TIERRA

REPORT OF GEOTECHNICAL EXPLORATION

Santa Rosa County School District – New Pace School A
Phase II Study
Santa Rosa County, Florida

Tierra Project No. 4511-20-020

Prepared for:

Santa Rosa County School District
6544 Firehouse Road
Milton, Florida 32570
Attn: Mr. Joseph B. Harrell

Prepared by:

Tierra, Inc.
1300 West Main Street
Pensacola, Florida 32502

June 16, 2020

1300 West Main Street • Pensacola, FL 32502
Phone (850) 462-8774 • Fax (850) 462-8784

TIERRA

June 16, 2020

Santa Rosa County School District
6544 Firehouse Road
Milton, FL 32570
Attn: Mr. Joseph B. Harrell

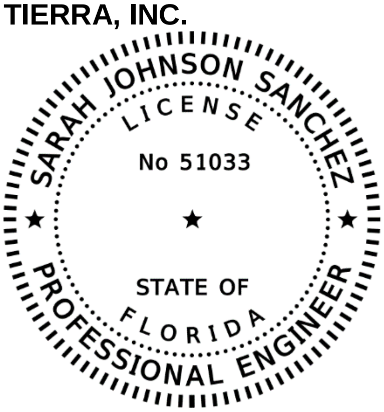
Subject: Santa Rosa County School District – New Pace School A
Phase II Study
Santa Rosa County, Florida
Tierra Project No. 4511-20-020

Mr. Harrell:

Thank you for choosing Tierra, Inc. (Tierra) as your Geotechnical consultant. Per your authorization, and in general accordance with Proposal No. 45-20-052, we have completed the Phase II Geotechnical exploration for the subject project. The results of the study are discussed in this report.

Should you have any questions regarding the enclosed report or the project in general, please do not hesitate to contact us at (850) 462-8774. Tierra would be pleased to provide Geotechnical engineering and construction materials testing services throughout the design and construction phases of the project.

Sincerely,
TIERRA, INC.



THIS DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED BY:

Sarah J Sanchez 2020.06.16 17:03:05-05'00'

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED. THE SIGNATURE MUST BE VERIFIED ON THE ELECTRONIC DOCUMENTS.

TIERRA, INC.

1300 West Main Street
Pensacola, Florida 32502

Sarah Johnson Sanchez, P.E. No. 51033

Sarah Johnson Sanchez
Sr. Project Engineering
Florida License No. 51033

Mitchell L. Smith, PE
Principal Geotechnical Engineer
Florida License No. 43416

1300 West Main Street • Pensacola, FL 32502
Phone (850) 462-8774 • Fax (850) 462-8784

TABLE OF CONTENTS

1.0 PROJECT INFORMATION

1.1 Project Authorization

Authorization to proceed on this project was issued by the Santa Rosa County School District through Purchase Order No. 730587.

1.2 Project Description

Based on the information provided, we understand that the project will include a new elementary school with associated parking and drive areas, a ground storage tank for fire protection, and a retaining wall. Stormwater control facilities will also be a component of the project. These facilities were addressed in a previous study.

The school building will be a 2-story structure supported by columns and load bearing walls. Maximum wall loads will reportedly be on the order of 4 klf and maximum column loads will reportedly be on the order of 140 kips. The finished floor elevation of the ground floor will be 110 feet which will require up to roughly 16 feet of cut on the west/northwest side of the structure and up to roughly 15 feet of fill on the east/southeast side of the structure.

A drive and bus loading area will be located northwest of the structure bordered on the north/northwest by a cantilevered sheet pile wall. The wall will reportedly retain up to roughly 8 feet of cut soil. There will also be a cantilevered sheet pile wall bordering the southeast side of the bus loading area. This wall will reportedly retain up to roughly 7 feet of cut soil.

The parking area will be located south of the structure. Finished grades in these areas will generally be within 2 feet to 3 feet of existing grades.

A ground storage tank for fire safety will be located in the vicinity of the drive and bus loading area and will bear near elevation +118 feet (roughly 13 feet below current grade). At this time, we understand that the tank will be founded on a concrete mat measuring roughly 12.5 feet x 80 feet with a contact pressure on the order of 1000 lbs/ft^2.

If any of the project information noted above is incorrect or has changed, please inform Tierra so that we may amend the recommendations presented in this report, if necessary.

1.3 Purpose and Scope of Services

The purpose of this exploration was to evaluate the subsurface conditions present in the subject areas and to render site preparation, foundation, and pavement recommendations, as well as soil parameters for sheet pile wall design.

The exploration consisted of a series of Standard Penetration Test borings ranging in depth from 10 feet to 60 feet below existing grade; laboratory soil testing including natural moisture content tests, wash #200 sieve tests, and Atterberg limits tests; and site visits; visual classification of the soil samples; and analysis by our engineering staff.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Location and Description

The site is located east of the north end of Whispering Creek Boulevard, north of the Gulf Power easement in Pace, Santa Rosa County, Florida. The general location of the site is shown on the Boring Location Plan (Appendix A).

At the time of our exploration, the site was undeveloped and vegetated with both soft and hard wood trees and underbrush. Several jeep trails were present on the site. Survey cut lines were also present on the site.

Based on the topographic information provided, the site slopes downward from the northwest corner near elevation +135 feet NAVD88 to the east near elevation +80 feet NAVD88 and to the south near elevation +95 feet NAVD88. The slope gradient was fairly consistent across the site.

2.2 Subsurface Conditions

The Boring Location Plan and the Soil Profiles of the borings drilled for this Phase II study are attached as Appendix A. The borings were field located using a Garmin GPSMap 64ST Global Positioning System (GPS) unit with a reported accuracy of ±1 meter. Therefore, the boring locations should be considered approximate.

The borings encountered similar subsurface conditions as were encountered in the Phase I study borings. In general, the borings encountered sands, silty sands, clayey sands, and clays from the ground surface to the boring termination depth 10 feet to 60 feet below existing grade. The silty and clayey sands were generally very loose to dense and the clays were generally firm to very stiff.

The above subsurface description is of a generalized nature provided to highlight the major soil strata encountered. The Soil Profiles should be reviewed for specific subsurface conditions at each boring location. The stratification shown on the Soil Profiles represents the subsurface conditions at the actual boring locations only, and variations in the subsurface conditions can and may occur between boring locations and should therefore be expected. The stratification represents the approximate boundary between subsurface materials, and the transitions between strata may be gradual.

2.3 Groundwater Conditions

Groundwater was encountered in the borings at various elevations at the time of drilling (see Soil Profiles, Appendix A). The variability is due to multiple “perched” groundwater zones created by the lower permeability silty/clayey sands and the relatively impermeable clays inhibiting the vertical flow of groundwater and creating laterally flowing conditions. Groundwater levels should be expected to vary across the site depending on the elevations of these lower permeability strata and weather conditions. We recommend that the Contractor determine the actual groundwater levels at the time of construction to determine potential impacts groundwater can/will have on construction procedures. We would expect relatively shallow perched groundwater to be present beneath the site during all but the driest times.

2.4 Laboratory Soil Testing

Laboratory soil testing consisted of water content tests, wash #200 sieve tests, and Atterberg limits tests. The results of the tests can be found on the Soil Profiles opposite the samples tested (Appendix A) and are presented in Table 1 – Summary of Laboratory Tests (Appendix A).

3.0 EVALUATION AND RECOMMENDATIONS

3.1 General Comments

Based on our understanding of the proposed development, the subsurface conditions encountered in the exploration will provide adequate support for the proposed structures and pavements provided the recommendations presented in this report are followed. **Of note, the borings did encounter shallow perched groundwater and moisture sensitive soils which will create site work challenges during grading and compaction operations, as well as long term moisture concerns for structures in cut areas.** This is discussed in Sections 3.2 and 3.3.

The proposed school structure can be founded on shallow foundations provided the subsoils are prepared as noted in this report. An allowable soil bearing pressure of 2500 psf can be used to design the footings. Foundation recommendations for the school can be found in Section 3.4.

The fire safety water tank can be founded on a mat as desired with a contact pressure of 1000 psf. Ground storage tank recommendations can be found in Section 3.6.

Given the presence of shallow and variable groundwater conditions, we recommend that either graded aggregate base or recycled concrete base be used in the asphaltic pavement design. Pavement recommendations can be found in Section 3.7.

3.2 Groundwater Control

Shallow groundwater should be anticipated on the site during all but the driest of times, particularly in cut areas on the north/northwest side of the site. The installation of the sheet pile wall should act as a barrier to some degree for laterally flowing groundwater provided the sheets are tipped into or below the clay/clayey sands encountered along the wall alignment. Installing the sheets at the start of construction would maximize the impact they could have on groundwater flow beneath the site. Even with the sheet piles, additional measures will be required to manage long term shallow groundwater conditions on the site. We recommend that an FDOT Type II underdrain (Index 440-001 of the Standard Plans) be installed west of the structure and extend along the north side of the structure where cuts are proposed. The underdrain can either tie into the stormwater system or daylight away from the structure and any site retaining walls. The underdrain can be installed in the stormwater system excavation trench but should not be placed immediately beneath the stormwater pipe. The invert of the underdrain pipe should be set at an elevation equal to or lower than the invert of the stormwater pipe or a minimum of 5 feet depth below the bottom of the building slab, whichever depth is greater. The specified coarse aggregate for the underdrain should extend the full trench depth, to intercept as much laterally flowing groundwater as possible, with the surficial 1 foot of the excavation topped with a lower permeability silty and/or clayey sand soils (Stratum 2 or Stratum 3) to minimize surficial infiltration of stormwater runoff into the underdrain system.

The sheet pile walls and permanent underdrain system will not prevent the presence of shallow groundwater and/or saturated near surface soils at the time of site work operations. Construction measures will be required to contend with saturated near surface soils and/or bleeding into cut areas and footing excavation.

3.3 Site Preparation Recommendations

The native silty and clayey silty sands are very moisture sensitive and will prove impractical to compact if above optimum moisture. To reduce the opportunity for potential compaction problems, we recommend that site work be scheduled for a historically dry period if practical. The site should be graded during site work operations to facilitate stormwater runoff and prevent ponding of stormwater which will soften the native soils, making them unworkable. Runoff from adjacent higher elevation areas should be directed away from the site. Excavations should not be left open for an extended period of time as ponded water will soften the subsoils and likely require undercutting to firm underlying soils and backfilling with compacted fill. Additionally, hydrostatic forces created by laterally flowing groundwater could de-stabilize the sides of excavations and cause sloughing.

Native soils that are above optimum at the time of construction will need to be undercut to firmer underlying soils and backfilled with dry readily compactable fill as the fines content of these soils do not lend themselves to drying in a timely manner. Depending on conditions at the time of construction, it may be possible to undercut and bridge over underlying soft soils in lieu of undercutting to the deeper firm soils. Bridging is usually only permissible in pavement areas, and undercutting 3± feet and backfilling with clean coarse sand will typically bridge most soils. The use of geotextiles typically reduces the depth of undercutting to achieve stable conditions and is an alternative worth considering if yielding soils are encountered. This decision will need to be made in the field based on the conditions present at the time of construction and on the final grading plans. The initial lift of backfill in relatively wet excavations should be a clean coarse sand containing less than 5% fines as this type of soil is more readily compactable than most under increased moisture conditions. These soils also have the added benefit of acting as a capillary break. Excavations should be pumped as dry as possible prior to backfilling to allow placement of backfill soils under relatively dry conditions.

The sands (Stratum 5), slightly silty sands (Stratum 1), silty sands (Stratum 2), and clayey sands (Stratum 3) encountered in the borings can be used as structural fill in building and pavement areas. However, ***it is more likely than not that these soils will need to be moisture conditioned prior to using them as structural fill***. The deeper clay soils (Stratum 4), which will be encountered in cuts in the west/northwest portions of the site, are not suitable as structural fill and should either be wasted in green belt areas or removed from the site. A unit bid price should be obtained for importing readily compactable sandy soils similar to the Stratum 1, 2, 3, and 5 soils.

The proposed development areas should be cleared, grubbed, stripped of topsoil and other deleterious materials. Excavations made to remove the significant root systems expected (given the size of the trees present on the site) should be backfilled with soils compacted to a minimum soil density of 93% of the Modified Proctor test (ASTM D1557).

Prior to placing fill soils, where applicable, the top of the ground surface should be stabilized and compacted to a minimum soil density of 93% of the Modified Proctor test (ASTM D1557). Vibratory compaction equipment is not recommended on the site due to the presence of moisture sensitive soils and elevated moisture conditions. If yielding soils are encountered, fill/compaction operations should be halted and the engineer contacted so that an evaluation can be made and recommendations rendered to resolve the issue.

Structural fill soils in the building and pavement areas should be placed in maximum 8 inch (loose thickness) lifts compacted to a minimum soil density of 95% of the Modified Proctor test (ASTM D1557).

In cut areas, clay soils (Stratum 4) present at the top of pavement subgrade and/or building pad elevation should be undercut a minimum depth of 2 feet and backfilled with readily compactible sandy soils placed in maximum 8 inch (loose thickness) lifts compacted to a minimum soil density of 98% of the Modified Proctor test (ASTM D1557).

3.4 Foundation Recommendations

We recommend placing 6 inches of #57 stone in the bottom of all footings. The stone should be fabric wrapped and compacted to a firm non-yielding mass. The stone should be placed atop native and/or fill soils compacted to a target density of 98% of the Modified Proctor test (ASTM D1557). If clay soils are encountered in the bottom of the footing excavations, they should not be compacted but should be probed and approved for bearing by the engineer. Soft soils will require undercutting to firm underlying soils and the excavation backfilled with soils compacted to a minimum soil density of 98% of the modified Proctor test, with #57 stone wrapped in fabric and compacted to a firm non-yielding mass, with excavatable flowable fill, or with concrete. The most favorable alternative can be assessed at the time of construction based on the conditions encountered.

Based on the reported structural loads, the subsurface conditions encountered in the borings are suitable for founding the proposed school building on spread footings. Footings having a minimum width of 1.5 feet and a minimum embedment of 1.5 feet below finished exterior grades can be designed for an allowable soil bearing pressure of 2500 psf.

Settlements in the building area will result from the weight of the structural fill and the building loads. Settlements will consist of both short term elastic compression of the sandy soils and long term consolidation of the softer, more deeply bedded clay soils. Short term settlements as a result of the building fill, estimated to range from approximately 1 inch to 4 inches, will occur during placement of the fill or within several weeks thereafter, and should not impact the proposed structure. Long term settlements due the building fill will occur over several years; however, the magnitude of the calculated long term settlement ($^1/_4$ inch or less) and the relative uniformity of the long term settlement should also not negatively impact the proposed structure.

Elastic short term settlement of the sands beneath the footings due to the building loads are expected to range from approximately ½ inch to 1 inch, and should occur immediately upon or soon after loading. No appreciable settlement due to the potential clay soils near the bottom of the footings are expected given the firmness of these materials.

3.5 Floor Slab Recommendations

We recommend that the top 6 inches of subgrade in the slab area consist of a clean coarse sand containing less than 5% fines compacted to a minimum soil density of 95% of the Modified Proctor test (ASTM D1557). A modulus of subgrade reaction of 80 pci can be used for floor slab design provided the slab is placed on soils similar to the near surface in-situ soils prepared in accordance with the recommendations presented in this report. To reduce the possibility of slab cracking due to minor differential settlement, we recommend that the floor slab be structurally isolated from foundations or that transitions from foundation-supported building elements to soil supported floors be reinforced.

3.6 Ground Storage Tank Foundation Recommendations

Based on the subsurface conditions encountered in the borings and the expected mat foundation elevation of approximately +115 feet, foundation soils could be either sands with silt and clay, or clay. As with the building footings discussed above, if sandy soils are present, they should be compacted to a minimum soil density of 98% of the Modified Proctor test (ASTM D1557) to a depth of 12 inches below the bottom of the mat. If clay soils are encountered at the mat foundation elevation, they should not be compacted but should be probed and approved for bearing by the engineer. Soft soils will require undercutting to firm underlying soils and the excavation backfilled with soils compacted to a minimum soil density of 98% of the Modified Proctor test (ASTM D1557), with #57 stone wrapped in fabric and compacted to a firm non-yielding mass, with excavatable flowable fill, or with concrete. The most favorable alternative can be assessed at the time of construction based on the conditions encountered.

At the reported mat contact pressure of 1000 psf, settlements should be less than 1 inch. The mat can be designed using a modulus of subgrade reaction of 80 pci.

3.7 Pavement Recommendations

Based on the subsurface conditions encountered and our understanding of finished grades, a flexible pavement section consisting of asphaltic concrete and graded aggregate base (GAB) or recycled concrete base should be suitable for the proposed pavement section. A moisture resistant base such as GAB or recycled concrete is recommended due to erratic groundwater conditions on the site and the moisture sensitivity of the near surface site soils. It should be noted that even with the minimal anticipated grade changes in the pavement areas over the majority of the site, shallow perched groundwater may be encountered. In such case, perimeter underdrains or ditches should be installed on the uphill (west/northwest) sides of the pavement areas to intercept laterally flowing groundwater on the site. This can be further evaluated during construction based on the conditions observed after grading.

The base course should be compacted to a minimum soil density of 98% of the Modified Proctor test (ASTM D1557). Stabilized subgrade having a minimum LBR of 40 should be installed beneath flexible and rigid pavements, and should be compacted to a minimum soil density of 98% of the

Modified Proctor test (ASTM D1557). The native silty and clayey sands should meet this LBR requirement but should be tested to confirm.

Clay soils (Stratum 4) encountered at the top of subgrade elevation in the pavement areas should be undercut a minimum depth of 2 feet and backfilled with readily compactible soil placed lifts compacted to a minimum soil density of 95% of the Modified Proctor test (ASTM D1557) with the top 12 inches of subgrade consisting on a material having a minimum LBR value of 40 and compacted to a minimum soil density of 98% of the Modified Proctor test (ASTM D1557).

While designing the pavement section(s) for the proposed development was beyond the scope of our service, typical light duty flexible pavement sections for developments of this type in the local area consist of a minimum of 6 inches of base and a minimum of 1½ inches of Superpave SP-12.5 asphaltic concrete. Moderate duty pavement sections typically consist of a minimum of 8 inches of base and a minimum of 2 inches of Superpave SP-12.5 asphaltic concrete, while heavy duty pavement sections typically consist of a minimum of 8 inches of base and a minimum of 3½ inches of Superpave SP-12.5 asphaltic concrete. Typical rigid pavement sections for developments of this type in the local area consist of a minimum of 6 inches of concrete having a minimum flexural strength of 650 lbs/in^2. Joints should be doweled, the details of which should be provided by a licensed structural engineer.

The above sections represent minimum thicknesses representative of typical, local construction practices, and as such periodic maintenance should be anticipated. All pavement materials and construction procedures should conform to FDOT and/or appropriate city or county requirements.

3.8 Sheet Pile Wall Recommendations

To assist the structural engineer in designing the sheet pile wall in the northwestern portion of the site, geotechnical design parameters have been estimated based on the four borings drilled along the proposed wall alignment (B-16 through B-19). Both drained (“long term”) and undrained (“short term”) values are provided so that each condition can be evaluated. The parameters are presented in Table 2 (Appendix B).

4.0 REPORT LIMITATIONS

The recommendations submitted are based on the available soil information obtained by Tierra, Inc. and design details furnished by the design team for the subject project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, Tierra should be notified immediately to determine if changes in the foundation, or other, recommendations are required. If Tierra is not retained to perform these functions, we cannot be responsible for the impact of such conditions on the performance of the project.

The findings, recommendations, specifications, and professional advice contained herein have been made in accordance with generally accepted professional Geotechnical engineering practices in the local area.

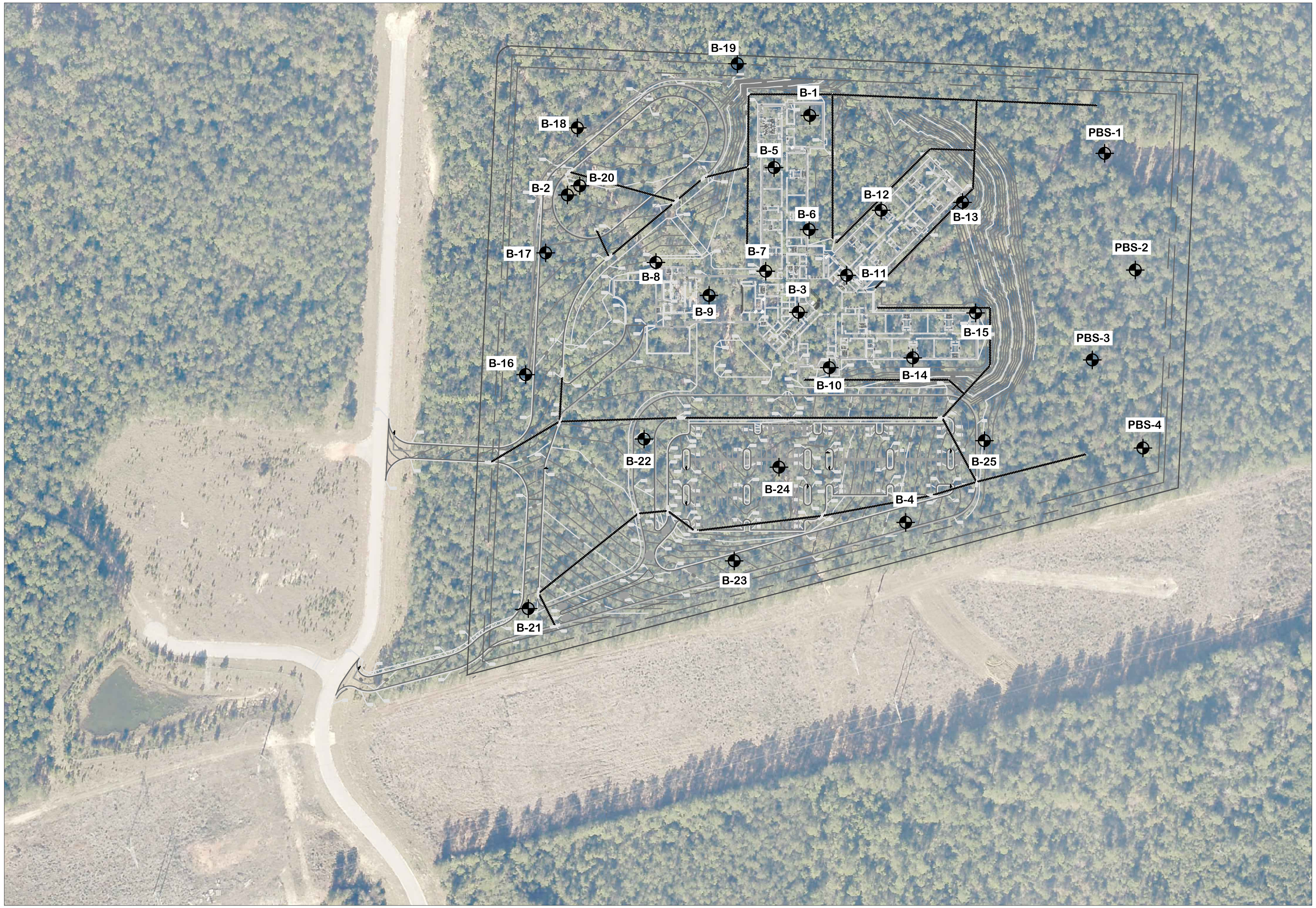
After the plans and specifications are more complete, the Geotechnical engineer should be provided the opportunity to review the final design plans and specifications to assure our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Santa Rosa County School District for the specific application to the subject project.

APPENDIX A

Boring Location Plan

Soil Profiles

Table 1 – Summary of Laboratory Tests



NOTE: BASE MAP PROVIDED BY McKIM AND CREED, INC.

BORING LOCATION PLAN

0 200'

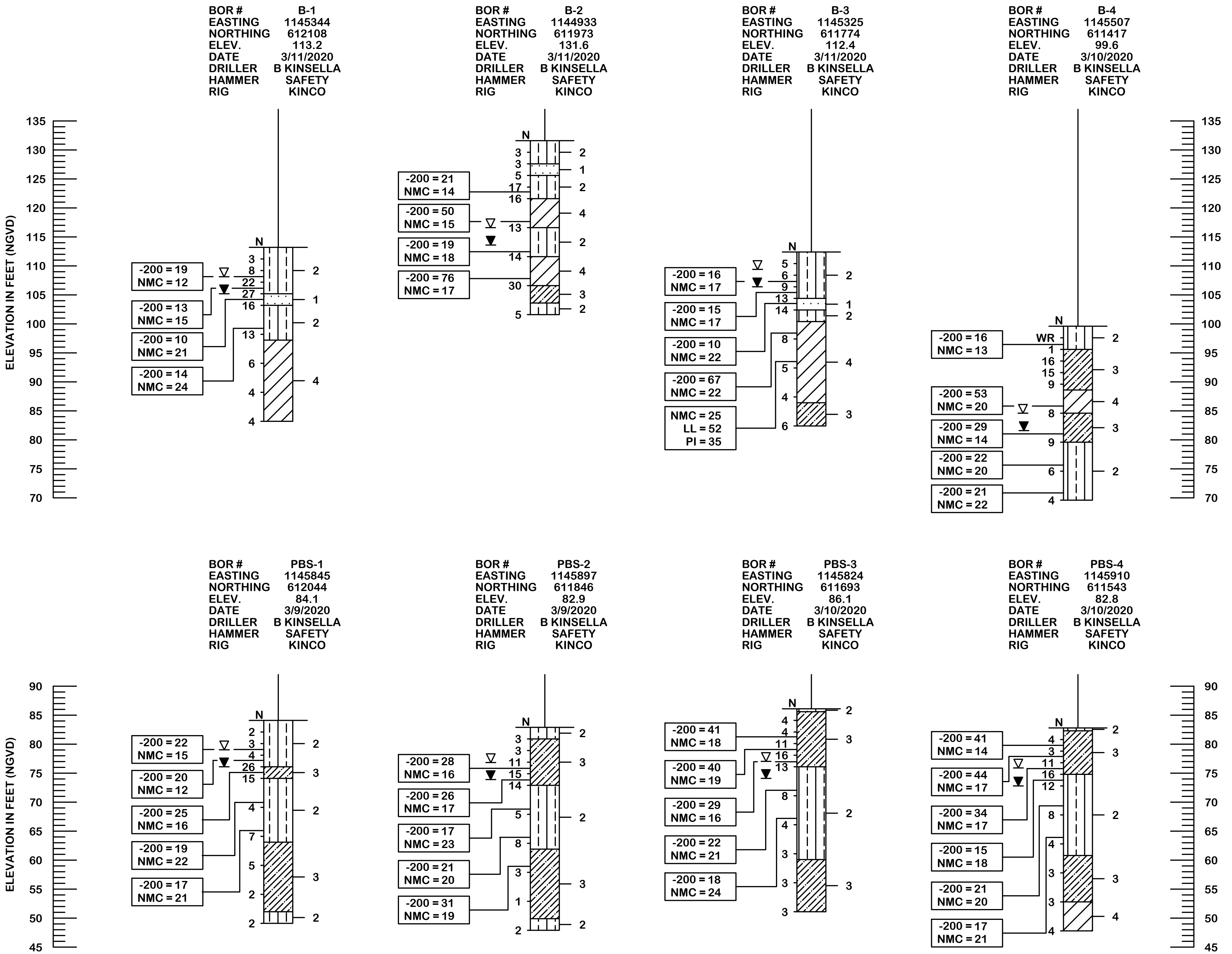
PLAN SCALE

LEGEND

APPROXIMATE LOCATION OF SPT BORING

DRAWN BY: SW	APPROVED BY: SJS	ENGINEER OF RECORD: SARAH J. SANCHEZ, P.E.	TIERRA 1300 West Main Street Pensacola, Florida 32502 Phone: 850-462-8774 Fax: 850-462-8784 FL Cert. No.: 6486	SCALE: NOTED	PROJECT NUMBER: 4511-20-020	GEOTECHNICAL ENGINEERING SERVICES SRC PACE SCHOOL A SANTA ROSA COUNTY, FLORIDA	SHEET 1
CHECKED BY: SJS	DATE: MAY 2020	FLORIDA LICENSE NO.: 51033					

SOIL PROFILES



LEGEND

1 TAN SLIGHTLY SILTY SAND (SP/SM - SM/SP)

2 BROWN, TAN, YELLOW, ORANGE, RED SILTY SAND (SM)

3 TAN, YELLOW, ORANGE, RED, LIGHT GRAY CLAYEY SAND (SC)

4 YELLOW, ORANGE, PINK, GRAY CLAY (CL/CH)

5 TAN, YELLOW SAND (SP)

▼ GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

N SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)

SP UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.

WR FELL UNDER WEIGHT OF ROD

-200 PERCENT PASSING #200 SIEVE

NMC NATURAL MOISTURE CONTENT (%)

LL LIQUID LIMIT (%)

PI PLASTICITY INDEX (%)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS- RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

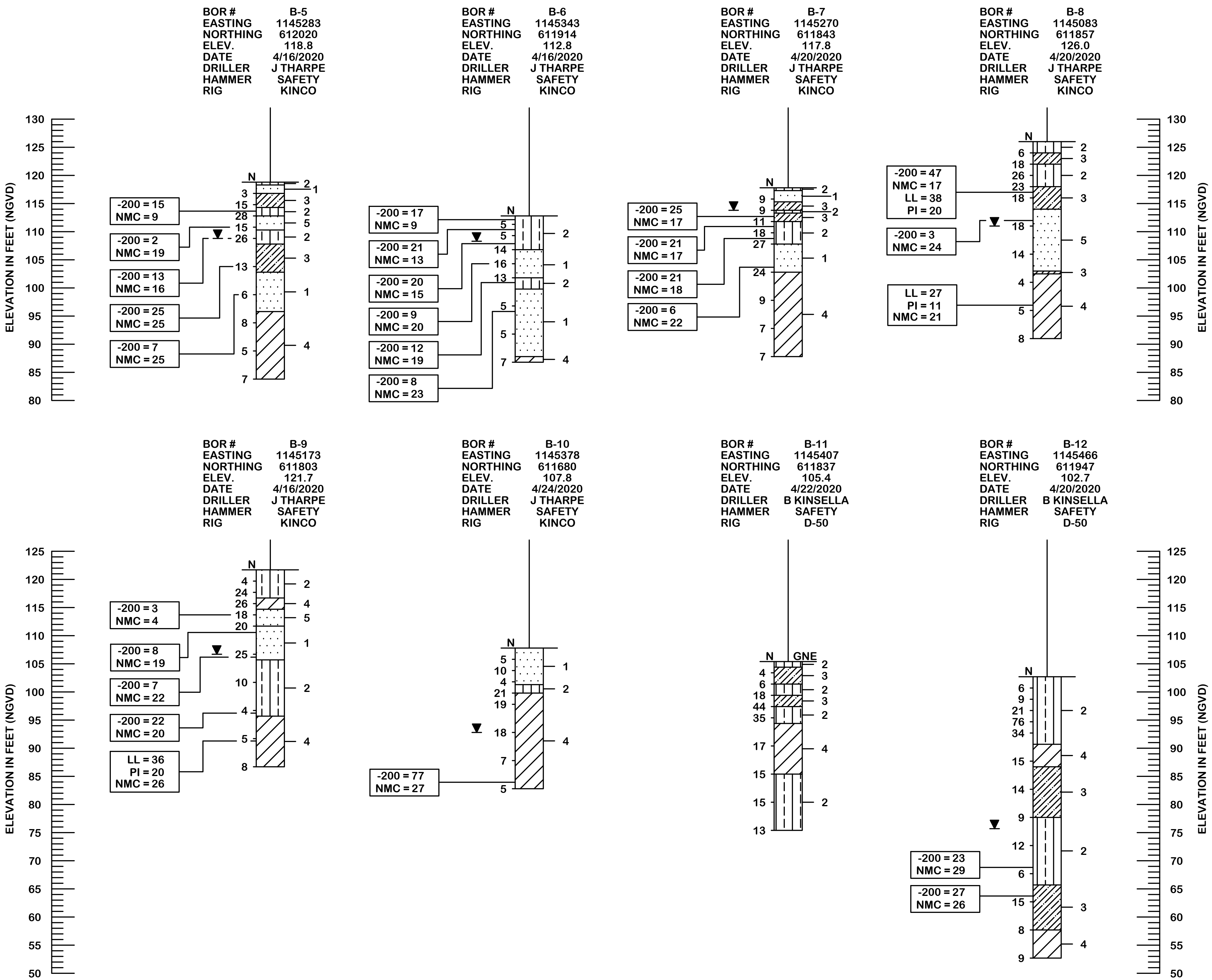
DRAWN BY: SW
CHECKED BY: SJS
APPROVED BY: SJS
DATE: MAY 2020
ENGINEER OF RECORD: SARAH J. SANCHEZ, P.E.
FLORIDA LICENSE NO.: 51033

TIERRA
1300 West Main Street
Pensacola, Florida 32502
Phone: 850-462-8774 Fax: 850-462-8784
FL Cert. No.: 6486

SCALE: NOTED
PROJECT NUMBER: 4511-20-020

GEOTECHNICAL ENGINEERING SERVICES
SRC PACE SCHOOL A
SANTA ROSA COUNTY, FLORIDA

SOIL PROFILES



LEGEND

1 TAN SLIGHTLY SILTY SAND (SP/SM - SM/SP)

2 BROWN, TAN, YELLOW, ORANGE, RED SILTY SAND (SM)

3 TAN, YELLOW, ORANGE, RED, LIGHT GRAY CLAYEY SAND (SC)

4 YELLOW, ORANGE, PINK, GRAY CLAY (CL/CH)

5 TAN, YELLOW SAND (SP)

▼ GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

N SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)

SP UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.

WR FELL UNDER WEIGHT OF ROD

-200 PERCENT PASSING #200 SIEVE

NMC NATURAL MOISTURE CONTENT (%)

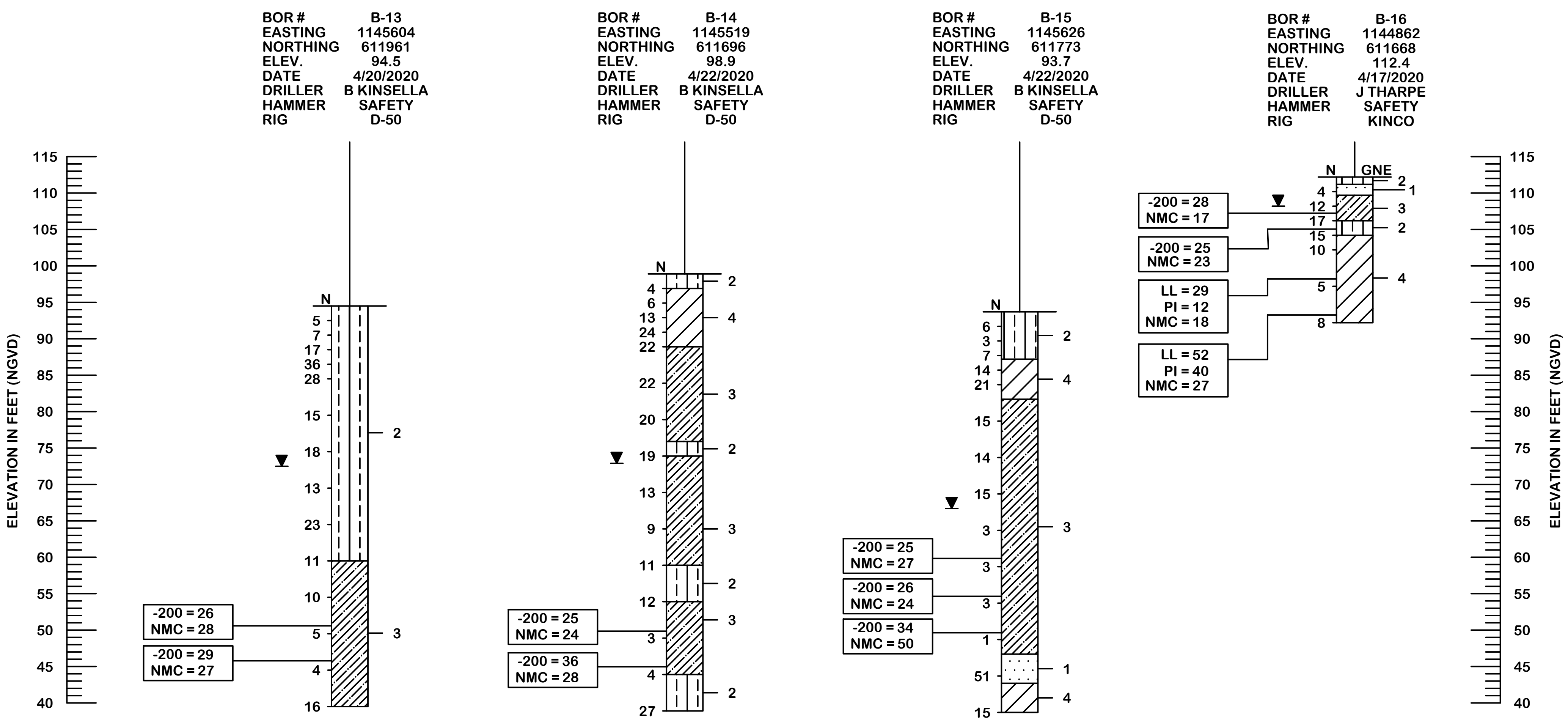
LL LIQUID LIMIT (%)

PI PLASTICITY INDEX (%)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

DRAWN BY: SW CHECKED BY: SJS	APPROVED BY: SJS DATE: MAY 2020	ENGINEER OF RECORD: SARAH J. SANCHEZ, P.E. FLORIDA LICENSE NO.: 51033	TIERRA 1300 West Main Street Pensacola, Florida 32502 Phone: 850-462-8774 Fax: 850-462-8784 FL Cert. No.: 6486	SCALE: NOTED	PROJECT NUMBER: 4511-20-020	GEOTECHNICAL ENGINEERING SERVICES SRC PACE SCHOOL A SANTA ROSA COUNTY, FLORIDA	SHEET 3

SOIL PROFILES



LEGEND

1 TAN SLIGHTLY SILTY SAND (SP/SM - SM/SP)

2 BROWN, TAN, YELLOW, ORANGE, RED SILTY SAND (SM)

3 TAN, YELLOW, ORANGE, RED, LIGHT GRAY CLAYEY SAND (SC)

4 YELLOW, ORANGE, PINK, GRAY CLAY (CL/CH)

5 TAN, YELLOW SAND (SP)

▼ GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

N SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)

SP UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.

WR FELL UNDER WEIGHT OF ROD

-200 PERCENT PASSING #200 SIEVE

NMC NATURAL MOISTURE CONTENT (%)

LL LIQUID LIMIT (%)

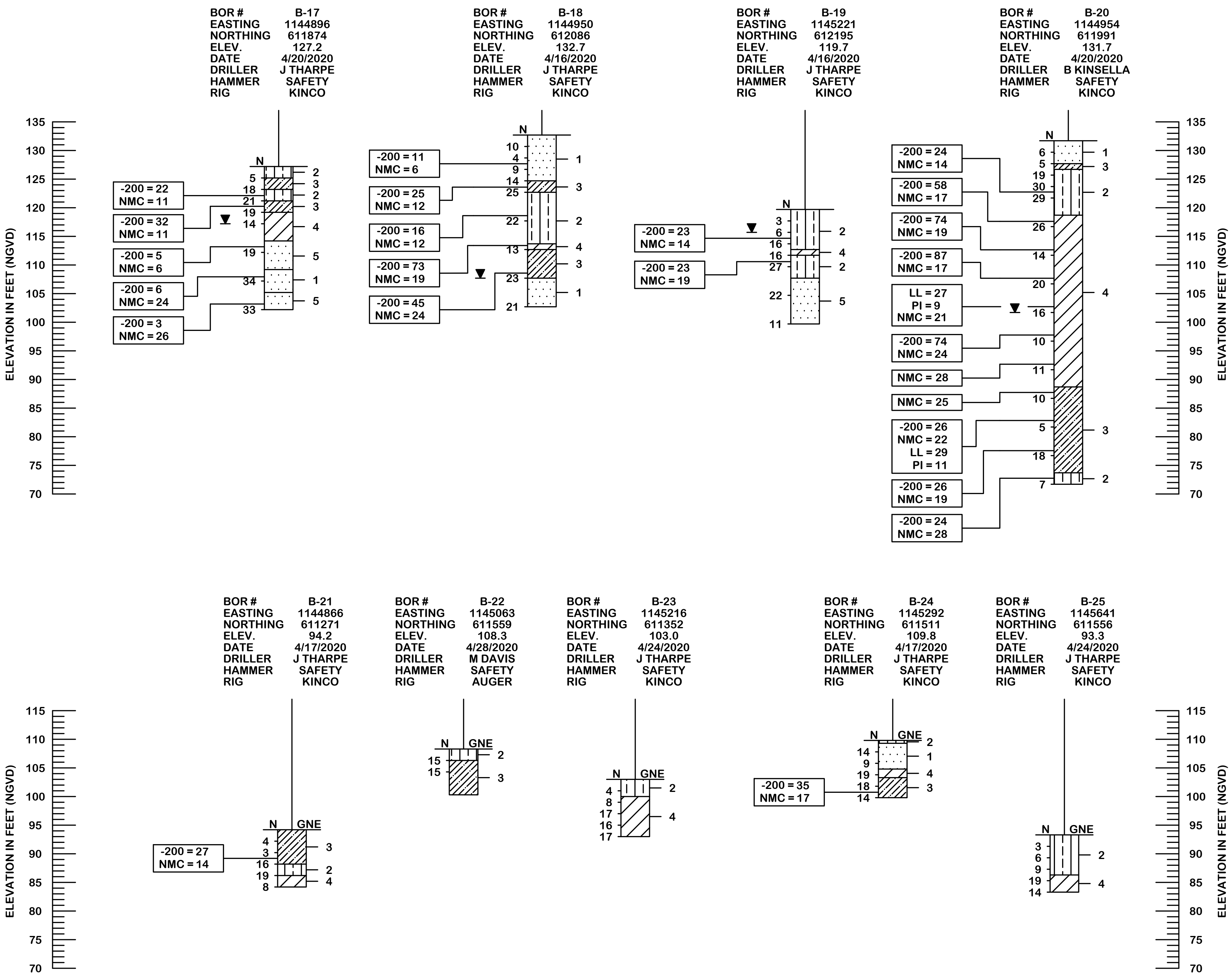
PI PLASTICITY INDEX (%)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

DRAWN BY: SW CHECKED BY: SJS	APPROVED BY: SJS DATE: MAY 2020	ENGINEER OF RECORD: SARAH J. SANCHEZ, P.E. FLORIDA LICENSE NO.: 51033	TIERRA 1300 West Main Street Pensacola, Florida 32502 Phone: 850-462-8774 Fax: 850-462-8784 FL Cert. No.: 6486	SCALE: NOTED	PROJECT NUMBER: 4511-20-020	GEOTECHNICAL ENGINEERING SERVICES SRC PACE SCHOOL A SANTA ROSA COUNTY, FLORIDA

SHEET 4

SOIL PROFILES



LEGEND

1 TAN SLIGHTLY SILTY SAND (SP/SM - SM/SP)

2 BROWN, TAN, YELLOW, ORANGE, RED SILTY SAND (SM)

3 TAN, YELLOW, ORANGE, RED, LIGHT GRAY CLAYEY SAND (SC)

4 YELLOW, ORANGE, PINK, GRAY CLAY (CL/CH)

5 TAN, YELLOW SAND (SP)

▼ GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

▽ ESTIMATED SEASONAL HIGH GROUNDWATER TABLE

N SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)

SP UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW.

WR FELL UNDER WEIGHT OF ROD

-200 PERCENT PASSING #200 SIEVE

NMC NATURAL MOISTURE CONTENT (%)

LL LIQUID LIMIT (%)

PI PLASTICITY INDEX (%)

	SAFETY HAMMER	AUTOMATIC HAMMER
GRANULAR MATERIALS-RELATIVE DENSITY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	LESS THAN 4 4 to 10 10 to 30 30 to 50 GREATER THAN 50	LESS THAN 3 3 to 8 8 to 24 24 to 40 GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT N-VALUE (BLOWS/FT.)	SPT N-VALUE (BLOWS/FT.)
VERY SOFT SOFT FIRM STIFF VERY STIFF HARD	LESS THAN 2 2 to 4 4 to 8 8 to 15 15 to 30 GREATER THAN 30	LESS THAN 1 1 to 3 3 to 6 6 to 12 12 to 24 GREATER THAN 24

DRAWN BY: SW
CHECKED BY: SJS
APPROVED BY: SJS
DATE: MAY 2020
ENGINEER OF RECORD: SARAH J. SANCHEZ, P.E.
FLORIDA LICENSE NO.: 51033

TIERRA
1300 West Main Street
Pensacola, Florida 32502
Phone: 850-462-8774 Fax: 850-462-8784
FL Cert. No.: 6486

SCALE: NOTED
PROJECT NUMBER: 4511-20-020

GEOTECHNICAL ENGINEERING SERVICES
SRC PACE SCHOOL A
SANTA ROSA COUNTY, FLORIDA

SHEET 5

TABLE 1
SUMMARY OF LABORATORY CLASSIFICATION TEST RESULTS
SCR SCHOOL A - PHASE II
SANTA ROSA COUNTY, FLORIDA
TIERRA PROJECT NO. 4511-20-020

STRATUM	BORING	SAMPLE DEPTH (ft)			MOISTURE CONTENT (%)	SIEVE ANALYSES (% PASSING)	ATTERBERG LIMITS		USCS
						#200	LL	PI	
2	B-5	4.5	-	6.0	9	15	--	--	SM
5	B-5	7.0	-	8.5	19	2	--	--	SP
2	B-5	9.5	-	11.0	16	13	--	--	SM
3	B-5	14.5	-	16.0	25	25	--	--	SC
1	B-5	19.5	-	21.0	25	7	--	--	SP-SM
2	B-6	0.0	-	1.5	9	17	--	--	SM
2	B-6	2.0	-	3.5	13	21	--	--	SM
2	B-6	4.5	-	6.0	15	20	--	--	SM
1	B-6	7.0	-	8.5	20	9	--	--	SM/SP
2	B-6	9.5	-	11.0	19	12	--	--	SM
1	B-6	14.5	-	16.0	23	8	--	--	SP/SM
2	B-7	4.0	-	6.0	17	25	--	--	SM
2	B-7	6.0	-	8.0	17	21	--	--	SM
2	B-7	8.0	-	10.0	18	21	--	--	SM
1	B-7	13.0	-	15.0	22	6	--	--	SP/SM
4	B-8	8.0	-	10.0	17	47	38	20	SC
5	B-8	13.0	-	15.0	24	3	--	--	SP
4	B-8	28.0	-	30.0	21	--	27	11	CL
5	B-9	7.0	-	8.5	4	3	--	--	SP
1	B-9	9.5	-	11.0	19	8	--	--	SP/SM
1	B-9	14.5	-	16.0	22	7	--	--	SP/SM
2	B-9	24.5	-	26.0	20	22	--	--	SM
4	B-9	29.5	-	31	26	--	36	20	CL
4	B-10	23.0	-	25.0	27	77	--	--	CL
2	B-12	33.0	-	35.0	29	23	--	--	SM
3	B-12	43.0	-	45.0	26	27	--	--	SC
3	B-13	43.0	-	45.0	28	26	--	--	SC
3	B-13	48.0	-	50.0	27	29	--	--	SC
3	B-14	48.0	-	50.0	24	25	--	--	SC
3	B-14	53.0	-	55.0	28	36	--	--	SC
3	B-15	33.0	-	35.0	27	35	--	--	SC
3	B-15	38.0	-	40.0	24	26	--	--	SC
3	B-15	43.0	-	45.0	50	34	--	--	SC
3	B-16	4.0	-	6.0	17	28	--	--	SC
4	B-16	6	-	8	23	25	--	--	CL
4	B-16	13	-	15	18	--	29	12	SC
4	B-16	18	-	20	27	--	52	40	CH
2	B-17	4	-	6	11	22	--	--	SM
3	B-17	6	-	8	11	32	--	--	SC
5	B-17	13	-	15	6	5	--	--	SP
1	B-17	18	-	20	24	6	--	--	SP/SM
5	B-17	23	-	25	26	3	--	--	SP
1	B-18	4.0	-	6.0	6	11	--	--	SM/SP
2	B-18	8.0	-	10.0	12	25	--	--	SM
2	B-18	13.0	-	15.0	12	16	--	--	SM
4	B-18	18.0	-	20.0	19	73	--	--	CL
3	B-18	23	-	25	24	45	--	--	SC
2	B-19	4	-	6	14	23	--	--	SM
2	B-19	8	-	10	19	23	--	--	SM
2	B-20	8	-	10	14	24	--	--	SM
4	B-20	13	-	15	17	58	--	--	CL
4	B-20	18	-	20	19	74	--	--	CL
4	B-20	23	-	25	17	87	--	--	CL
4	B-20	28	-	30	21	--	27	9	CL
4	B-20	33	-	35	24	74	--	--	CL
4	B-20	38.0	-	40.0	28	--	--	--	CL
4	B-20	43.0	-	45.0	25	--	--	--	CL
4	B-20	48	-	50	22	26	29	11	SC
3	B-20	53	-	55	19	26	--	--	SC
3	B-20	58	-	60	28	24	--	--	SC
3	B-21	4.0	-	6.0	14	27	--	--	SC
3	B-24	8	-	10	17	35	--	--	SC

APPENDIX B

Table 2 – Sheet Pile Wall Parameters

TABLE 2
GEOTECHNICAL DESIGN PARAMETERS FOR STEEL SHEET PILE WALLS
SCR NEW PACE SCHOOL A
PHASE II STUDY
SANTA ROSA COUNTY, FLORIDA
TIERRA PROJECT NO. 4511-20-020

WALL	REFERENCE BORING	APPROXIMATE STRATUM ELEVATION (ft NAVD 88)	USCS [(1)]	SHWT [(2)] (ft NAVD 88)	UNIT WEIGHT (pcf)		SOIL FRICTION ANGLE (degrees)		COHESION (psf)		Initial Soil Modulus, k (psi)	Ultimate Soil Strain, E_{50}	WALL / SOIL ADHESION [(3)] (psf)		WALL / SOIL FRICTION [(3)] (degrees)	
					Total	Effective	Short Term (Undrained)	Long Term (Drained)	Short Term (Undrained)	Long Term (Drained)			Short Term (Undrained)	Long Term (Drained)	Short Term (Undrained)	Long Term (Drained)
South Side of Wall	B-16	112 - 104	SM-SP, SC	111	110	48	32	32	---	---	35	---	---	---	17	17
		104 - 92	CL-CH		110	48	---	18	1000	50	---	0.015	500	---	---	9
South Side of Wall	B-17	127 - 119	SM, SC	127	115	53	33	33	---	---	44	---	---	---	17	17
		119 - 114	CL-CH		115	53	---	18	1500	75	---	0.010	750	---	---	9
		114 - 102	SM-SP		115	53	34	34	---	---	65	---	---	---	17	17
North Side of Wall	B-18	133 - 114	SM	115	112	48	33	33	---	---	50	---	---	---	17	17
		114 - 113	CL-CH		110	48	---	18	1000	50	---	0.015	500	---	---	9
		113 - 103	SC, SP-SM		112	48	33	33	---	---	50	---	---	---	17	17
North Side of Wall	B-19	120 - 113	SM, SC	114	105	43	30	30	---	---	12	---	---	---	17	17
		113 - 112	CL-CH		110	48	---	18	1000	50	---	0.015	500	---	---	9
		112 - 100	SM, SP-SM		115	53	33	33	---	---	50	---	---	---	17	17

Notes: (1) USCS - Unified Soil Classification System
(2) SHWT - Seaonal High Water Table
(3) Adhesion & Wall/Soil Friction values apply to uncoated steel sheets only. If coated sheets are used, these values should be zero and not used in computing Kp.