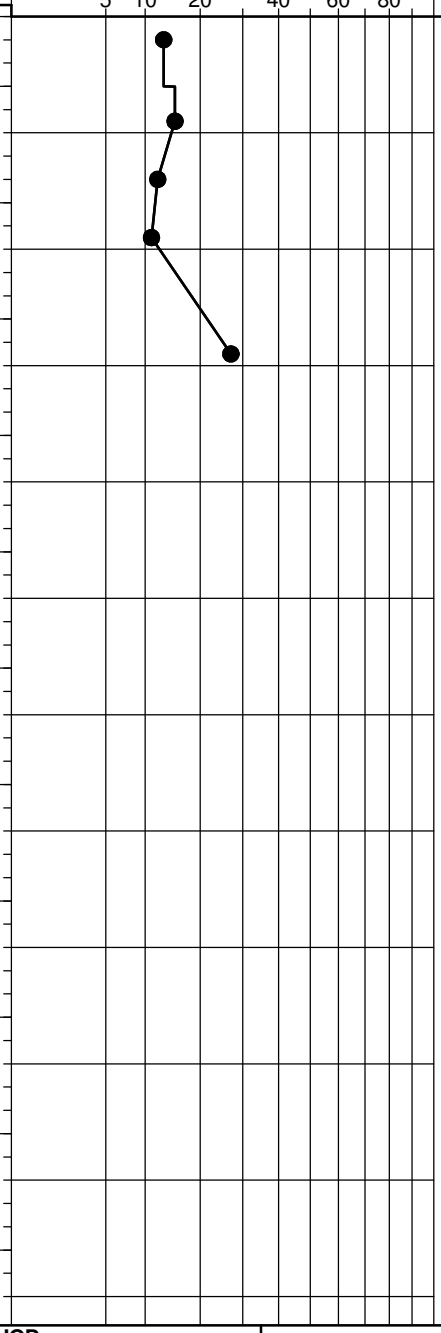
Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **5** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3"	CH	623.0	13
					FILL: Stiff red medium to fine sandy fat **CLAY**	CL	620	
5		SS			RESIDUUM: Stiff tan, white, and red medium to fine sandy **CLAY**			15
		SS					615	12
10		SS						11
					Very stiff tan medium to fine sandy **CLAY**	CL	610	
15		SS						27
					Boring was terminated at 15 feet below the existing ground surface.		605	
20					No groundwater was encountered at the time of boring completion.		600	
25							595	
30							590	
35							585	
40							580	
45							575	
50							570	
55								

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-26**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. R-27**
Location: **Richard B. Russell Regional Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **623.00** Station: **NA**

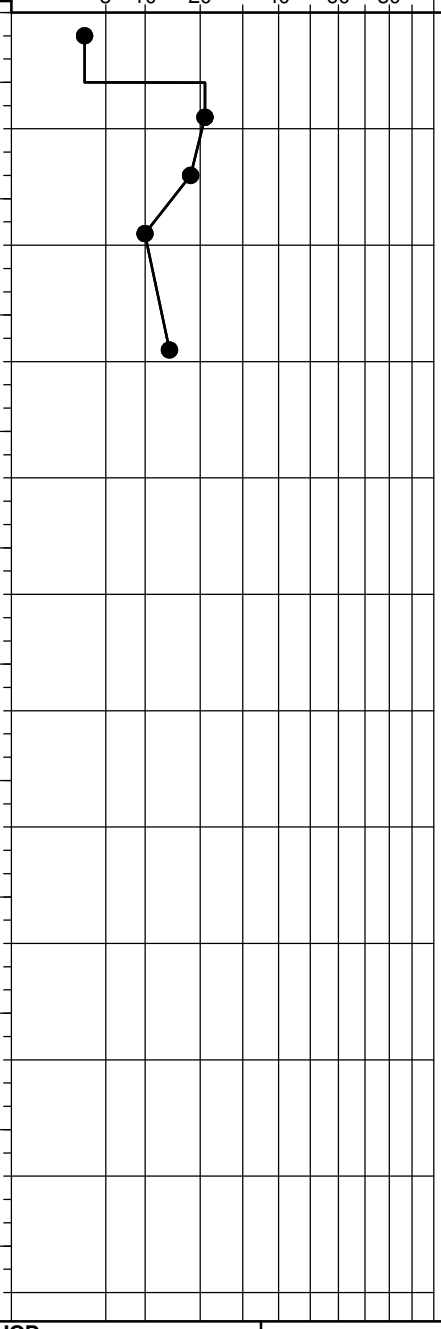
Drilling Equipment: **CME 750** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **5** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **11/20/17**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	N-VALUE
		SS			TOPSOIL = 3"	CL	623.0	3
					FILL: Soft red medium to fine sandy **CLAY**	CL	620	
5		SS			RESIDUUM: Very stiff to stiff tan and red medium to fine sandy **CLAY**			21
		SS					615	18
10		SS						10
							610	
15		SS						14
					Boring was terminated at 15 feet below the existing ground surface.		605	
20					No groundwater was encountered at the time of boring completion.			
							600	
25								
							595	
30								
							590	
35								
							585	
40								
							580	
45								
							575	
50								
							570	
55								

STANDARD PENETRATION TEST DATA (blows/foot)



SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **R-27**

SPTN LOGS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B3-1**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **638.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	638.0		
					Tan and brown medium to fine sandy **CLAY**	635		
5		BULK				630		
10					Boring was terminated at 10 feet below the existing ground surface.	625		
					No groundwater was encountered at the time of boring completion.			
15						620		
20						615		
25						610		
30						605		
35						600		
40						595		
45						590		
50						585		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B3-1**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B3-2**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **637.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	637.0		
					Tan medium to fine sandy **CLAY**	635		
5								
		BULK			Brown medium to fine sandy **CLAY** CL	630		
10					Boring was terminated at 10 feet below the existing ground surface.	625		
15					No groundwater was encountered at the time of boring completion.	620		
20						615		
25						610		
30						605		
35						600		
40						595		
45						590		
50						585		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B3-2**

SPTN RMG AIRPORT PHASE 2 BORROW AREAS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B3-3**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **642.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 4" CL	642.0		
					Tan medium to fine sandy **CLAY**	640		
5								
					Brown medium to fine sandy **CLAY** CL	635		
10		BULK				630		
15					Boring was terminated at 15 feet below the existing ground surface.	625		
					No groundwater was encountered at the time of boring completion.			
20						620		
25						615		
30						610		
35						605		
40						600		
45						595		
50						590		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B3-3**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B3-4**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **643.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	643.0		
					Tan and brown medium to fine sandy **CLAY**	640		
5								
					Brown medium to fine sandy **CLAY** CL	635		
10		BULK						
						630		
15					Boring was terminated at 15 feet below the existing ground surface.			
						625		
20					No groundwater was encountered at the time of boring completion.			
						620		
25								
						615		
30								
						610		
35								
						605		
40								
						600		
45								
						595		
50								
						590		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B3-4**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B3-5**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **642.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	642.0		
					Tan and red medium to fine sandy **CLAY**	640		
5						635		
10		BULK			Brown and gray medium to fine sandy **CLAY** CL	630		
15					Boring was terminated at 15 feet below the existing ground surface.	625		
					No groundwater was encountered at the time of boring completion.			
20						620		
25						615		
30						610		
35						605		
40						600		
45						595		
50						590		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B3-5**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B3-6**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **637.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3" CL	637.0		
					Tan medium to fine sandy **CLAY**	635		
5								
					Brown clayey medium to fine **SAND** SC	630		
10					Boring was terminated at 10 feet below the existing ground surface.	625		
15					No groundwater was encountered at the time of boring completion.	620		
20						615		
25						610		
30						605		
35						600		
40						595		
45						590		
50						585		
55								

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B3-6**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B3-7**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **642.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	642.0		
					Brown medium to fine sandy **CLAY**	640		
5						635		
10		BULK			Brown and gray medium to fine sandy **CLAY** with rock fragments CL	630		
15					Boring was terminated at 15 feet below the existing ground surface.	625		
20					No groundwater was encountered at the time of boring completion.	620		
25						615		
30						610		
35						605		
40						600		
45						595		
50						590		
55								

STANDARD PENETRATION TEST DATA scale: 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B3-7**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-1**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **600.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3"	600.0		
					Tan and brown medium to fine sandy fat **CLAY**	CH		
5						595		
10		BULK				590		
15					Boring was terminated at 15 feet below the existing ground surface.	585		
					Groundwater was encountered at 12 feet and 1 foot below the existing ground surface at the time of boring completion and at 24 hours after boring completion, respectively.			
20						580		
25						575		
30						570		
35						565		
40						560		
45						555		
50						550		
55						545		

Scale: 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-1**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-2**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **595.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **4** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3" CL	595.0		
					Tan and brown medium to fine sandy **CLAY**			
5					Auger refusal was encountered at 4 feet below the existing ground surface.	590		
10					Groundwater was encountered at 3 feet and 0 feet below the existing ground surface at the time of boring completion and at 24 hours after boring completion, respectively.	585		
15						580		
20						575		
25						570		
30						565		
35						560		
40						555		
45						550		
50						545		
55						540		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-2**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-3**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **598.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **5** Rock (ft): **NA** Total Depth (ft): **20.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3" CH	598.0		
		BULK			Brown and tan medium to fine sandy fat **CLAY**	595		
5					Auger refusal was encountered at 5 feet below the existing ground surface.	590		
10					No groundwater was encountered at the time of boring completion.	585		
15						580		
20						575		
25						570		
30						565		
35						560		
40						555		
45						550		
50						545		
55								

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-3**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-4**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **604.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **6** Rock (ft): **NA** Total Depth (ft): **25.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CH	604.0		
		BULK			Brown and tan medium to fine sandy fat **CLAY**	600		
5								
					Auger refusal was encountered at 6 feet below the existing ground surface.	595		
10					No groundwater was encountered at the time of boring completion.	590		
15						585		
20						580		
25						575		
30						570		
35						565		
40						560		
45						555		
50						550		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-4**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-5**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **604.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3"	604.0		
					Brown and tan medium to fine sandy fat **CLAY** **CH**			
5		BULK				600		
						595		
10					Boring was terminated at 10 feet below the existing ground surface.			
					No groundwater was encountered at the time of boring completion.	590		
15								
						585		
20								
						580		
25								
						575		
30								
						570		
35								
						565		
40								
						560		
45								
						555		
50								
						550		
55								

STANDARD PENETRATION TEST DATA scale: 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-5**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-6**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **601.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **5** Rock (ft): **NA** Total Depth (ft): **20.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3" CL	601.0		
					Brown and tan medium to fine sandy **CLAY**	600		
5					Auger refusal was encountered at 5 feet below the existing ground surface.	595		
10					No groundwater was encountered at the time of boring completion.	590		
15						585		
20						580		
25						575		
30						570		
35						565		
40						560		
45						555		
50						550		
55								

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-6**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-7**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **607.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **25.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	607.0		
					Brown and tan medium to fine sandy **CLAY**	605		
5						600		
10					Gray clayey medium to fine **SAND** SC	595		
15		BULK				590		
20						585		
25					Boring was terminated at 25 feet below the existing ground surface.	580		
30					Groundwater was encountered at 2 feet and 0.5 feet below the existing ground surface at the time of boring completion and at 24 hours after boring completion, respectively.	575		
35						570		
40						565		
45						560		
50						555		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-7**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-8**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **609.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **7** Rock (ft): **NA** Total Depth (ft): **10.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3" CL	609.0		
					Brown and tan medium to fine sandy **CLAY**	605		
5								
					Auger refusal was encountered at 7 feet below the existing ground surface.	600		
10					Groundwater was encountered at 6 feet and 0.5 feet below the existing ground surface at the time of boring completion and at 24 hours after boring completion, respectively.			
15						595		
20						590		
25						585		
30						580		
35						575		
40						570		
45						565		
50						560		
55						555		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-8**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-9**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **606.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **20.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3"	CL	606.0		
					Red medium to fine sandy **CLAY**		605		
5							600		
10							595		
					Tan and gray medium to fine sandy **CLAY**	CL			
15							590		
20					Boring was terminated at 20 feet below the existing ground surface.		585		
					Groundwater was encountered at 12 feet below the existing ground surface at the time of boring completion.				
25							580		
30							575		
35							570		
40							565		
45							560		
50							555		
55									

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-9**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-10**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **607.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3"	CL	607.0		
					Brown medium to fine sandy **CLAY**		605		
5									
					Brown and gray clayey medium to fine **SAND**	SC	600		
10							595		
15					Boring was terminated at 15 feet below the existing ground surface.		590		
					No groundwater was encountered at the time of boring completion.				
20							585		
25							580		
30							575		
35							570		
40							565		
45							560		
50							555		
55									

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-10**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-11**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **601.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **6** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3" CH	601.0		
		BULK			Brown medium to fine sandy fat **CLAY**	600		
5						595		
					Auger refusal was encountered at 6 feet below the existing ground surface.			
10					No groundwater was encountered at the time of boring completion.	590		
15						585		
20						580		
25						575		
30						570		
35						565		
40						560		
45						555		
50						550		
55								

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-11**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-12**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **603.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CH	603.0		
		BULK			Tan and brown medium to fine sandy fat **CLAY**	600		
5						595		
10						590		
15					Boring was terminated at 15 feet below the existing ground surface.	585		
					No groundwater was ecountered at the time of boring completion.			
20						580		
25						575		
30						570		
35						565		
40						560		
45						555		
50						550		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-12**

SPTN RMG AIRPORT PHASE 2 BORROW AREAS.GPJ 5/24/18

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-13**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **615.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3" CL	615.0		
					Brown and red medium to fine sandy **CLAY**			
5						610		
		BULK						
10						605		
15					Boring was terminated at 15 feet below the existing ground surface.	600		
					No groundwater was encountered at the time of boring completion.			
20						595		
25						590		
30						585		
35						580		
40						575		
45						570		
50						565		
55						560		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-13**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B4-14**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **621.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **15.0**

Logged By: **ER** Date Drilled: **4/3/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" CL	621.0		
					Brown and red medium to fine sandy **CLAY**	620		
5						615		
10		BULK				610		
15					Boring was terminated at 15 feet below the existing ground surface.	605		
					No groundwater was encountered at the time of boring completion.			
20						600		
25						595		
30						590		
35						585		
40						580		
45						575		
50						570		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B4-14**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B5-1**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **616.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **25.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3"	CL	616.0		
					Tan and brown medium to fine sandy **CLAY**		615		
5							610		
10							605		
15					Brown and tan clayey medium to fine **SAND**	SC	600		
20					Tan and brown medium to fine sandy **CLAY**	CL	595		
25					Boring was terminated at 25 feet below the existing ground surface.		590		
30					No groundwater was encountered at the time of boring completion.		585		
35							580		
40							575		
45							570		
50							565		
55									

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B5-1**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B5-2**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **625.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **30.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 4"	CL	625.0		
					Red and brown medium to fine sandy **CLAY**				
5							620		
10							615		
15					Brown clayey medium to fine **SAND**	SC	610		
20		BULK			Red and brown medium to fine sandy fat **CLAY**	CH	605		
25							600		
30					Boring was terminated at 30 feet below the existing ground surface.		595		
35					Groundwater was encountered at 24 feet below the existing ground surface at 24 hours after boring completion.		590		
40							585		
45							580		
50							575		
55							570		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B5-2**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B5-3**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **618.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **20.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" **CH**	618.0		
					Red and orange medium to fine sandy fat **CLAY**	615		
5								
						610		
10								
						605		
15		BULK						
						600		
20					Boring was terminated at 20 feet below the existing ground surface.			
					No groundwater was encountered at the time of boring completion.	595		
25								
						590		
30								
						585		
35								
						580		
40								
						575		
45								
						570		
50								
						565		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B5-3**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B5-4**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **621.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **25.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION		ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3"	CL	621.0		
					Red medium to fine sandy **CLAY**		620		
5							615		
10					Red clayey medium to fine sandy fat **CLAY**	CH	610		
15		BULK					605		
20							600		
25					Boring was terminated at 25 feet below the existing ground surface.		595		
					No groundwater was encountered at the time of boring completion.				
30							590		
35							585		
40							580		
45							575		
50							570		
55									

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B5-4**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B5-5**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **620.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **25.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot) 5 10 20 40 60 80	N-VALUE
					TOPSOIL = 3" CH	620.0		
					Red and brown medium to fine sandy fat **CLAY**			
5						615		
10						610		
15						605		
20		BULK				600		
25					Boring was terminated at 25 feet below the existing ground surface.	595		
					No groundwater was encountered at the time of boring completion.			
30						590		
35						585		
40						580		
45						575		
50						570		
55						565		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B5-5**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B5-6**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **617.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **20.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 4"	617.0		
					Red and orange medium to fine sandy fat **CLAY** **CH**	615		
5						610		
10						605		
15		BULK				600		
20					Boring was terminated at 20 feet below the existing ground surface.	595		
					No groundwater was encountered at the time of boring completion.			
25						590		
30						585		
35						580		
40						575		
45						570		
50						565		
55								

STANDARD PENETRATION TEST DATA (blows/foot): 5 10 20 40 60 80

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

Hole No. **B5-6**

WILLMER Engineering

Project: **Runway 1/19 & Partial Parallel Taxiway Extension**	**HOLE No. B5-7**
Location: **Richard B. Russell Reginal Airport, Rome, Floyd County, Georgia**	Sheet 1 of 1
Project Number: **ATL-71.4259**	Location: **See Figure 2**

Azimuth: **--** Angle from Horizontal: **90** Surface Elevation (ft): **619.00** Station: **NA**

Drilling Equipment: **CME 550X** Drilling Method: **HSA - Automatic Hammer**

Core Boxes: **NA** Samples: **NA** Overburden (ft): **NA** Rock (ft): **NA** Total Depth (ft): **20.0**

Logged By: **ER** Date Drilled: **4/2/18**

VERTICAL DEPTH (ft)	GRAPHIC LOG	SAMPLE TYPE	REC%	RQD %	MATERIAL DESCRIPTION	ELEVATION (feet)	STANDARD PENETRATION TEST DATA (blows/foot)	N-VALUE
					TOPSOIL = 3" **CH**	619.0		
					Brown medium to fine sandy fat **CLAY**			
5						615		
10						610		
15		BULK				605		
20						600		
					Boring was terminated at 20 feet below the existing ground surface.			
					No groundwater was encountered at the time of boring completion.			
25						595		
30						590		
35						585		
40						580		
45						575		
50						570		
55						565		

SAMPLER TYPE

SS - Split Spoon
ST - Shelby Tube
NQ - Rock Core, 1-7/8"
NX - Rock Core, 2-1/8"
CU - Cuttings
CT - Continuous Tube

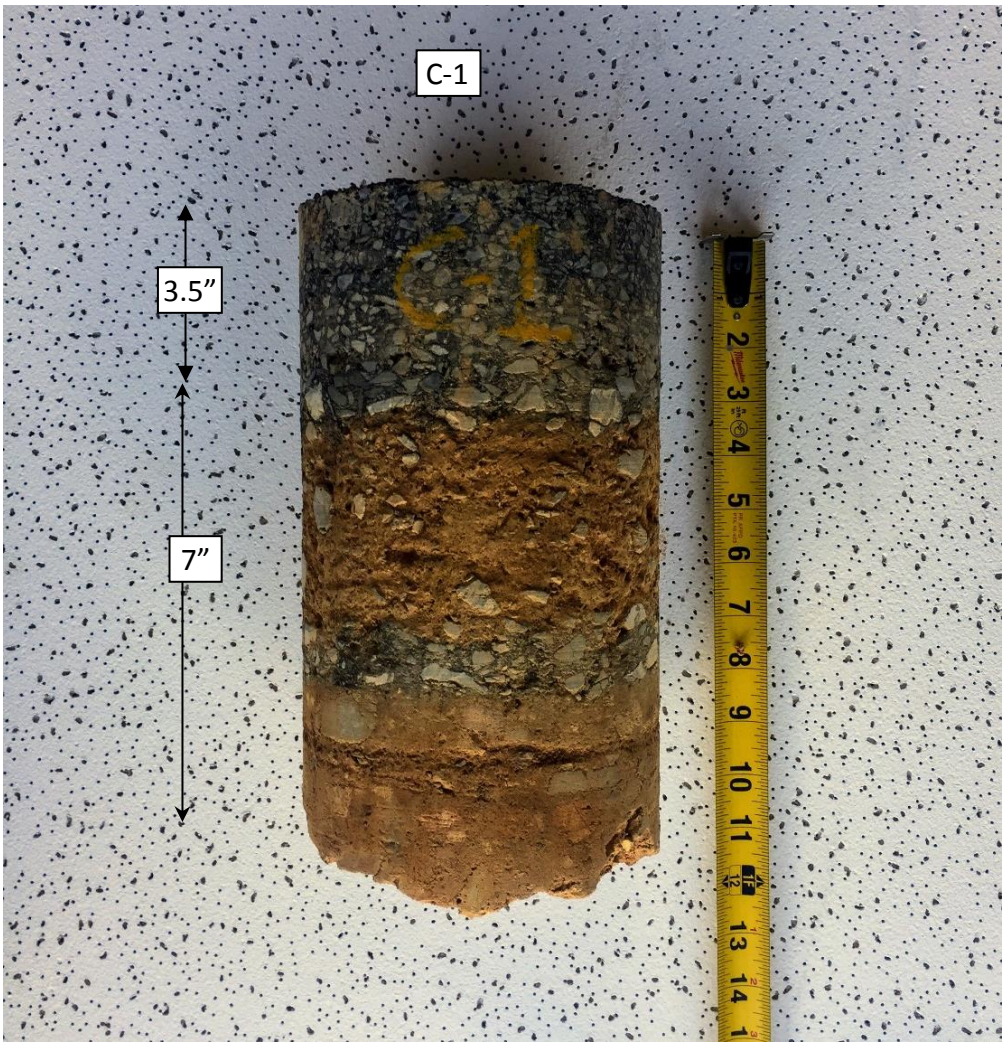
DRILLING METHOD

HSA - Hollow Stem Auger
CFA - Continuous Flight Augers
DC - Driving Casing
RW - Rotary Wash
RC - Rock Core

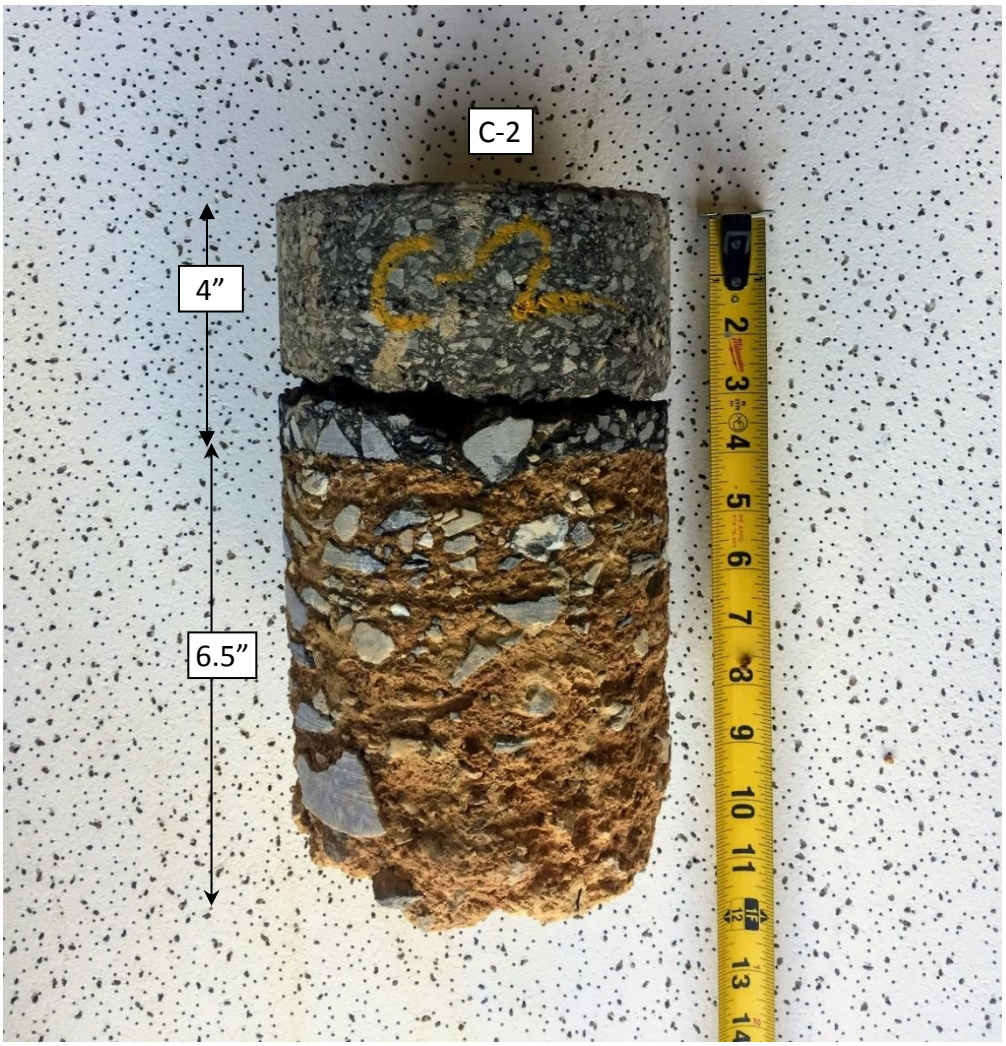
Hole No. **B5-7**

APPENDIX II

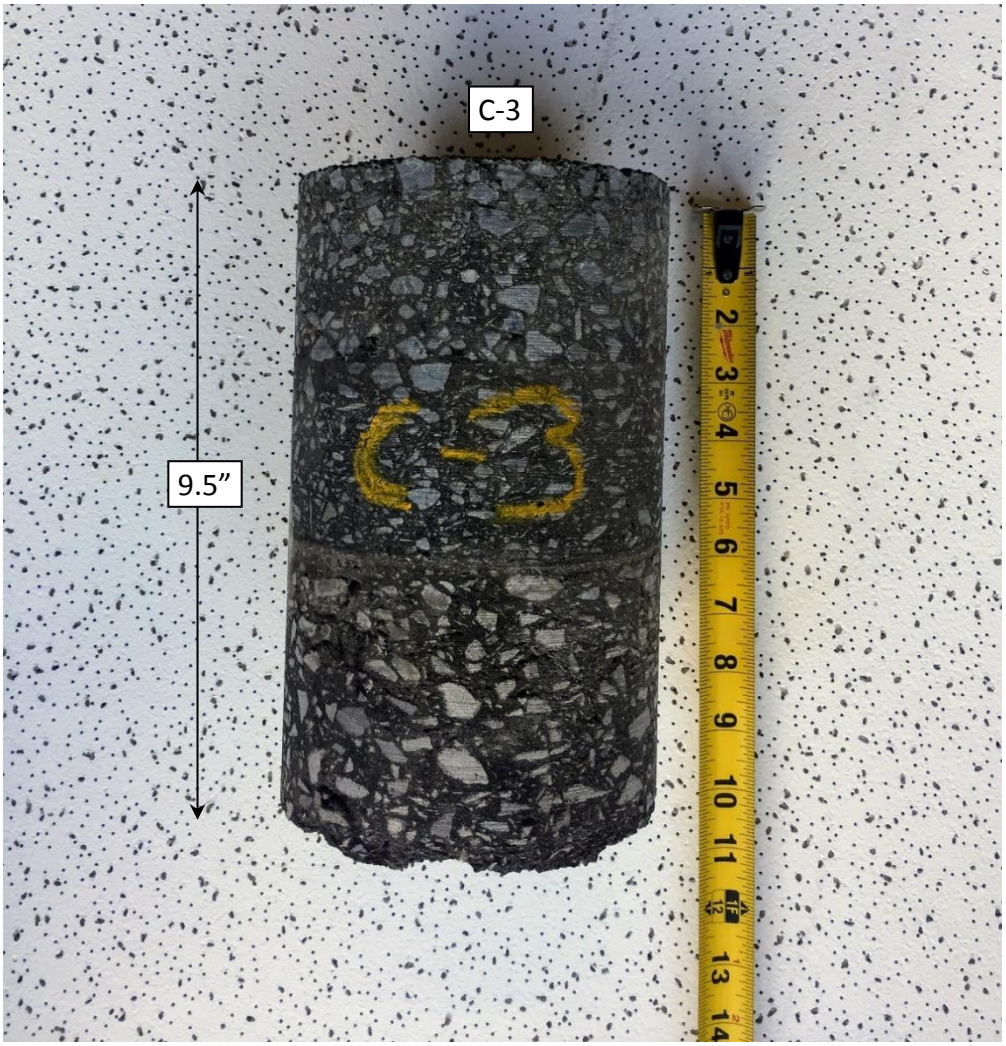
Pavement Core Photographs



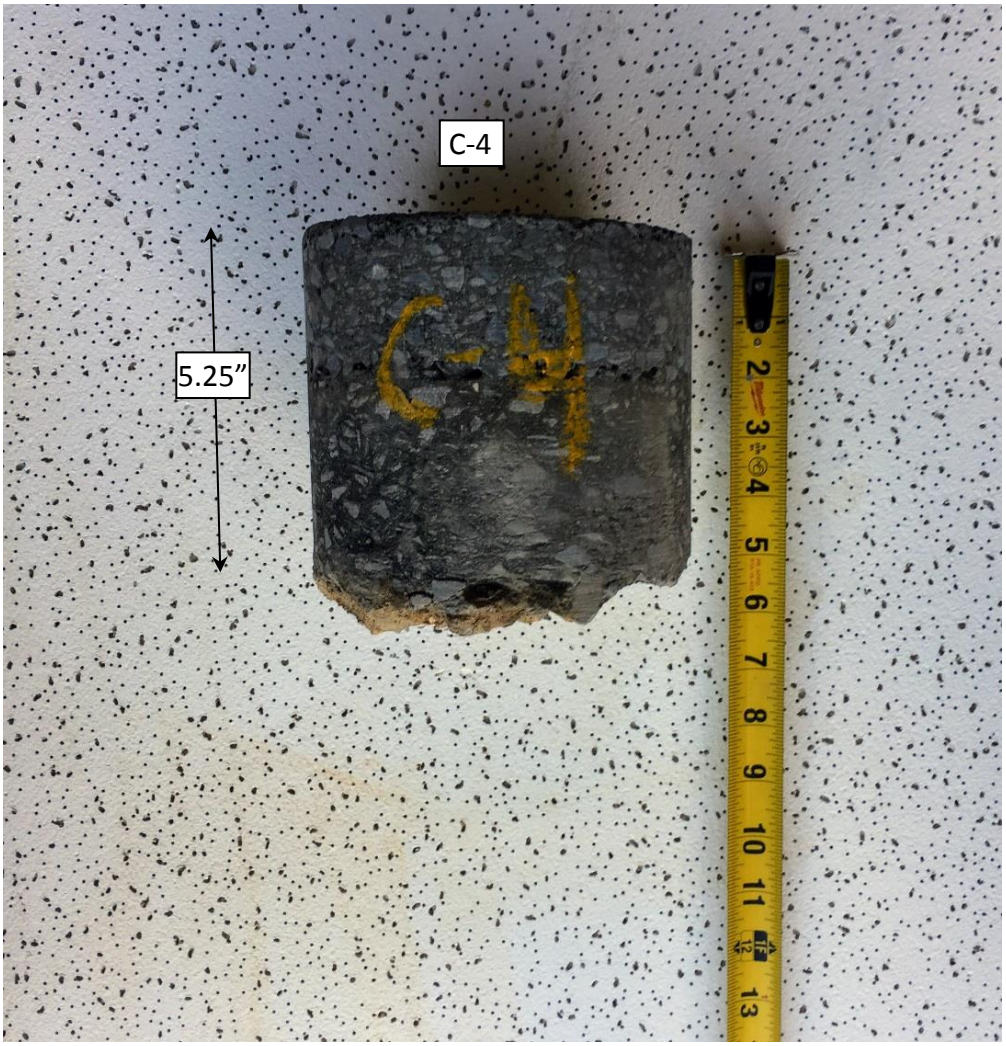
Core No.	Location
C-1	Jones Mill RD



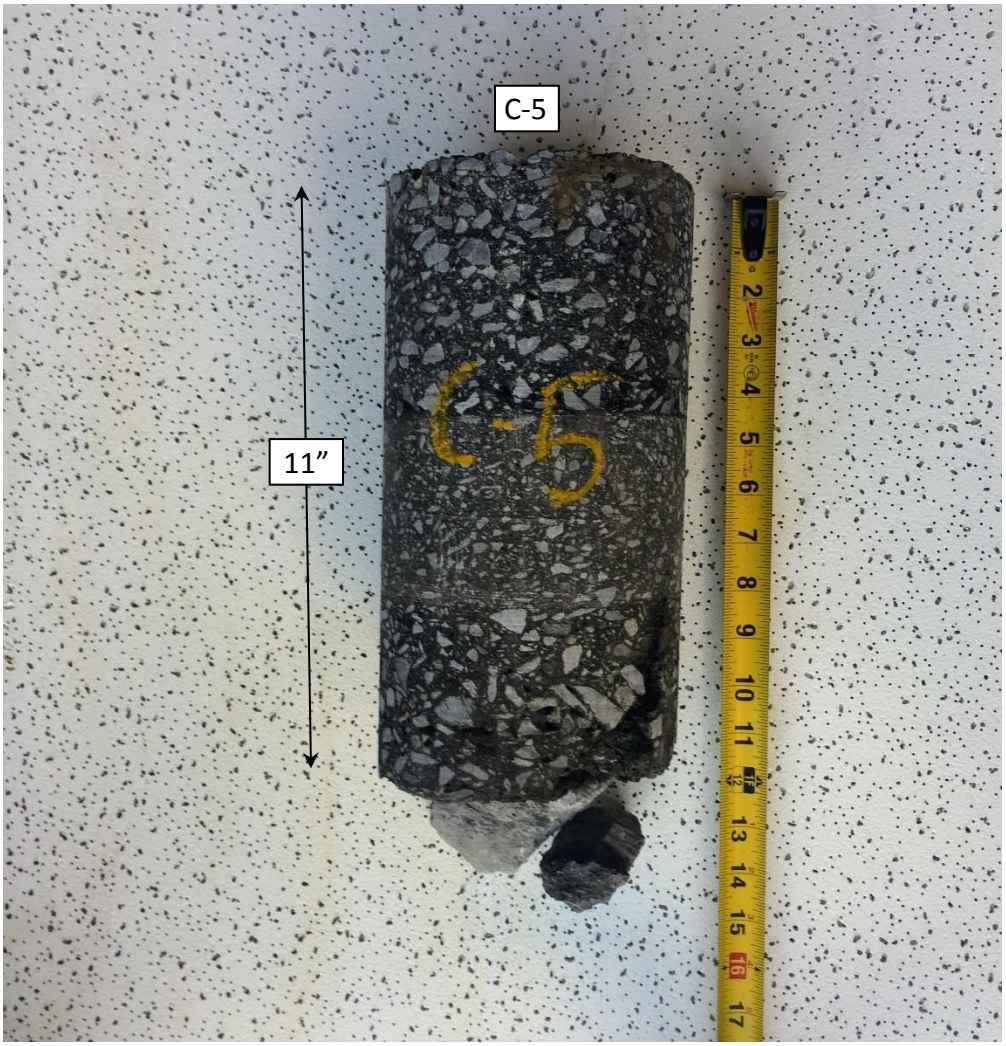
Core No.	Location
C-2	Jones Mill RD



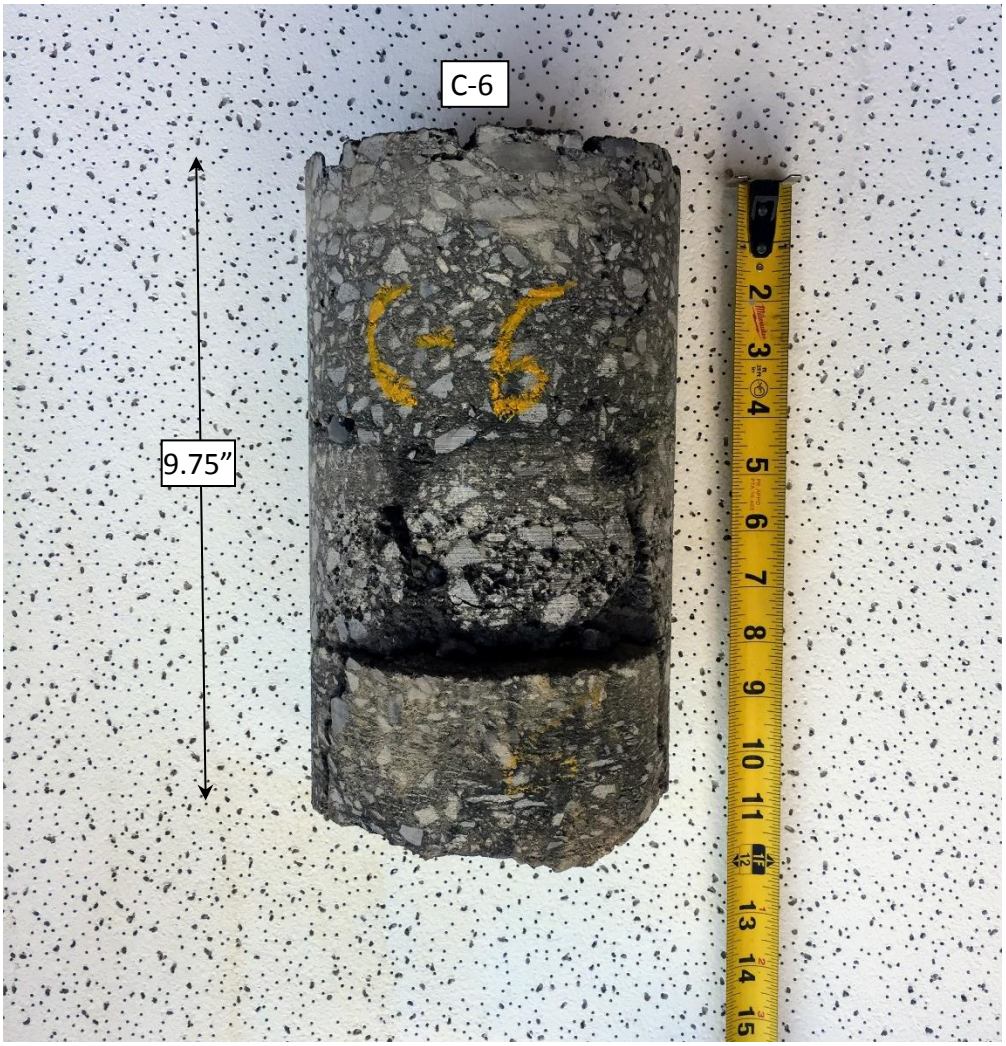
Core No.	Location
C-3	Taxiway



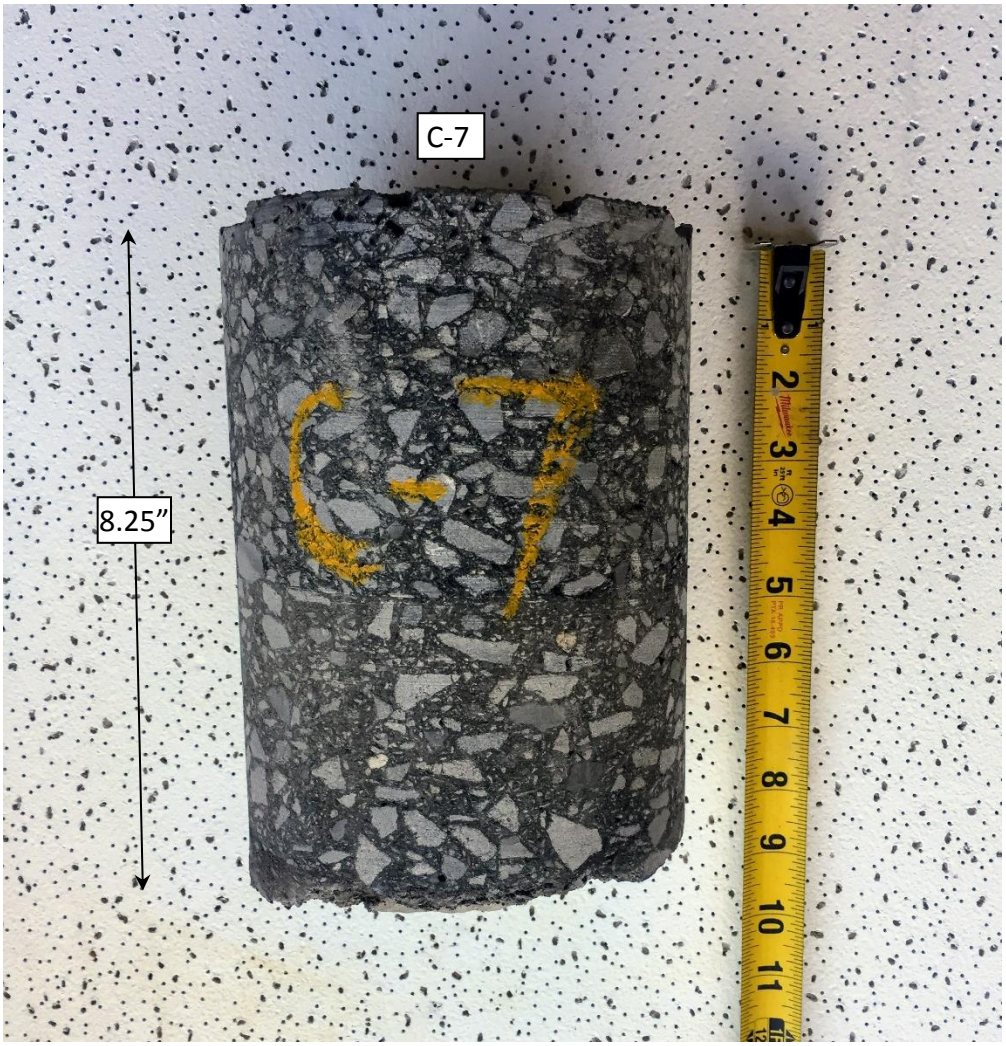
Core No.	Location
C-4	Taxiway



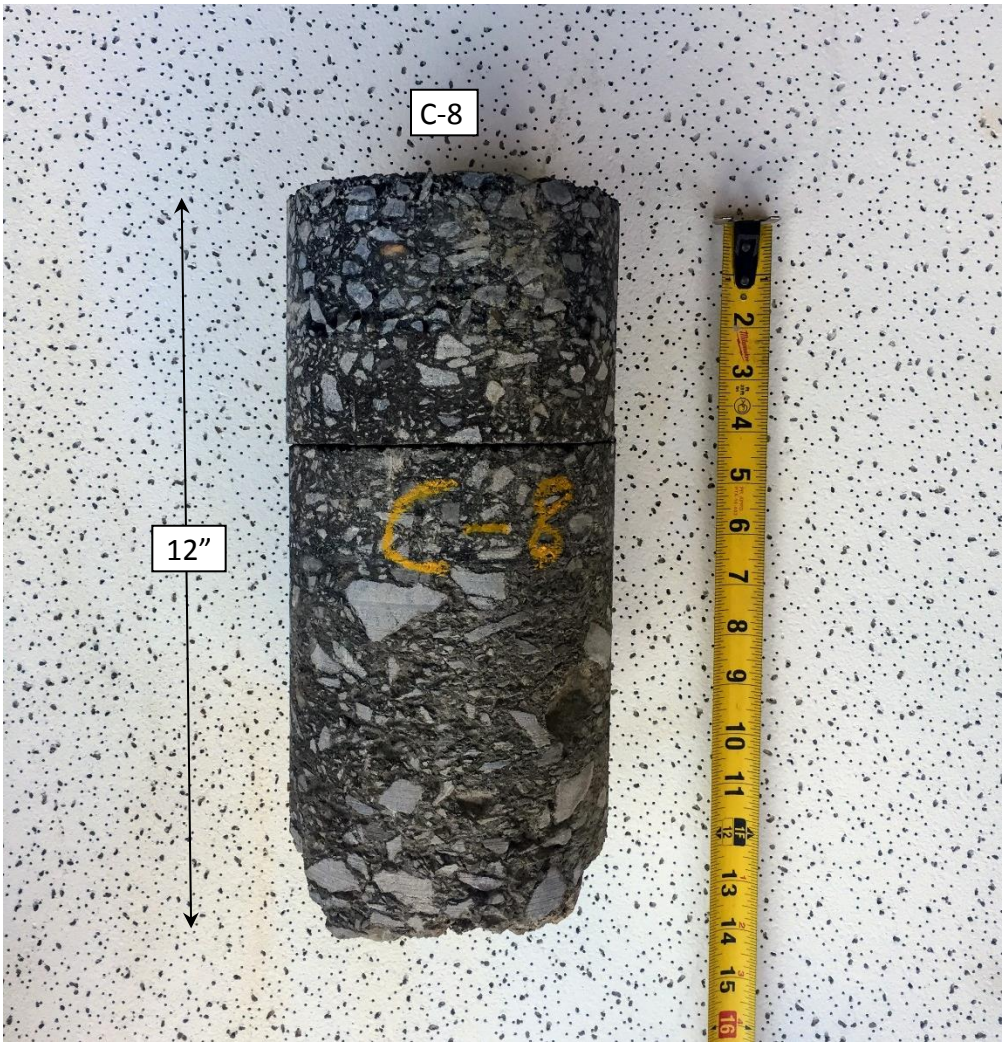
Core No.	Location
C-5	Runway



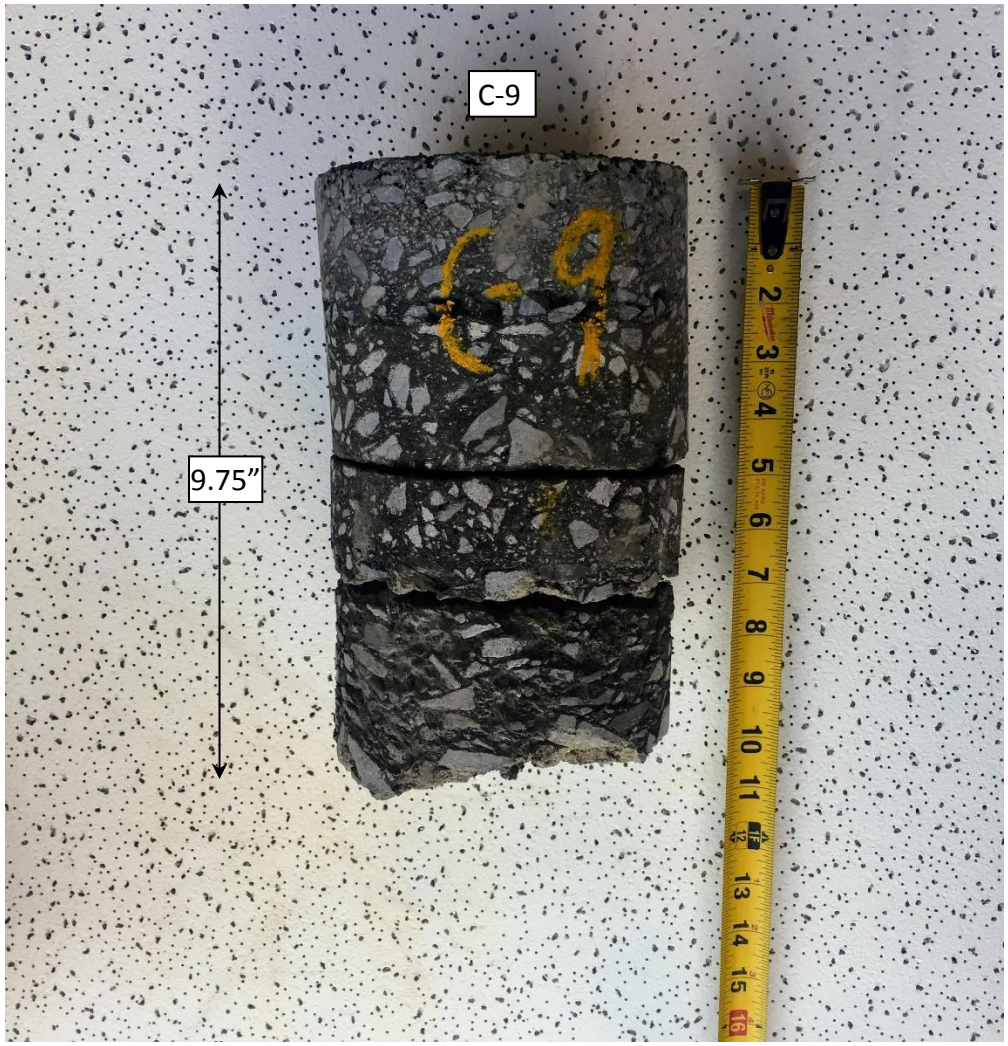
Core No.	Location
C-6	Runway



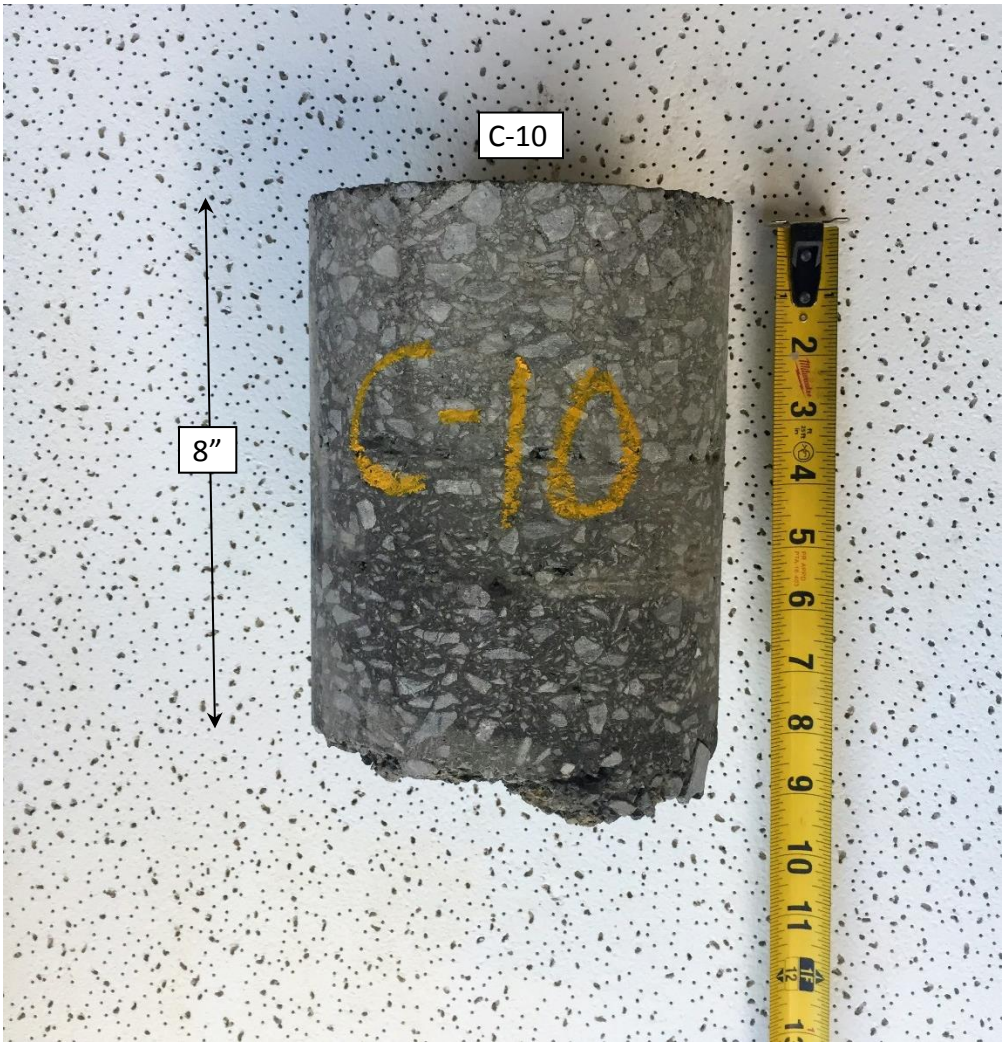
Core No.	Location
C-7	Runway



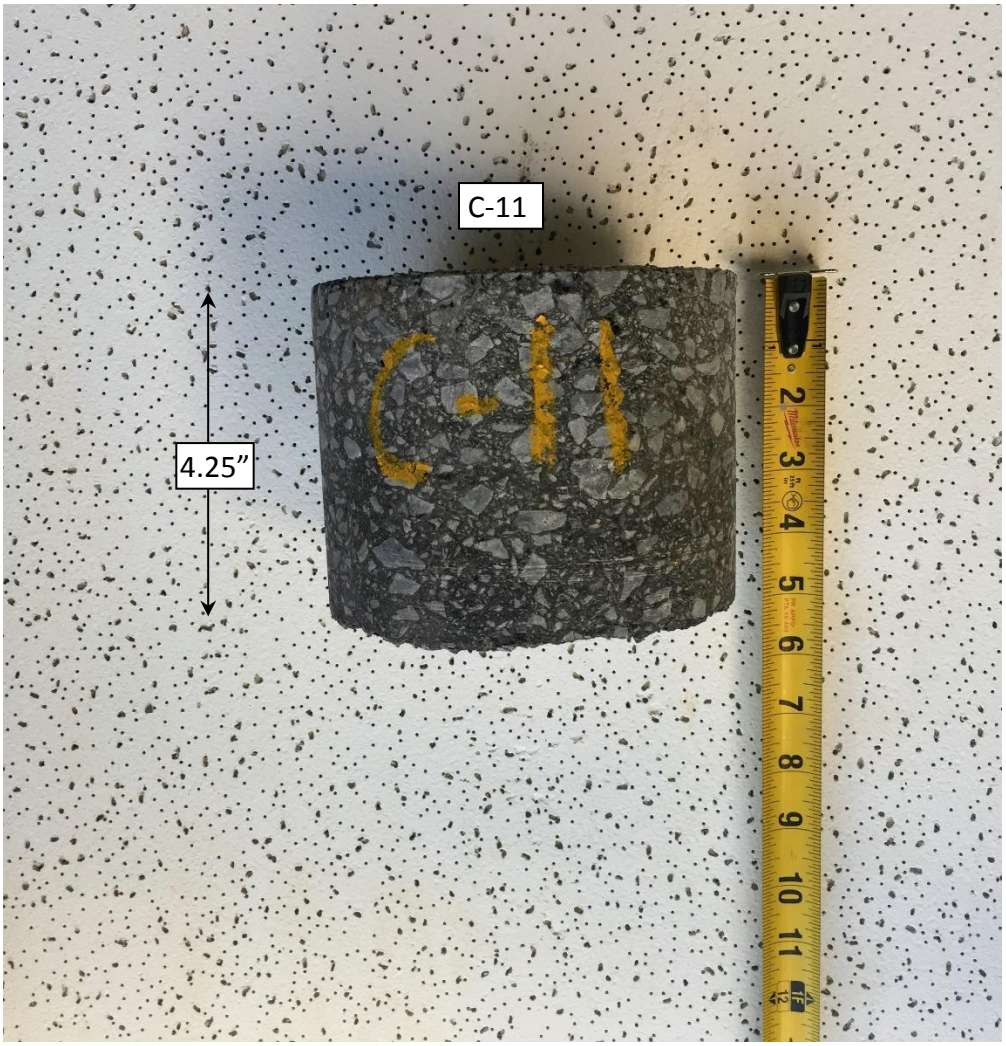
Core No.	Location
C-8	Taxiway



Core No.	Location
C-9	Taxiway



Core No.	Location
C-10	Taxiway



Core No.	Location
C-11	Taxiway

APPENDIX III

Laboratory Test Results

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Ph: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	01/16/18
Checked By	

Client Pr. #	71-4259	Lab. PR. #	1892-02-1
Project Name	Richard B.Rossell Regional Airport	S. Type	UD
Sample ID	26535/R-15	Depth/Elev.	1-3'
Location	R-15	Add. Info	-

ASTM D2435

Standard Test Method for One-Dimensional Consolidation Properties of Soils (Method B)

Sample Data

	Initial	Final
Mass of Ring, g	194.73	194.73
Mass of Wet Sample and Ring, g	366.70	366.64
Mass of Wet Sample, g	171.97	171.91
Mass of Dry Sample, g	149.26	149.26
Height of Sample, in	0.9970	0.9778
Diameter of Sample, in	2.501	2.501
Area of Sample, in^2	4.91	4.91
Volume of Sample, in^3	4.90	4.80
Specific Gravity (Assumed)	2.700	2.700
Wet Unit Weight, pcf	133.8	136.3
Dry Unit Weight, pcf	116.1	118.4
Height of Solids, in	0.6867	0.6867
Height of Voids, in	0.3103	0.2911
Height of Water, in	0.2821	0.2814
Void Ratio	0.452	0.424
Degree of Saturation, %	90.9	96.6

Initial Seating Pressure, lbf/ft^2	100
Additional Vertical Pressure, lbf/ft^2	0
Total Seating Pressure, lbf/ft^2	100
STATION #	2
Consolidometer Ring ID Number	1
Consolidometer ID Number	1
Frame ID Number	66
Dial Gage ID Number	677
Initial Dial Gauge Reading, 10^{-4} in	0
Final Dial Gauge Reading, 10^{-4} in	192

DESCRIPTION

NA

USCS (ASTM D2487;2488)

NA

REMARKS

Portion of sample used for testing was located 2" above the bottom of the shelby tube.

Condition of Test:

1. Deionized water used for inundation of sample.
2. Saturated porous stones w/t filter paper used

Moisture Content

	Trimmings	Initial	Final
Mass of Wet Sample and Tare, g	401.30	366.70	426.23
Mass of Dry Sample and Tare, g	358.40	343.99	403.58
Mass of Tare, g	95.30	194.73	254.33
Moisture Content, %	16.3	15.2	15.2

LL	-
PL	-
PI	-

TIMELY ENGINEERING SOIL TESTS, LLC

1874 Forge Street Tucker, GA 30084
Ph: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	01/16/18
Checked By	

Client Pr. #	71-4259	Lab Pr. #	1892-02-1
Project Name	Richard B.Rossell Regional Airport	S. Type	UD
Sample ID	26535/R-15	Depth/Elev.	1-3'
Location	R-15	Add. Info	-

ASTM D2435

Standard Test Method for One-Dimensional Consolidation Properties of Soils (Method B)

Void Ratio, Strain Information and Coefficient of Consolidation Calculation

Pressure		Uncorrected Dial Reading, in		Apparatus Correction, in	Corrected Dial Reading, in		Change in specimen height, in		Sample Height, in		Height of Voids, in	Void Ratio		Strain, %		Fitting Time, min		Hd_{50}, in	Coefficient of Consolidation	
lbf/ft^2	Ksf	d_{100}	d_{50}		d_{100}	d_{50}	ΔH_{100}	ΔH_{50}	H_{100}	H_{50}	Hv^{100},in	e_{100}	e_{50}	e_{100}	e_{50}	t_{90}	t_{50}		in^2/min	ft^2/day
100	0.1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.9970	0.9970	0.3103	0.452	0.452	0.00	0.00	-	-	0.4985	-	-
250	0.25	0.0023	0.0019	0.0000	0.0023	0.0019	0.0023	0.0019	0.9947	0.9951	0.3080	0.449	0.449	0.23	0.19	1.21	0.28	0.4976	0.17	1.73
500	0.5	0.0046	0.0042	0.0000	0.0046	0.0042	0.0046	0.0042	0.9924	0.9928	0.3057	0.445	0.446	0.46	0.42	2.25	0.53	0.4964	0.09	0.93
1000	1	0.0078	0.0073	0.0000	0.0078	0.0073	0.0078	0.0073	0.9892	0.9897	0.3025	0.440	0.441	0.79	0.74	2.72	0.64	0.4948	0.08	0.76
2000	2	0.0113	0.0107	0.0000	0.0113	0.0107	0.0113	0.0107	0.9857	0.9863	0.2990	0.435	0.436	1.13	1.08	2.89	0.67	0.4931	0.07	0.71
4000	4	0.0163	0.0156	0.0000	0.0163	0.0156	0.0163	0.0156	0.9807	0.9814	0.2941	0.428	0.429	1.63	1.57	3.06	0.71	0.4907	0.07	0.67
8000	8	0.0222	0.0214	0.0000	0.0222	0.0214	0.0222	0.0214	0.9748	0.9756	0.2881	0.420	0.421	2.23	2.15	2.89	0.67	0.4878	0.07	0.70
2000	2	0.0215	0.0216	0.0000	0.0215	0.0216	0.0215	0.0216	0.9755	0.9754	0.2889	0.421	0.420	2.15	2.17	0.36	0.08	0.4877	0.56	5.60
250	0.25	0.0192	0.0197	0.0000	0.0192	0.0197	0.0192	0.0197	0.9778	0.9773	0.2911	0.424	0.423	1.93	1.97	0.81	0.19	0.4887	0.25	2.50

Note:
d_{100} = Dial gauge reading at 100% primary consolidation, in
d_{50} = Dial gauge reading at 50% primary consolidation, in
H_{100} = Specimen height at 100% primary consolidation, in
H_{50} = Specimen height at 50% primary consolidation, in
Hd_{50} = Length of the drainage path at 50% consolidation, in
e_{100} = Void ratio at 100% primary consolidation
e_{50} = Void ratio at 50% primary consolidation

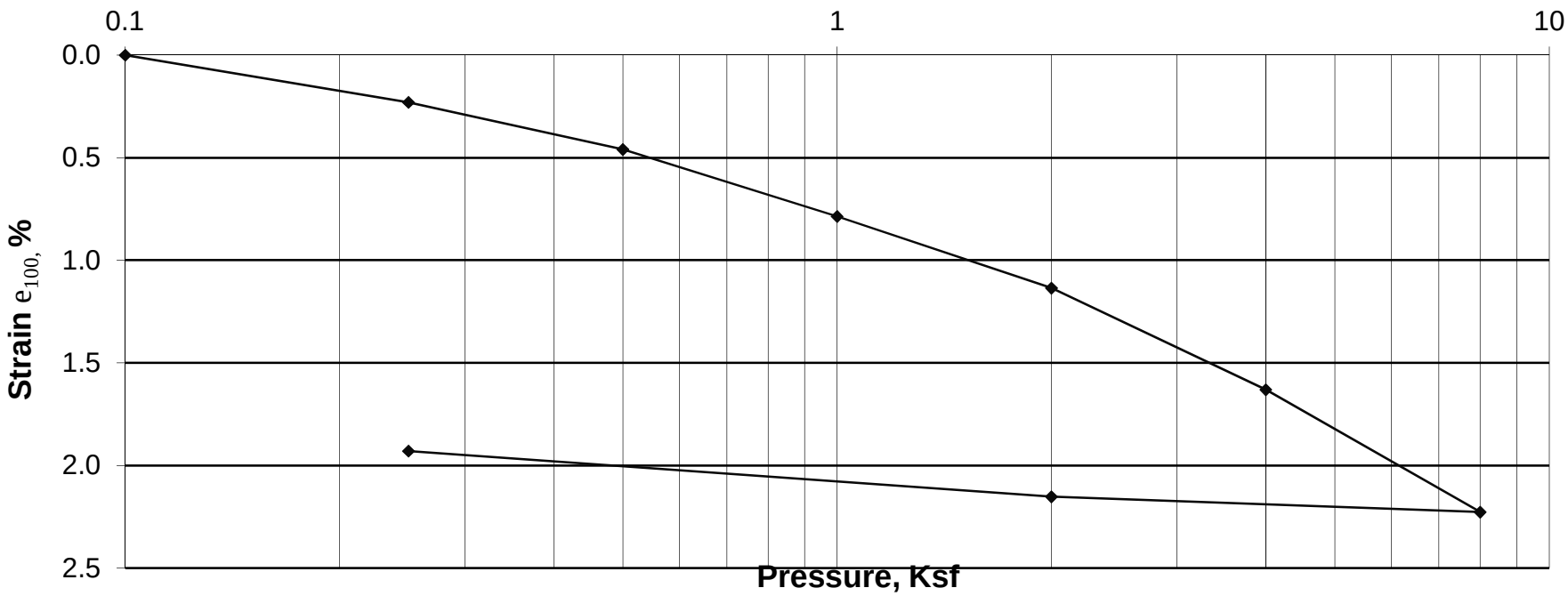
TIMELY ENGINEERING SOIL TESTS, LLC

1874 Forge Street Tucker, GA 30084
Ph: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	01/16/18
Checked By	

Client Pr. #	71-4259	Lab. PR. #	1892-02-1
Project Name	Richard B.Rossell Regional Airport	S. Type	UD
Sample ID	26535/R-15	Depth/Elev.	1-3'
Location	R-15	Add. Info	-

ASTM D 2435; Standard Test Method for One-Dimensional Consolidation Properties of Soils (Method B)



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Client Pr. #	71-4259	Lab. PR. #	1892-02-1
Project Name	Richard B.Rossell Regional Airport	S. Type	UD
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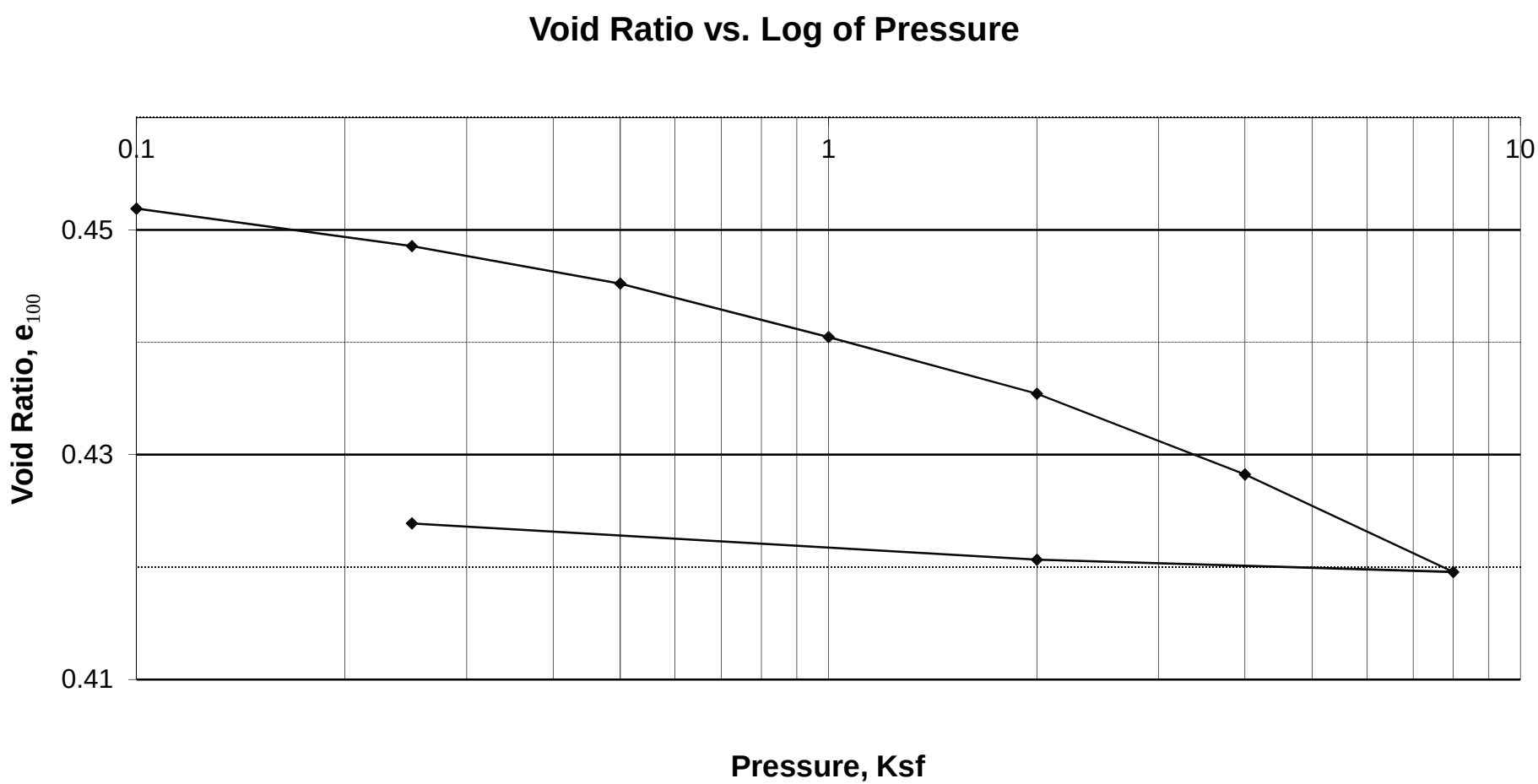

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Location	R-15	Add. Info	-

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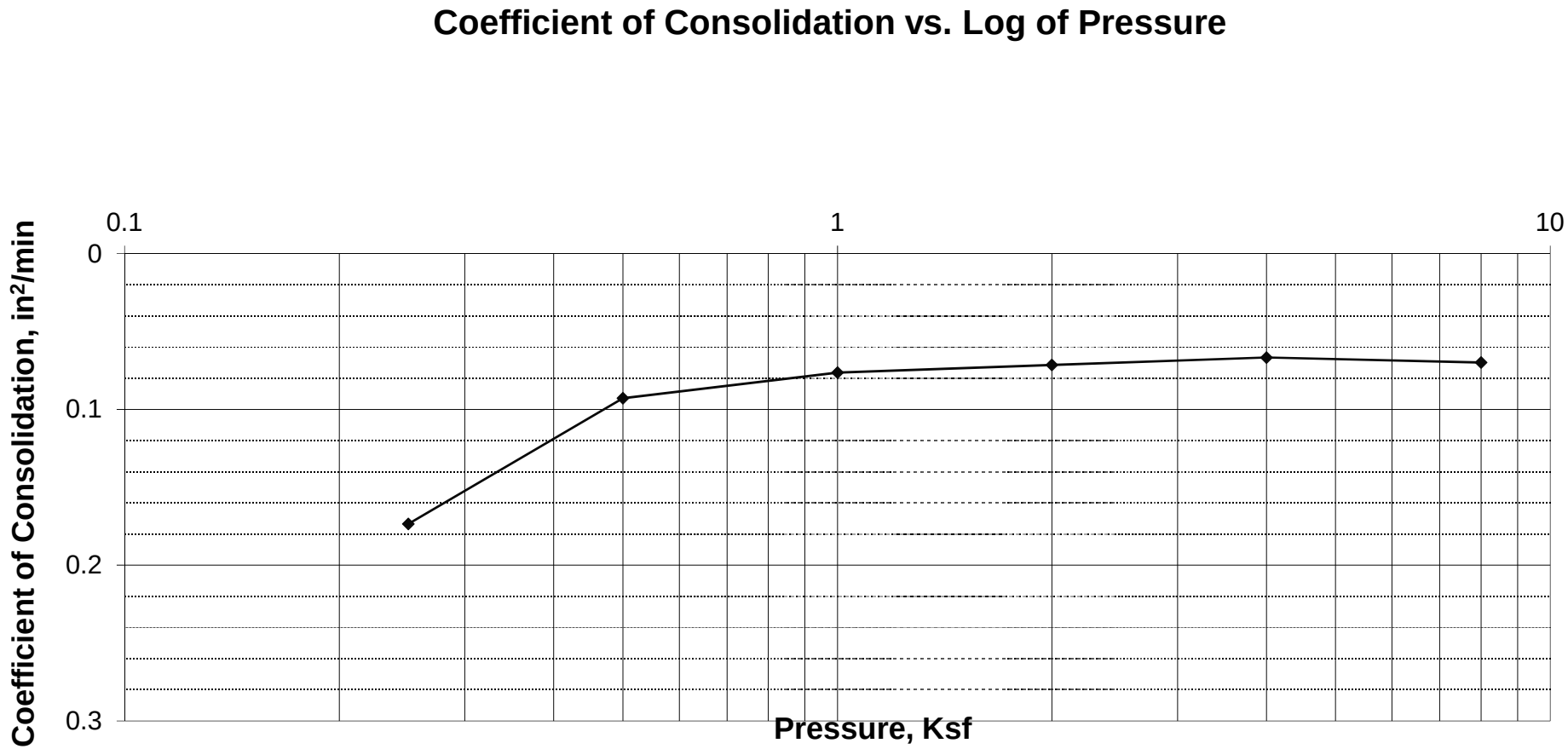

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Tested By	EB
Date	12/19/17
Checked By	

Client Pr. #	71.4257	Lab. PR. #	1792-08-1
Pr. Name	Richard B. Russell Airport	S. Type	Bag
Sample ID	26462/R-25	Depth/Elev.	-
Location	R-25	Add. Info	-

ASTM G 57/G187/AASHTO T 288

Standard Test Method for Determining Minimum Laboratory Soil Resistivity

Determination of Resistivity at as-received moisture content

As-received Moisture Content	
Mass of Wet Sample & Tare, g	
Mass of Dry Sample & Tare, g	
Mass of Tare, g	
Moisture Content, %	NA

Remarks

TEST DATA

Mass of Soil Box, g	-	Meter Dial Reading, ohms	-
Mass of Soil Box + Soil, g	-	Reading of Meter Range Multiplier	-
Mass of Soil, g	-	Measured Resistance, ohms	-
Calibrated Volume of Soil Box, ft^3	0.0027	Calibrated Soil Box Multiplier, cm	1.0
Wet Density of as-placed Soil, pcf	-		
Dry Density of as-placed Soil, pcf	-	**Reported Soil Resistivity, ohms-cm**	**NA**

Determination of Minimum Soil Resistivity

TEST DATA

	Trials at Various Moisture Content								
TRIAL #	1	2	3	4	5	6	7	8	9
Meter Dial Reading, ohms	9.85	9.67	9.21	8.97	8.74	8.74			
Reading of Meter Range Multiplier	K	K	K	K	K	K			
Measured Resistance, ohms	9850	9670	9210	8970	8740	8740			
Calibrated Soil Box Multiplier, cm	1.0	1.0	1.0	1.0	1.0	1.0			
Measured Resistivity, ohms-cm	9850	9670	9210	8970	8740	8740			

Reported Soil Minimum Resistivity, ohms-cm **8740**

Note: Material passed # 10 sieve used for testing

Oven ID #	496/610
Balance ID #	563/700
Soil Box ID #	612/613/707
Resistivity Meter ID #	706

Description

NA

USCS (D2487; D2488)	NA
AASHTO (M145)	NA

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Web: www.test-llc.com

AASHTO ACCREDITED

Tested By	EB
Date	12/19/17
Checked By	

Client Pr. #	71.4257	Lab. PR. #	1792-08-1
Pr. Name	Richard B. Russell Airport	S. Type	Bag
Sample ID	26462/R-25	Depth/Elev.	-
Location	R-25	Add. Info	-

ASTM G51

Standard Test Method for Determining pH of Soil for Use in Corrosion Testing

SAMPLE PREPARATION

Roots, Stones, Gravel and other deleterious material was removed prior to testing

Measurements performed ar room temperature condition: 18 °C

TEST DATA

T.E.S.T. Sample ID	Client Sample ID	pH meter Reading #1	pH meter Reading #2	pH meter Reading #3	**Reported pH value**
26462	See Above	4.92	4.91	4.90	**4.9**

REMARKS

NIST TRACEABLE BUFFER SOLUTIONS (4.0; 7.0; 10.0 pH) were used for CALIBRATION of pH METER prior to testing.

pH Meter ID 375/732/733

PARTICLE- SIZE DISTRIBUTION TEST REPORT

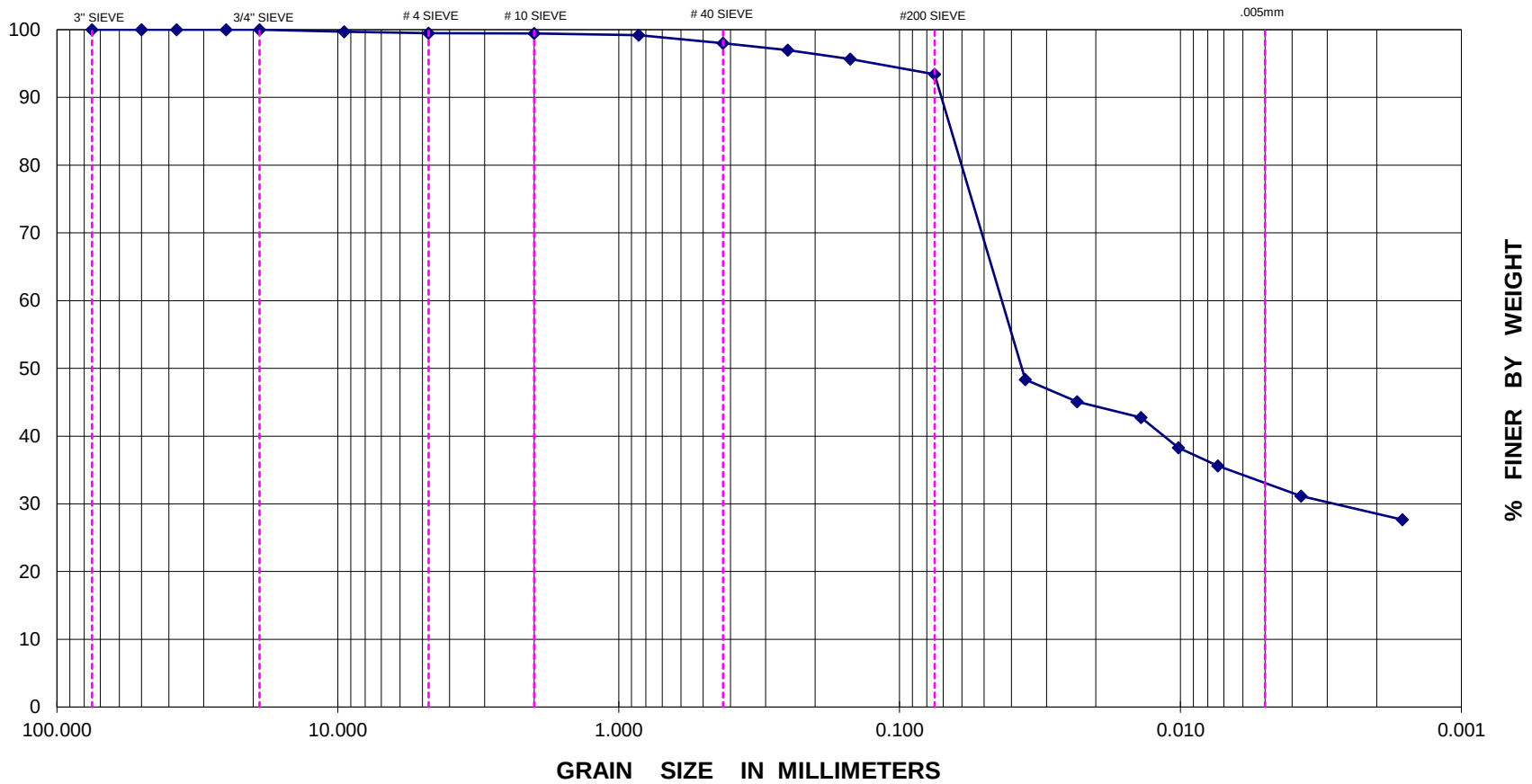
SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8209*	**DATE :**	12/20/17	**REVIEWED BY :**	AB
BORING / PIT NO. :	*R-4,R-9*	**DEPTH / ELEV. :**	*0-5'*	**SAMPLE NO. :**	*B-1*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	R-4 and R-9						
SOIL DESCRIPTION :	*Tan and red fat clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*67*	**PLASTICITY INDEX , % :**	*37*	**MOISTURE , % :**	32.2	**FINES , % :**	*93.4*
D10 , MM :	*N/A*	**D30 , MM :**	0.003	**D60 , MM :**	0.042	**COEFF. OF CURVATURE , C_C :**	*N/A*
CLASSIFICATION	*Clay*	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	*N/A*

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **12/6/2017**

Project **Runway 1/19 and Partial Taxiway Extension**

Location **Richard B. Russell Regional Airport**

Proctor No. **B-1**

Source of Material **Borings R-4 and R-9**

Description of Material **Tan and red fat clay**

Test Method **ASTM D698 Method A**

TEST RESULTS

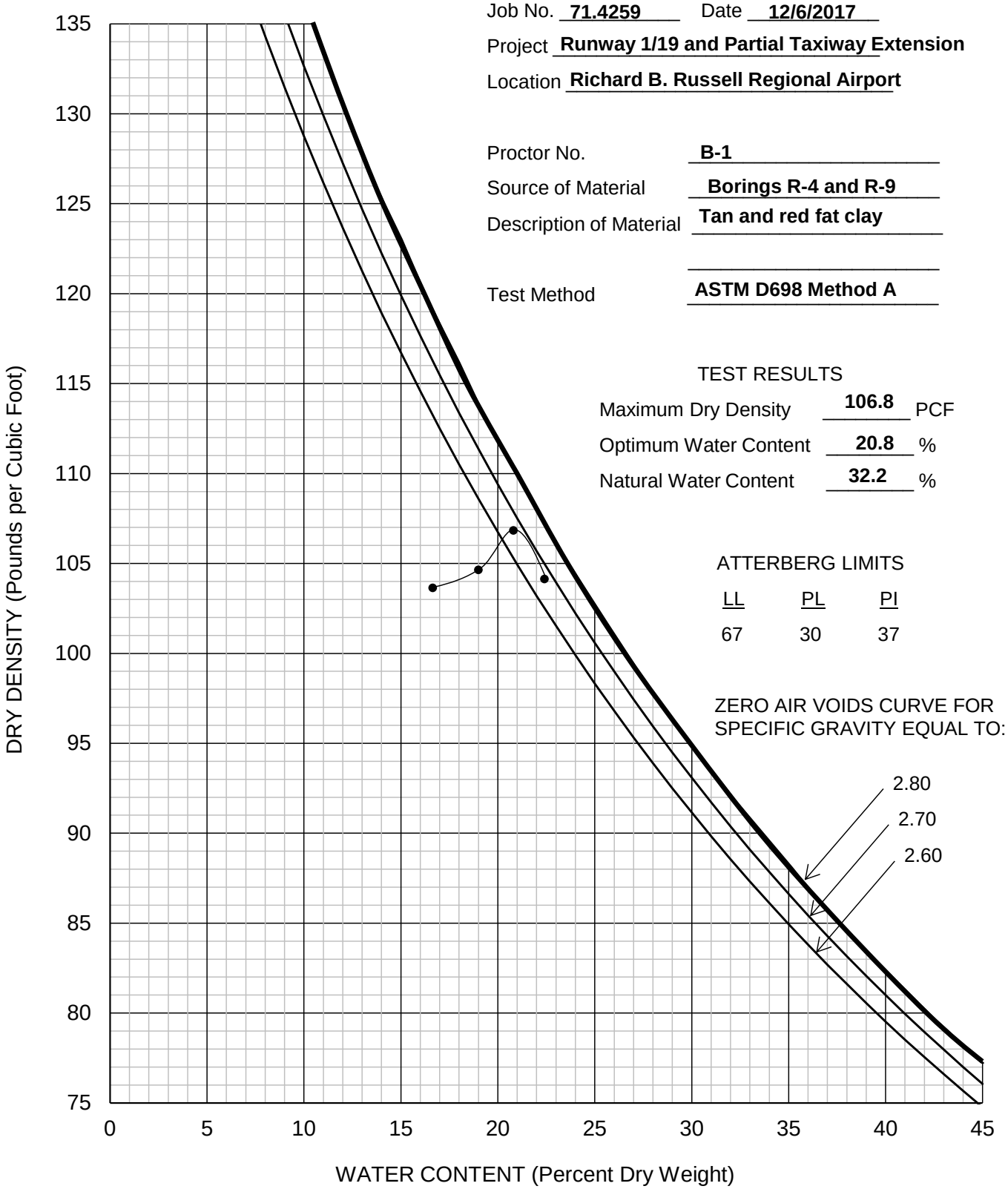
Maximum Dry Density **106.8** PCF

Optimum Water Content **20.8** %

Natural Water Content **32.2** %

ATTERBERG LIMITS

LL	PL	PI
67	30	37



WILLMER Engineering

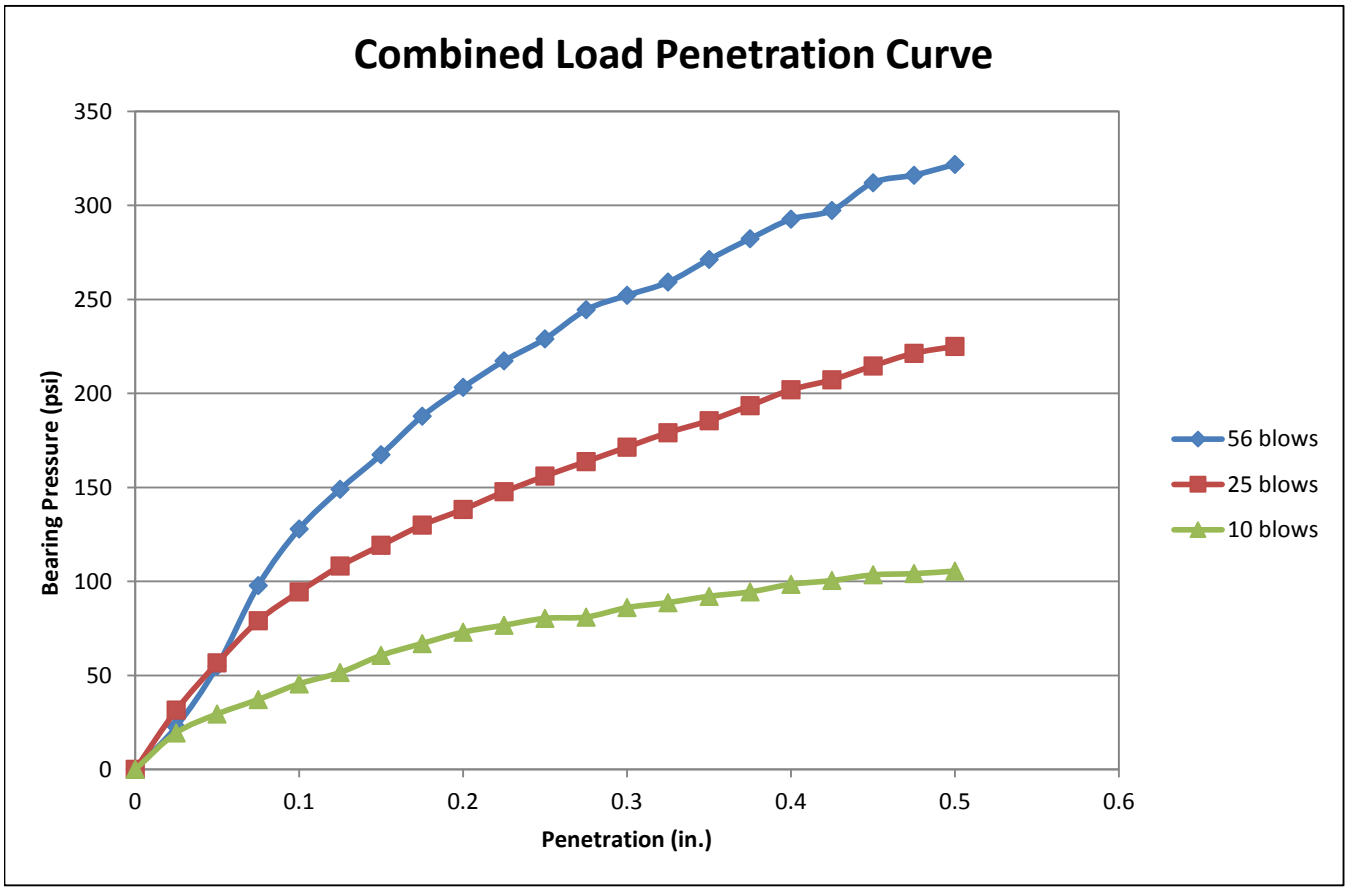
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**	12/18/2017
Lab Number	8209	**SAMPLE NO.**		B-1	**Depth**	0-5'
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		106.8	**Optimum Water Content (%)**	20.8
Soil Description	Reddish brown fat clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		104.1	100.7	89.2
			Compaction Percentage		97%	94%	83%
			CBR Value		14.4	9.7	4.3
Index Properties	**Percent Fines**	93.4%	**G_S**	2.65	**Reviewed**	AB
	LL	67	**PI**	37		

CBR Value at 95% Maximum Proctor Maximum Dry Density	**11.0**



PARTICLE- SIZE DISTRIBUTION TEST REPORT

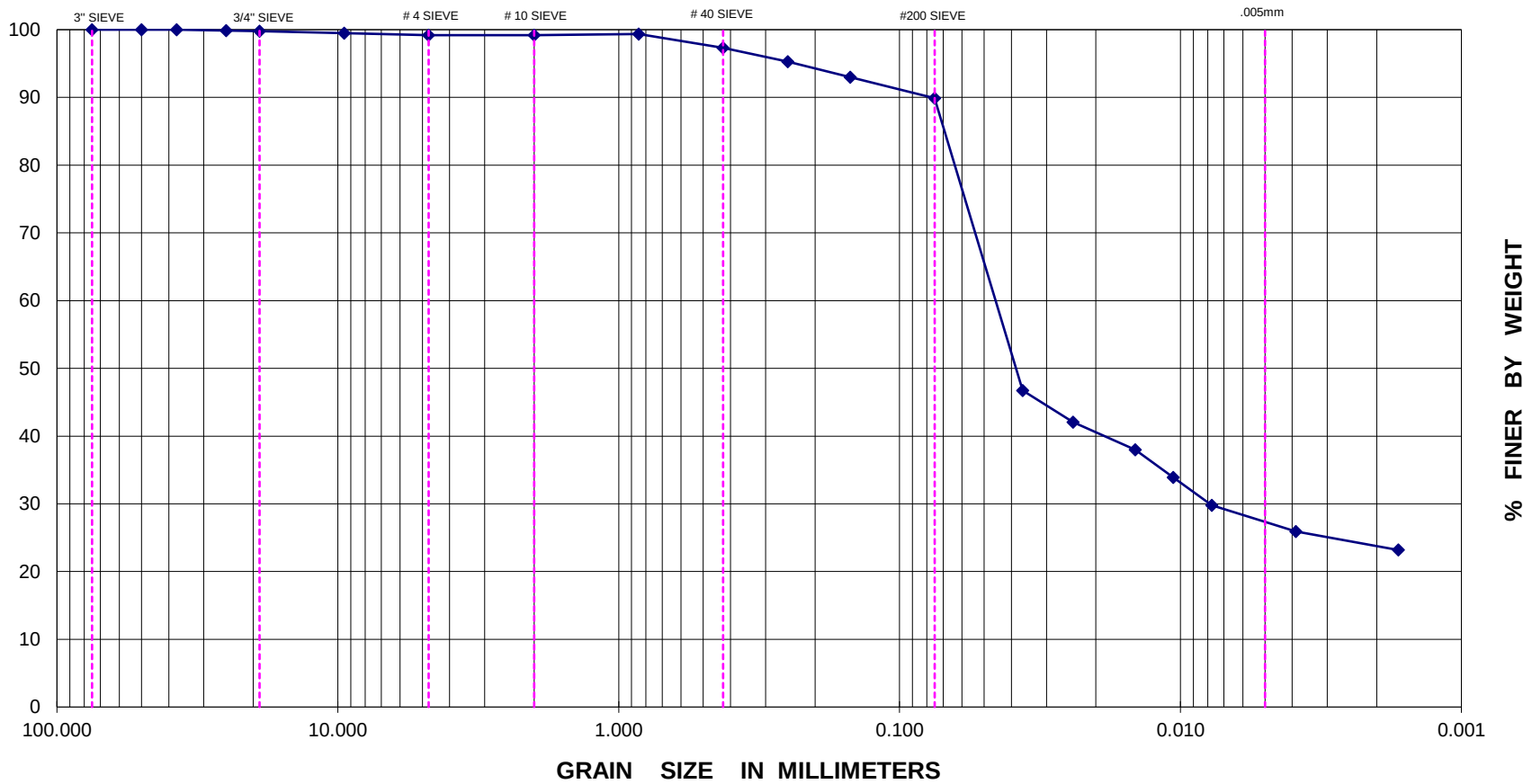
SIEVE AND HYDROMETER **ASTM D422**

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8210*	**DATE :**	12/20/17	**REVIEWED BY :**	AB
BORING / PIT NO. :	*R-2, R-7*	**DEPTH / ELEV. :**	*0-5'*	**SAMPLE NO. :**	*B-2*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	*R-2 and R-7*						
SOIL DESCRIPTION :	*Brown fat clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*51*	**PLASTICITY INDEX , % :**	*25*	**MOISTURE , % :**	29.6	**FINES , % :**	*89.9*
D10 , MM :	N/A	**D30 , MM :**	0.0078	**D60 , MM :**	0.45	**COEFF. OF CURVATURE , C_C :**	*N/A*
CLASSIFICATION	Clay	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	*N/A*

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **12/8/2017**

Project **Runway 1/19 Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **B-2**

Source of Material **Borings R-2 and R-7**

Description of Material **Brown fat clay**

Test Method **ASTM D698 Method A**

TEST RESULTS

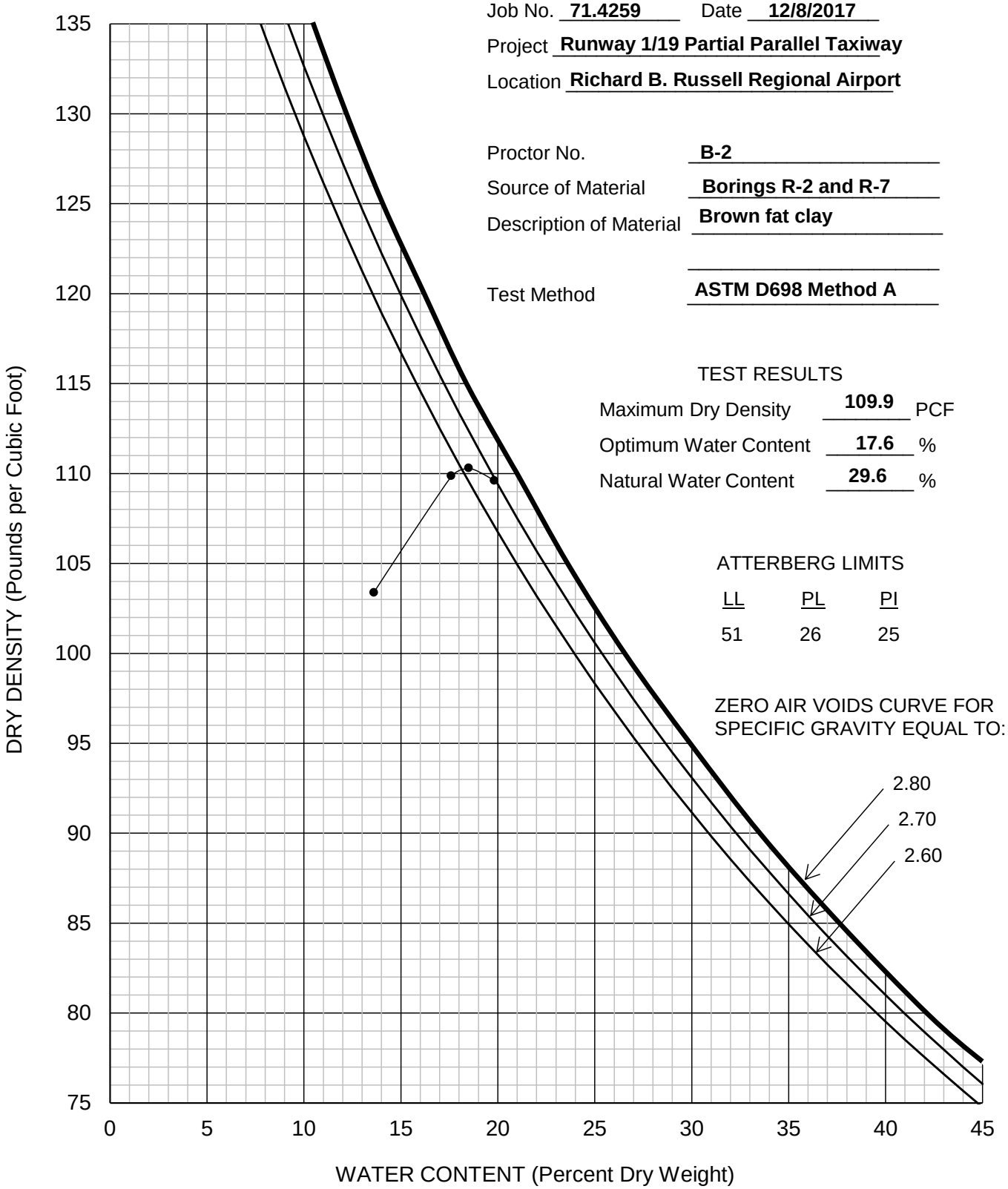
Maximum Dry Density **109.9** PCF

Optimum Water Content **17.6** %

Natural Water Content **29.6** %

ATTERBERG LIMITS

LL	PL	PI
51	26	25



WILLMER Engineering

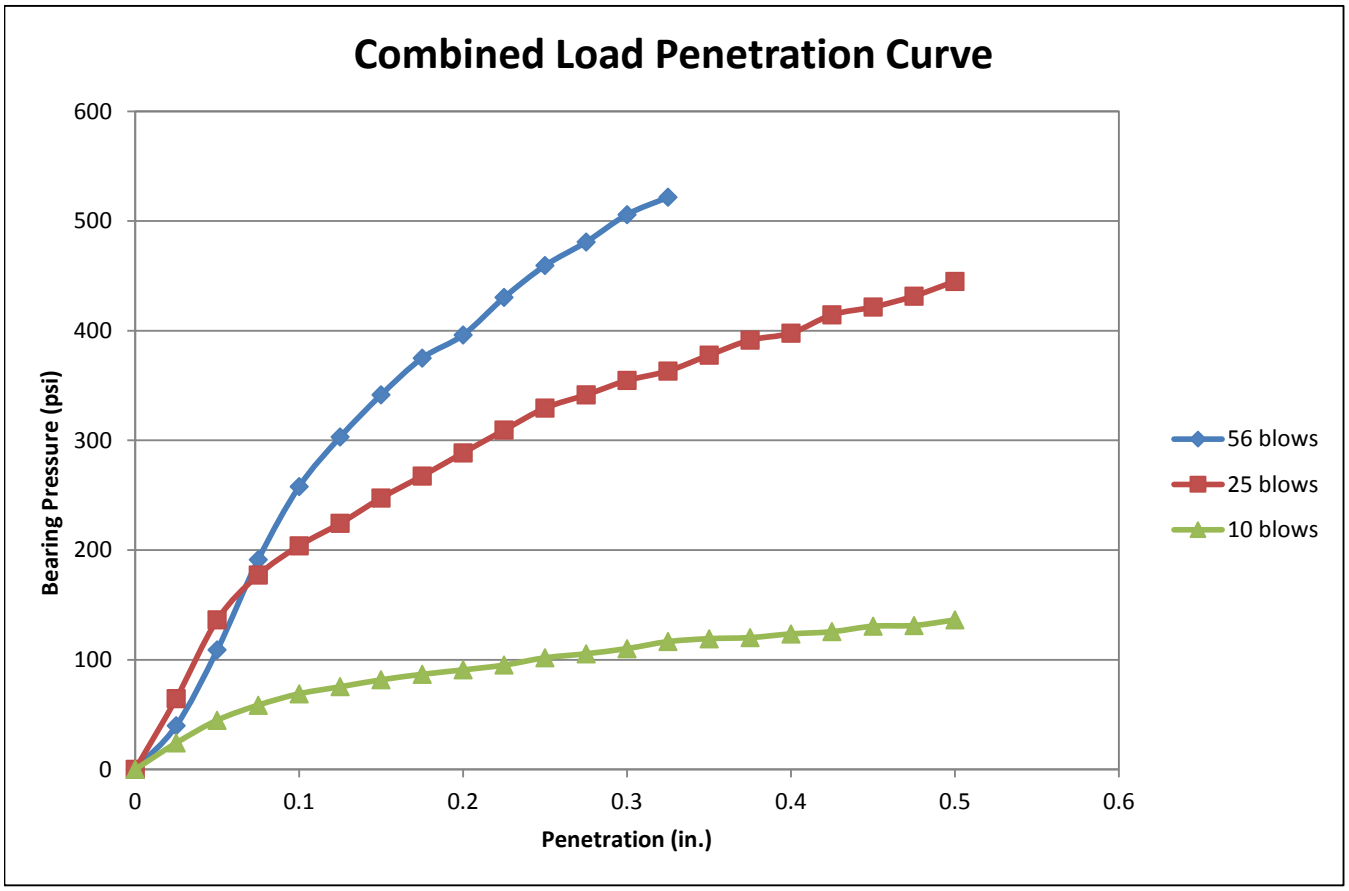
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**	12/18/2017
Lab Number	8210	**SAMPLE NO.**		B-2	**Depth**	0-5'
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		109.9	**Optimum Water Content (%)**	17.6
Soil Description	Brown fat clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		109.3	105.3	94.9
			Compaction Percentage		99%	96%	86%
			CBR Value		28.5	20.4	6.9
Index Properties	**Percent Fines**	89.9%	**G_S**	2.65	**Reviewed**	AB
	LL	51	**PI**	25		

CBR Value at 95% Maximum Proctor Maximum Dry Density	**19.0**



PARTICLE- SIZE DISTRIBUTION TEST REPORT

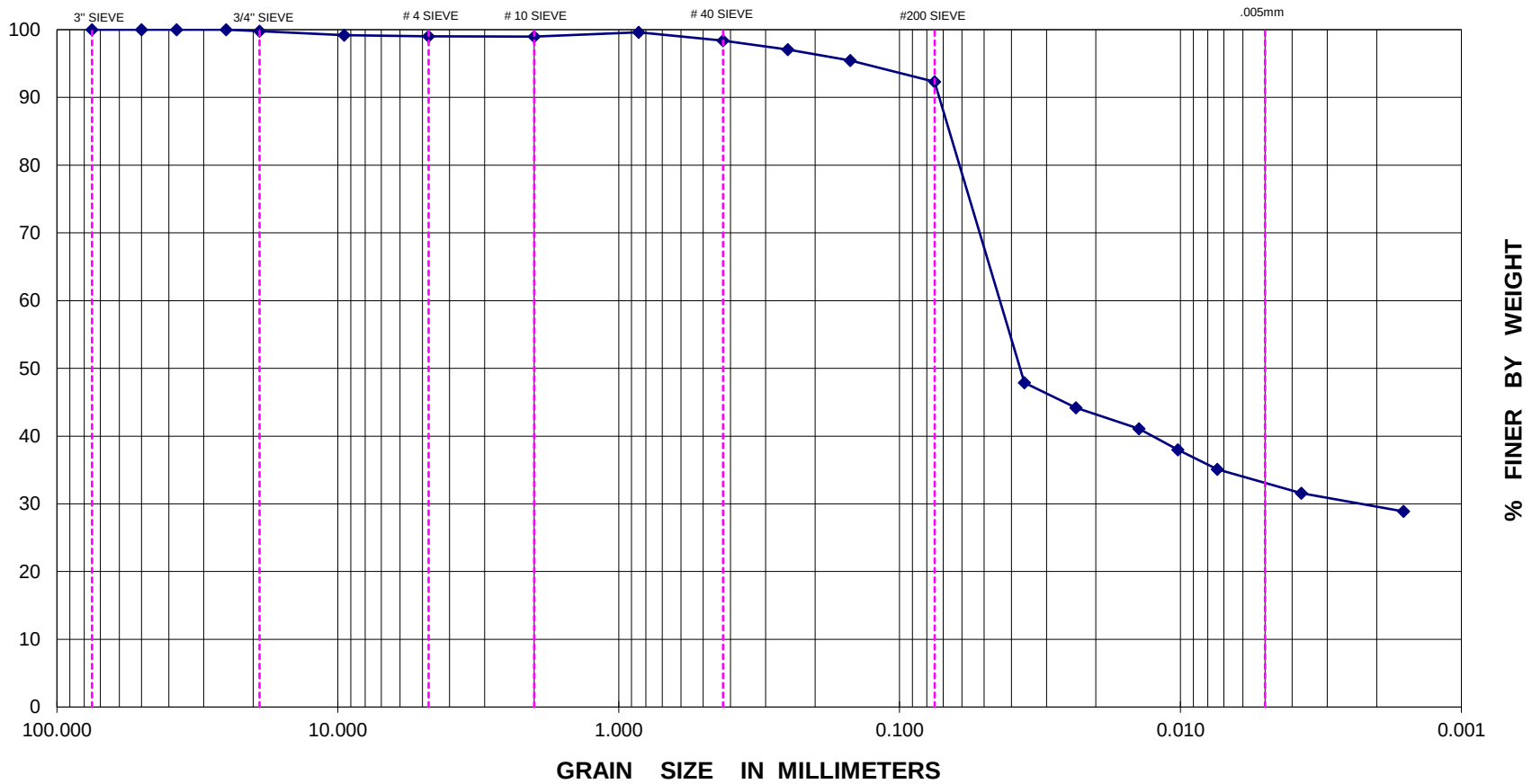
SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8211*	**DATE :**	12/20/17	**REVIEWED BY :**	AB
BORING / PIT NO. :	*R-19, R-24*	**DEPTH / ELEV. :**	*0-5'*	**SAMPLE NO. :**	*B-3*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	*R-19, R-24*						
SOIL DESCRIPTION :	*Brown fat clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*69*	**PLASTICITY INDEX , % :**	*39*	**MOISTURE , % :**	27.6	**FINES , % :**	*92.3*
D10 , MM :	*N/A*	**D30 , MM :**	0.0023	**D60 , MM :**	0.44	**COEFF. OF CURVATURE , C_C :**	*N/A*
CLASSIFICATION	*CLAY*	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	*N/A*

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **12/6/2017**

Project **Runway 1/19 Partial Parallel Taxiway Extension**

Location **Richard B. Russell Regional Airport**

Proctor No. **B-3**

Source of Material **Borings R-19 and R-24**

Description of Material **Brown fat clay**

Test Method **ASTM D1557 Method A**

TEST RESULTS

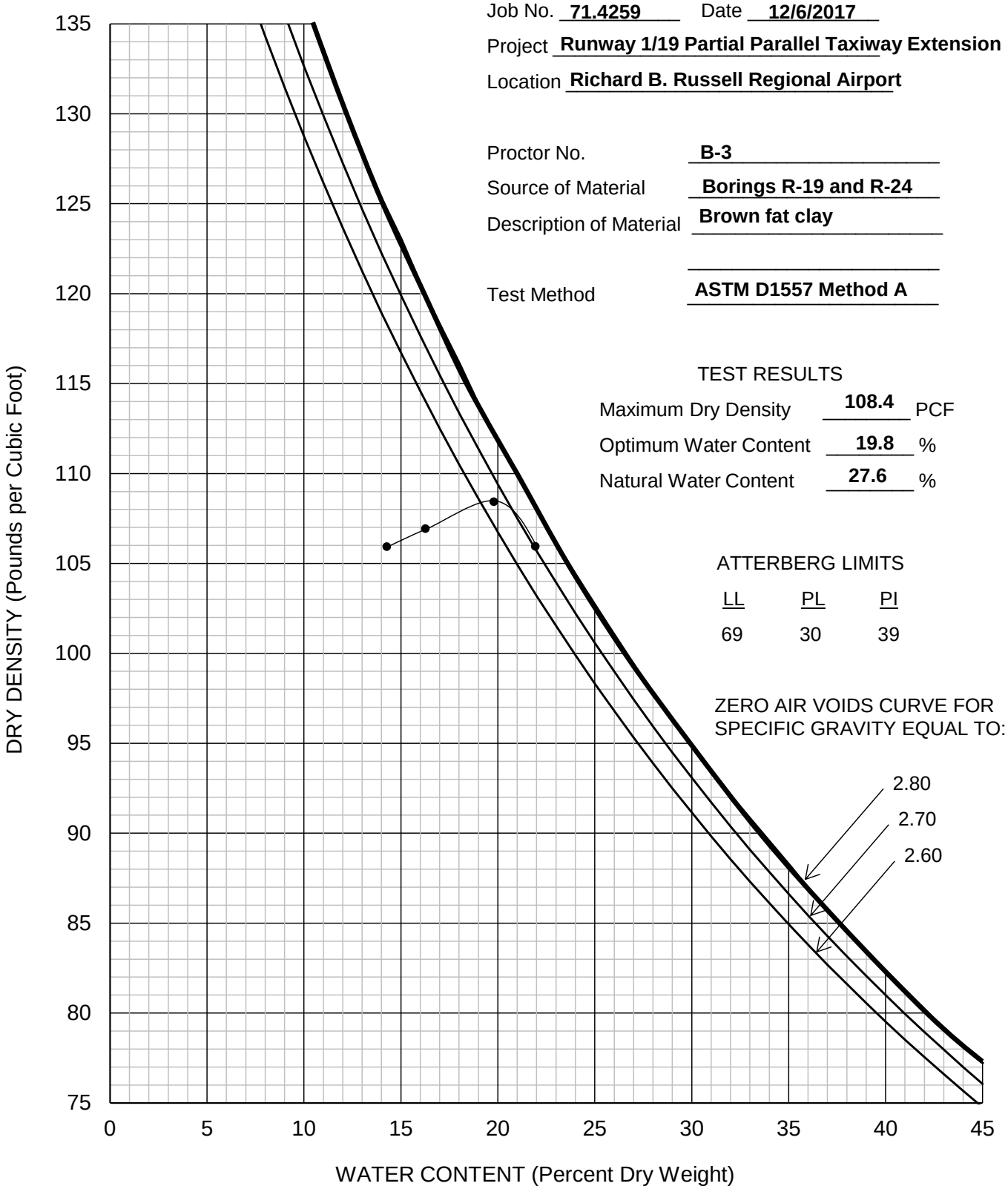
Maximum Dry Density **108.4** PCF

Optimum Water Content **19.8** %

Natural Water Content **27.6** %

ATTERBERG LIMITS

LL	PL	PI
69	30	39



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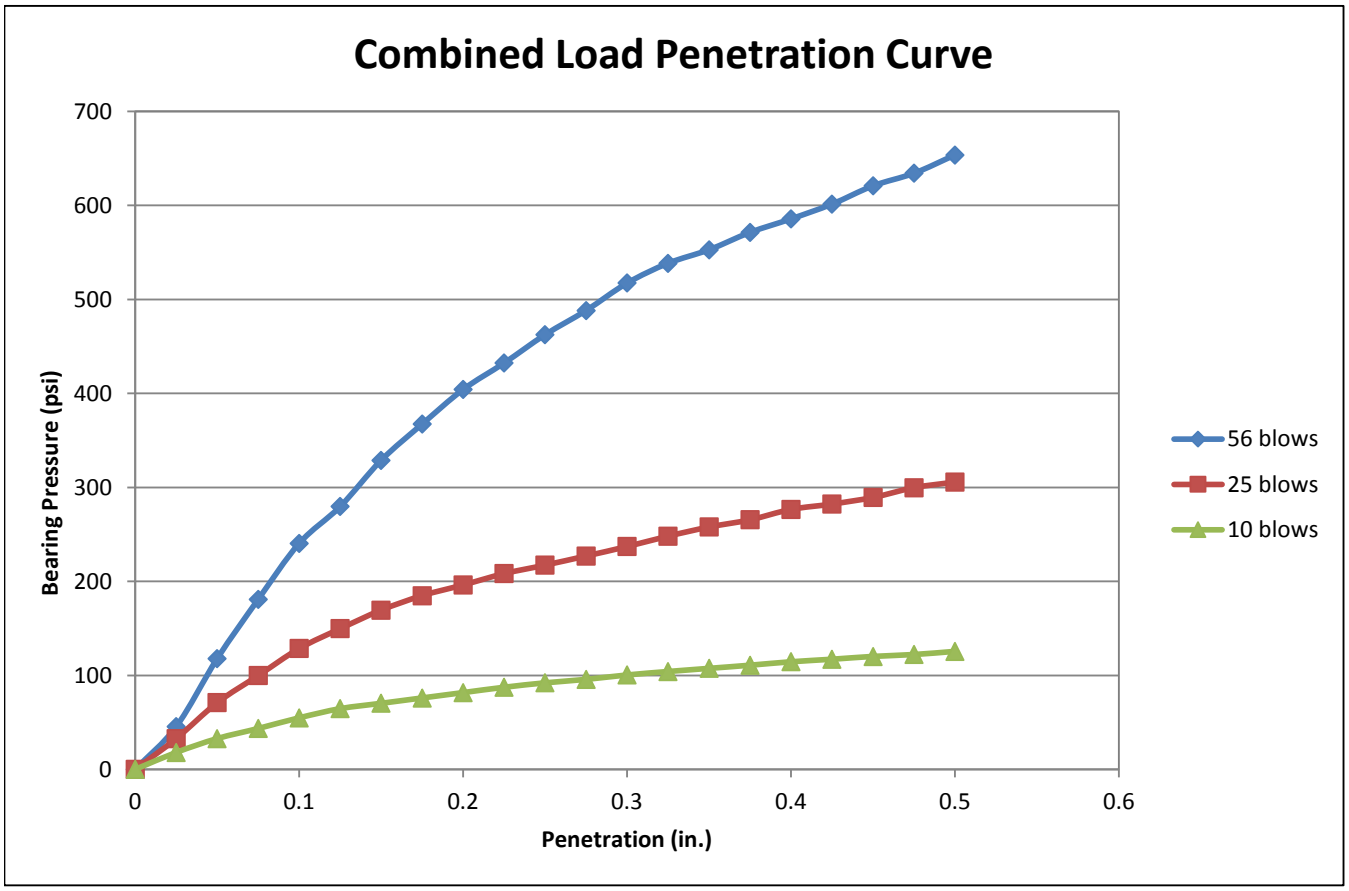
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**	12/18/2017
Lab Number	8211	**SAMPLE NO.**		B-3	**Depth**	0-5'
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		108.4	**Optimum Water Content (%)**	19.8
Soil Description	Brown fat clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		106.8	102.1	92.1
			Compaction Percentage		99%	94%	85%
			CBR Value		24.9	13.0	5.9
Index Properties	**Percent Fines**	92.3%	**G_S**	2.65	**Reviewed**	AB
	LL	69	**PI**	39		

CBR Value at 95% Maximum Proctor Maximum Dry Density	**15.0**



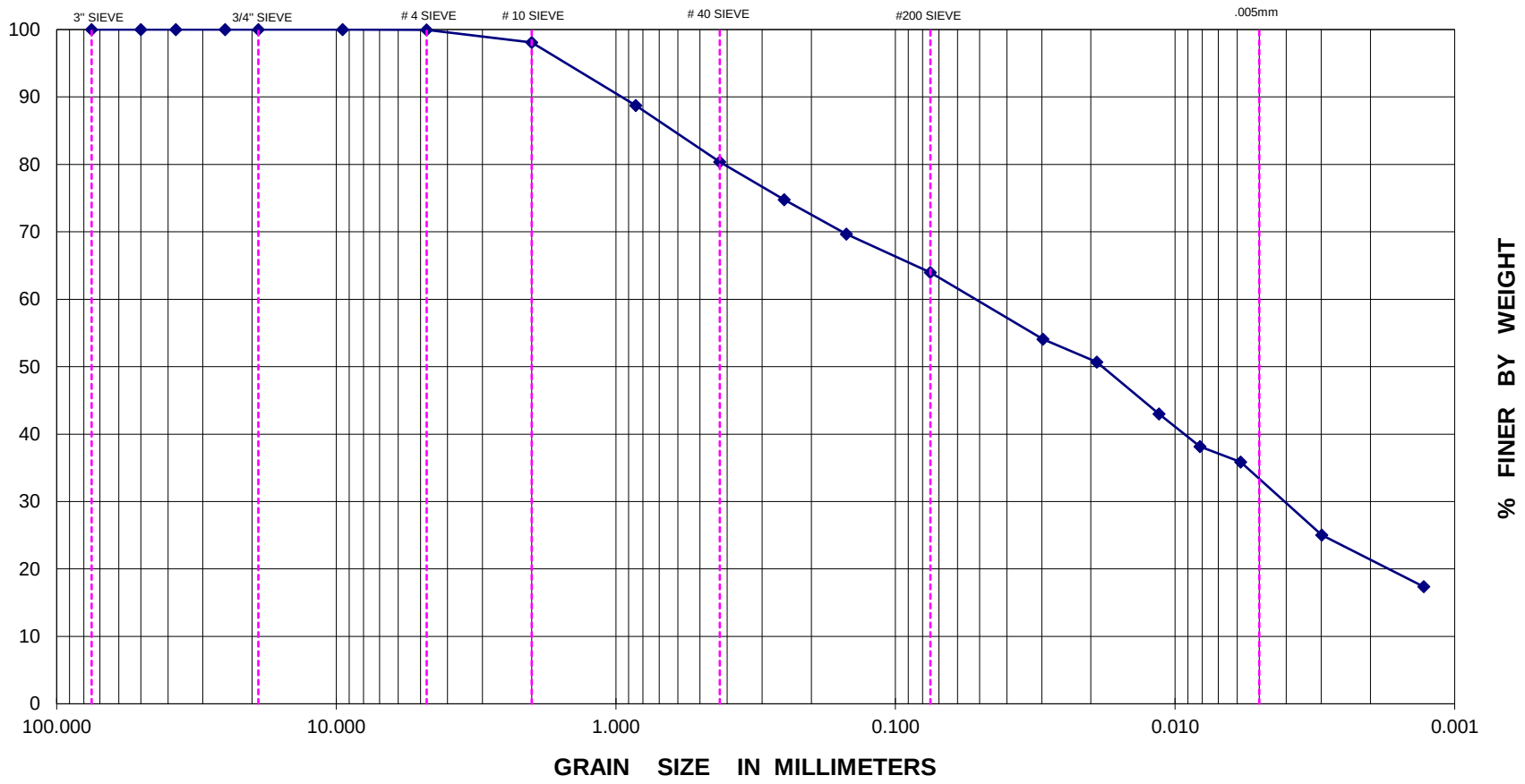
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*--*	**DATE :**	4/25/18	**REVIEWED BY :**	
BORING / PIT NO. :	*B3-1,B3-2*	**DEPTH / ELEV. :**	*5-10'*	**SAMPLE NO. :**	*CS-1*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Composite Sample 1 (B3-1 and B3-2)						
SOIL DESCRIPTION :	*Light Brown Lean Clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*39*	**PLASTICITY INDEX , % :**	*19*	**MOISTURE , % :**	17.3	**FINES , % :**	*64.0*
D10 , MM :	N/A	**D30 , MM :**	0.004	**D60 , MM :**	0.052	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CL*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--



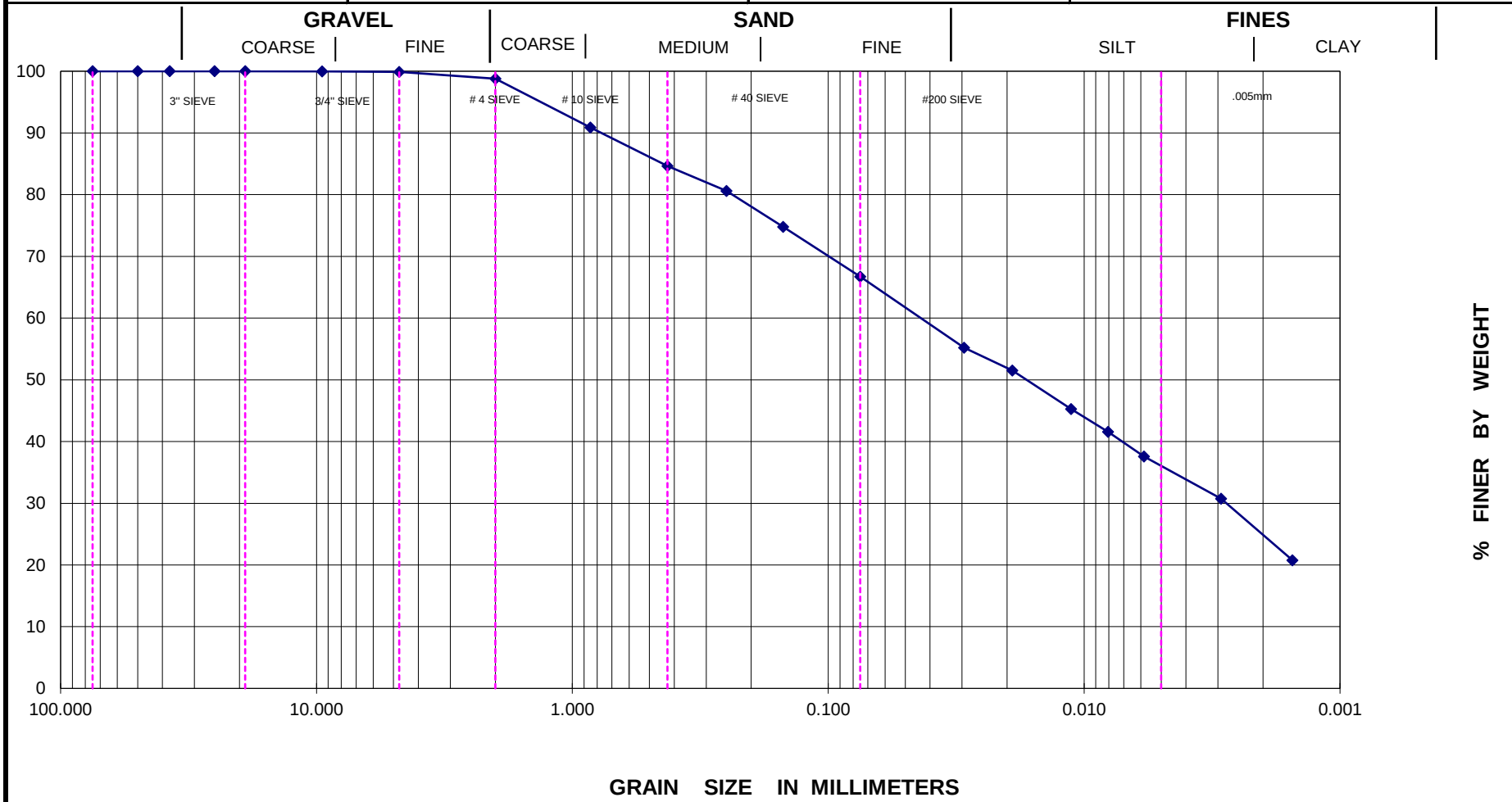
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8330*	**DATE :**	4/25/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*B3-3,B3-4*	**DEPTH / ELEV. :**	*7-12'*	**SAMPLE NO. :**	*CS-2*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Composite Sample 2 (B3-3 and B3-4)						
SOIL DESCRIPTION :	*Light Brown Lean Clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*44*	**PLASTICITY INDEX , % :**	*23*	**MOISTURE , % :**	19.5	**FINES , % :**	*66.7*
D10 , MM :	N/A	**D30 , MM :**	0.0027	**D60 , MM :**	0.044	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CL*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--



Job No. **71.4259** Date **4/20/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **CS-1 and CS-2 (Combined)**

Source of Material **Borings B3-1,B3-2,B3-3, B3-4**

Description of Material **Light Brown Lean CLAY**

Test Method **ASTM D1557 Method A**

TEST RESULTS

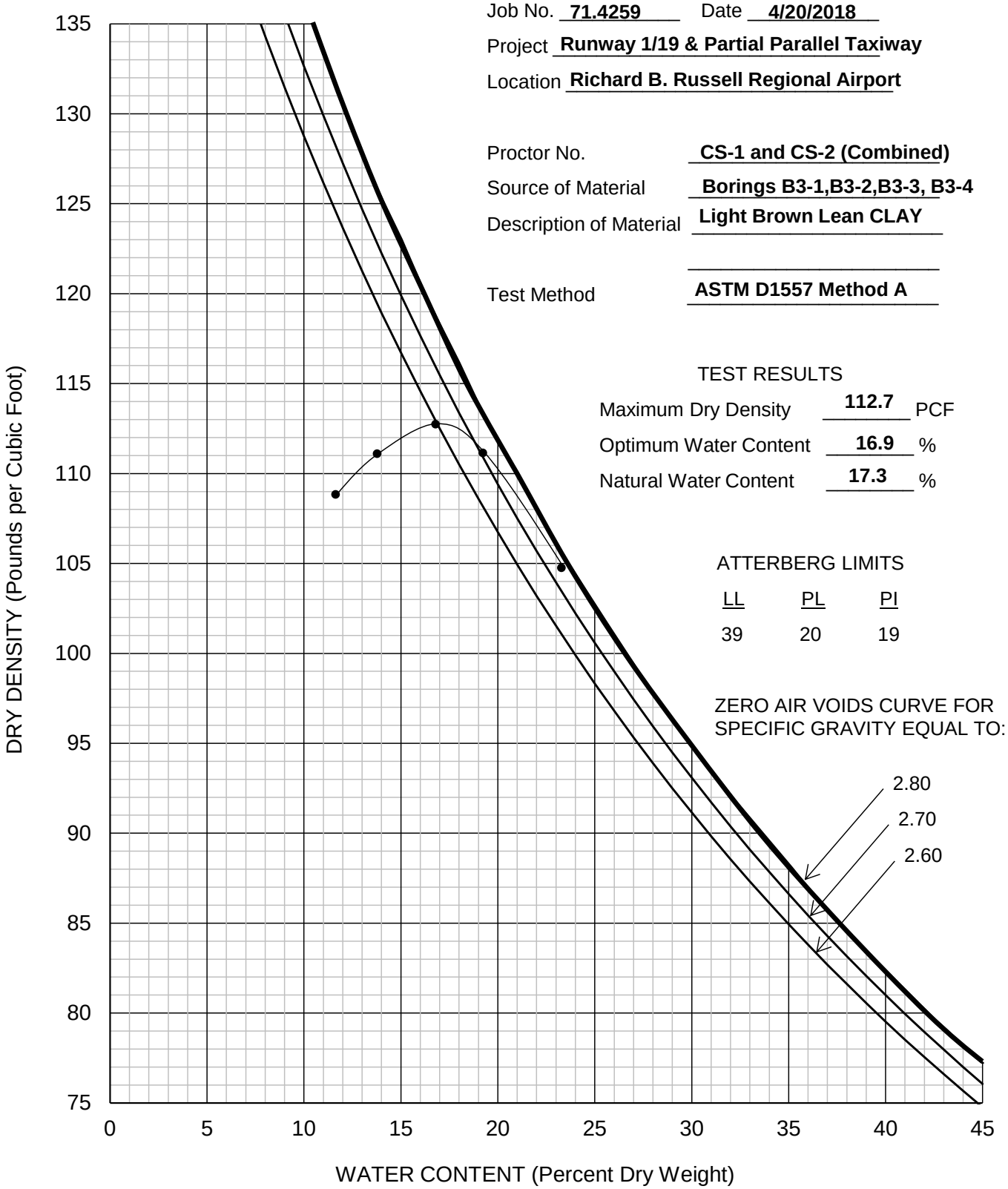
Maximum Dry Density **112.7** PCF

Optimum Water Content **16.9** %

Natural Water Content **17.3** %

ATTERBERG LIMITS

LL	PL	PI
39	20	19



WILLMER Engineering

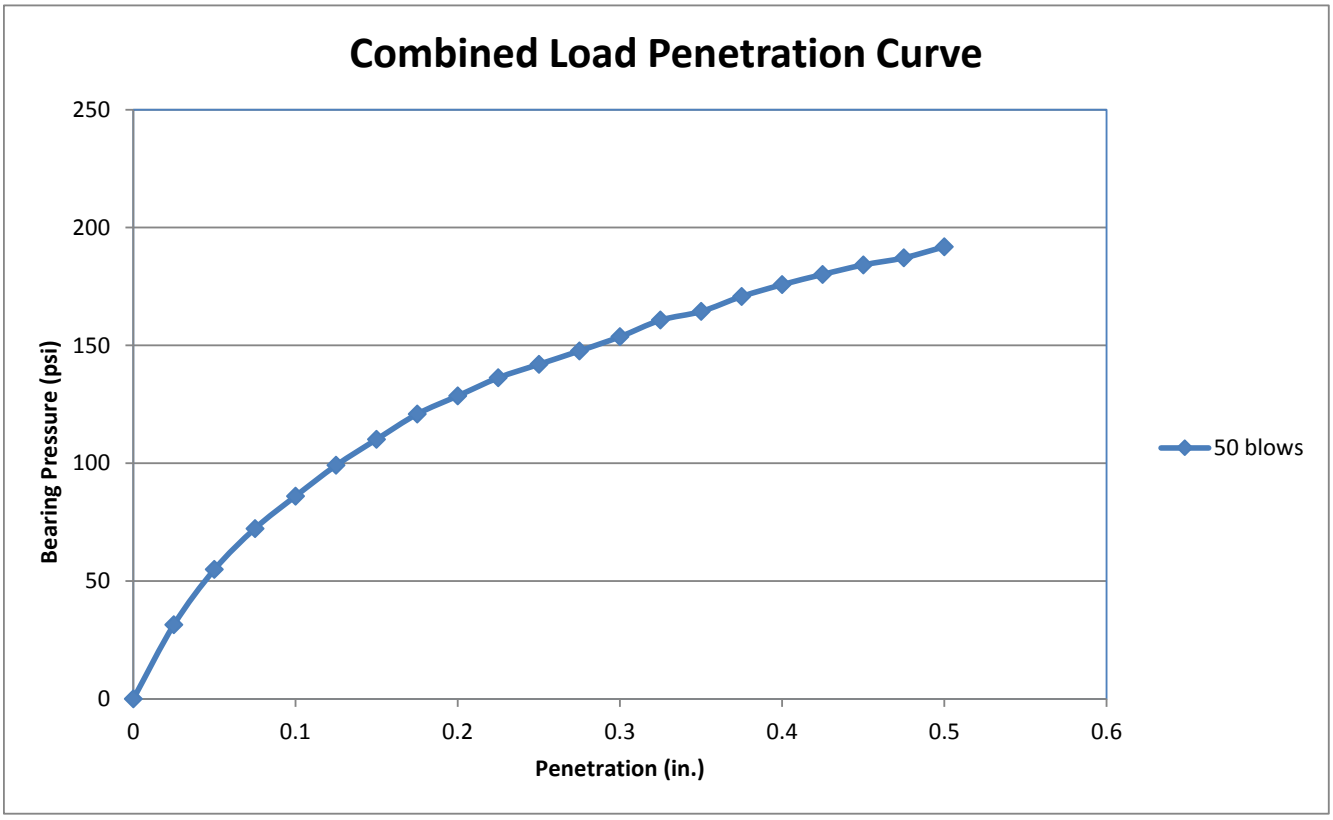
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**	4/24/2018
Lab Number	8329-30	**SAMPLE NO.**		CS-1 and CS-2	**Depth**	7-12'
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		112.7	**Optimum Water Content (%)**	16.9
Soil Description	Light Brown Lean Clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		108.0	--	--
			Compaction Percentage		96%	--	--
			CBR Value		8.5	--	--
Index Properties	**Percent Fines**	N/A	**G_S**	2.65	**Reviewed**	AB
	LL	N/A	**PI**	N/A		

CBR Value at 95% Modified Proctor Maximum Dry Density	**8.5**



PARTICLE- SIZE DISTRIBUTION TEST REPORT

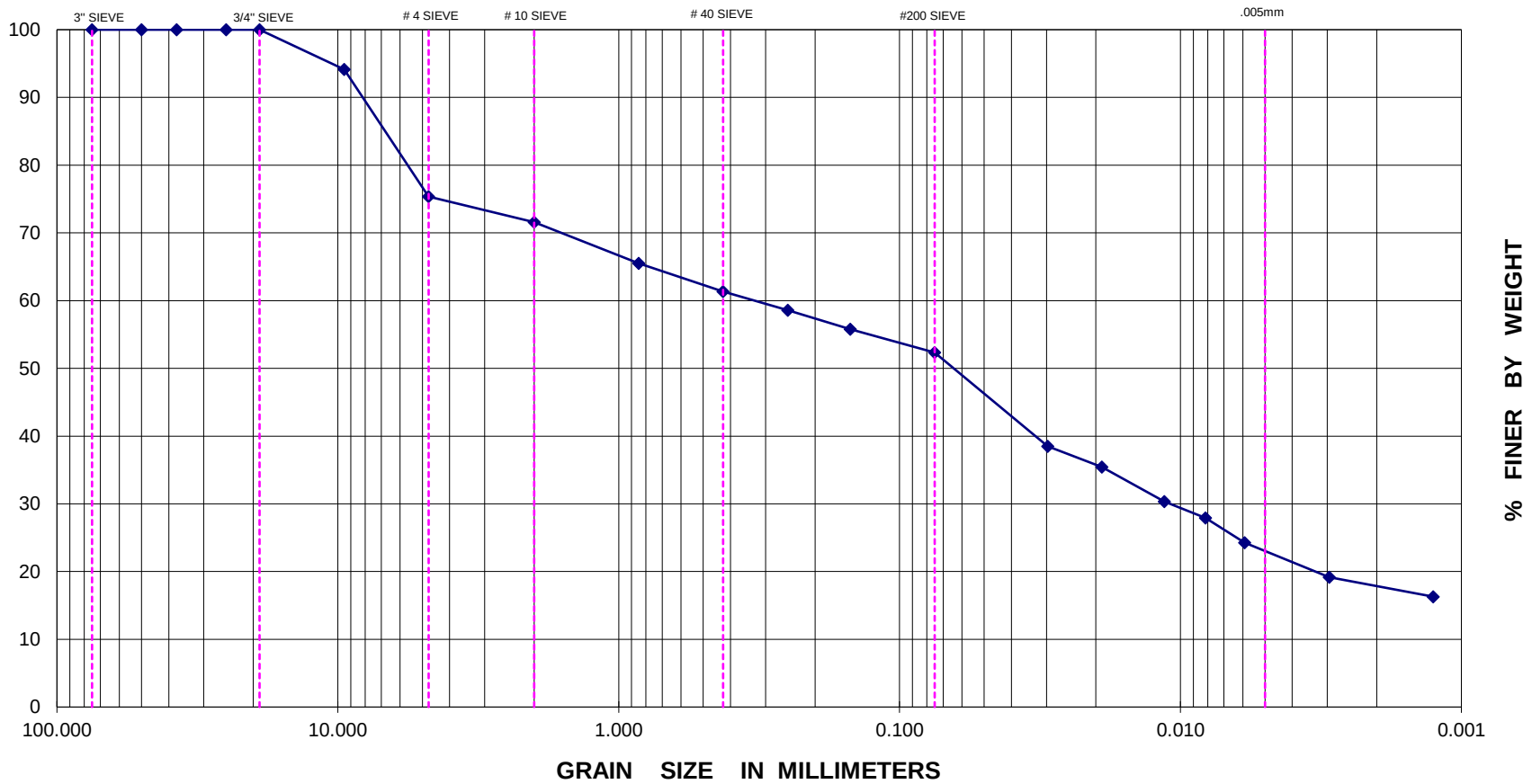
SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8331*	**DATE :**	4/25/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*B3-5,B3-7*	**DEPTH / ELEV. :**	*10-15'*	**SAMPLE NO. :**	*CS-3*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Composite sample 3 (B3-5 and B3-7)						
SOIL DESCRIPTION :	*Brown, gray lean clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*35*	**PLASTICITY INDEX , % :**	*16*	**MOISTURE , % :**	16.1	**FINES , % :**	*73.1*
D10 , MM :	N/A	**D30 , MM :**	0.011	**D60 , MM :**	0.325	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CL*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **4/20/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **CS-3**

Source of Material **Borings B3-5 and B3-7**

Description of Material **Brown and gray lean clay**

Test Method **ASTM D1557 Method A**

TEST RESULTS

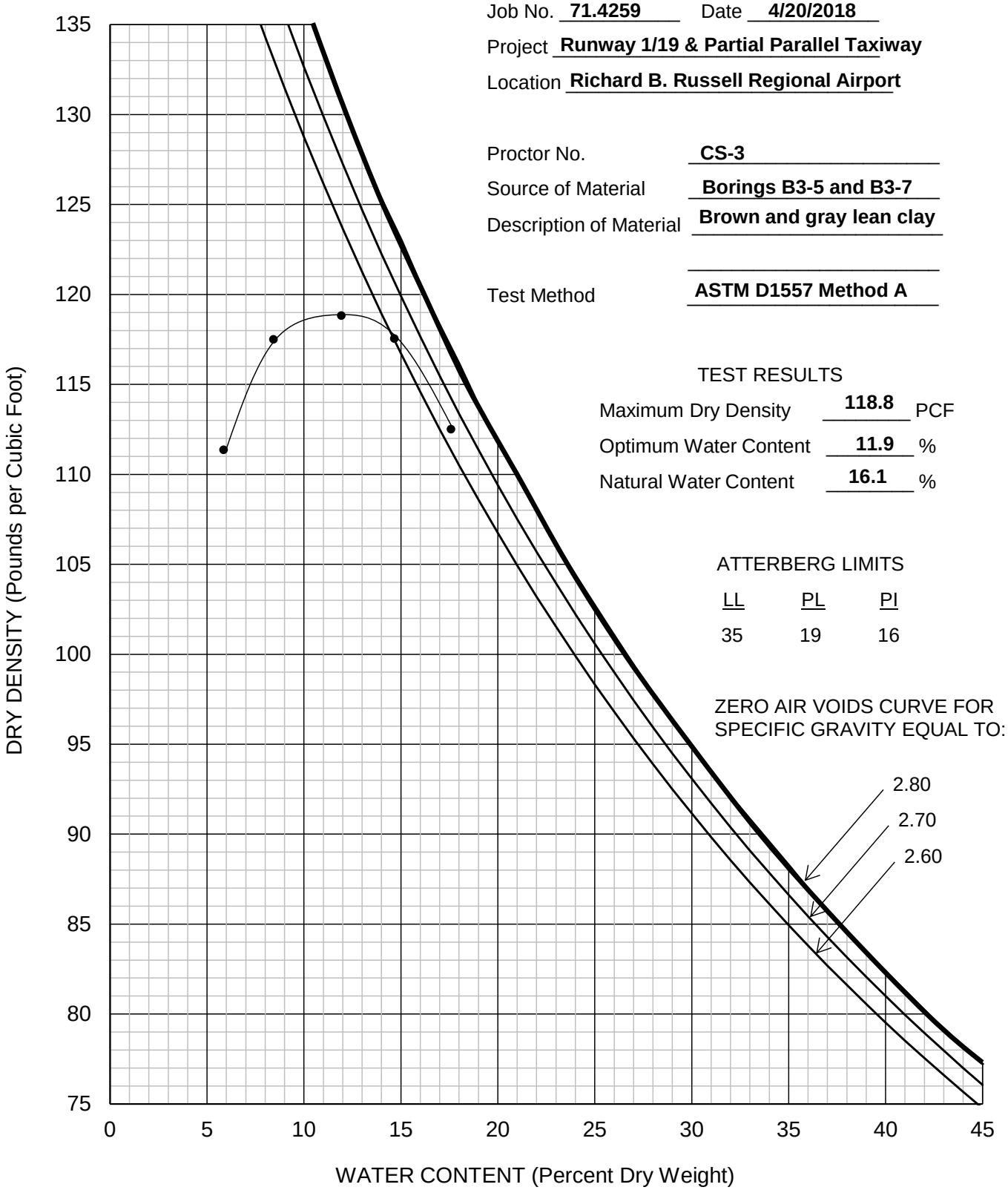
Maximum Dry Density **118.8** PCF

Optimum Water Content **11.9** %

Natural Water Content **16.1** %

ATTERBERG LIMITS

LL	PL	PI
35	19	16



WILLMER Engineering

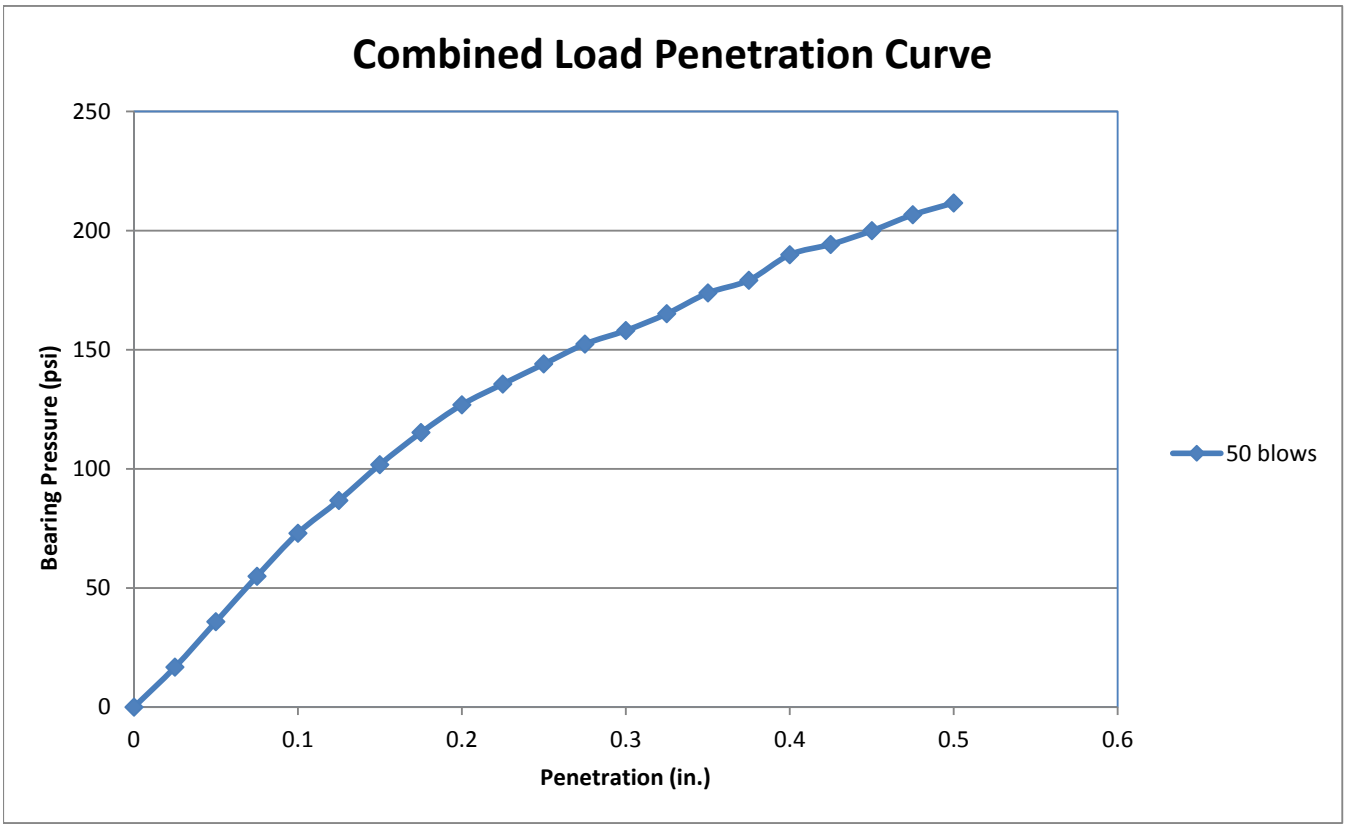
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**	4/24/2018
Lab Number	8331	**SAMPLE NO.**		BA3-5,7	**Depth**	10-15'
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		118.8	**Optimum Water Content (%)**	11.9
Soil Description	Grey/ Black Lean Clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		112.3		
			Compaction Percentage		95%		
			CBR Value		7.2		
Index Properties	**Percent Fines**	52.3%	**G_S**	2.65	**Reviewed**	AB
	LL	35	**PI**	16		

CBR Value at 95% Standard Proctor Maximum Dry Density	**7.2**



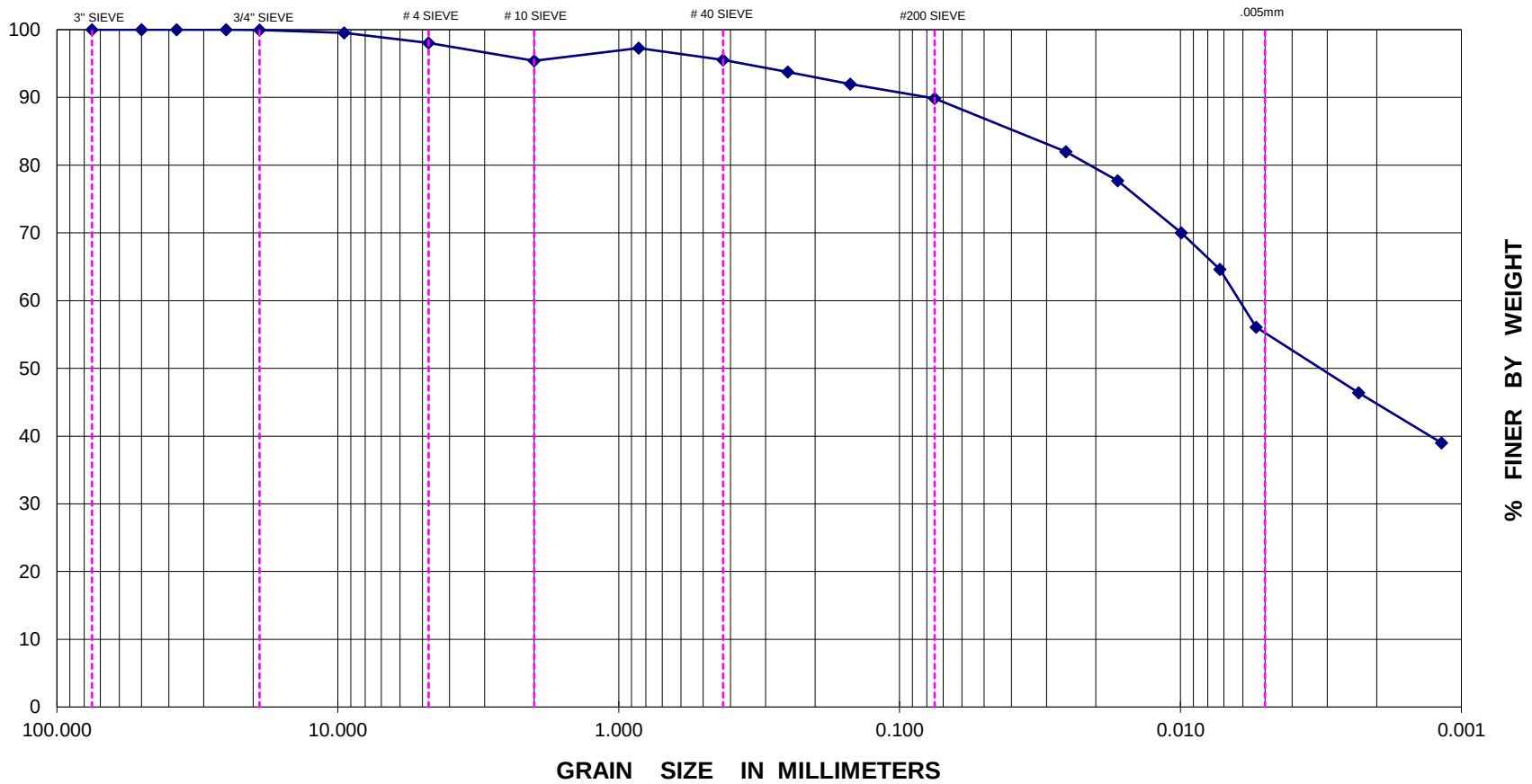
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 and Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8325*	**DATE :**	4/18/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*B4-3,4,5*	**DEPTH / ELEV. :**	*Table 5b*	**SAMPLE NO. :**	*CS-4*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Composite sample from B4-3, B4-4 and B4-5						
SOIL DESCRIPTION :	*Tan light brown fat clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*53*	**PLASTICITY INDEX , % :**	*38*	**MOISTURE , % :**	27.8	**FINES , % :**	*89.8*
D10 , MM :	N/A	**D30 , MM :**	N/A	**D60 , MM :**	0.0061	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--



PARTICLE- SIZE DISTRIBUTION TEST REPORT

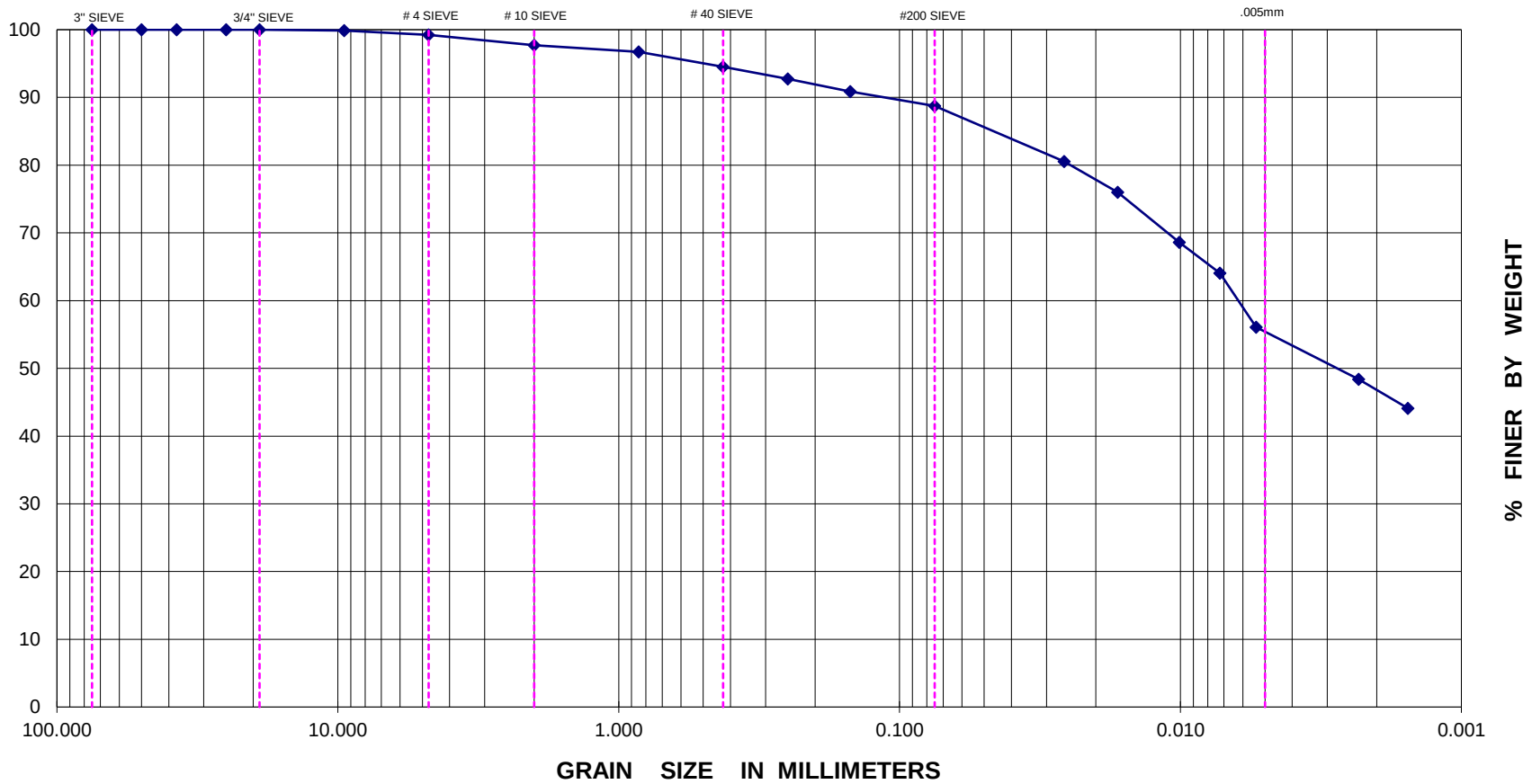
SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 and Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8328*	**DATE :**	4/18/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*B4-1,11,12*	**DEPTH / ELEV. :**	*See Table 5b*	**SAMPLE NO. :**	*CS-5*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Composite sample from B4-1, B4-11 and B4-12						
SOIL DESCRIPTION :	*Tan, light brown fat clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*61*	**PLASTICITY INDEX , % :**	*44*	**MOISTURE , % :**	29.6	**FINES , % :**	*88.7*
D10 , MM :	N/A	**D30 , MM :**	N/A	**D60 , MM :**	0.0062	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **4/20/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **CS-4 and CS-5 (combined)**

Source of Material **B4-1,B4-3,B4-4,B4-5,B4-11,B4-12**

Description of Material **Tan light brown fat clay**

Test Method **ASTM D1557 Method A**

TEST RESULTS

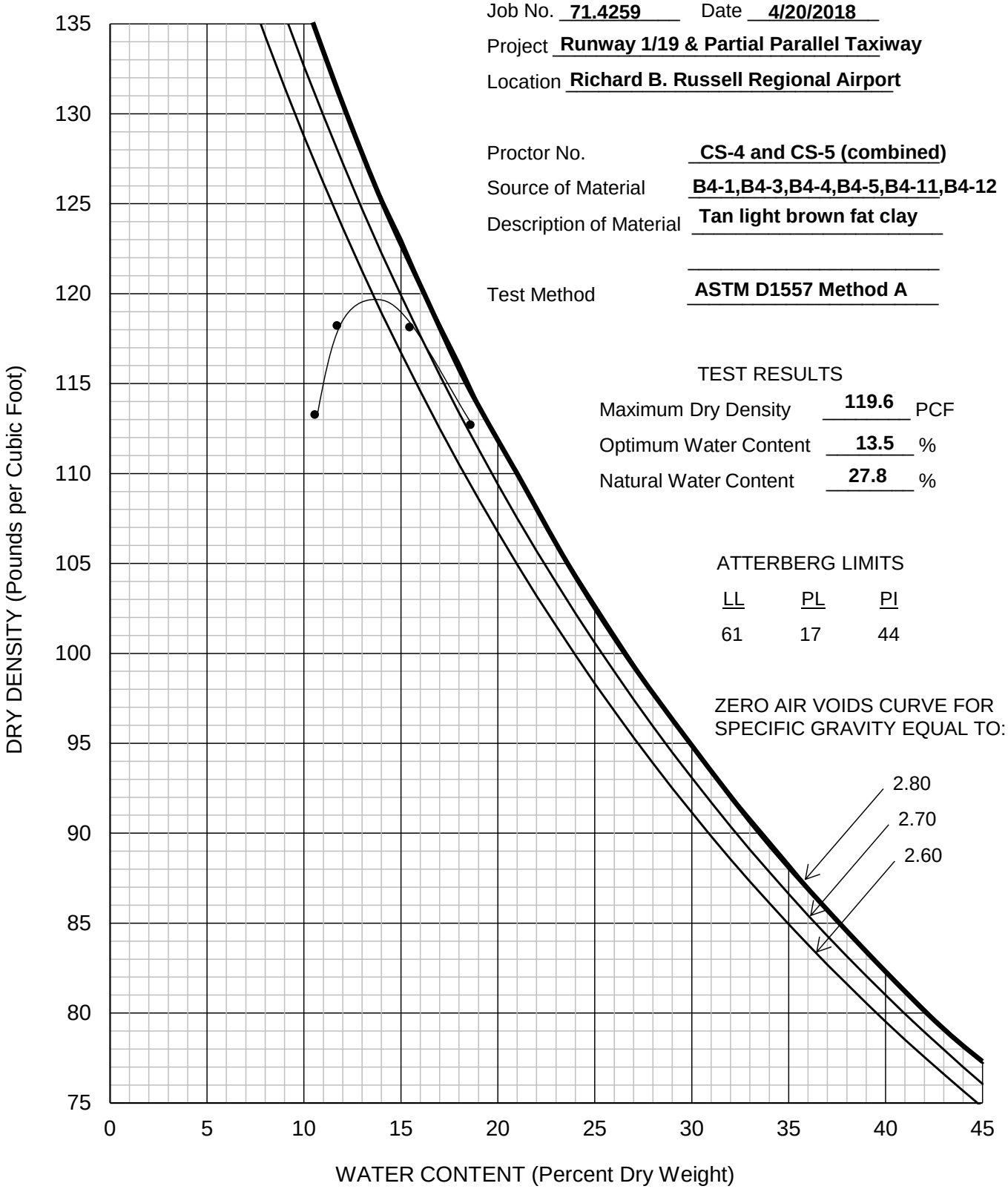
Maximum Dry Density **119.6** PCF

Optimum Water Content **13.5** %

Natural Water Content **27.8** %

ATTERBERG LIMITS

LL	PL	PI
61	17	44



WILLMER Engineering

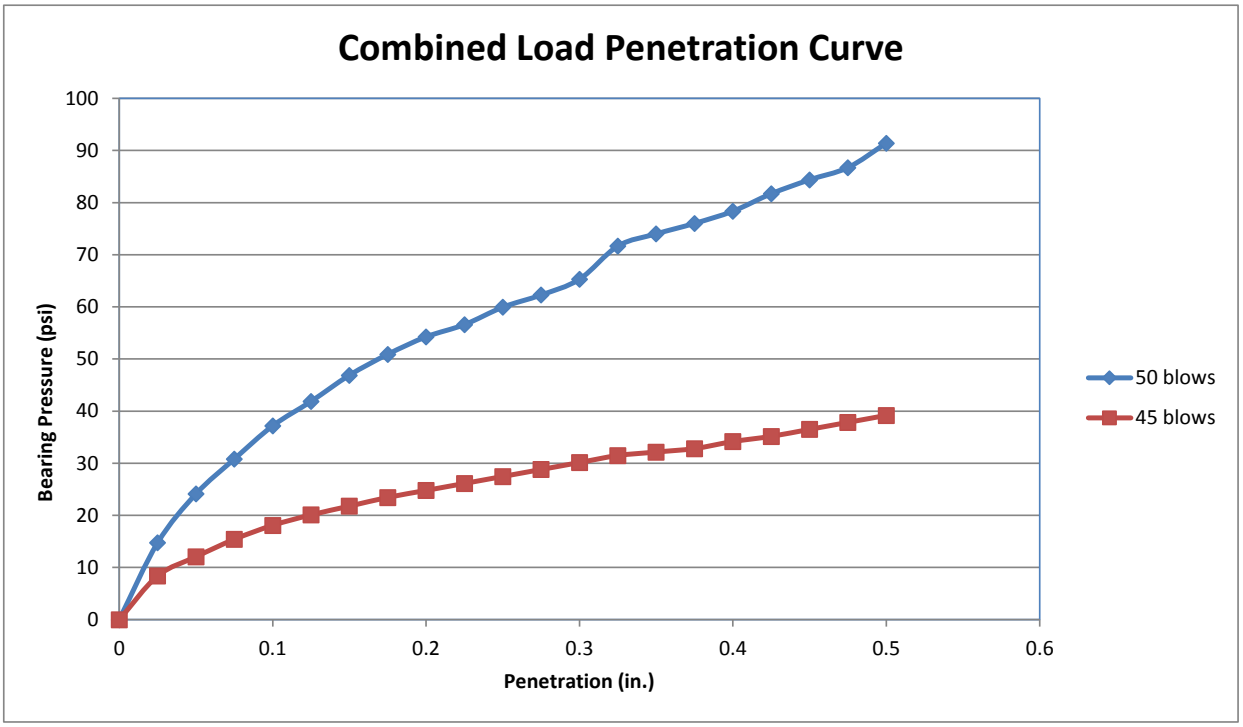
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**	4/24/2018
Lab Number	8325(8)	**SAMPLE NO.**		CS-4 and CS-5	**Depth**	See Table 5b
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		119.6	**Optimum Water Content (%)**	13.5
Soil Description	Tan and light brown fat clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		113.1	110.0	
			Compaction Percentage		95%	92%	
			CBR Value		3.7	1.8	
Index Properties	**Percent Fines**	N/A	**G_S**	2.65	**Reviewed**	AB
	LL	N/A	**PI**	N/A		

CBR Value at 95% Modified Proctor Maximum Dry Density	**3.5**



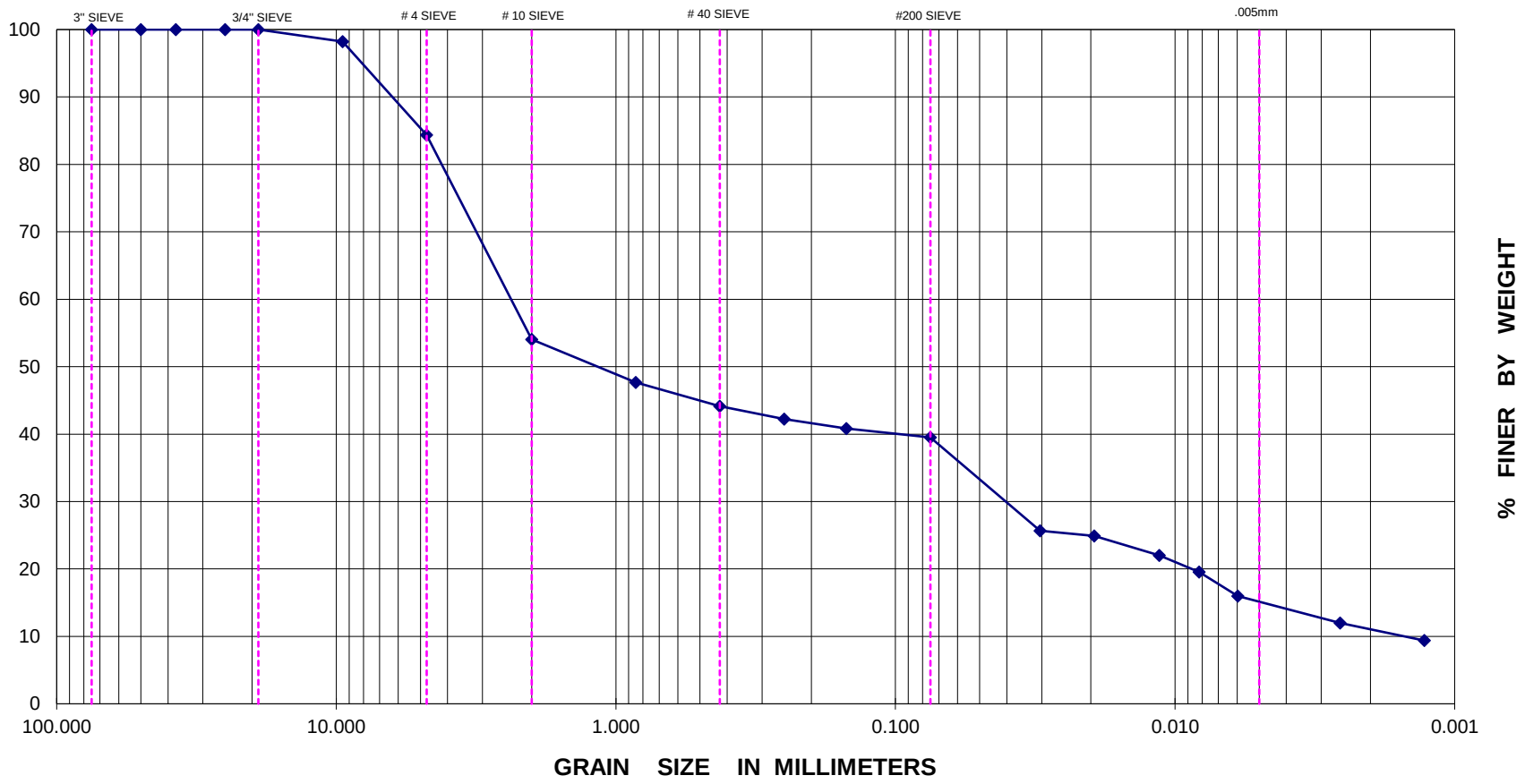
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 and Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8327*	**DATE :**	4/18/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*BA4-7*	**DEPTH / ELEV. :**	*12-17'*	**SAMPLE NO. :**	*B4-7*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Boring B4-7						
SOIL DESCRIPTION :	*Gray clayey sand*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*30*	**PLASTICITY INDEX , % :**	*14*	**MOISTURE , % :**	6.1	**FINES , % :**	*39.5*
D10 , MM :	N/A	**D30 , MM :**	0.04	**D60 , MM :**	2.450	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Sand	**UNIFIED :**	*SC*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--



PARTICLE- SIZE DISTRIBUTION TEST REPORT

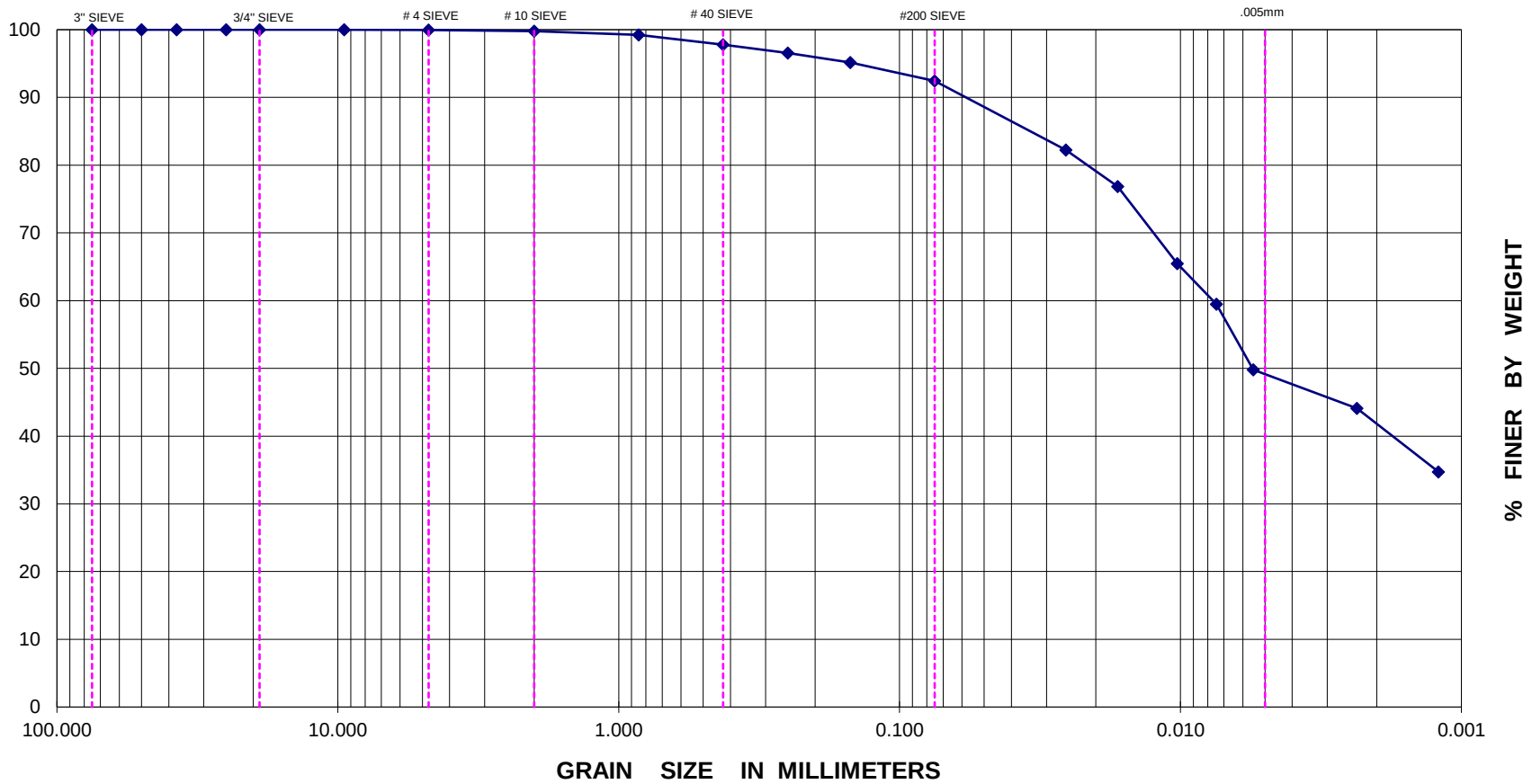
SIEVE AND HYDROMETER **ASTM D422**

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 and Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8326*	**DATE :**	4/18/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*B4-13,B4-14*	**DEPTH / ELEV. :**	*7-12'*	**SAMPLE NO. :**	*CS-6*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Composite sample from B4-13 and B4-14						
SOIL DESCRIPTION :	*Orange Lean Clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*48*	**PLASTICITY INDEX , % :**	*30*	**MOISTURE , % :**	21.4	**FINES , % :**	*92.9*
D10 , MM :	N/A	**D30 , MM :**	N/A	**D60 , MM :**	0.0077	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CL*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **4/20/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **CS-6**

Source of Material **B4-13, B4-14**

Description of Material **Orange Lean CLAY**

Test Method **ASTM D1557 Method A**

TEST RESULTS

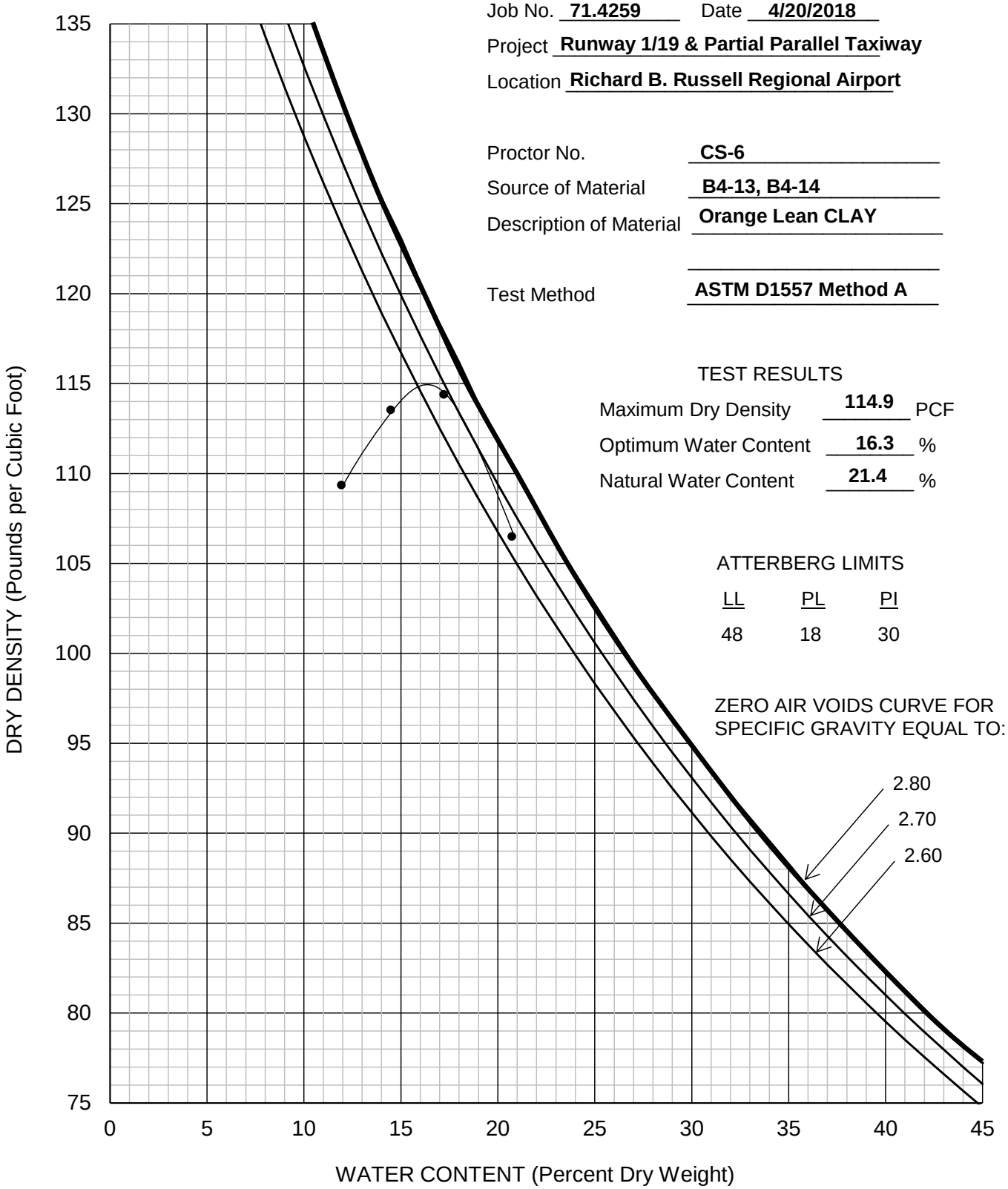
Maximum Dry Density **114.9** PCF

Optimum Water Content **16.3** %

Natural Water Content **21.4** %

ATTERBERG LIMITS

LL	PL	PI
48	18	30



WILLMER Engineering

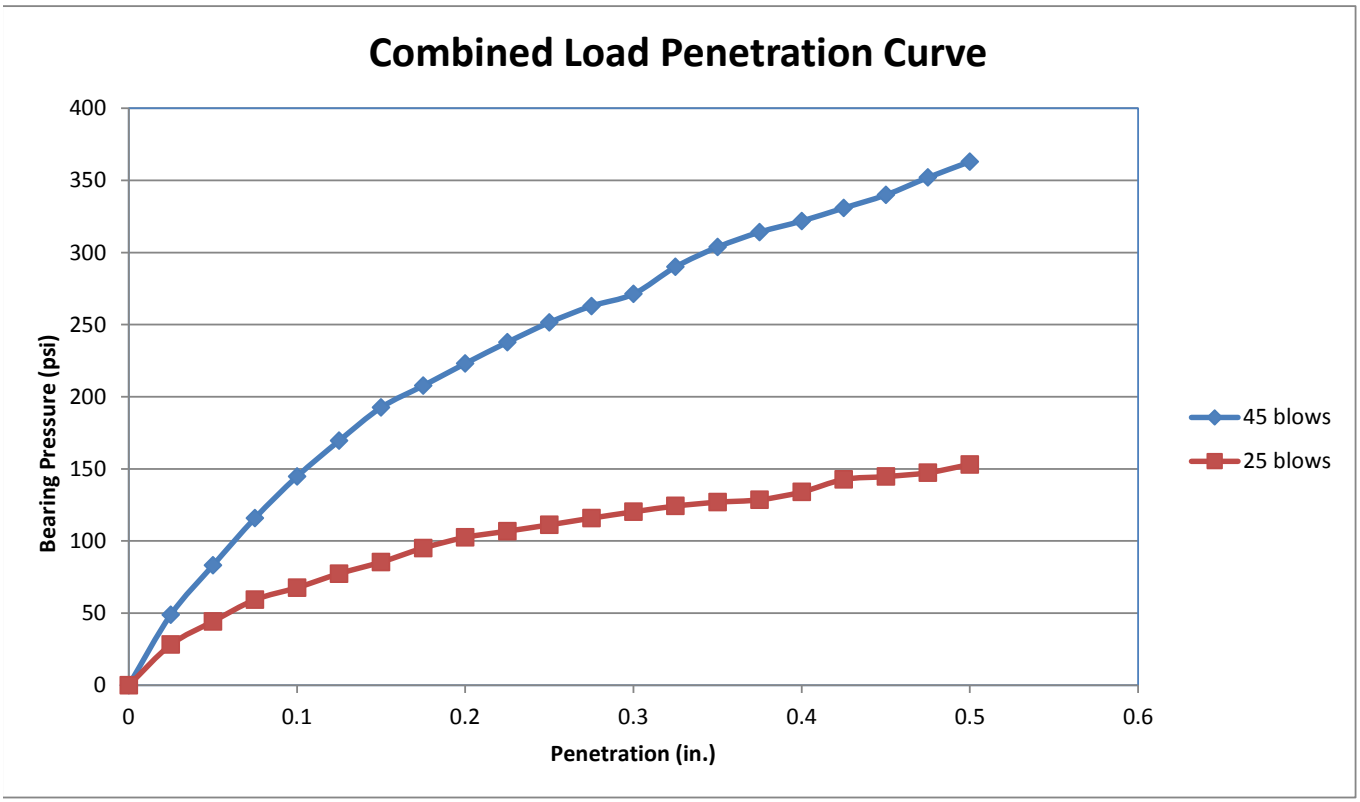
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**	4/24/2018
Lab Number	8326	**SAMPLE NO.**		B4-13,14	**Depth**	7-12'
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		114.9	**Optimum Water Content (%)**	16.3
Soil Description	Orange Lean Clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		108.6	103.0	
			Compaction Percentage		95%	90%	
			CBR Value		14.4	6.7	
Index Properties	**Percent Fines**	92.9%	**G_S**	2.65	**Reviewed**	AB
	LL	48	**PI**	30		

CBR Value at 95% Modified Proctor Maximum Dry Density	**13.8**



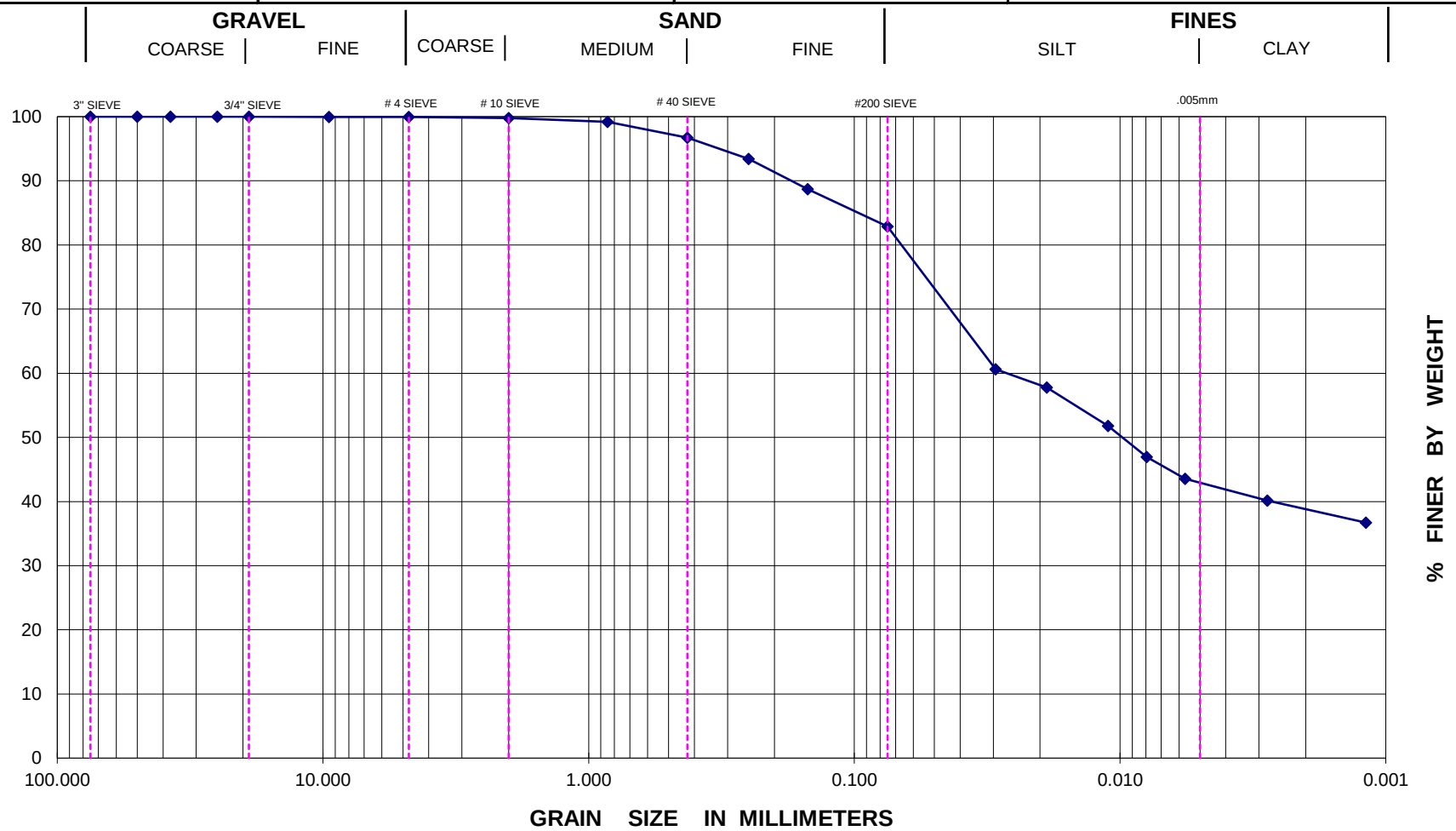
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER **ASTM D422**

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8322*	**DATE :**	4/10/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*B5-3*	**DEPTH / ELEV. :**	*15-20'*	**SAMPLE NO. :**	*B5-3*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	B5-3						
SOIL DESCRIPTION :	*Yellow/ Brown Fat Clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*50*	**PLASTICITY INDEX , % :**	*26*	**MOISTURE , % :**	26.0	**FINES , % :**	*82.6*
D10 , MM :	N/A	**D30 , MM :**	N/A	**D60 , MM :**	0.028	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--



Job No. **71.4259** Date **4/11/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **B5-3**

Source of Material **B5-3**

Description of Material **Yellowish Brown Sandy Fat Clay**

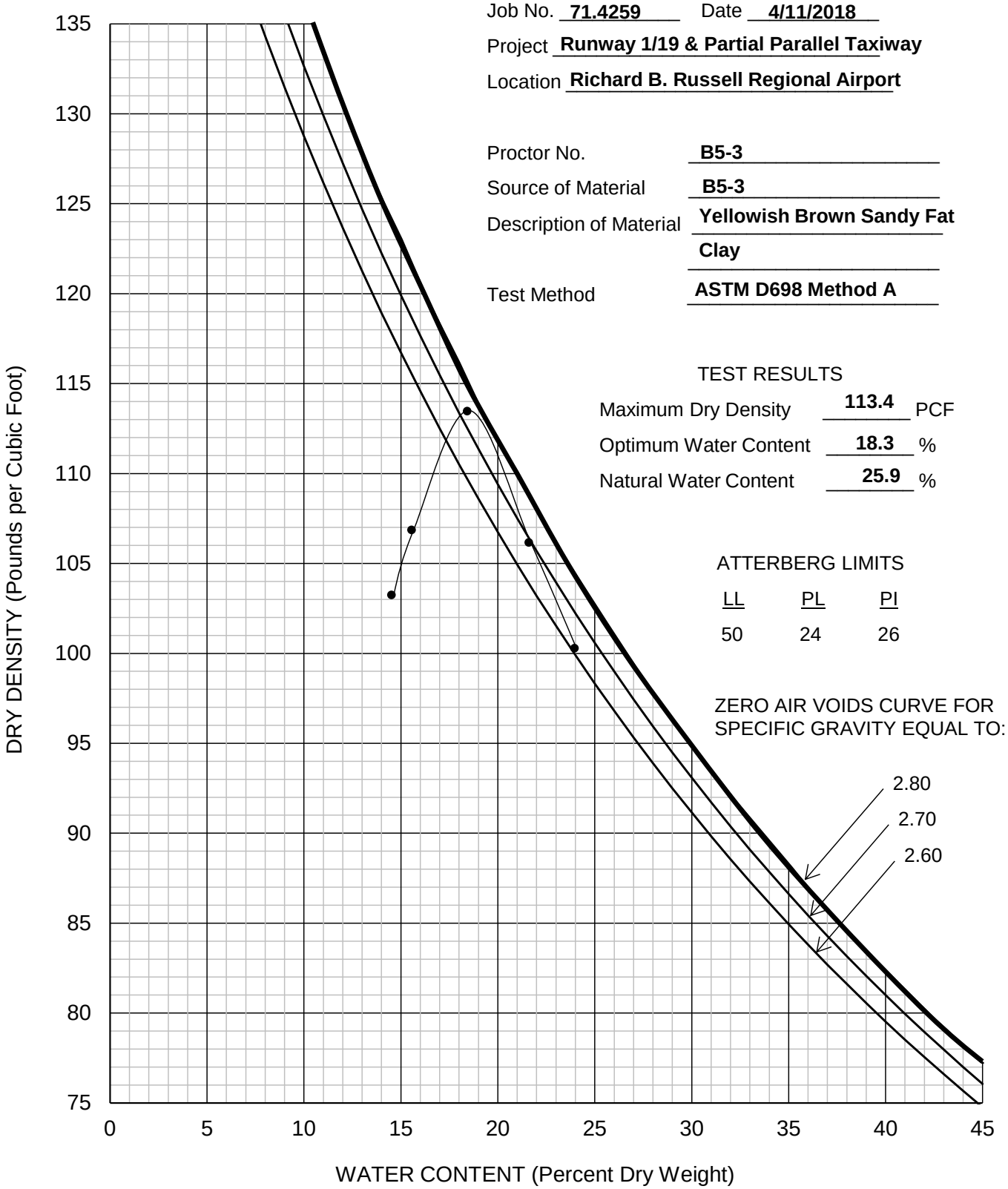
Test Method **ASTM D698 Method A**

TEST RESULTS

Maximum Dry Density	**113.4**	PCF
Optimum Water Content	**18.3**	%
Natural Water Content	**25.9**	%

ATTERBERG LIMITS

LL	PL	PI
50	24	26



WILLMER Engineering

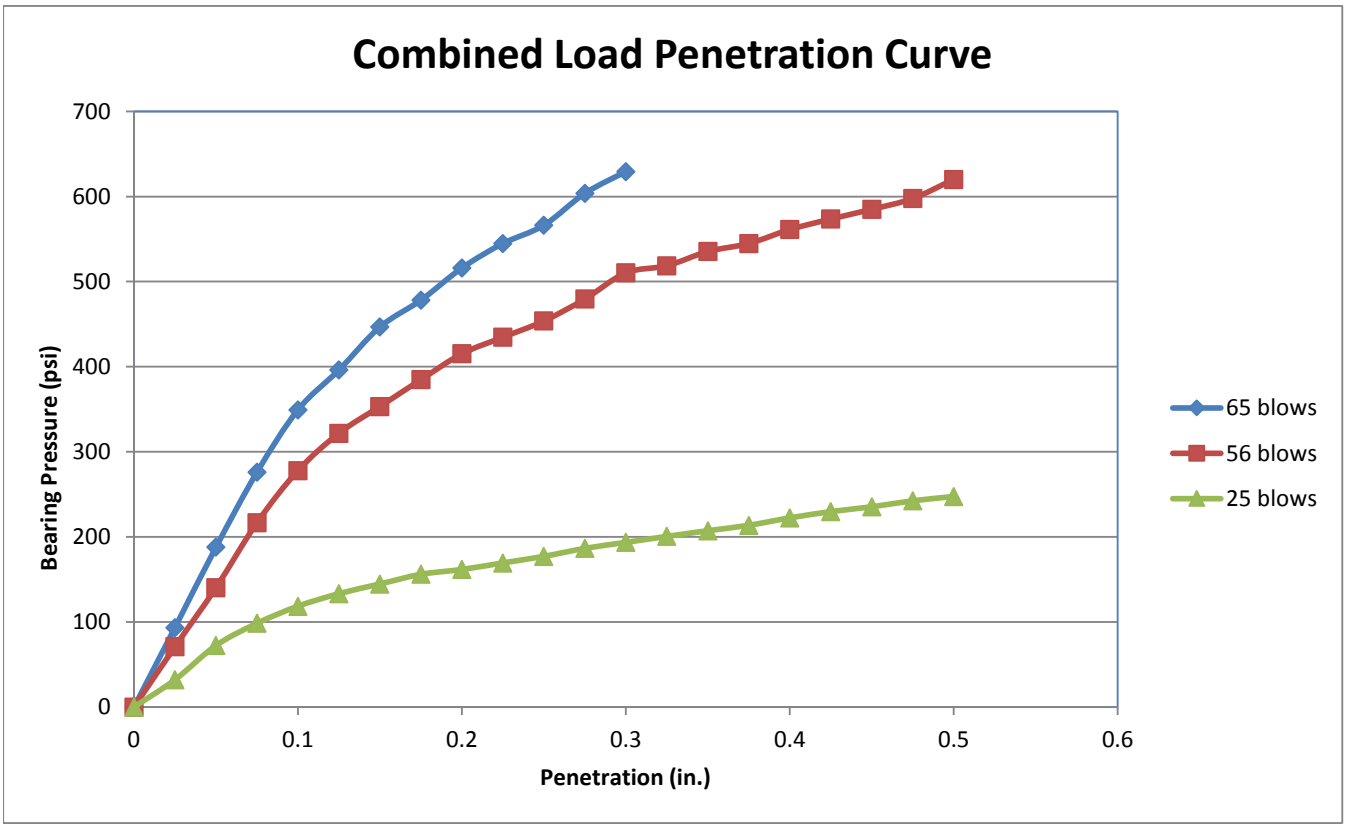
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**		4/16/2018
Lab Number	8322	**SAMPLE NO.**		B5-3	**Depth**		15-20'
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		113.4	**Optimum Water Content (%)**		18.3
Soil Description	Yellow/ Brown Sandy Fat Clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		111.1	111.2	99.0
			Compaction Percentage		98%	98%	87%
			CBR Value		35.0	29.0	12.2
Index Properties	**Percent Fines**	82.9%	**G_S**	2.65	**Reviewed**		AB
	LL	50	**PI**	26			

CBR Value at 95% Modified Proctor Maximum Dry Density	**15.4**



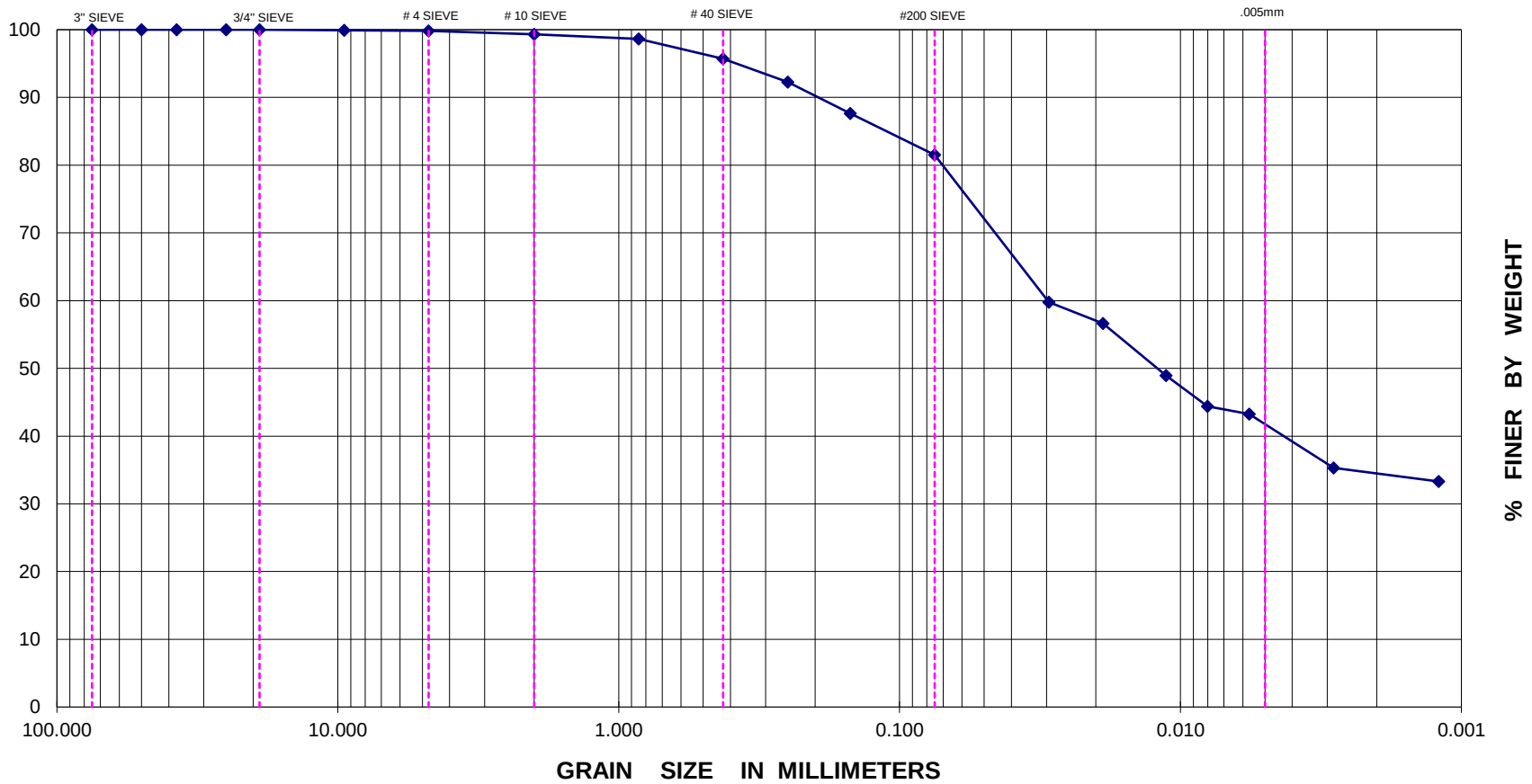
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER **ASTM D422**

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8323*	**DATE :**	4/10/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*B5-4*	**DEPTH / ELEV. :**	*13-18'*	**SAMPLE NO. :**	*B5-4*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	B5-4						
SOIL DESCRIPTION :	*Reddish/ Brown Fat Clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*50*	**PLASTICITY INDEX , % :**	*24*	**MOISTURE , % :**	25.8	**FINES , % :**	*81.7*
D10 , MM :	N/A	**D30 , MM :**	N/A	**D60 , MM :**	0.030	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--



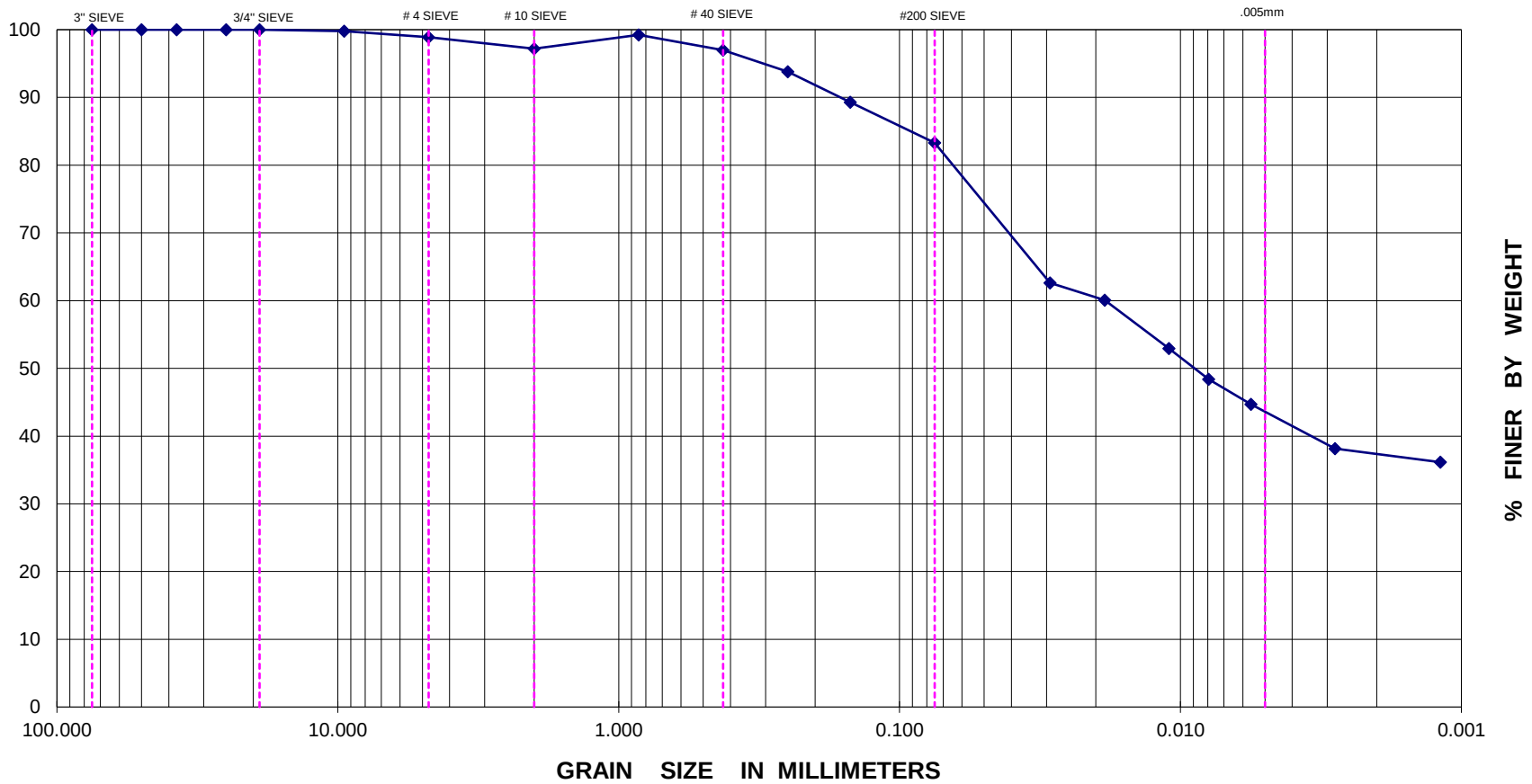
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*				*Runway 1/19 & Partial Parallel Taxiway Extension*		
JOB NO. :	*71.4259*	**REPORT NO. :**	*8324*	**DATE :**	4/10/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*B5-5*	**DEPTH / ELEV. :**	*20-25'*	**SAMPLE NO. :**	*B5-5*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	B5-5						
SOIL DESCRIPTION :	*Reddish/ Brown Fat Clay*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*55*	**PLASTICITY INDEX , % :**	*27*	**MOISTURE , % :**	32.5	**FINES , % :**	*83.3*
D10 , MM :	N/A	**D30 , MM :**	N/A	**D60 , MM :**	N/A	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	Clay	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--



Job No. **71.4259** Date **4/11/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard Russell B. Regional Airport**

Proctor No. **B5-4 and B5-5 (combined)**

Source of Material **B5-4 and B5-5**

Description of Material **Reddish Brown sandy fat CLAY**

Test Method **ASTM D1557 Method A**

TEST RESULTS

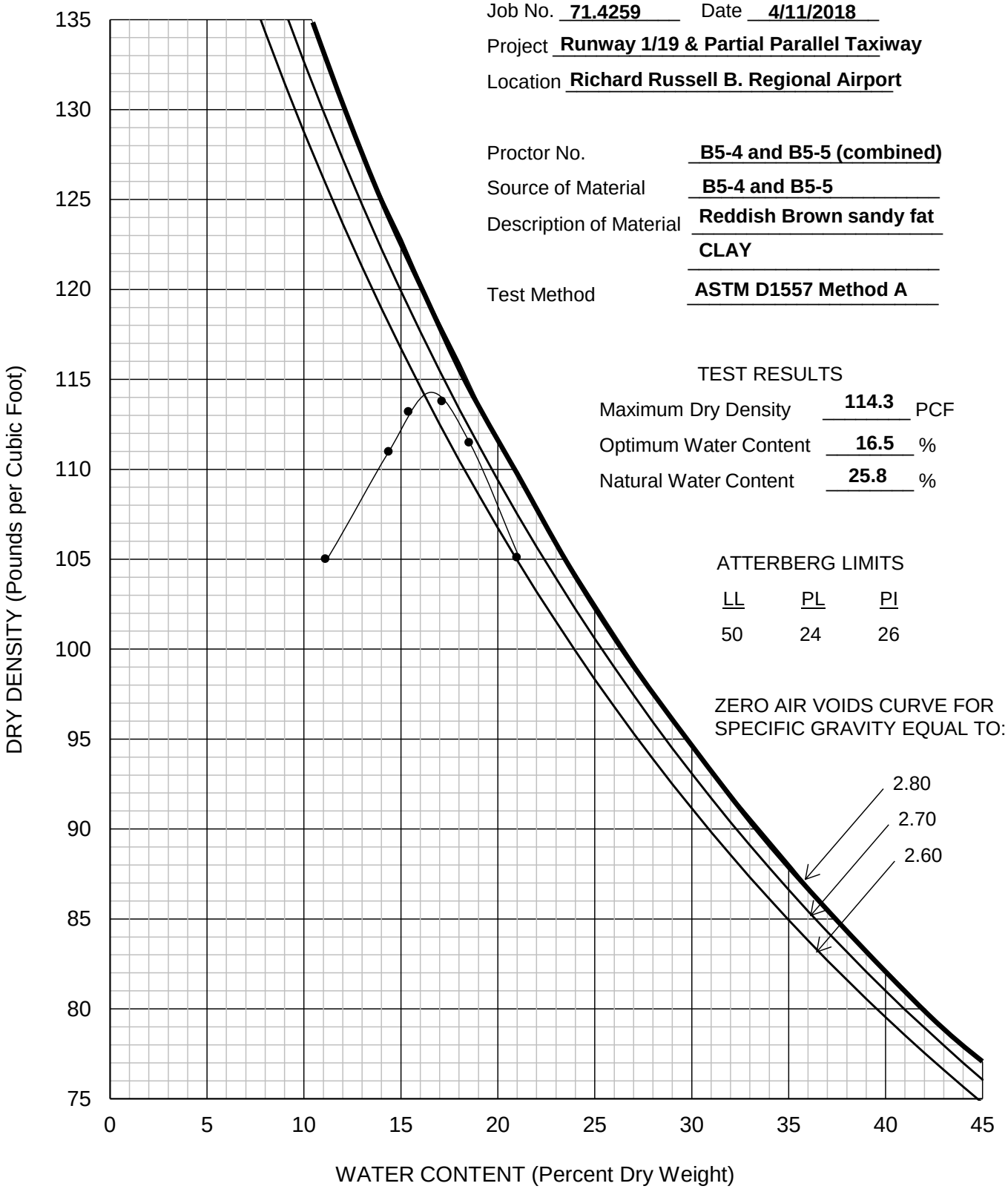
Maximum Dry Density **114.3** PCF

Optimum Water Content **16.5** %

Natural Water Content **25.8** %

ATTERBERG LIMITS

LL	PL	PI
50	24	26



WILLMER Engineering

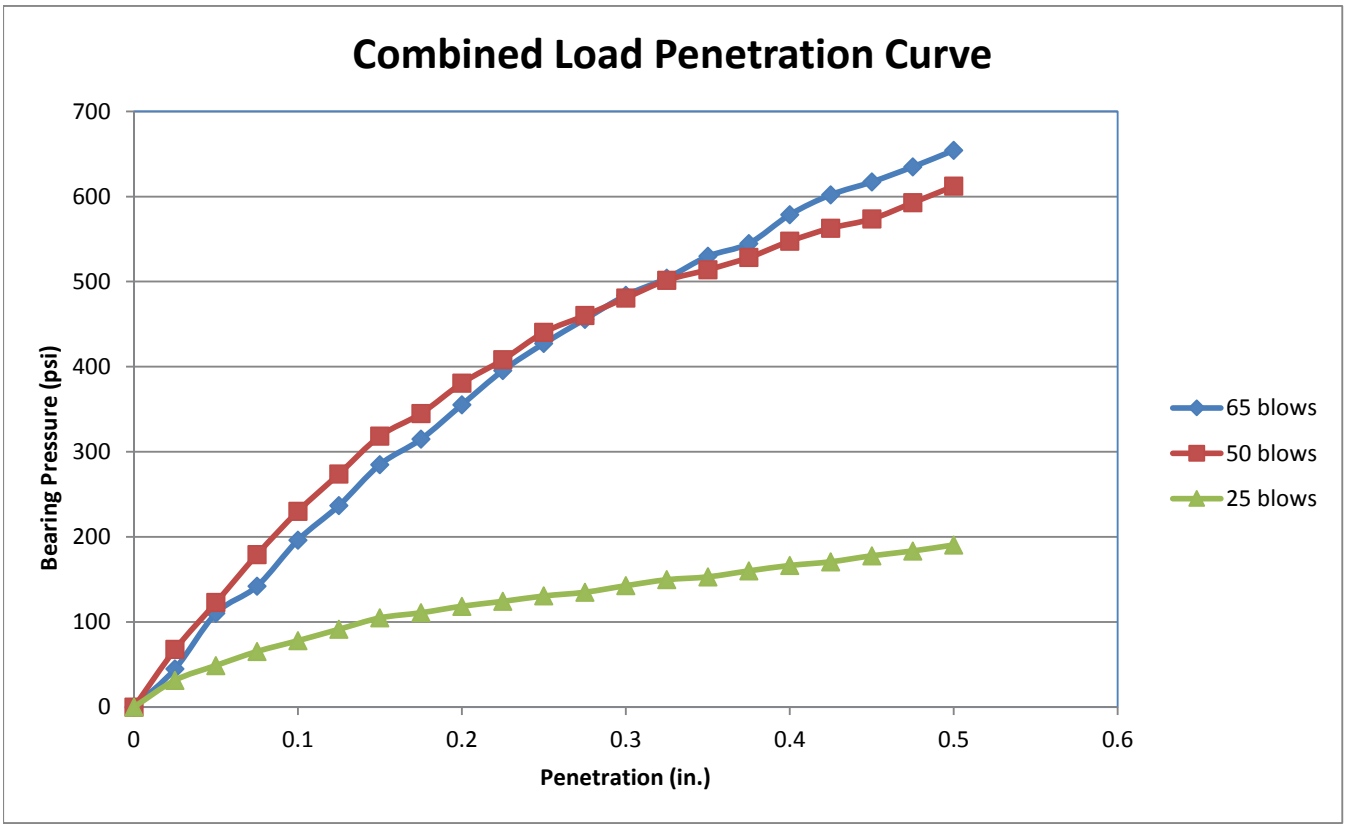
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**		4/16/2018
Lab Number	8323-4	**SAMPLE NO.**		B5-4 and B5-5	**Depth**		Table 5c
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		114.3	**Optimum Water Content (%)**		16.5
Soil Description	Reddish Brown Sandy Fat Clay		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		110.0	106.6	101.3
			Compaction Percentage		96%	93%	89%
			CBR Value		23.0	22.9	7.8
Index Properties	**Percent Fines**	N/A	**G_S**	2.65	**Reviewed**		AB
	LL	N/A	**PI**	N/A			

CBR Value at 95% Modified Proctor Maximum Dry Density	**13.8**



PARTICLE- SIZE DISTRIBUTION TEST REPORT

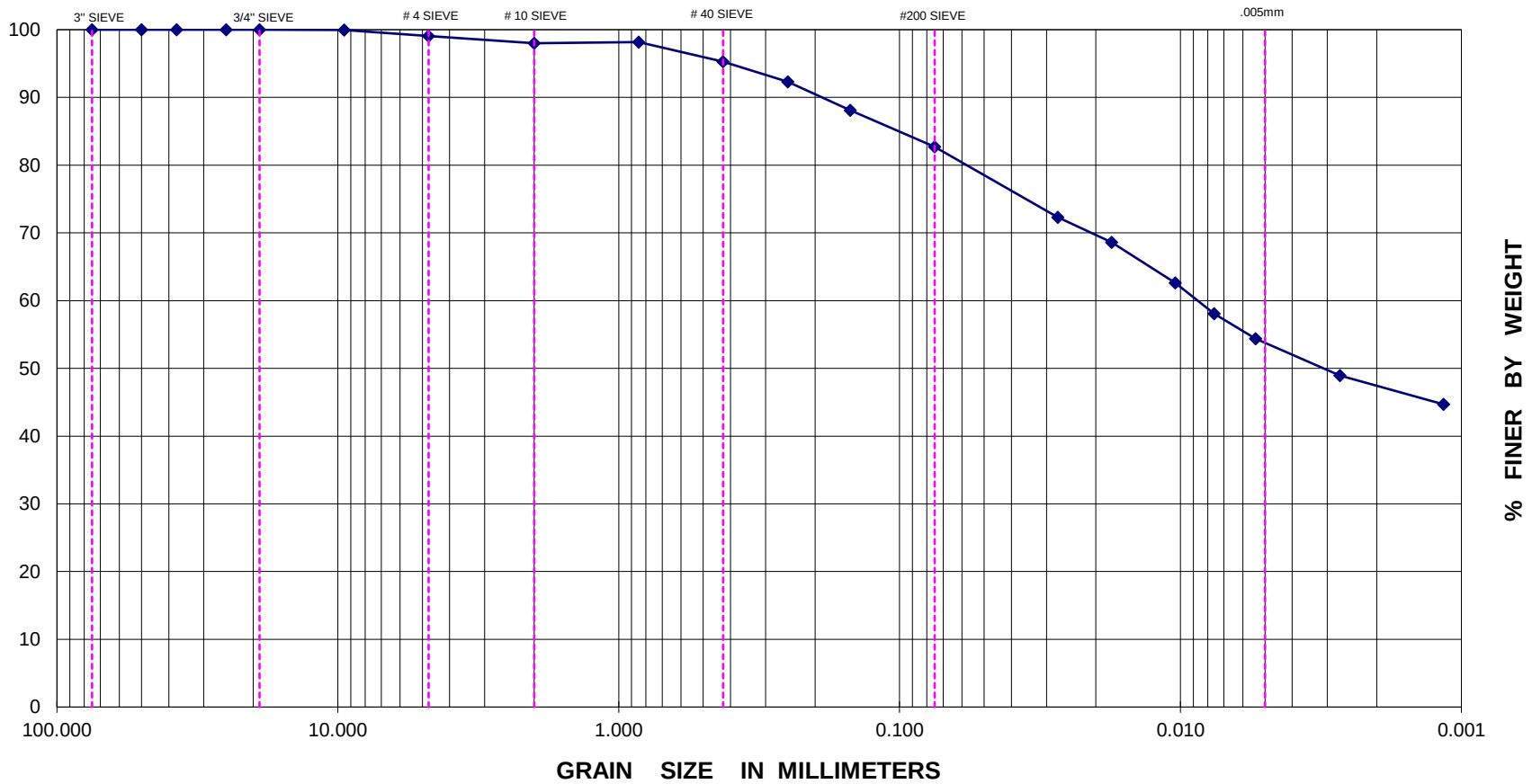
SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8332*	**DATE :**	4/10/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*LS-0*	**DEPTH / ELEV. :**	*N/A*	**SAMPLE NO. :**	*LS-0*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	*Composite sample from borrow area 5*						
SOIL DESCRIPTION :	*Reddish brown fat clay with 0% lime*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*57*	**PLASTICITY INDEX , % :**	*32*	**MOISTURE , % :**	26.0	**FINES , % :**	*82.7*
D10 , MM :	*N/A*	**D30 , MM :**	N/A	**D60 , MM :**	0.0087	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	*Clay*	**UNIFIED :**	*CH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **5/1/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **LS-0**

Source of Material **Borrow area 5 (composite)**

Description of Material **Reddish brown fat clay with 0% lime**

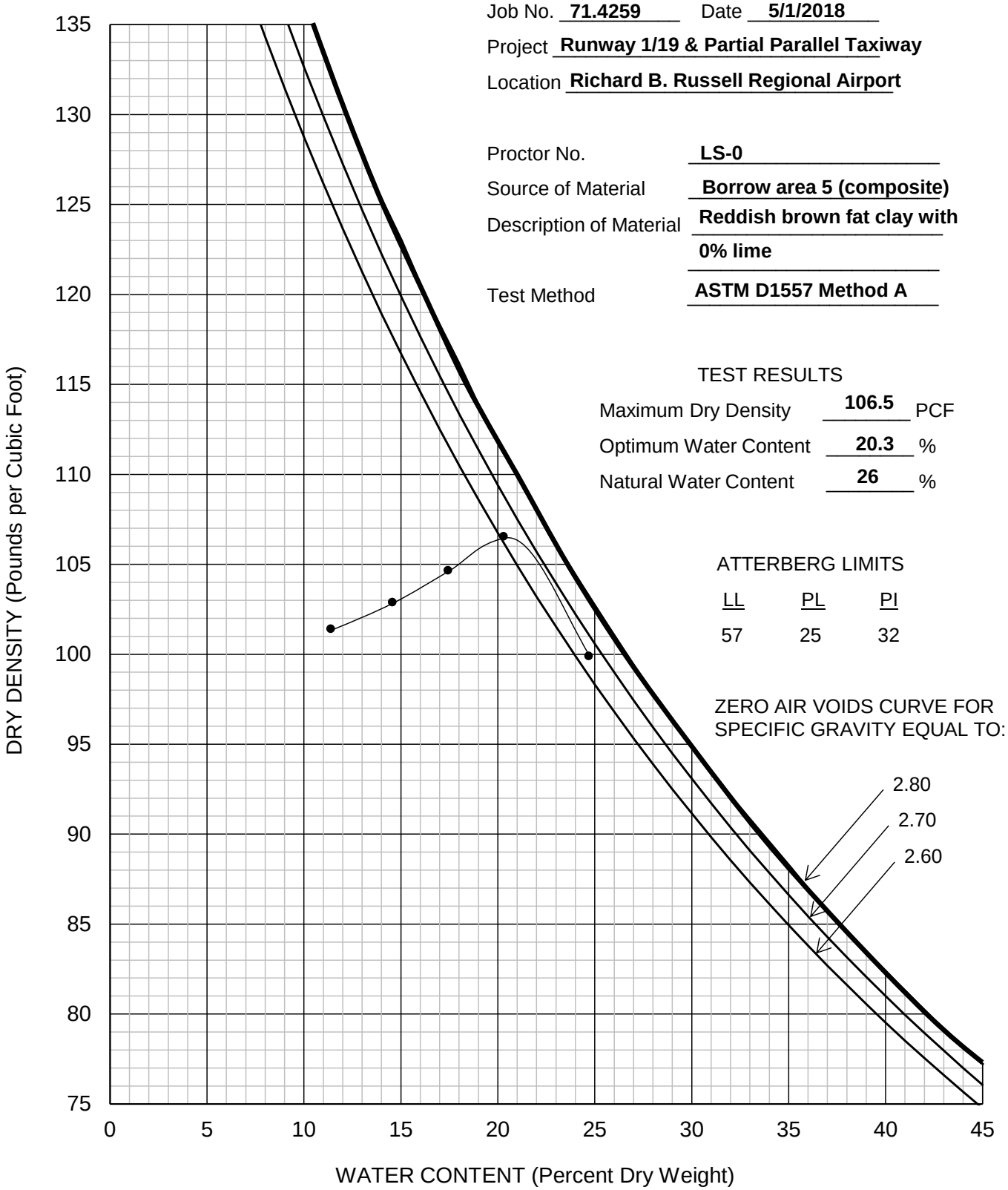
Test Method **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density	**106.5**	PCF
Optimum Water Content	**20.3**	%
Natural Water Content	**26**	%

ATTERBERG LIMITS

LL	PL	PI
57	25	32



WILLMER Engineering

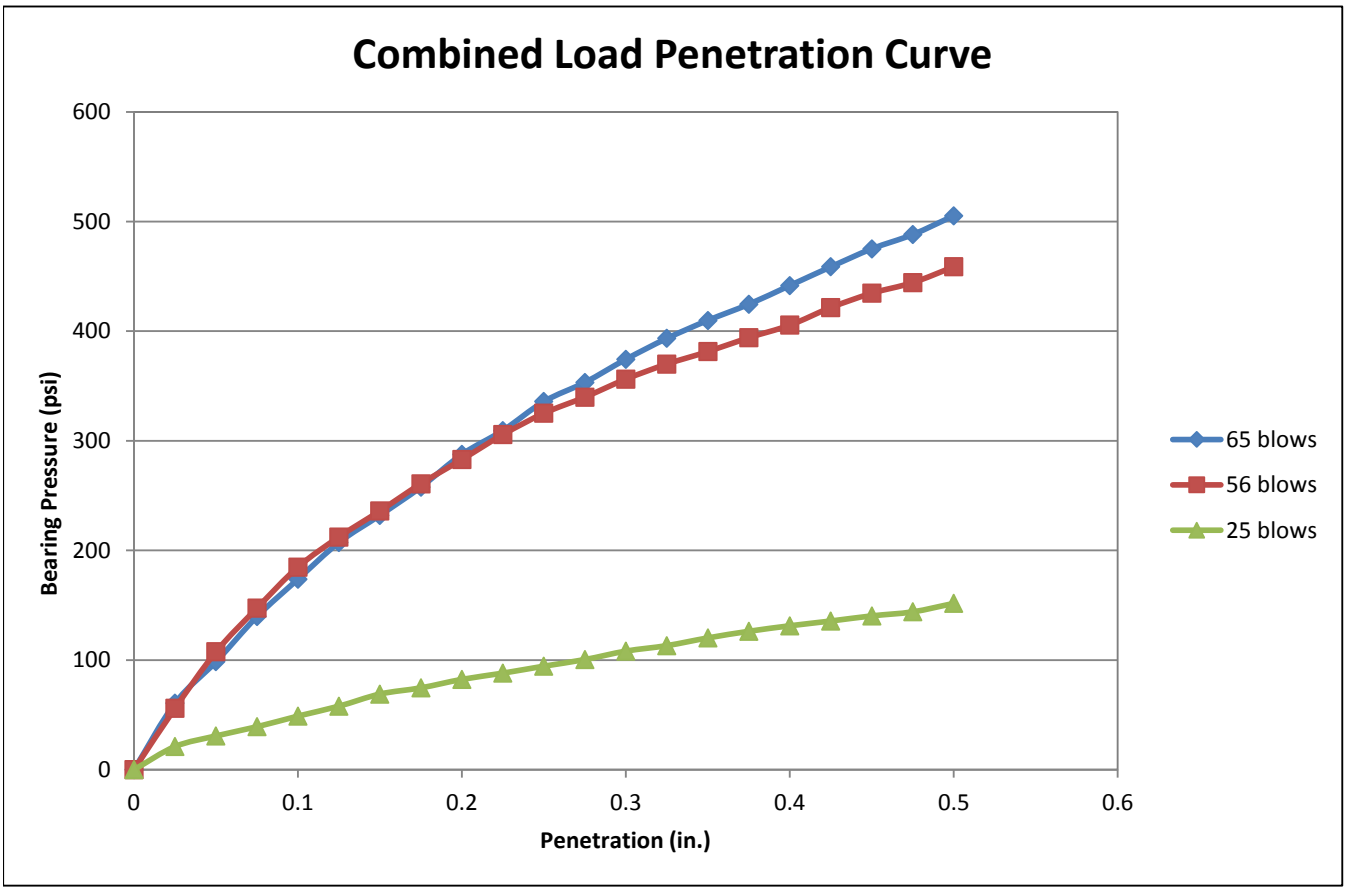
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**		5/7/2018
Lab Number	8332	**SAMPLE NO.**		LS-0	**Depth**		N/A
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		106.5	**Optimum Water Content (%)**		20.3
Soil Description	Reddish brown fat clay with 0% lime		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		107.1	106.2	98.8
			Compaction Percentage		101%	100%	93%
			CBR Value		17.3	18.4	4.8
Index Properties	**Percent Fines**	82.7%	**G_S**	2.65	**Reviewed**		AB
	LL	57	**PI**	32			

CBR Value at 95% Maximum Proctor Maximum Dry Density	**8.8**



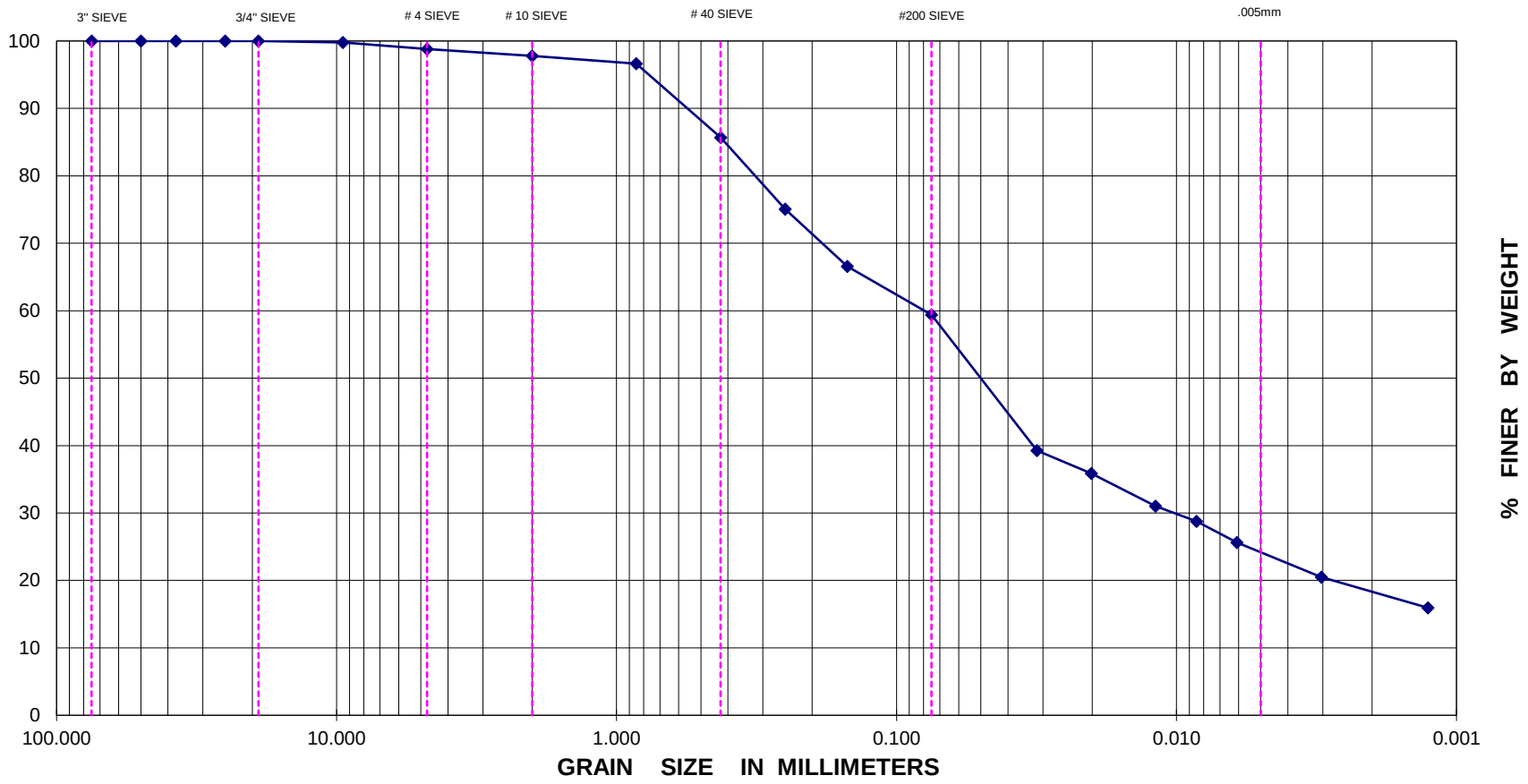
PARTICLE- SIZE DISTRIBUTION TEST REPORT

SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8333*	**DATE :**	4/10/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*LS-4*	**DEPTH / ELEV. :**	*N/A*	**SAMPLE NO. :**	*LS-4*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	*Composite sample from borrow area 5*						
SOIL DESCRIPTION :	*Reddish brown sandy elastic silt (4% lime)*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*56*	**PLASTICITY INDEX , % :**	*23*	**MOISTURE , % :**	26.0	**FINES , % :**	*59.4*
D10 , MM :	*N/A*	**D30 , MM :**	0.01	**D60 , MM :**	0.079	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	*Silt*	**UNIFIED :**	*MH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--



Job No. **71.4259** Date **5/1/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **LS-4**

Source of Material **Borrow area 5 (composite)**

Description of Material **Reddish brown sandy elastic silt (4% lime)**

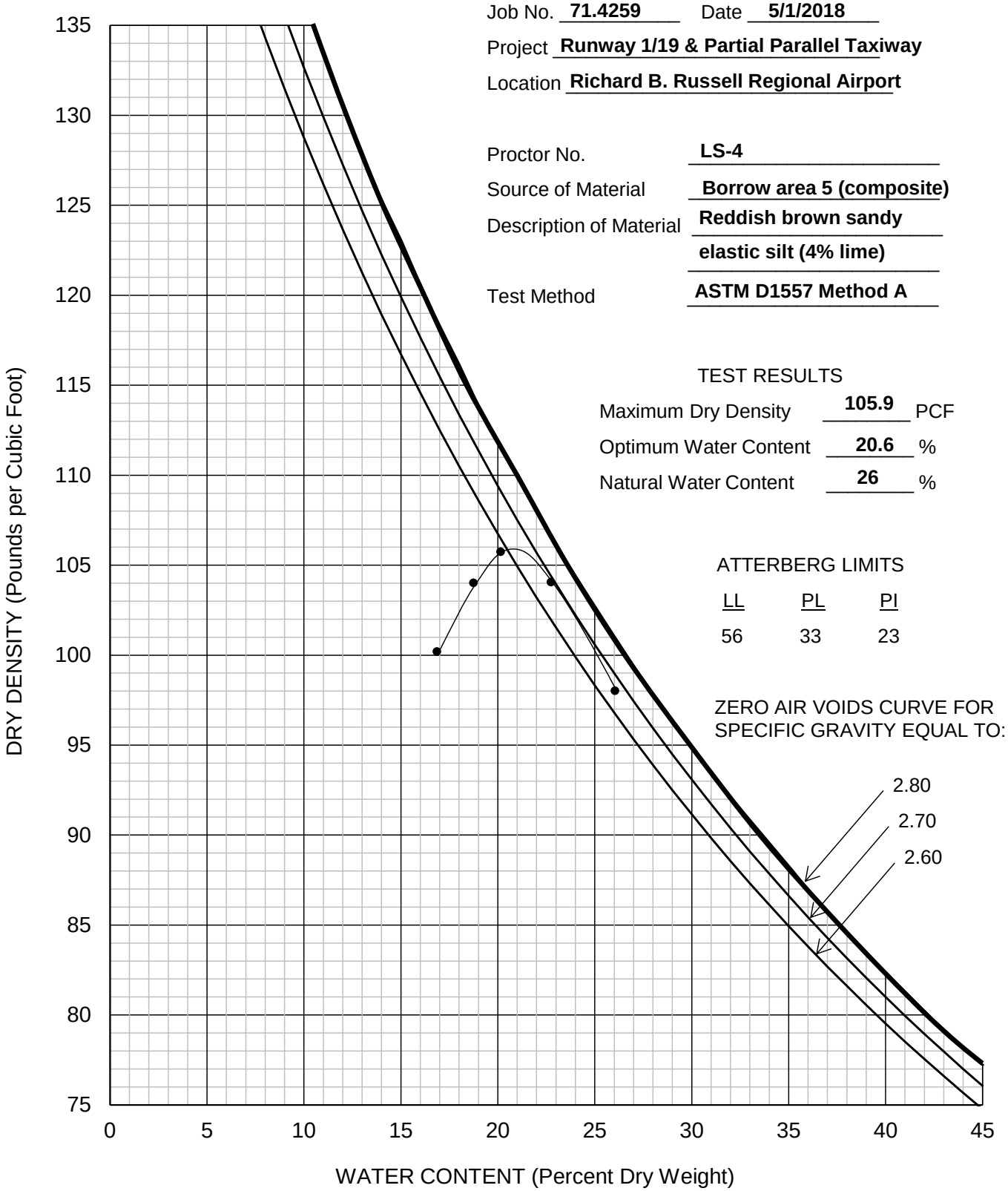
Test Method **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density	**105.9**	PCF
Optimum Water Content	**20.6**	%
Natural Water Content	**26**	%

ATTERBERG LIMITS

LL	PL	PI
56	33	23



WILLMER Engineering

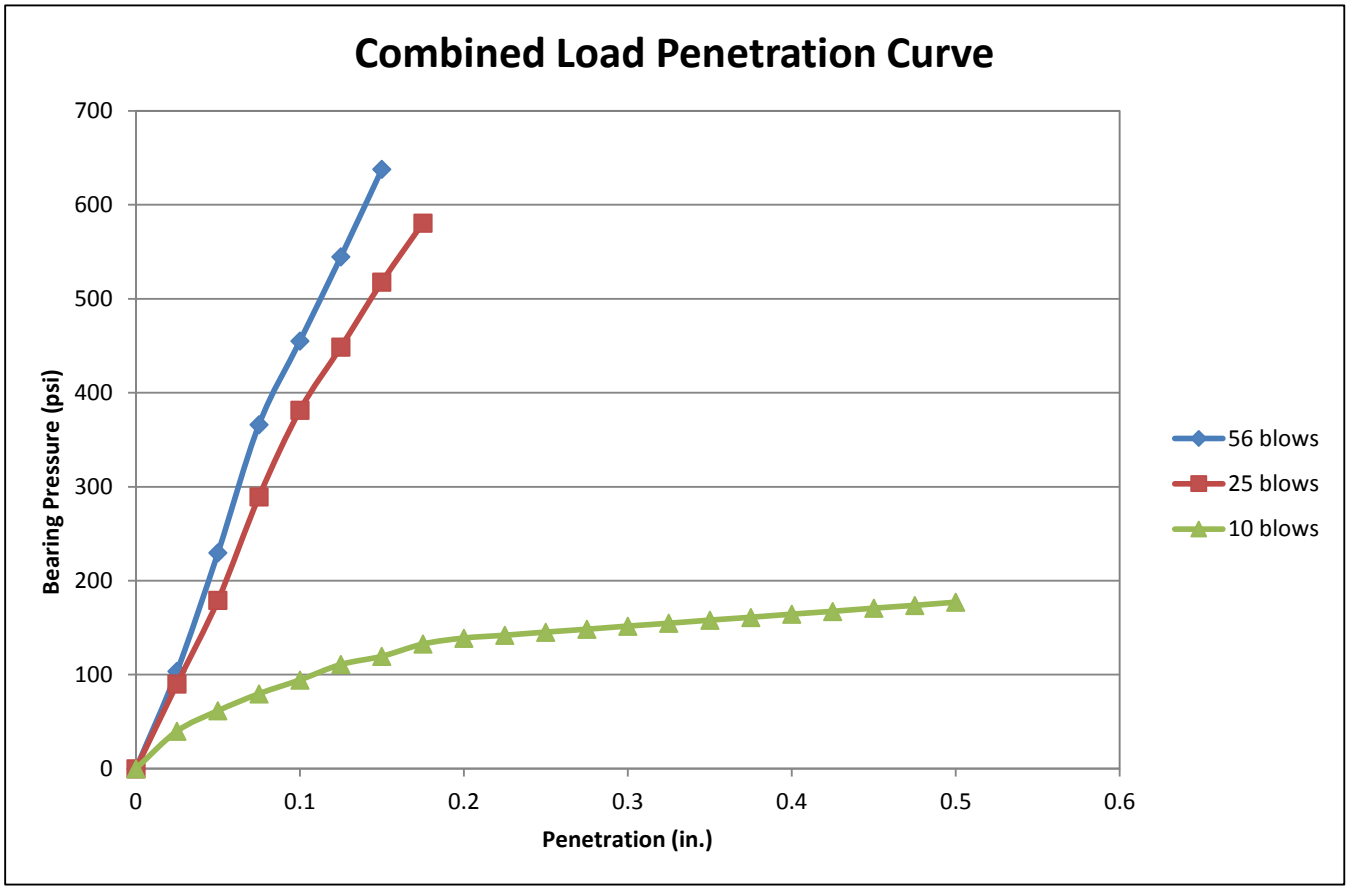
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**		5/7/2018
Lab Number	8333	**SAMPLE NO.**		LS-4	**Depth**		N/A
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		105.9	**Optimum Water Content (%)**		20.8
Soil Description	Reddish brown sandy elastic silt (4% lime)		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		107.0	101.4	92.2
			Compaction Percentage		101%	96%	87%
			CBR Value		45.0	37.9	9.9
Index Properties	**Percent Fines**	59.4%	**G_S**	2.65	**Reviewed**		AB
	LL	56	**PI**	23			

CBR Value at 95% Modified Proctor Maximum Dry Density	**24.2**



PARTICLE- SIZE DISTRIBUTION TEST REPORT

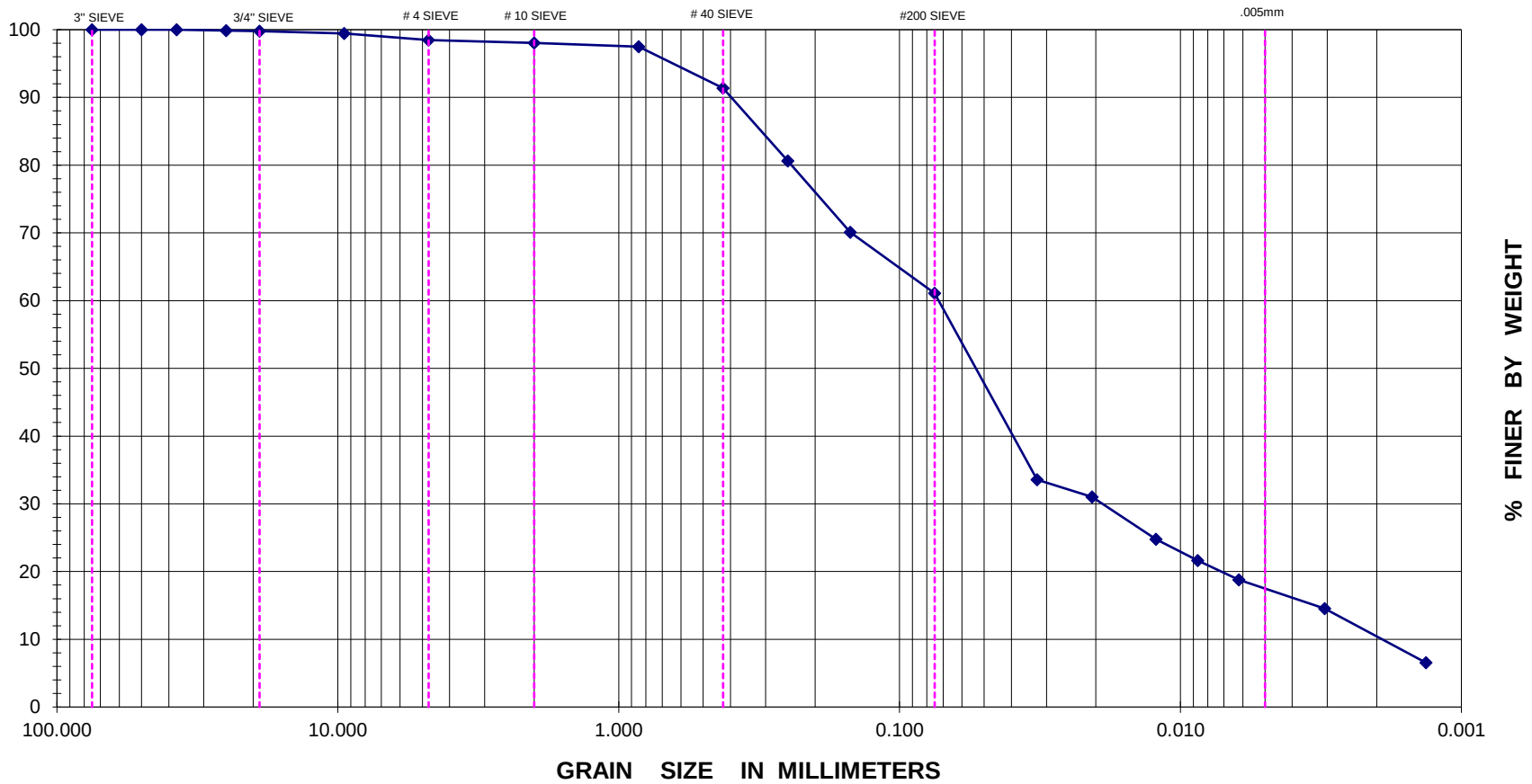
SIEVE AND HYDROMETER ASTM D422

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8334*	**DATE :**	4/10/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*LS-8*	**DEPTH / ELEV. :**	*N/A*	**SAMPLE NO. :**	*LS-8*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Composite sample from borrow area 5						
SOIL DESCRIPTION :	*Reddish brown sandy elastic silt (8% lime)*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*51*	**PLASTICITY INDEX , % :**	*15*	**MOISTURE , % :**	26.0	**FINES , % :**	*61.1*
D10 , MM :	0.0019	**D30 , MM :**	0.019	**D60 , MM :**	0.073	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	*Silt*	**UNIFIED :**	*MH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **5/1/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **LS-8**

Source of Material **Borrow area 5 (composite)**

Description of Material **Reddish brown sandy elastic silt (8% lime)**

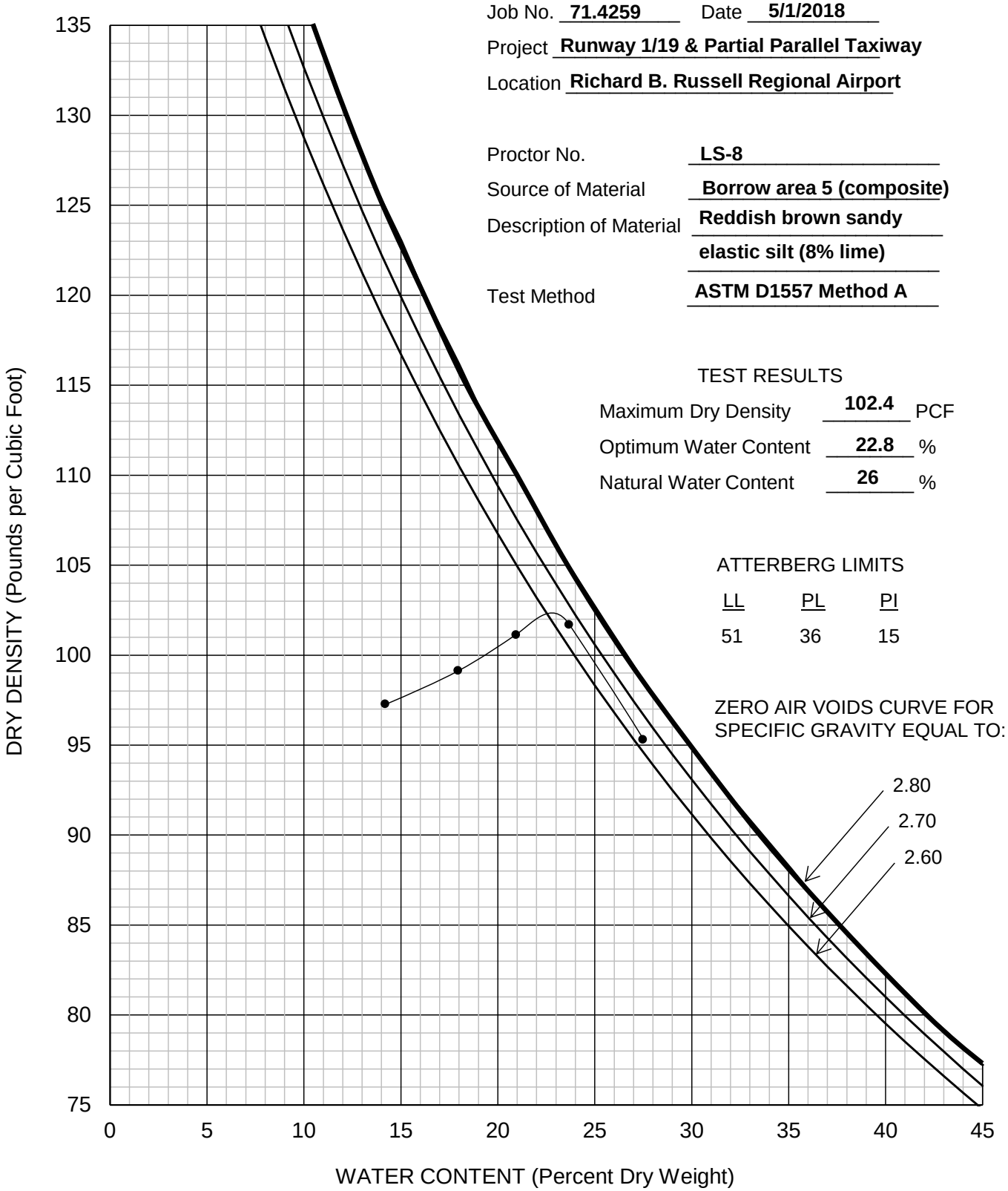
Test Method **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density	**102.4**	PCF
Optimum Water Content	**22.8**	%
Natural Water Content	**26**	%

ATTERBERG LIMITS

LL	PL	PI
51	36	15



WILLMER Engineering

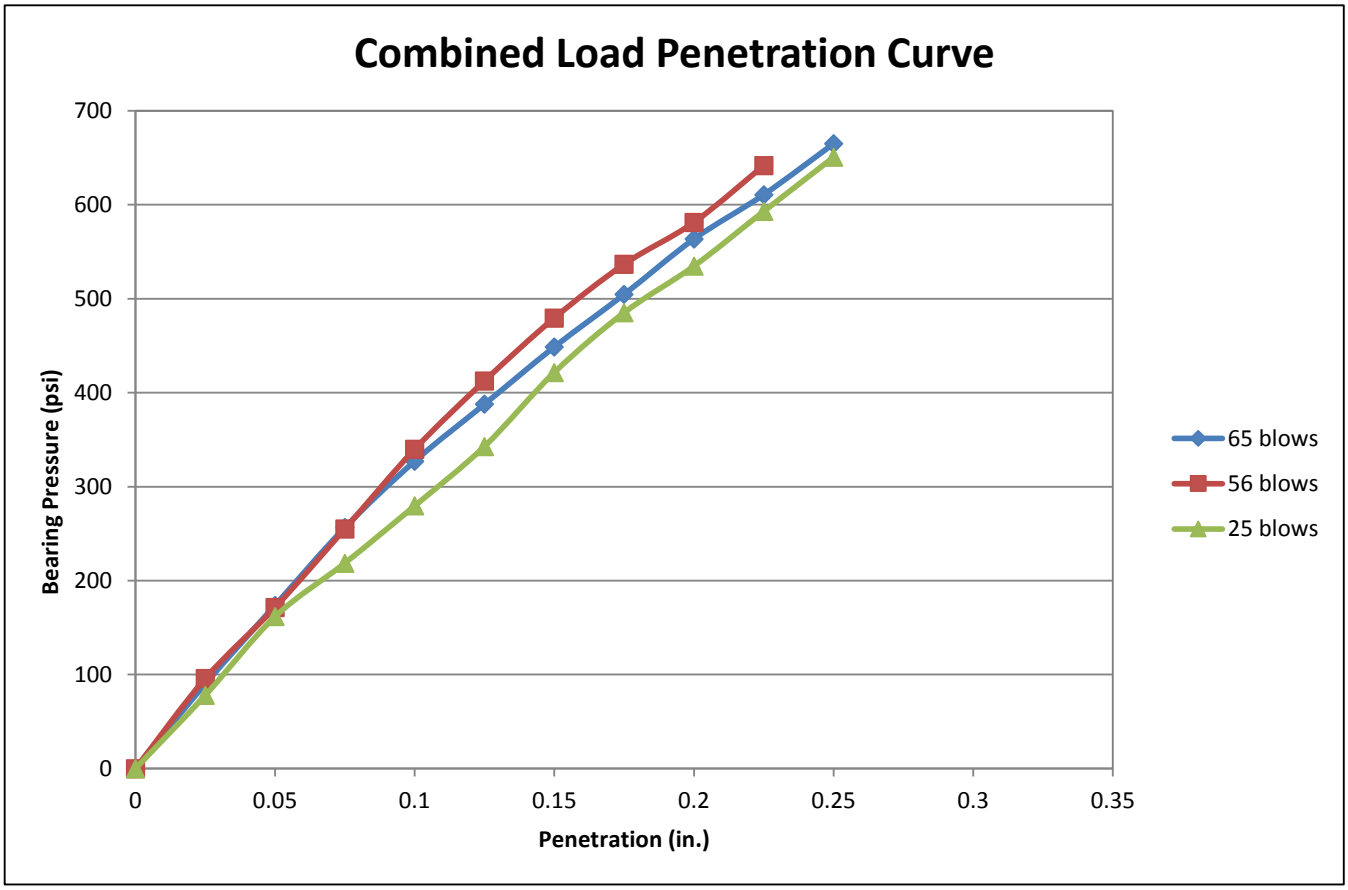
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**		5/7/2018
Lab Number	8334	**SAMPLE NO.**		LS-8	**Depth**		N/A
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		102.3	**Optimum Water Content (%)**		22.8
Soil Description	Reddish brown sandy elastic silt (8% lime)		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		102.1	103.8	99.8
			Compaction Percentage		100%	101%	98%
			CBR Value		34.0	33.9	27.9
Index Properties	**Percent Fines**	61.1%	**G_S**	2.65	**Reviewed**		AB
	LL	51	**PI**	15			

CBR Value at 95% Modified Proctor Maximum Dry Density	**24.4**



PARTICLE- SIZE DISTRIBUTION TEST REPORT

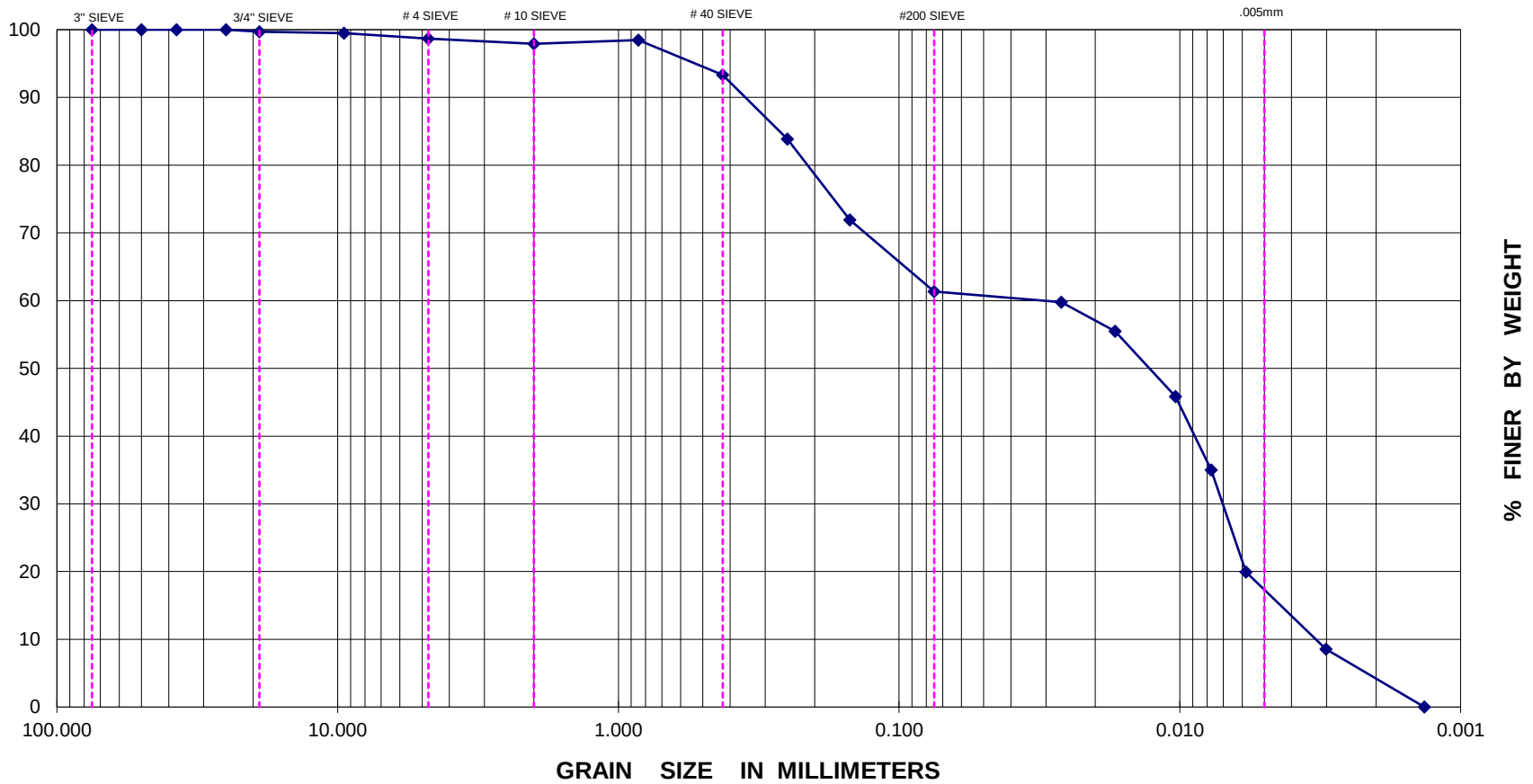
SIEVE AND HYDROMETER **ASTM D422**

REV3,12/14/06

AASHTO R18

JOB NAME :	*Runway 1/19 & Partial Parallel Taxiway Extension*						
JOB NO. :	*71.4259*	**REPORT NO. :**	*8335*	**DATE :**	4/10/18	**REVIEWED BY :**	AB
BORING / PIT NO. :	*LS-12*	**DEPTH / ELEV. :**	*N/A*	**SAMPLE NO. :**	*LS-12*	**SAMPLE TYPE :**	*Bulk*
SAMPLE LOCATION :	Composite sample from borrow area 5						
SOIL DESCRIPTION :	*Reddish brown sandy elastic silt (12% lime)*					**SP. GRAVITY, Gs :**	*2.65*
LIQUID LIMIT, % :	*61*	**PLASTICITY INDEX , % :**	*28*	**MOISTURE , % :**	26.0	**FINES , % :**	*61.3*
D10 , MM :	*0.0034*	**D30 , MM :**	0.007	**D60 , MM :**	0.030	**COEFF. OF CURVATURE , C_C :**	--
CLASSIFICATION	*Silt*	**UNIFIED :**	*MH*	**AASHTO :**	*N/A*	**COEFF. OF UNIFORMITY , C_U :**	--

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY



Job No. **71.4259** Date **5/1/2018**

Project **Runway 1/19 & Partial Parallel Taxiway**

Location **Richard B. Russell Regional Airport**

Proctor No. **LS-12**

Source of Material **Borrow area 5 (composite)**

Description of Material **Reddish brown sandy elastic silt (12% lime)**

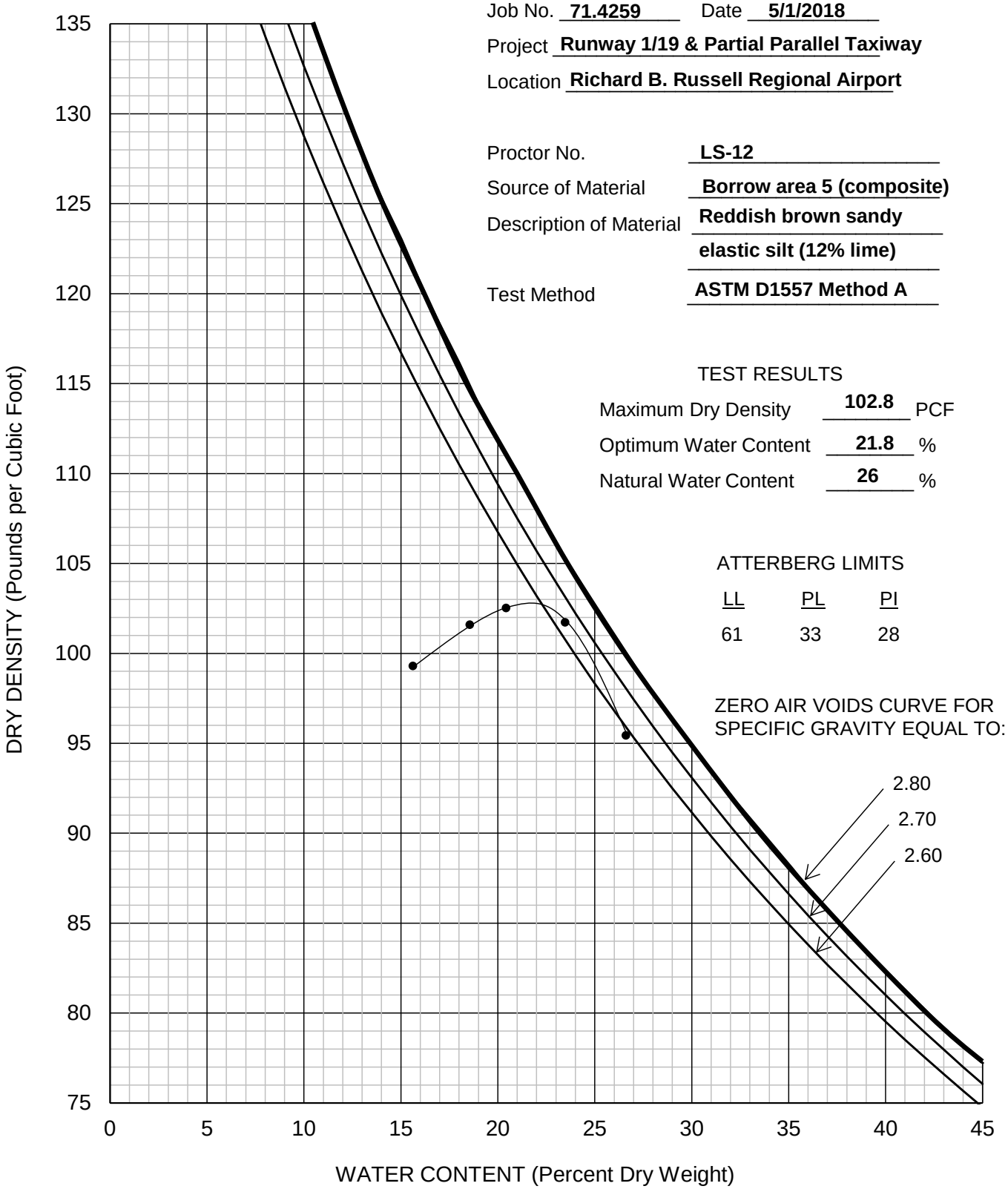
Test Method **ASTM D1557 Method A**

TEST RESULTS

Maximum Dry Density	**102.8**	PCF
Optimum Water Content	**21.8**	%
Natural Water Content	**26**	%

ATTERBERG LIMITS

LL	PL	PI
61	33	28



WILLMER Engineering

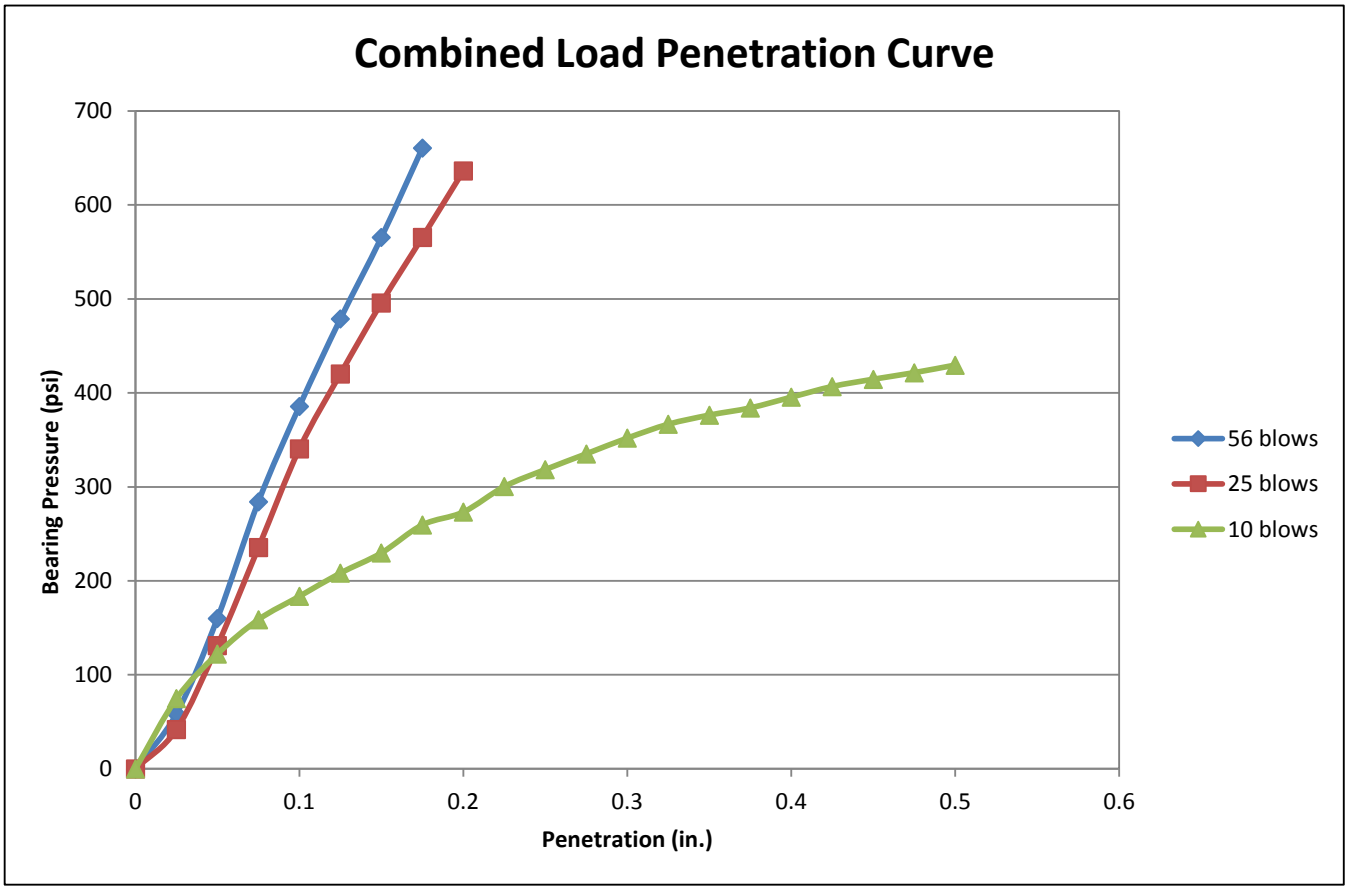
MOISTURE-DENSITY RELATIONSHIP

California Bearing Ratio Test Report

ASTM D1883-16

Project	Runway 1/19 and Partial Parallel Taxiway Extension	**Project Number**		71.4259	**Date**		5/7/2018
Lab Number	8335	**SAMPLE NO.**		LS-12	**Depth**		N/A
Proctor Procedure	Modified	**Maximum Dry Density (pcf)**		102.8	**Optimum Water Content (%)**		21.8
Soil Description	Reddish brown sandy elastic silt (12% lime)		**CBR Point**		**1**	**2**	**3**
			Compacted Dry Density		101.7	98.0	88.2
			Compaction Percentage		99%	95%	86%
			CBR Value		47.0	42.0	18.7
Index Properties	**Percent Fines**	61.3%	**G_S**	2.65	**Reviewed**		AB
	LL	61	**PI**	28			

CBR Value at 95% Modified Proctor Maximum Dry Density	**32.5**



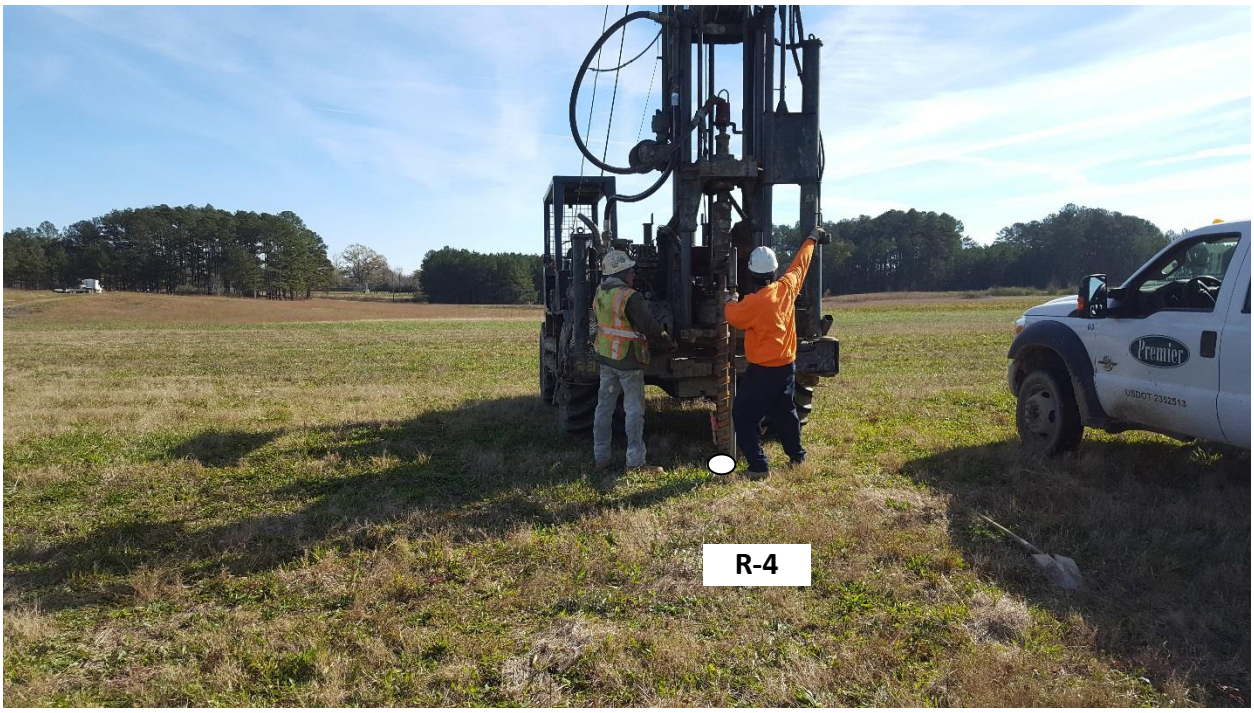
APPENDIX IV

Site Photographs

Boring R-1; Looking South

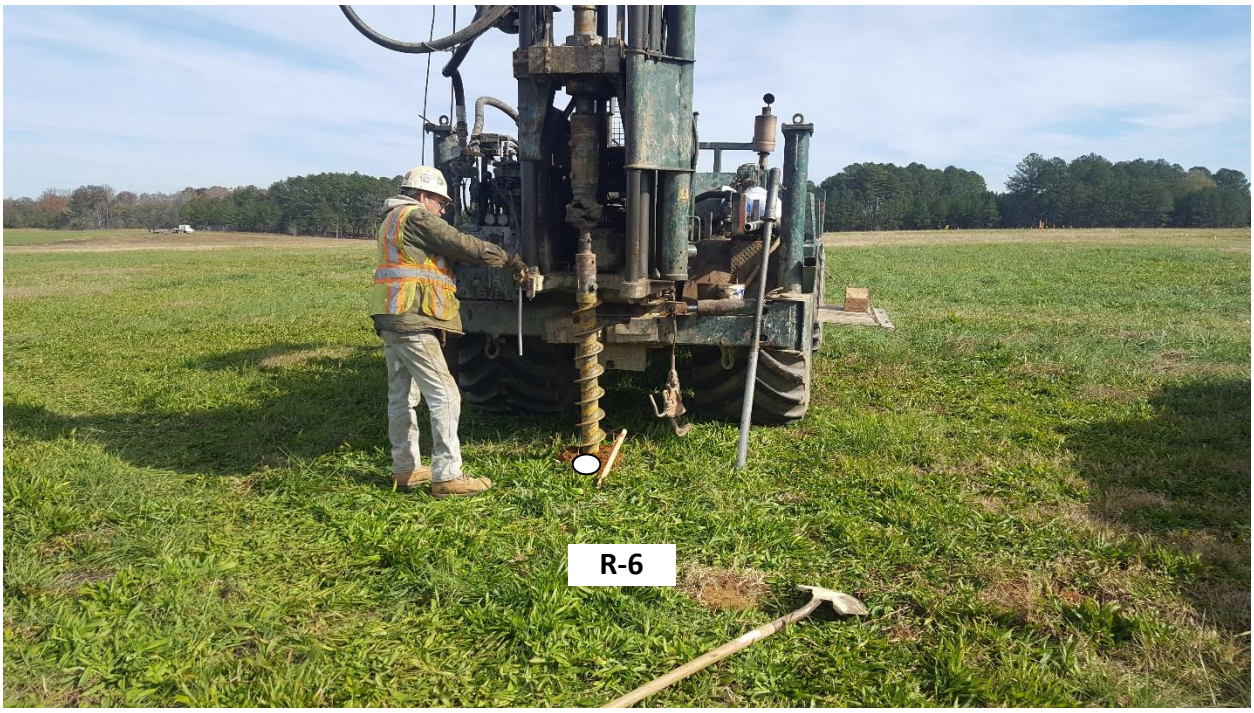
Boring R-2; Looking North

Boring R-3; Looking South

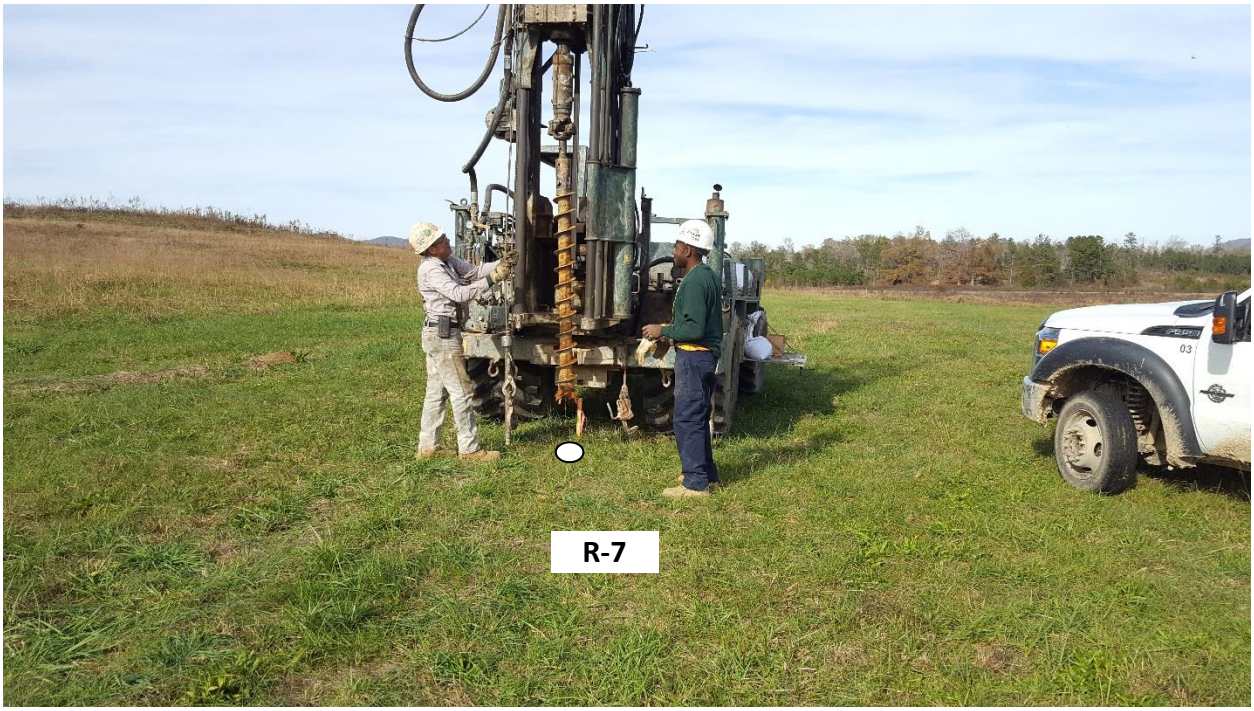


Boring R-4; Looking East

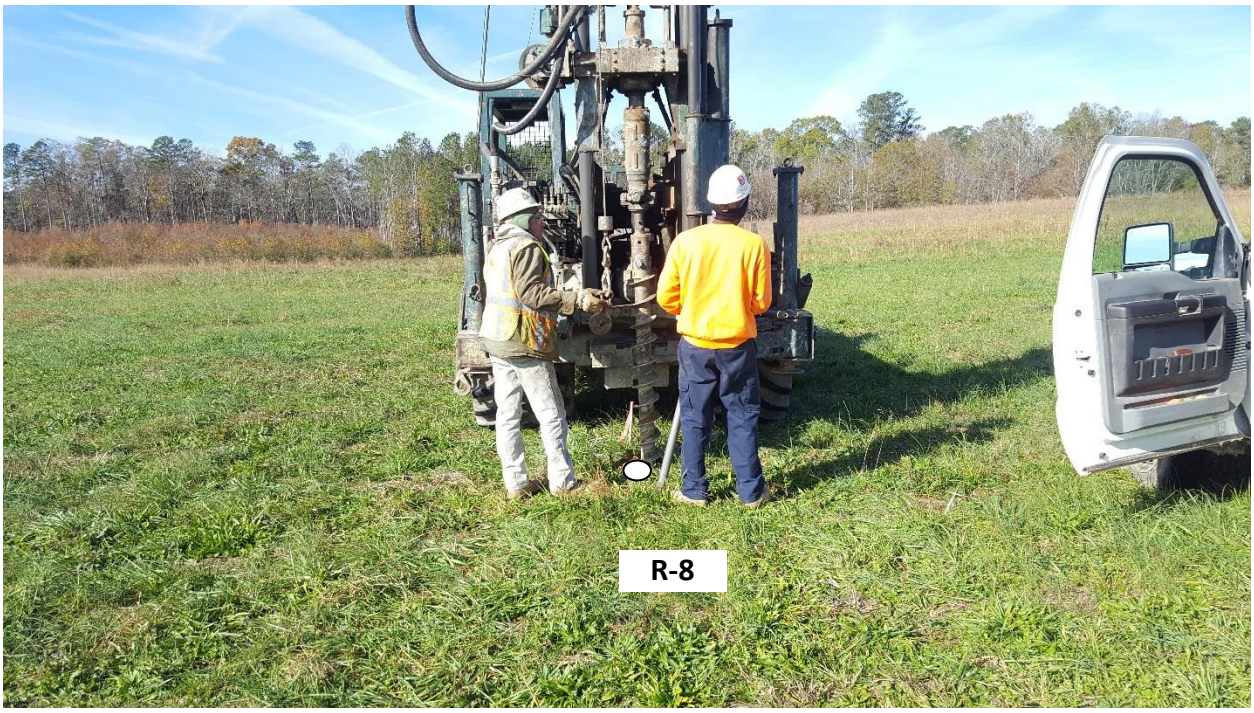
Boring R-5; Looking South



Boring R-6; Looking Northeast



Boring R-7; Looking North



Boring R-8; Looking West

Boring R-9; Looking East

Boring R-10; Looking South

Boring R-11; Looking East

Boring R-12; Looking West

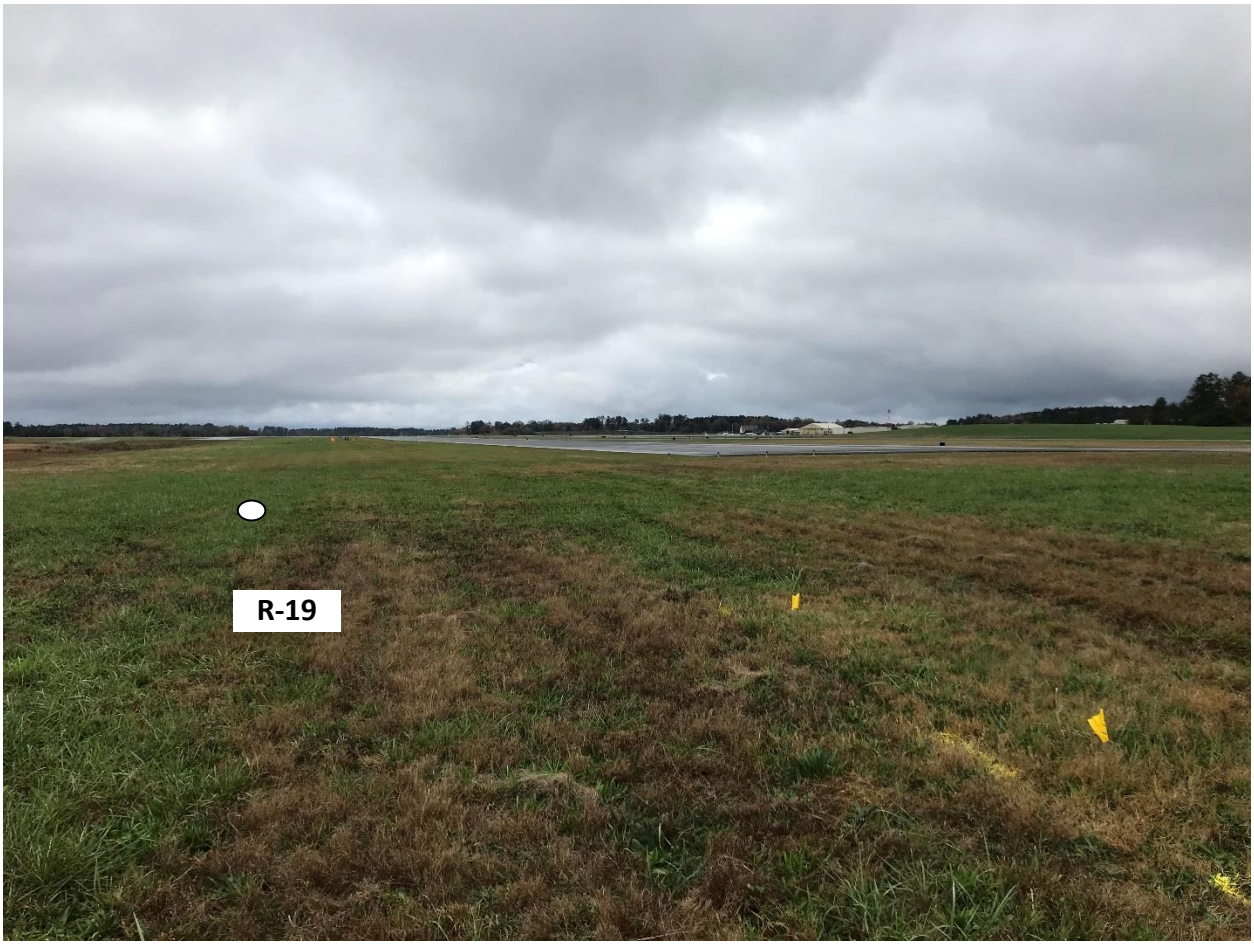
Boring R-14; Looking West

Boring R-15; Looking West

Boring R-16; Looking South

Boring R-17; Looking Southwest

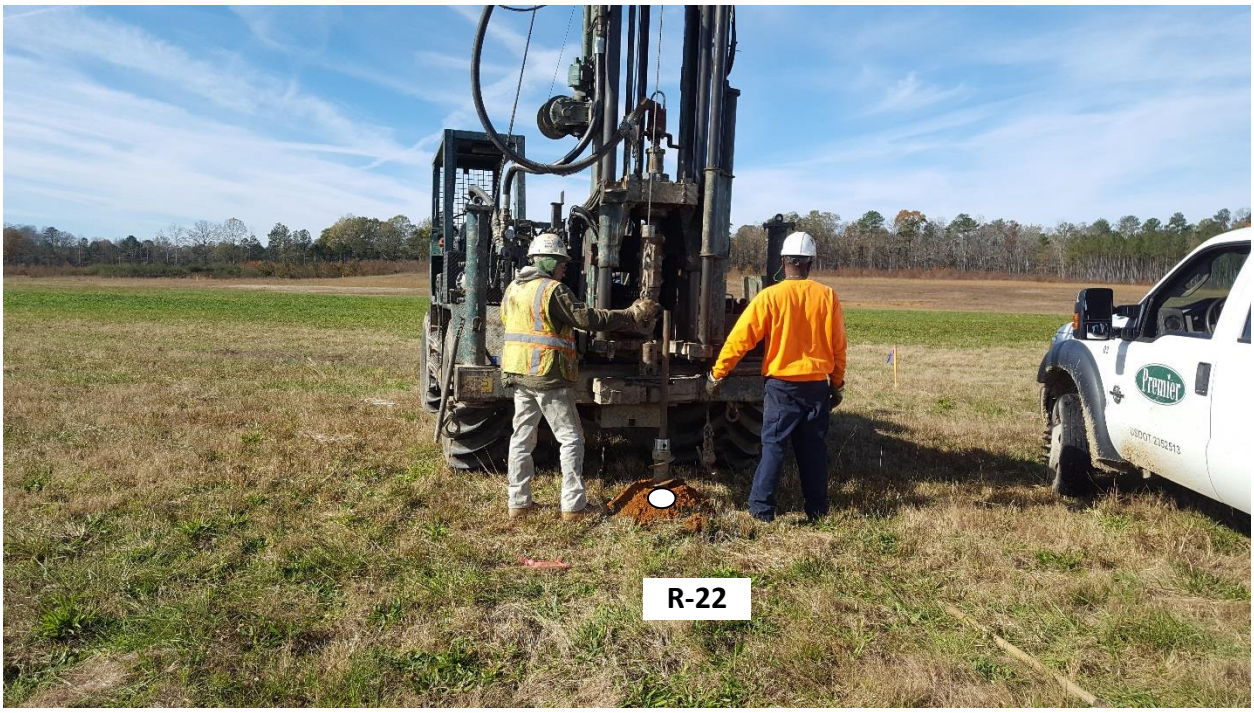
Boring R-18; Looking North



Boring R-19; Looking South

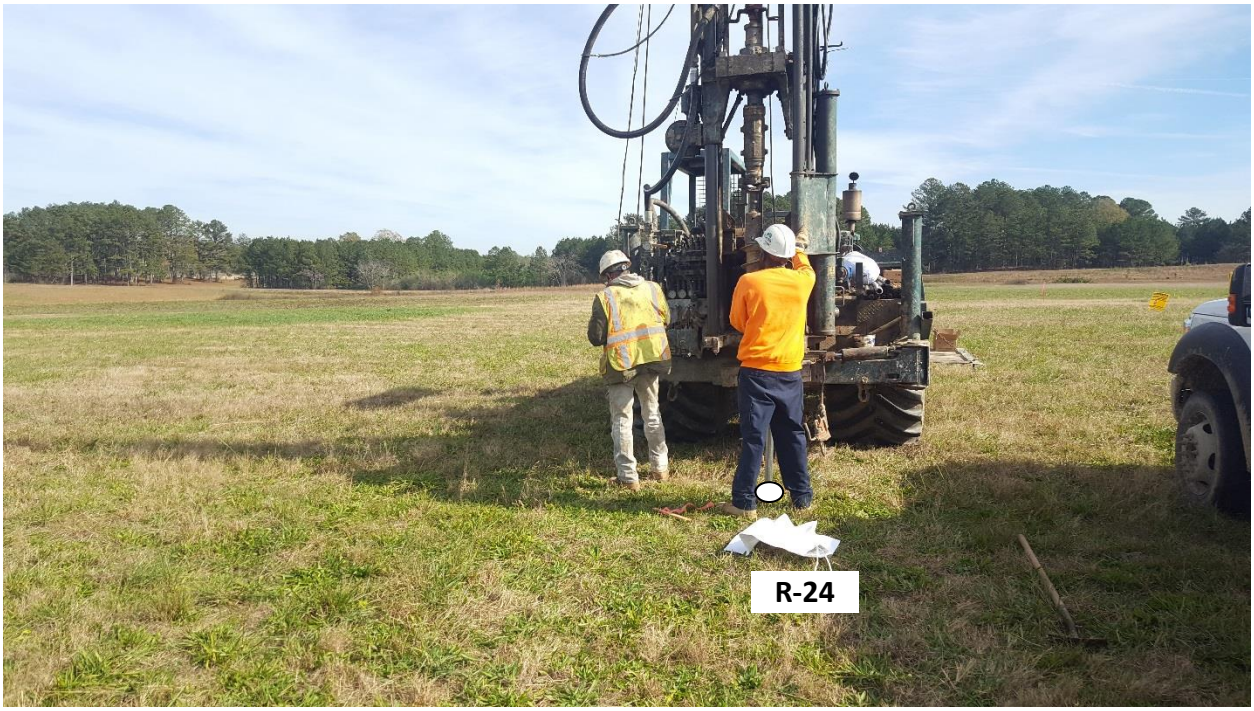
Boring R-20; Looking South

Boring R-21; Looking West



Boring R-22; Looking West

Boring R-23; Looking West



Boring R-24; Looking East

APPENDIX V

Important Information About Geotechnical Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation*.

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

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