GEOTECHNICAL ENGINEERING REPORT

ECP Gate 3 Apron – Limited Existing Pavement Evaluation

Bay County, Florida

PREPARED FOR:
ZHA, Inc.
6300 West Bay Parkway
Suite 5052
Panama City, Florida 32409

NOVA Project Number: 7216101r1

December 10, 2016

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December 10, 2016

ZHA, Inc.
6300 West Bay Parkway
Suite 5052
Panama City, Florida 32409

Attention: Ms. Jennifer Wolgamott, RA, AIA

Subject: Report of Limited Existing Pavement Evaluation
ECP Gate 3 Apron
Bay County, Florida
NOVA Project Number 7216101r1

Dear Ms. Wolgamott,

NOVA Engineering and Environmental LLC (NOVA) has completed the authorized limited existing pavement evaluation for the ECP Gate 3 Apron project in Bay County, Florida. The work was performed in general accordance with NOVA proposal number 011-20167076, dated October 3, 2016 and with industry standards.

This report briefly discusses our understanding of the project at the time of the subsurface exploration, describes the geotechnical consulting services provided by NOVA, and presents our findings, conclusions and commentary.

We appreciate your selection of NOVA and the opportunity to be of service on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,
NOVA Engineering and Environmental LLC

B. Webster

Bailey N. Webster, E.I.
Staff Engineer
Florida Registration No. 1100020349

CHRISTOPHER JAMES CONWAY
No. 78082

Christopher J. Conway, P.E.
Branch Manager
Florida Registration No. 78082

Digitally signed by Christopher J. Conway, P.E.
Date: 2016.12.10 13:20:37 -06'00'

Copies Submitted: Addressee (electronic)

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APPENDIX

1.0 INTRODUCTION

1.1 PROJECT INFORMATION

Our understanding of the existing pavement distress is based on recent conversations and email exchanges with ZHA, Inc. personnel; review of aerial photography and public record data via internet-based GIS software; review of Bay County Property Appraiser information posted on their website for the subject property; observations during our field services; and our past recent experience providing geotechnical consulting services for other projects in this general locale.

The areas included in this exploration comprise a limited portion of the existing pavement areas near Gate 3 at the Northwest Florida Beaches International Airport (ECP) in Panama City, Bay County, Florida. NOVA understands that a portion of the existing pavement within the airplane drive lane adjacent to the existing concrete apron along the Gate 3 approach has experienced distress. The primary reported distress consists of distortion in the form of two (2) depressions.

Please note, this report is limited to an existing pavement evaluation of a limited portion of the existing apron area present adjacent to ECP Gate 3; hence, additional information regarding overall site development is not relevant.

1.2 SCOPE OF WORK

1.2.1 GEOTECHNICAL

ZHA, Inc. engaged NOVA to provide geotechnical engineering consulting services for the ECP Gate 3 – Limited Existing Pavement Evaluation project. This report briefly discusses our understanding of the project, describes our exploratory procedures and presents our findings, conclusions, and commentary.

The primary objective of this study was to provide a limited pavement evaluation and geotechnical exploration of the existing pavement section and underlying near surface soils within the areas of reported distress within the ECP Gate 3 apron area and to assess these findings as they relate to potential causes of the observed distress and general commentary regarding potential repairs. The authorized geotechnical engineering services included three (3) pavement cores with subsequent hand auger borings and dynamic cone penetrometer (DCP) testing, soil sampling, laboratory testing, engineering evaluation of the field and laboratory data, and the preparation of this report. The approximate core/boring locations are shown on the attached Core/Boring Location Plan.

The assessment of site environmental conditions, including the presence of wetlands or detection of pollutants in the soil, rock or groundwater, laboratory testing of samples, or a site-specific seismic study was beyond the scope of this geotechnical study. If requested, NOVA can provide these services.

2.0 SITE DESCRIPTION

2.1 GENERAL

The subject area of study comprises a limited portion of the existing asphaltic concrete pavement section comprising a portion of the apron area adjacent to Gate 3 within the Northwest Florida Beaches International Airport. Based on visual observations, two areas of distressed pavement were noted along the airplane drive line approach to Gate 3. The primary observed distress consists of distortion in the form of depressions. Two (2) depressions were noted along the airline rear wheel drive path and were approximated to be about 6 feet wide by 10 feet long and about 4-inches to 8-inches deep at the center of depressions as referenced from the surrounding pavement surface. The distorted areas appeared to begin about 10 feet to 11 feet south of the existing concrete apron area and slope down to the bottom of the depression. We understand that the pavement section was designed to include a 10-foot extended section of reinforced Portland Cement Concrete (PCC) "transitional" slab overlain with asphaltic concrete which abuts the edge of the concrete apron. Beyond the transitional PCC slab area, the pavement design included limerock base and 5-inches of asphaltic concrete. The distorted pavement appears to be occurring outside of the limits of the "transitional" slab area. In addition, various linear, and generally straight, cracks were noted in the asphalt pavement surface. The cracks appear to coincide with the leading outer edge and sawcut joints of the underlying concrete transition slab as presented in the design documents. For clarity, a typical cross-section of the design pavement section prepared by PBS&J is included in the Appendix of this report.

2.2 GEOLOGY / HYDROLOGY

2.2.1 SITE AND AREA GEOLOGY

According to the United States Geological Survey (USGS), the subject site is located in Bay County within the Gulf Coastal Plain, separated from the Florida Platform by geologic structures known as the Gulf Trough and Apalachicola Embayment. These structures formed a bathymetric and environmental barrier from the earliest Eocene or earliest Oligocene periods into the Miocene.

According to the "Text to Accompany the Geologic Map of Florida" by Scott, 2001, the site is generally underlain by undifferentiated sediments deposited during the Quaternary period. These sediments typically consist of siliciclastics (sand), organics and freshwater carbonates. These soils are highly permeable and form the Sand and Gravel Aquifer of the surficial aquifer system.

Surficial soils in the region are primarily siliciclastic sediments deposited in response to the renewed uplift and erosion in the Appalachian highlands to the north and sea-level fluctuations. The extent and type of deposit is influenced by numerous factors, including mineral composition of the parent rock and meteorological events.

2.2.2 GROUNDWATER

Groundwater in the Gulf Coastal Plain typically occurs as an unconfined aquifer condition. Recharge is provided by the infiltration of rainfall and surface water through the soil overburden. More permeable zones in the soil matrix can affect groundwater conditions. The groundwater table is expected to be a subdued replica of the original surface topography. Based on our visual site observations, we anticipate the groundwater flow at the site to be generally to the south towards the nearby West Bay.

3.0 FIELD AND LABORATORY PROCEDURES

3.1 FIELD EXPLORATION

The core/boring locations, provided by ECP personnel, were established in the field based on visual observations. Consequently, the referenced core/boring locations should be considered approximate.

Our field exploration at the subject site included performing three (3) pavement cores with subsequent hand auger borings and DCP testing that were each advanced to a depth of approximately 4½ feet below existing grade (BEG). Two (2) cores/borings were performed within the distressed pavement areas and one (1) core/boring was performed outside of the limits of the typical airplane drive path for comparison (background boring). The approximate core/boring locations are depicted on the Core/Boring Location Plan provided in the Appendix of this report. Drilling, testing and sampling operations were performed in general accordance with ASTM designations and other industry standards.

The DCP test procedure used during the evaluation is as follows. The cone point of the hand operated penetrometer is first seated 2 inches into the soil subgrade material to embed the point. The cone point is driven three 1¾ inch intervals using a 15-pound weight falling 20 inches. The penetrometer test result is the number of blows required to drive the cone point 1¾ inches. When properly evaluated, the penetrometer test results provide an index for estimating soil strength and relative density.

The Test Boring Records in the Appendix present the soil conditions encountered. These records represent our interpretation of the subsurface conditions based on the field exploration data, visual examination of the samples, and generally accepted geotechnical engineering practices. The stratification lines and depth designations represent approximate boundaries between various subsurface strata. Actual transitions between materials may be gradual. Also, subsurface conditions across the site may vary relative to those present at the core/boring locations.

The groundwater levels reported on the Test Boring Records represent measurements made after the completion of the borings. The bore holes were backfilled with quick-setting, bag-mix concrete materials and allowed to initially set and then the pavement core locations were filled with cold-patch asphalt for safety concerns upon completion of the borings. The approximate locations of the borings are depicted on the Core/Boring Location Plan in the Appendix. Please refer to the Test Boring Records and Dynamic Cone Penetrometer Test Results included in the Appendix for the pavement section and subsurface conditions encountered at the specific core/boring locations.

3.2 LABORATORY TESTING

Asphalt cores were obtained and returned to our testing laboratory to be photographed and measured. Grab/bulk soil samples were obtained from the hand auger boring equipment and returned to our testing laboratory, where they were classified using visual/manual methods in accordance with the Unified Soil Classification System (USCS) and ASTM designations. The descriptions presented in the Test Boring Records should be considered approximate.

Further laboratory testing was beyond the scope of this exploration.

4.0 SUBSURFACE CONDITIONS

4.1 EXISTING SITE CONDITIONS

The following paragraphs provide a generalized description of the pavement section, subsurface profiles and soil conditions encountered by the cores/borings conducted during this exploration. The Test Boring Records in the Appendix should be reviewed to provide detailed descriptions of the conditions encountered at the core/boring locations. Conditions may vary at other locations and times.

4.1.1 SURFACE CONDITIONS

The surface conditions observed within the study area consisted of an existing asphaltic concrete pavement section. A surface layer of approximately 5-inch thick asphaltic concrete was encountered at each of the pavement core locations and was underlain by limerock base material varying in thickness from approximately 12½ inches to 16 inches.

4.1.2 SUBSURFACE CONDITIONS

Underlying the pavement layers noted above, the subsurface soils encountered in the borings consisted primarily of very light brown to grey/brown fine-grained sands to slightly silty fine-grained sands (SP and SP-SM) from the bottom of the limerock base course to the maximum depth explored of approximately 4½ feet BEG. The subsurface soil materials exhibited DCP test results ranging from 21 blows per increment (bpi) to more than 50 bpi. Subsurface conditions are described in greater detail on the Test Boring Records and DCP Test Results presented in the Appendix.

4.2 GROUNDWATER CONDITIONS

Groundwater was not encountered within the boring termination depths of about 4½ feet below the top of the pavement section at the time of our subsurface exploration, which occurred during a period of approximately normal seasonal rainfall. The groundwater table is anticipated to be a subdued replica of the surface topography.

Groundwater levels vary with changes in season and rainfall, construction activity, surface water runoff and other site-specific factors. Groundwater levels in the Bay County area are typically lowest in the late spring and the late fall and highest in the mid-summer with annual groundwater fluctuations by seasonal rainfall; consequently, the water table may vary at times.

5.0 CONCLUSIONS AND COMMENTARY

5.1 GENERAL

The following conclusions and commentary are based on our understanding of the site observations, our evaluation and interpretation of the field data, our previous experience with the subsurface conditions on this site, and generally accepted geotechnical engineering principles and practices.

Pavement and subsurface conditions in unexplored locations or at other times may vary from those encountered at specific core/boring locations. If such variations are noted during repairs, or if project plans are changed, we request the opportunity to review the changes and amend our recommendations, if necessary.

As previously noted, the core/boring locations were established in the field by measuring distances from existing site landmarks and as directed by ECP personnel. If increased accuracy is desired by the client, we recommend that the core/boring locations and elevations be surveyed.

5.2 EXISTING SITE CONDITIONS

As previously noted, a portion of the existing pavement area has experienced distortion distress in the form of depressions. The existing pavement at the observed depression areas are considered to be in a fair to poor condition and are reported to be causing occasional difficult airplane access to the adjacent concrete apron.

Based on the cores/borings performed, the existing pavement section comprises approximately 5-inches of asphaltic concrete underlain by 12½ inches to 16 inches of limerock base material. Based on the aforementioned provided design pavement section detail prepared by PBS&J, the asphaltic concrete layer observed appears to meet the project design requirements; however, the design limerock base thickness was specified to be approximately 21 inches thick at the core/boring locations.

Based on the boring and DCP test results, the subgrade soils underlying the pavement section within the existing distressed areas and background boring consist of fine-sand and slightly silty fine-sand materials that exist in a generally dense to very dense condition. Groundwater was not observed within the boring termination depths and based on visual-manual observations, the soils encountered appeared in a slightly moist to relatively dry condition. At the time of our exploration, groundwater did not appear to be adversely affecting the subgrade soils.

5.3 PAVEMENT DISTRESS AND REPAIR COMMENTARY

5.3.1 POTENTIAL CAUSES OF OBSERVED DISTRESS

Based on the results of our field exploration program, visual observations, and our evaluations, it is NOVA's professional opinion that the observed pavement distress consisting of distortion in the form of depressions occurring along the wheel path of the alignment of concern are likely attributed to one, or more, of the following factors:

1) The deficient observed thickness of the limerock base material resulting in an insufficient overall pavement section to support the aircraft traffic loading conditions.

2) Aircraft slowing and/or stopping at the observed distress/depression locations causing repeated concentrated static wheel loading.

3) Additional slowing and/or stopping occurring as the depressions get deeper causing repeated application of concentrated static aircraft wheel loading.

4) "Birdbath" conditions occurring within the depressed areas possibly allowing water infiltration into the base and/or subgrade materials.

5) Reflective cracks along the edge and saw cut joint allowing water infiltration into the base and/or subgrade materials within the distressed area.

6) Aircraft traffic frequency and/or weight possibly exceeding the original design.

7) Weather conditions such as direct sunlight and high ambient temperatures affecting the stability of the asphaltic concrete materials.

5.3.2 REPAIR COMMENTARY

Based on the above noted potential contributing factors to the fair to poor current condition of the pavement section in the affected area together with the subsurface conditions observed and presented in this report, we recommend that a specialty civil engineering firm with aviation specific pavement design experience and expertise be consulted to provide appropriate remedial repair recommendations for the observed Gate 3 pavement distresses. Depending on the risk tolerance of the owner, desired service life, and urgency to repair/remediate the affected areas, we anticipate that the level of repairs could range from temporary (short term) to more permanent (standard design service life options).

APPENDIX A
Figures and Maps

Base map provided by *Google Maps*

Scale: Not To Scale

Date Drawn: October 28, 2016

Drawn By: B. Webster

Checked By: C. Conway

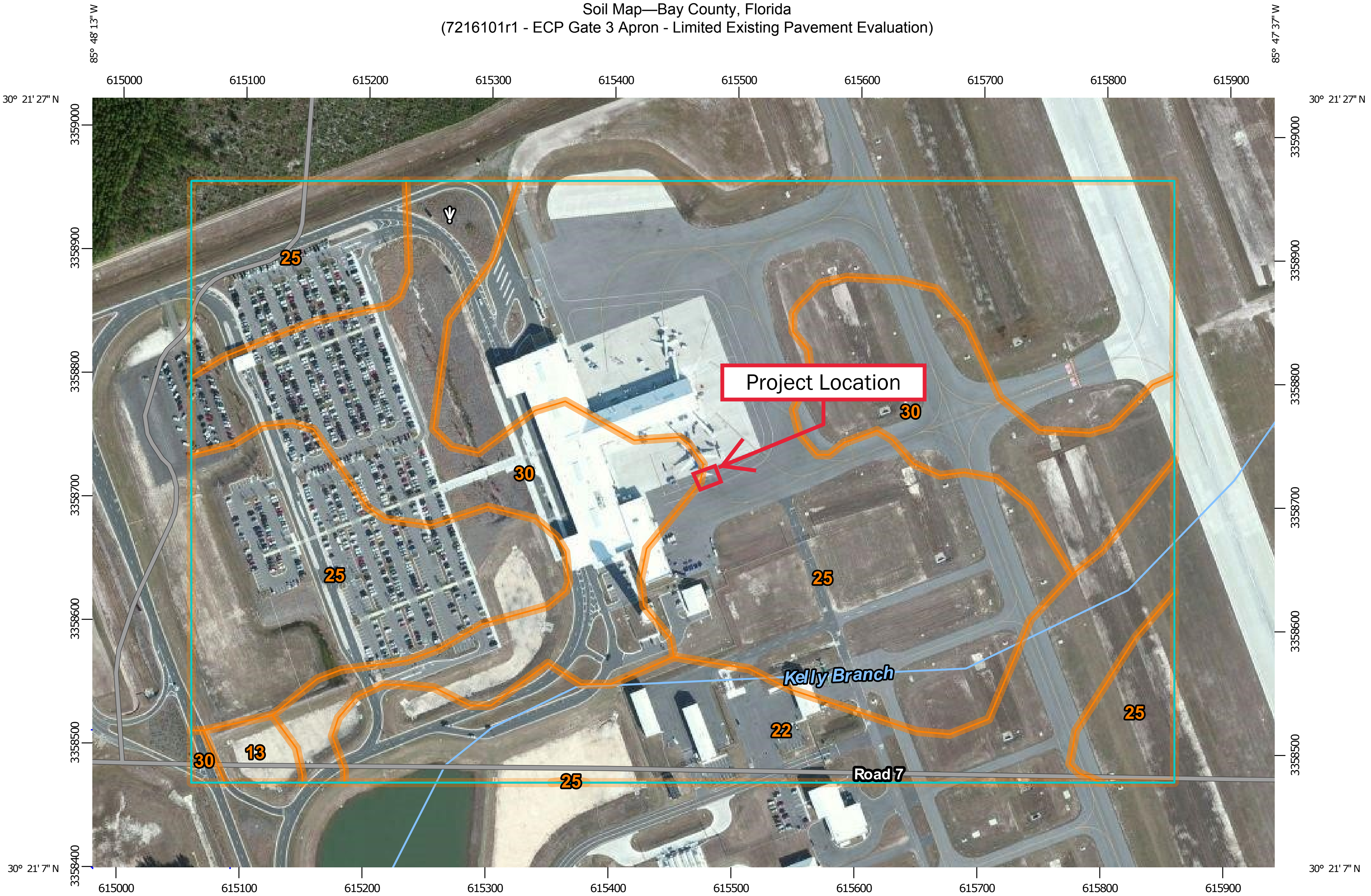
NOVA

17612 Ashley Drive
Panama City Beach, Florida 32413
850.249.6682 ♦ 850.249.6683

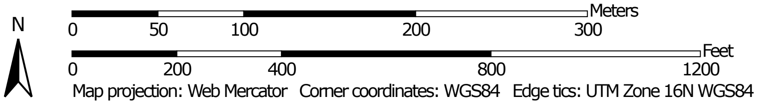
PROJECT LOCATION MAP

ECP Gate 3 Apron – Limited Existing Pavement Evaluation
Panama City, Bay County, Florida
NOVA Project Number 7216101r1

Soil Map—Bay County, Florida
(7216101r1 - ECP Gate 3 Apron - Limited Existing Pavement Evaluation)



Map Scale: 1:4,400 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bay County, Florida
Survey Area Data: Version 15, Nov 18, 2015

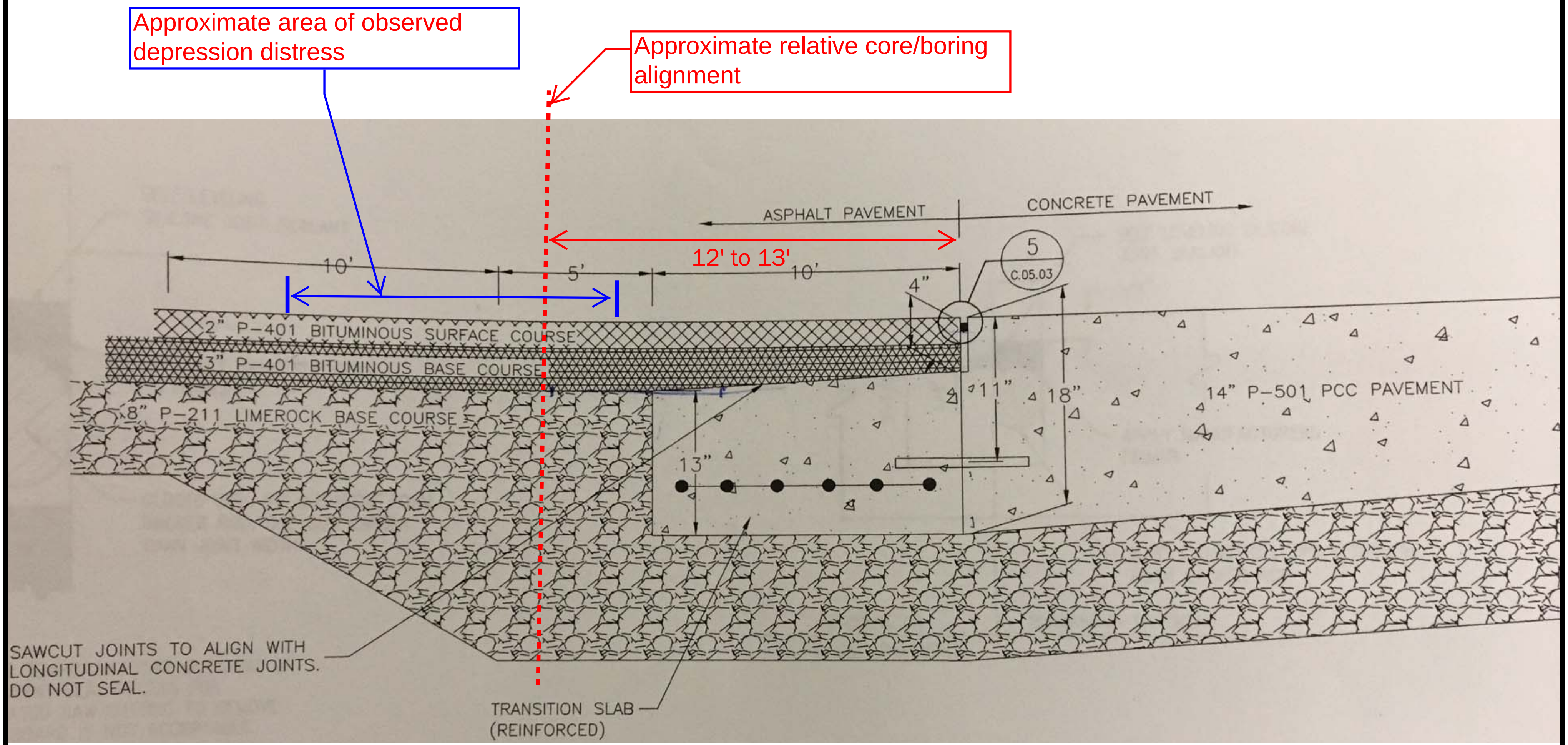
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 5, 2010—Dec 10, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Bay County, Florida (FL005)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
13	Leon sand, 0 to 2 percent slopes	0.8	0.8%
22	Pamlico-Dorovan complex	14.0	14.5%
25	Hurricane sand, 0 to 2 percent slopes	57.3	59.3%
30	Pottsburg-Pottsburg, wet, sand, 0 to 2 percent slopes	24.5	25.4%
Totals for Area of Interest		**96.6**	**100.0%**



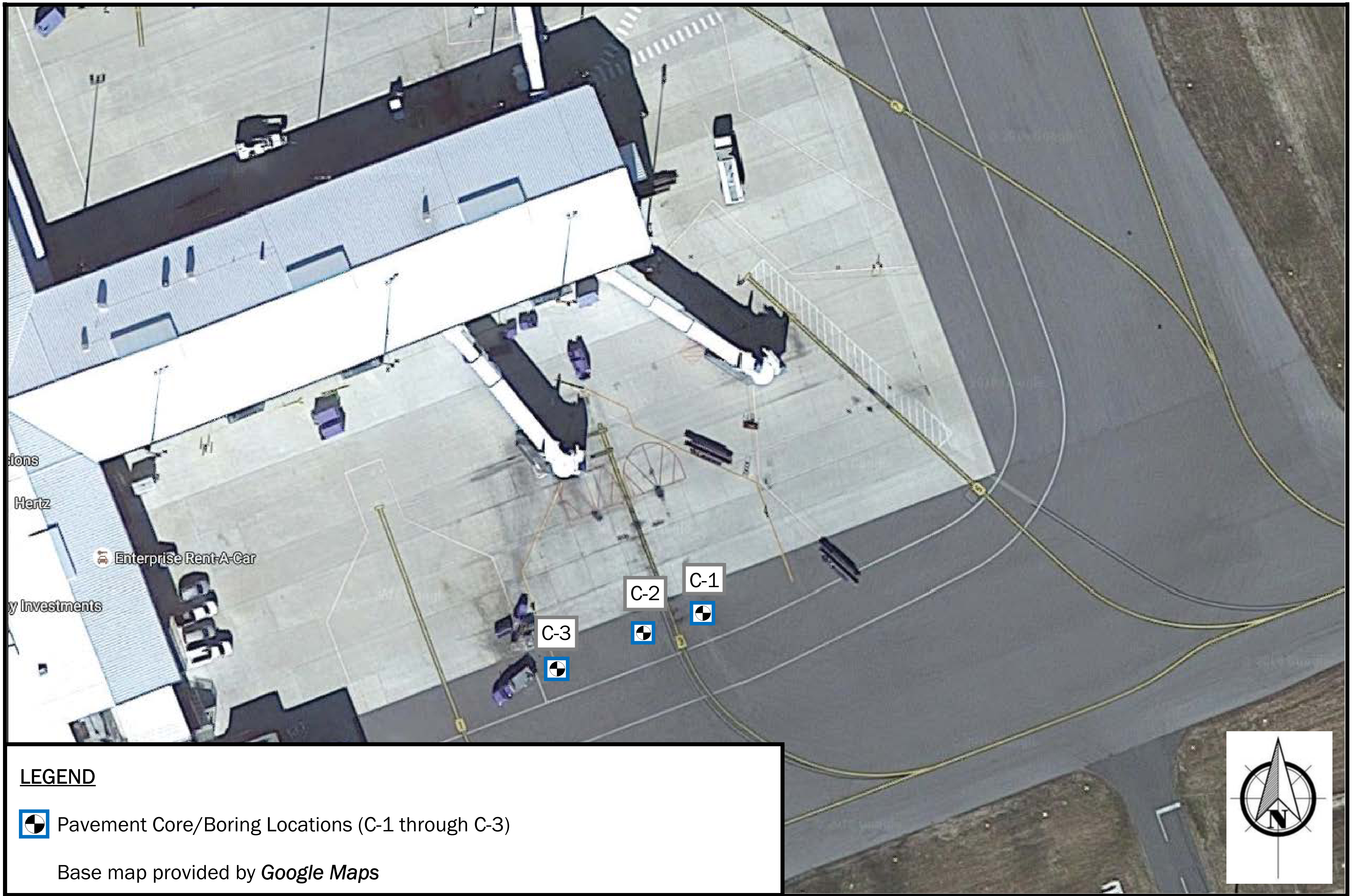
Drawing prepared by *PBS&J* and provided by Client

Scale: Not To Scale
Date Drawn: November 23, 2016
Drawn By: B. Webster
Checked By: C. Conway

NOVA
17612 Ashley Drive
Panama City Beach, Florida 32413
850.249.NOVA(6682) ♦ 850.249.6683

TYPICAL PAVEMENT SECTION DETAIL
ECP Gate 3 Apron – Limited Existing Pavement Evaluation
Panama City, Bay County, Florida
NOVA Project Number 7216101r1

APPENDIX B
Subsurface Data



LEGEND

⊕ Pavement Core/Boring Locations (C-1 through C-3)

Base map provided by *Google Maps*

Scale: Not To Scale
Date Drawn: October 28, 2016
Drawn By: B. Webster
Checked By: C. Conway

NOVA
17612 Ashley Drive
Panama City Beach, Florida 32413
850.249.NOVA(6682) ♦ 850.249.6683

CORE/BORING LOCATION PLAN
ECP Gate 3 Apron – Limited Existing Pavement Evaluation
Panama City, Bay County, Florida
NOVA Project Number 7216101r1

ASPHALT CORE SAMPLE SUMMARY

PROJECT: ECP Gate 3 Apron – Limited Existing Pavement Evaluation
CLIENT: ZHA, Inc.

NOVA PROJECT NUMBER: 7216101r1
LOCATION: Bay County, Florida

CORE/BORING LOCATION	ASPHALTIC CONCRETE THICKNESS (INCHES) (5-INCHES SPECIFIED)	CRUSHED LIMEROCK BASE MATERIAL THICKNESS (INCHES) (21-INCHES SPECIFIED)
C-1	5	12½
C-2	5	15½
C-3	5	16

ASPHALT CORE SAMPLE SUMMARY

PROJECT: ECP Gate 3 Apron – Limited Existing Pavement Evaluation
CLIENT: ZHA, Inc.

NOVA PROJECT NUMBER: 7216101r1
LOCATION: Bay County, Florida

C-1

Photo of the 5 inch thick pavement core obtained at C-1 location

ASPHALT CORE SAMPLE SUMMARY

PROJECT: ECP Gate 3 Apron – Limited Existing Pavement Evaluation
CLIENT: ZHA, Inc.

NOVA PROJECT NUMBER: 7216101r1
LOCATION: Bay County, Florida

C-2

Photo of the 5 inch thick pavement core obtained at C-2 location

ASPHALT CORE SAMPLE SUMMARY

PROJECT: ECP Gate 3 Apron – Limited Existing Pavement Evaluation

CLIENT: ZHA, Inc.

NOVA PROJECT NUMBER: 7216101r1

LOCATION: Bay County, Florida

C-3

Photo of the 5 inch thick pavement core obtained at C-3 location

Dynamic Cone Penetrometer Test Results

PROJECT: ECP Gate 3 Apron – Limited Existing Pavement Evaluation
CLIENT: ZHA, Inc.

NOVA PROJECT NUMBER: 7216101r1
LOCATION: Bay County, Florida

Core/Boring Number	Location	Depth (feet below bottom of limerock base material)	DCP Test Result (Blows per increment)	Average DCP values (Blows per increment)
C-1	See Boring Location Plan	0	29/50+	50+
		1	50/50+	50+
		2	17/45/50+	37
		3	16/49/50+	38
C-2	See Boring Location Plan	0	30/50+	50+
		1	23/50+	50+
		2	17/35/48	33
		3	18/21/25	21
C-3	See Boring Location Plan	0	24/50+	50+
		1	26/50+	50+
		2	23/38/48	36
		3	25/38/48	37

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KEY TO BORING LOGS

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
◨	Sample from Auger Cuttings
◩	Standard Penetration Test Sample
▯	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
▼	Stabilized Groundwater Level
▽	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on the the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Poorly graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts
			CH	Inorganic clays or clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
			PT	Peat, muck and other highly organic soils

*Based on the material passing the 3-inch (75 mm) sieve

** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY

(Sands and Gravels)

Very loose – Less than 4 Blow/Foot
Loose – 4 to 10 Blows/Foot
Medium Dense – 11 to 30 Blows/Foot
Dense – 31 to 50 Blows/Foot
Very Dense – More than 50 Blows/Foot

CONSISTENCY

(Silts and Clays)

Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Medium Stiff – 5 to 8 Blows/Foot
Stiff – 9 to 15 Blows/Foot
Very Stiff – 16 to 30 Blows/Foot
Hard – More than 30 Blows/Foot

RELATIVE HARDNESS

(Limestone)

Soft – 100 Blows for more than 2 Inches
Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample

Trace – 5% or less
With Silt or With Clay – 6% to 11%
Silty or Clayey – 12% to 30%
Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample

Trace – Less than 3%
Few – 3% to 4%
Some – 5% to 8%
Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample

Trace – 5% or less
Few – 6% to 12%
Some – 13% to 30%
Many – 31% to 50%

NOVA

TEST BORING RECORD

C-1

PROJECT: ECP Gate 3 Apron
PROJECT NO.: 7216101r1
CLIENT: ZHA, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Core/Boring Location Plan
ELEVATION: Existing Grade
DRILLER: D. Reed
LOGGED BY: B. Webster
DRILLING METHOD: Coring/Hand Auger
DATE: October 27, 2016
DEPTH TO - WATER> INITIAL: ▽ GNE **AFTER 24 HOURS:** ▼ GNE **CAVING>** C

◇ ORGANIC CONTENT
■ -200 (%)
● BLOW COUNT
▲ MC (%)
PLASTIC LIMIT ├───┤ LIQUID LIMIT
10 20 30 40 60 100

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value
0						
		5 inches of Asphaltic Concrete	■			
		12.5 inches of limerock base material	▨			
2		Mixed grey/brown slightly silty fine-grained SAND (SP-SM) and light brown to grey clayey fine-grained SAND (SC)			▮	
		Grey/brown slightly silty fine-grained SAND (SP-SM)			▮	
		Yellow/brown slightly silty fine-grained SAND (SP-SM)			▮	
4		Very light brown fine-grained SAND (SP)			▮	
		Boring Terminated at 4.5 ft.				
6						
8						
10						
12						
14						

This information pertains only to this boring and should not be interpreted as being indicative of the site.

NOVA

TEST BORING RECORD
C-2

PROJECT: ECP Gate 3 Apron **PROJECT NO.:** 7216101r1
CLIENT: ZHA, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Core/Boring Location Plan **ELEVATION:** Existing Grade
DRILLER: D. Reed **LOGGED BY:** B. Webster
DRILLING METHOD: Coring/Hand Auger **DATE:** October 27, 2016
DEPTH TO - WATER> INITIAL: ▽ GNE **AFTER 24 HOURS:** ▼ GNE **CAVING>** ⊏

◇ ORGANIC CONTENT
■ -200 (%)
● BLOW COUNT
▲ MC (%)
PLASTIC LIMIT ├──┤ LIQUID LIMIT
10 20 30 40 60 100

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value
0						
		5 inches of Asphaltic Concrete	■			
		15.5 inches of limerock base material	▨			
2		Mixed grey/brown slightly silty fine-grained SAND (SP-SM) and light brown to grey clayey fine-grained SAND (SC)	⁘		▮	
		Light brown fine-grained SAND (SP)	⁘		▮	
		Yellow/brown slightly silty fine-grained SAND (SP-SM)	⁘		▮	
		Light brown fine-grained SAND (SP)	⁘		▮	
4		Brown slightly silty fine-grained SAND (SP-SM)	⁘		▮	
		Boring Terminated at 4.5 ft.				
6						
8						
10						
12						
14						

TEST BORING RECORD
C-3

PROJECT: ECP Gate 3 Apron
PROJECT NO.: 7216101r1
CLIENT: ZHA, Inc.
PROJECT LOCATION: Panama City, Bay County, Florida
LOCATION: See Core/Boring Location Plan
ELEVATION: Existing Grade
DRILLER: D. Reed
LOGGED BY: B. Webster
DRILLING METHOD: Coring/Hand Auger
DATE: October 27, 2016
DEPTH TO - WATER> INITIAL: ∇ GNE AFTER 24 HOURS: ▼ GNE CAVING> C

◇ ORGANIC CONTENT
■ -200 (%)
● BLOW COUNT
▲ MC (%)
PLASTIC LIMIT ├──┤ LIQUID LIMIT
10 20 30 40 60 100

Depth (feet)	Elevation (feet)	Description	Graphic	Groundwater	Sample Type	N-Value
0						
		5 inches of Asphaltic Concrete	■			
		16 inches of limerock base material	▨			
2		Mixed grey/brown slightly silty fine-grained SAND (SP-SM) and light brown to grey clayey fine-grained SAND (SC)	▒		■	
		Brown fine-grained SAND (SP)	░		■	
4		Light brown fine-grained SAND (SP)	░		■	
		Boring Terminated at 4.5 ft.				
6						
8						
10						
12						
14						

APPENDIX C
Support Documents

QUALIFICATIONS OF RECOMMENDATIONS

The findings, conclusions and recommendations presented in this report represent our professional opinions concerning subsurface conditions at the site. The opinions presented are relative to the dates of our site work and should not be relied on to represent conditions at later dates or at locations not explored. The opinions included herein are based on information provided to us, the data obtained at specific locations during the study, and our previous experience. If additional information becomes available which might impact our geotechnical opinions, it will be necessary for NOVA to review the information, re-assess the potential concerns, and re-evaluate our conclusions and recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is the possibility that conditions between borings may differ from those encountered at specific core/boring locations, that conditions are not as anticipated by the designers and/or the contractors, or that either natural events or the construction process has altered the subsurface conditions. These variations are an inherent risk associated with subsurface conditions in this region and the approximate methods used to obtain the data. These variations may not be apparent until construction.

The professional opinions presented in this report are not final. Field observations and foundation installation monitoring by the geotechnical engineer, as well as soil density testing and other quality assurance functions associated with site earthwork and foundation construction, are an extension of this report. Therefore, NOVA should be retained by the owner to observe all earthwork and foundation construction to confirm that the conditions anticipated in this study actually exist, and to finalize or amend our conclusions and recommendations. NOVA is not responsible or liable for the conclusions and recommendations presented in this report if NOVA does not perform these observations and testing services.

This report is intended for the sole use of ZHA, Inc. only. The scope of work performed during this study was developed for purposes specifically intended by ZHA, Inc. only, and may not satisfy other users' requirements. Use of this report or the findings, conclusions or recommendations by others will be at the sole risk of the user. NOVA is not responsible or liable for the interpretation by others of the data in this report, nor their conclusions, recommendations or opinions.

Our professional services have been performed, our findings obtained, our conclusions derived and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices in the State of Florida. This warranty is in lieu of all other statements or warranties, either expressed or implied.

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.

Geotechnical 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 civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you 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 the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- 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. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by*: the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of 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.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* 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 environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of 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. Confer with you GBC-Member geotechnical engineer for more information.

GBC GEOTECHNICAL BUSINESS COUNCIL
of the Geoprofessional Business Association

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org