

THE LANDINGS GOLF COURSE REDEVELOPMENT FEASIBILITY STUDY

Prepared for

City of Clearwater Engineering Department

PO Box 4748

Clearwater, Florida 33758-4748

Prepared by

Geosyntec Consultants, Inc.

1511 East State Road 434, Suite 1005

Winter Springs, Florida 32708

Project Number: FW3786

April 2020

TABLE OF CONTENTS

1. INTRODUCTION AND BACKGROUND1-1

1.1 Introduction 1-1

1.2 Background 1-1

1.3 Problem Description 1-1

1.4 Report Organization 1-1

2. PREVIOUS STUDY REVIEW.....2-1

2.1 Tierra Preliminary Geotechnical Engineering and Environmental Study 2-1

3. GEOTECHNICAL RECOMMENDATIONS.....3-1

3.1 Re-use of On-Site Soils 3-1

 3.1.1 Surficial Soil3-1

 3.1.2 Debris.....3-1

3.2 Groundwater Control Recommendations 3-1

3.3 General Design and Construction Information 3-1

3.4 Preliminary Site Preparation Criteria 3-2

 3.4.1 Excavations3-2

 3.4.2 Site Preparation.....3-2

 3.4.3 Fill Placement.....3-2

4. STORMWATER AND FLOODPLAIN MANAGEMENT4-1

4.1 Stormwater Management 4-1

4.2 Floodplain Impacts 4-1

4.3 Permitting Requirements 4-2

5. COST ESTIMATE AND ASSUMPTIONS.....5-1

6. CONCLUSIONS AND RECOMMENDATIONS6-1

7. REFERENCES7-1

LIST OF TABLES

Table 4-1: Stormwater Calculations and Compensatory Storage..... 4-3
Table 5-1: Estimated Construction Costs Based on Conceptual Site Plans..... 5-2

LIST OF APPENDICES

Appendix A: Conceptual Site Plans
Appendix B: Tierra Preliminary Geotechnical Engineering Report
Appendix C: FEMA FIRM Panel

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

This report represents the results of the feasibility study of the redevelopment of the Landings Golf Course (project). Geosyntec Consultants was tasked by City of Clearwater to perform this work. This work was performed under the City of Clearwater project number 19-0042-EN.

1.2 Background

The Landings Golf Course (study area) is located within Pinellas County within Section 12 of Township 29 South, Range 15 East (Parcel Number 12-29-15-00000-320-0100). The study area is located within the jurisdiction of the Southwest Water Management District (SWFWMD). The specific study site is 72.9 acres located at 1875 Airport Drive, Clearwater, Florida 33765, adjacent to the Clearwater Air Park and has been utilized as a golf course since 1972. Refer to the cover sheet of the plan set (included in **Appendix A**) for a map of the project vicinity.

1.3 Problem Description

The main objective of this project is to provide a site evaluation and engineering feasibility services to assess the floodplain impacts, required permitting, and construction cost based on a preliminary site layout provided by a developer for an industrial, research, and technology (IRT) land use.

The proposed site layout is shown on Sheet 5 of the conceptual plan set (included in **Appendix A**). The layout displays the following:

- Nine buildings with an average size of 1.8 acres;
- Approximately 15.5 acres of greenspace;
- Approximately 24.5 acres of pavement;
- Four stormwater ponds with an average size of 4.7 acres;
- Ten mitered end sections for the stormwater ponds; and
- Stormwater network with 27 ditch bottom inlets, 2 manholes, and approximately 8000 feet of 24-inch reinforced concrete pipe throughout the development.

It should be noted that quantities mentioned above are subject to change based on various factors (i.e. further site investigations, comments from City of Clearwater). Additionally, the stormwater ponds were modified from the proposed layout to satisfy regulatory requirements for stormwater treatment and floodplain impact mitigation.

1.4 Report Organization

The following report was developed to include an evaluation of the existing conditions and the selected alternative by City of Clearwater. Conceptual drawings, cost estimates, and permitting requirements were developed and provided for the selected alternative. Recommendations were

provided for moving forward. The study was completed in accordance with the submitted scope of work and is separated into five sections:

- Introduction and Background
 - Provides location information, main objective of the study area, and a description of the proposed site plan
- Previous Study Review
 - Summarized information compiled by previous subconsultant (i.e. Tierra) and the selected alternative
- Geotechnical Recommendations
 - Reuse of On-Site Soils
 - Groundwater Control Recommendations
 - General Design and Construction Information
 - Site Preparation Preliminary Criteria
- Cost Estimate and Assumptions
 - Completed construction cost estimate and included assumptions of the selected alternative
- Conclusions and Recommendations
 - Summary of the overall study with recommendations for moving forward with the selected alternative

2. PREVIOUS STUDY REVIEW

2.1 Tierra Preliminary Geotechnical Engineering and Environmental Study

The following Site evaluation and recommendations are based solely upon the Tierra Preliminary Geotechnical Engineering Report, dated 03 October 2019, which is included as **Appendix B**. It should be noted that Geosyntec did not perform a site investigation/exploration.

According to the Tierra report, the site soils within the top five feet were typically granular soils consisting of poorly graded sands and sand with silt (SP, SP-SM). Silty sand (SM) was encountered in a few of the borings but typically below five feet. The preliminary report has a limited amount of information related to the strength of the soils encountered. Only 5 borings were completed where standard penetration test (SPT) N-values were recorded. The soils encountered in the SPT borings typically had loose to medium dense relative densities. In a large portion of the site (predominately the north end, see **Appendix B**) debris was encountered. Tierra described the debris as a “trench-and-fill” pattern landfill that consisted of glass, plastic, metal, ceramics, rubber, and wood.

Tierra’s review of the Pinellas County soil survey indicated the seasonal high groundwater table to range from 0.5 to 3.0 feet below the ground surface. Tierra’s measured groundwater depth, at the time of their exploration, was between 1.0 and 5.0 feet below ground surface. Tierra reported the seasonal high water table to be from the existing ground surface to 3.25 feet below ground surface (bgs). It should be noted that groundwater levels will fluctuate due to changes in seasonal climate, surface runoff patterns, construction activity, and other site specific factors.

3. GEOTECHNICAL RECOMMENDATIONS

3.1 Re-use of On-Site Soils

3.1.1 Surficial Soil

The sandy surficial soils (SP, SP-SM) typically are suitable for re-use as structural fill and backfill material. For the purposes of this report, structural fill refers to fill placed beneath the subgrade for pavement or beneath a structure. Structural fill material should be a sandy soil that is free from organic matter or debris, has less than 12 percent fines passing the No. 200 sieve, and no more than 10 percent of particles with a dimension greater than one inch. General backfill material can include the silty soil (SM) and can be placed outside areas for structures and pavements.

The suitability of specific soils as fill material should be based on laboratory classification and compaction test results and should be approved by the geotechnical engineer.

3.1.2 Debris

It is anticipated that a challenge facing the development of the Site is removing the debris, backfilling, and regrading the site to suit the proposed construction. The presence of buried waste, which included glass, plastic, metal, ceramics, rubber, and wood, on the Site observed during the investigation, suggests that site preparation activities will necessitate greater manipulation during the earthwork grading operations. Additional material handling such as mechanical sorting or screening may be required for debris. The debris will likely require off-site disposal at a permitted waste disposal facility. Any buried debris that remains in place during the Site development will have an adverse effect on total and differential settlement of the foundations and pavement.

Geosyntec recommends that a ground penetrating radar (GPR) study be conducted on the site to locate the “trench-and-fill” debris on site. By further defining the location, a more selective excavation removal plan could be put in place.

3.2 Groundwater Control Recommendations

There is a large range to the depth to groundwater measured on Site. It is anticipated that groundwater dewatering would be typical for the area and soils encountered (sump and pump), other than where debris is encountered. Even small excavations into debris can produce large volumes of water that has the potential to be trapped in void spaces between the debris. Also, contaminated groundwater, if it exists, will require special handling procedures not addressed herein.

3.3 General Design and Construction Information

Based on Geosyntec’s review of the Tierra report, the subsurface soils will likely offer suitable support for shallow foundations and slab-on-grade construction of the proposed Site structures. However, due to the debris, there exists the potential for total and differential settlements that may adversely impact the proposed structures.

To mitigate total and differential settlement impacts and improve subsurface conditions for the use of shallow foundations, we concur with Tierra's recommendation for debris removal and replacement with fill. Alternatively, deep foundation systems may be considered if founded on competent soils. A deep foundation will transfer the structure loads to competent soils underlying the fill material. Various deep foundation system options should be considered, such as driven piles or auger cast piles. The 20-foot depths of the preliminary borings did not encounter limestone or indicate soils that were competent for deep foundations.

An additional geotechnical investigation will need to be completed for foundation design when the desired layout of the Site is determined. Geosyntec recommends the investigation include at least 24 standard penetration test (SPT) borings to depths of 25 to 50 feet to characterize the strength of the soils and the presence or absence of subsurface debris in the footprint of the proposed buildings and ponds. Also, the deeper borings would allow for design of deep foundations, if needed.

3.4 Preliminary Site Preparation Criteria

3.4.1 Excavations

Initially, the debris should be removed from beneath all structures and pavements plus an additional five feet laterally in each direction. Excavated debris should be removed from the site. Debris can be loose and can cause unstable side slopes during excavation; therefore, additional effort may be required for excavations within debris. As stated above, large volumes of groundwater can be trapped in debris and may require additional effort when excavating debris.

Excavations should be performed in accordance with OSHA requirements (29 CFR 1926). The contractor shall be responsible for ensuring that cut slopes and excavation depths do not exceed OSHA limits. Provided the excavation depth does not exceed the depth to groundwater (approximately 0.5 to 5 ft bgs), minimal amounts of seepage should be anticipated in excavations.

3.4.2 Site Preparation

All topsoil, vegetation, and organic containing surface soils should be removed from the construction area. We recommend that the exposed subgrade (outside the area of debris removal) then be densified using a vibratory roller. Compaction with the roller should continue until the soil density 12 inches below the existing subgrade is at least 95 percent of the modified Proctor compaction (ASTM D1557) maximum dry unit weight.

3.4.3 Fill Placement

Structural fill should be located under all structures and pavements plus an additional five feet laterally in each direction. Structural fill should be placed in horizontal lifts not to exceed a loose thickness of 12 inches. Each lift should be compacted to at least 95 percent of the modified Proctor compaction (ASTM D1557) maximum dry unit weight with the exception of the upper one foot of pavement subgrade, which should be compacted to 98 percent of modified Proctor maximum dry unit weight. If hand-held compaction equipment is used, the maximum loose lift thickness should be reduced to six inches.

General backfill can be placed outside of the limits of the structural fill. General fill should be placed in horizontal lifts not to exceed a loose thickness of 12 inches. Each lift should be compacted to at least 90 percent of the modified Proctor compaction (ASTM D1557) maximum dry unit weight.

A qualified representative of the geotechnical engineer should monitor all fill placement and compaction operations. Field moisture and density tests must be performed on each lift to verify that the recommended compaction is achieved. Additional passes and/or over excavation and re-compaction may be required if these minimum density requirements are not achieved. The soil moisture should be adjusted as necessary during compaction to achieve the required density.

4. STORMWATER AND FLOODPLAIN MANAGEMENT

4.1 Stormwater Management

As mentioned previously, the site consists of a stormwater network within 27 ditch bottom inlets, 2 manholes, and approximately 8000 feet of 24-inch reinforced concrete pipe throughout the conceptual development. Preliminary stormwater calculations were completed to approximate the size of the proposed ponds for the stormwater system, which can be found in **Table 4-1**. Based on the boring logs and review of the Pinellas County Soil Survey within the Tierra report, along with available topography, an elevation of 63 feet (NAVD88) was assumed for the bottom of each pond, 1-foot below the estimated seasonal high water table of 64 feet (NAVD88).

The ponds' sizes were estimated using the Rational Method to ensure the proposed conceptual plan could handle a 25-year 24-hour storm event. Each wet pond would be at a minimum 6-feet deep with 4:1 side slopes, a pond bottom set to 1-foot below the seasonal high water table, and allow for 0.5-feet for freeboard. Ponds 1 through 3 have a stormwater treatment depth of 4-feet, while Pond 4 has a treatment depth of 2-feet to allow for additional compensatory storage as discussed in Section 4.2 below.

To improve site drainage, the ponds will be interconnected with swales; Pond 3 overflows into Pond 4 and Pond 2 overflows into Pond 1. We have assumed discharge locations from the site will be at the southwest corner of Pond 1 and the northwest corner of Pond 4.

Geosyntec recommends that the hydraulic and hydrologic modeling for final sizing of stormwater structures, optimization of the overall system, and evaluation of contributing areas offsite be completed before the implementation of the presented conceptual redevelopment of this Site. [The stormwater concept discussed within this report is limited to considering the required stormwater features \(stormwater ponds, floodplain compensation areas, etc.\) to meet the September 2015 City of Clearwater Stormwater Drainage Criteria Manual.](#)

4.2 Floodplain Impacts

According to the FEMA Flood Insurance Rate Maps (FIRM) from FEMA Flood Insurance Study: Pinellas County, Florida (FIS# 12103C0107H, 2005), the majority of the site is classified as "Zone X", which defines areas to be outside the 0.2% annual chance floodplain. However, the site does contain several areas classified as "Zone AE" with determined base flood elevations of 68 feet and 69 feet, and Ponding Area Number 17. Refer to **Appendix C** for the FEMA FIRM associated with the Site.

A total of 8.2 ac-ft compensatory storage is required for areas below the 68-foot base flood elevation. The compensatory storage for these impacts would occur in Pond 4 (8.3 ac-ft). Ponds 1, 2, and 3 would provide the compensatory storage for impacts to the 69-foot base flood elevation of 5.05 ac-ft (1.4 ac-ft and 1.6 ac-ft, and 2.05 ac-ft, respectively). It should be noted that the stormwater runoff at this Site flows south to north in the existing conditions, where the majority of the floodplain impacts are proposed. Modifications to the overall site layout may result in providing the required compensatory storage more uniformly amongst all the ponds and reducing the stormwater infrastructure (inlets and piping).

4.3 Permitting Requirements

Due to the nature of the proposed conceptual development, environmental resource permitting would be required through the Southwest Florida Water Management District under Chapter 62-330, F.A.C. for the proposed stormwater management system. It should be noted that additional permitting will need to be completed through Pinellas County and/or the City of Clearwater for the site development, buildings, and utilities needed for the Site.

Table 4-1
Preliminary Development Concept
Stormwater Calculations and Compensatory Storage

Assumptions:	
25 yr/24 hr Storm Event	
Rainfall Intensity, <i>i</i> (in/hr):	0.44
Precipitation (in):	10.56
C (buildings, paved areas):	0.95
C (Green pervious):	0.2
Wet season Rainfall Depth, <i>R</i> (in):	30.54
Wet Season Length (days):	122

Basin ID	001	002	003	004
Area (ac)	38.38	13.57	12.43	8.52
Wet Pool Volume (ac-ft)	10.6	3.76	3.45	2.36
Permanent Pool Volume, V_r (ac-ft)	32.1	11.3	10.4	7.12
Treatment Volume as 1-inch Runoff, Q_{proj} (ac-ft)	3.20	1.13	1.04	0.71
Design Pool Volume, V_b (ac-ft)	35.3	12.5	11.4	7.8
Minimum Pond area (ac)	8.82	3.12	2.86	1.96
Minimum Pond Depth (ft)	4	4	4	4
Compensatory Storage for 68 ft (ac-ft)	0	0	0	8.3
Compensatory Storage for 69 ft (ac-ft)	1.4	1.6	2.05	0

5. COST ESTIMATE AND ASSUMPTIONS

A Class 4 Construction cost estimate was completed for the preliminary redevelopment of The Landings site based on the completed conceptual plan set shown in **Appendix A**. This type of cost estimate (see **Table 5-1**) is generally used for feasibility studies and has an expected accuracy range of -15% to -30% in the low range and +20% to +50% in the high range. Items included in the cost estimate are listed below, with assumptions made in italics:

- Mobilization (*5% of total costs*);
- Sediment and Erosion Control (*1% of total costs*);
- Clearing and Grubbing the site;
- Buried debris removal (*Geosyntec has assumed that 50% of the hatched area displayed in the 2019 Tierra report was “trenched-and-filled” with debris, see Tierra report, Sheet 10*);
- Pond excavation (*includes excavation of on-site ponds*);
- Disposal of debris (*unit cost assumes hauling and tipping fees*);
- Grading of the site (*includes filling of onsite ponds and balancing cut and fill across site*);
- Installation of stormwater structures (*i.e. ditch bottom inlets, manholes, mitered end sections, and pipe network displayed in the conceptual plan set in Appendix A*);
- Pavement installation throughout the development including roadways (*from conceptual plan set in Appendix A*);
- Landscaping of the available green space displayed in the conceptual plan set in **Appendix A**;
- As-built Survey and Plans (*from engineering experience with similar projects*); and
- Credit for excess fill from the pond excavation (there is approximately 35,600 cubic yards of excess soil that can be sold at approximately \$5 per cubic yard).

Based on the previous years' worth of FDOT Item unit costs for the items mentioned above and the use of engineer's judgement, the redevelopment of the site would be approximately **\$16,438,000 (low to high range: \$13,972,300 to \$19,725,600)**.

**Table 5-1
 PRELIMINARY DEVELOPMENT CONCEPT
 ESTIMATED CONSTRUCTION COSTS BASED ON CONCEPTUAL SITE PLANS**

Conceptual Improvement						
Item	FDOT Pay Item No. ¹	Description	Units	Unit Cost	Quantity	Total
1		Mobilization (5% of Total) ²	LS	varies	1	\$581,645
3		Prevention, Control and Abatement of Erosion and Water Pollution (1% of Total) ²	LS	varies	1	\$116,329
4	110-1-1	Clearing and Grubbing	AC	\$18,725.74	73	\$1,366,979
5	120-1	Debris Excavation	CY	\$6.52	26459	\$172,509
6		Waste Disposal (Hauling and tipping fee) ²	CY	\$40.00	26459	\$1,058,340
7	120-1	Pond Excavation	CY	\$6.52	145274	\$947,186
8		Dewatering	WK	\$12,000.00	52	\$624,000
9		Site Grading ²	AC	\$5,500.00	73	\$401,500
10	285-7-11	Optional Base, Base Group 11 (Type B-12.5)	SY	\$17.63	195401	\$3,444,920
11	334-1-13	Superpave Asphaltic Conc, Traffic C, 6" Thickness	TN	\$95.08	43965	\$4,180,192
12	430-982-129	Mitered End Secion, Optional Round, 24-inch CD	EA	\$ 1,586.30	10	\$15,863
13	425-1541	Inlets, Ditch Bottom, Type D, <10'	EA	\$ 4,057.68	27	\$109,557
14	425-2-61	Manholes, P-8 <10'	EA	\$ 4,777.68	2	\$9,555
15	430-175-124	Pipe Culvert, Optional Material, Round, 24" S/CD	LF	\$74.10	8000	\$592,800
16	570-1-2	Performance Turf, Sod (Like Kind)	SY	\$2.54	68206	\$173,243
17	580-1-1	Landscape Complete - Small Plants	LS	\$55,120.88	1	\$55,121
18		As-Built Survey and Plans ²	LS	\$26,000.00	1	\$26,000
19		Indemnification ²	LS	\$100.00	1	\$100
20		Sell Excess Fill ²	CY	(\$5.00)	35599	-\$177,996
				CONSTRUCTION COST:		\$13,698,000
				CONTINGENCY @ 20%:		\$2,740,000
				ESTIMATED CONSTRUCTION COST:		\$16,438,000

NOTE:

1. FDOT Pay Item unit costs are adapted from the FDOT Basis of Estimates and engineer's judgement
2. Cost items obtained from similar Geosyntec project estimates
3. This estimate does not include potential utility conflicts and resolution

6. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this memorandum was to present the results of the completed feasibility study of the redevelopment of the Landings Golf Course conceptual plan based on the following: the 2019 Tierra Preliminary Geotechnical Engineering Report; available topography; the FIRM from FEMA Flood Insurance Study: Pinellas County, Florida (FIS# 12103C0107H, 2005); the *September 2015 City of Clearwater Stormwater Drainage Criteria Manual*; and the SWFWMD stormwater design criteria.

Before the Landings Golf Course can be redeveloped into the selected conceptual design, the site must undergo site preparation. The encountered debris may cause total and differential settlements that could lead to adverse impacts to proposed structures. Geosyntec agrees with Tierra's recommendation for debris removal and replacement with fill to mitigate settlement impacts and improve subsurface conditions for the use of shallow foundations. However, an additional geotechnical investigation, that includes a GPR study, will need to be completed for debris location and foundation design once desired layout of the Site is determined.

Hydraulic and hydrologic modeling for final sizing of stormwater structures, optimization of the overall stormwater system, and evaluation of contributing areas offsite is recommended before the implementation of the presented conceptual redevelopment of this Site.

According to the FIRM from FEMA Flood Insurance Study: Pinellas County, Florida (FIS# 12103C0107H, 2005), the majority of the site is classified as "Zone X", which defines areas to be outside the 0.2% annual chance floodplain. However, the site does contain several areas classified as "Zone AE" with determined base flood elevations of 68 feet and 69 feet, and Ponding Area Number 17. A total of 13.25 ac-ft of compensatory storage is required for areas below the 68-foot and 69-foot base flood elevations to offset the fill impacts proposed within these floodplains. The proposed ponds would provide a compensatory storage volume of 13.35 ac-ft as well as stormwater treatment.

Optimization of the site layout to minimize the stormwater infrastructure could reduce pond excavation costs, pipe run lengths, and possibly other items if the site is rearranged. This exercise is outside of Geosyntec's current scope of work but could result in a cost savings of 10 to 20 percent. Also, an alternative development of the site, not considered herein, would be to leave the "trench-and-fill" area undeveloped. This would limit the space for development, but also eliminate costly debris excavation and waste disposal.

Based on the information provided in this memorandum, the redevelopment of the Landings Golf Course has an estimated cost of **\$16,438,000 (low to high range: \$13,972,300 to \$19,725,600)**.

7. REFERENCES

1. FEMA Flood Insurance Study (FIS# 12103C0107H), Pinellas County, FL, 2005.
2. Flood Insurance Rate Map Pinellas County FL, Federal Emergency Management Agency, 2005.
3. Florida Department of Transportation, Item Average Unit Cost (Statewide Pay Item Cost History), March 2019 through February 2020.
4. Preliminary Geotechnical Engineering and Limited Contamination Testing Services: The Landings Corporate Center (Tierra Project No. 6511-19-027), 2019.

APPENDIX A

Conceptual Site Plans

SHEET INDEX

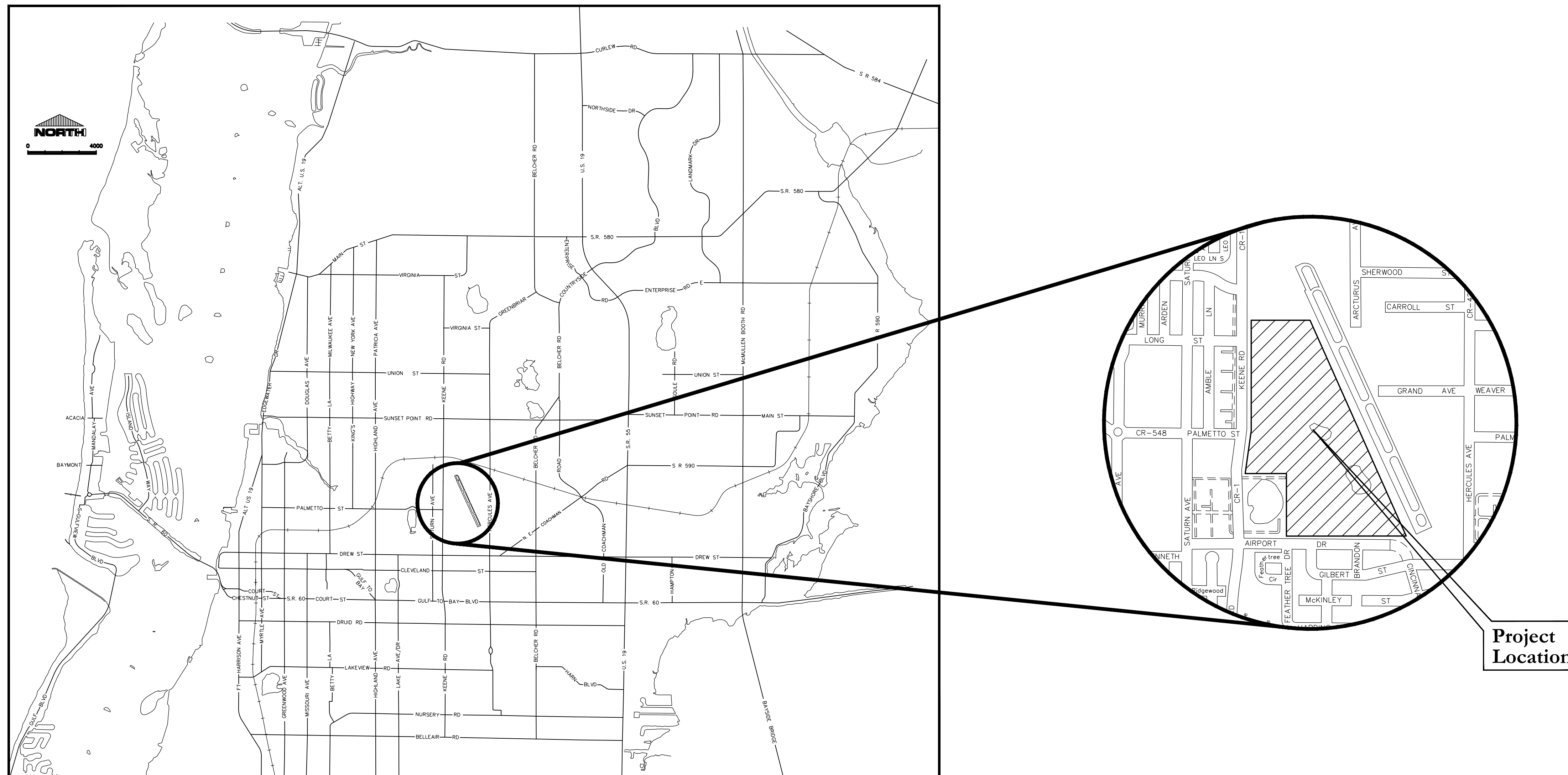
SHEET #	SHEET DESCRIPTION
1	COVER SHEET
2	GENERAL NOTES
3	EXISTING CONDITIONS PLAN
4	DEBRIS REMOVAL PLAN
5	CONCEPTUAL SITE PLAN
6	CONCEPTUAL STORMWATER MANAGEMENT PLAN



CLEARWATER
BRIGHT AND BEAUTIFUL • BAY TO BEACH



THE LANDINGS GOLF COURSE REDEVELOPMENT FEASIBILITY STUDY NORTH KEENE ROAD - CLEARWATER, FLORIDA



CITY OFFICIALS

- | | |
|----------------------------|----------------------|
| George N. Cretekos | Mayor |
| Jay Polglaze | Councilmember |
| Dr. Bob Cundiff | Councilmember |
| David Allbritton | Councilmember |
| Hoyt Hamilton | Councilmember |
| William B. Horne II | City Manager |

Tara L. Kivett, P.E.
City Engineer

Approved For
Construction

Date Approved

CITY ENGINEER Tara L. Kivett, P.E. #86611

GENERAL NOTES

- All work performed shall comply with the regulations and ordinances of the various governmental agencies having jurisdiction over the work.
- All workmanship and materials used in the construction of this project shall conform to the latest City of Clearwater standards, contract documents and specifications unless otherwise noted.
- Specific requirements of the Florida Department of Transportation (FDOT) "Design Standards" and "Standard Specifications for Road and Bridge Construction", most current editions, are incorporated into the contract documents by reference.
- The Contractor shall obtain all required permits prior to construction.
- The Contractor shall notify all utility companies at least forty eight (48) hours prior to start of construction, demolition and/or excavation in accordance with Florida Statutes.
- The Contractor shall call Sunshine 811, previously known as Sunshine State One Call of Florida, at 1-800-432-4770 or 811, a minimum of two (2) days and a maximum of five (5) days prior to start of construction.
- Locations, elevations and dimensions of existing utilities, structures and other features are shown according to the best information available at the time of the preparation of these plans, but do not purport to be absolutely correct. The Contractor shall verify the location, elevations and dimensions of all existing utilities, structures and other features affecting the work prior to construction.
- The Contractor shall be responsible to review the site to determine existing conditions. Anything not shown on these plans shall be brought to the attention of the City's Engineering Representative and shall not constitute additional scope of work approved by the Engineer.
- The Contractor shall contact the City's Engineering Representative immediately concerning any conflicts arising during construction.
- All construction activities must conform to the local noise ordinance.
- Hours of work shall be in accordance with the local governmental agency.
- These drawings do not include necessary components for construction safety. The Contractor is solely responsible for construction safety. Special precautions may be required in the vicinity of power lines and other utilities.
- The Contractor shall furnish, erect and maintain all necessary traffic control and safety devices in accordance with the U.S. Department of Transportation, "Manual on Uniform Traffic Control Devices" and the latest Florida Department of Transportation "Design Standards".
- The Contractor shall provide, erect and maintain effective barricades, danger signals, signs and pedestrian detours in all areas where required for the protection of the work and the safety of the public.
- Maintenance of Traffic (MOT): if it becomes necessary for the Contractor to close any street to through traffic within the limits of construction, access for local traffic with destination within the project limits of construction shall be maintained. If during construction, access for local traffic is changed, the property owners affected shall be given at least three (3) days advance notice. The Contractor shall submit to the City's Engineering Representative the Traffic Control Plan for approval prior to implementation.
- A registered Land Surveyor, at the Contractor's expense, shall reset all section corners or property corners dislocated or disturbed by any construction related activities.
- Any National Geodetic Survey (NGS) Monument within the limits of construction is to be protected. If in danger of damage, contractor shall notify the city's field representative immediately and contact the National Geodetic Survey information center.
- Unless noted on the plans, final grade is to generally be the same as existing grade. Restore uniformly and for proper yard drainage grade toward roadway.
- All new utilities shall be installed with the minimum thirty six (36) inches of cover.
- Where utilities cross the lowest pipe shall be installed first.
- The Contractor shall be responsible for testing of all newly constructed utilities in accordance with current standards of local jurisdiction. The Contractor shall notify the local jurisdiction and the Owner or an authorized representative at least forty eight (48) hours in advance of performing tests.
- The Contractor shall provide all sheeting, shoring and bracing required to protect adjacent structures or to minimize trench width. Where a separate pay item is not provided, the cost of all sheeting and bracing required shall be included in the contract price for the item of work for which sheeting, shoring and bracing is anticipated to be required in accordance with local, state, or federal regulations for construction.
- All concrete shall have a minimum compressive strength of 3,000 psi (28-day strength), unless otherwise noted on drawings.
- No surfacing material is to be applied to any manhole covers, frames, valve boxes, gas drops, etc. All existing and proposed utility and storm sewer structures whose tops will be exposed within any paved area shall be adjusted so that the top surface of covers or frames shall be flush with the pavement surface.
- Materials interfering with construction shall be disposed of as directed by the City's Engineering Representative, unless otherwise noted on plans.
- All excess soil resulting from construction activities that is not claimed by the Owner shall become the property of the Contractor and disposed of by the Contractor.
- All disturbed landscaped and/or grassed areas shall be restored uniformly and be generally at the same elevation as existing grades.
- All disturbed areas shall be replaced within fifteen (15) days to a condition equal to or better than existing conditions.
- All voids after placement of sod shall be filled with prepared soil mix. The sod shall be rolled to meet the proposed grades. Sod placed on slopes 3:1 or steeper shall be pegged.
- Areas of exposed earth resulting from construction shall be sodded in kind as directed by the City's Engineering Representative unless otherwise noted on plans.
- The Contractor shall maintain an accurate set of marked-up drawings (As-Builts) at the construction site.
- A CCTV inspection of the new sewer system in digital format utilizing the industry standard Pipeline Assessment and Certification Program (PACP) coding system shall be provided to the City. The video shall be taken prior to placing the new sewer system into service. Data will be collected utilizing CUES Granite software.
- Installation of gravity sewer pipe shall be in conformance with recommended practices contained in Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications ASTM D2321. Connections to manholes with sanitary pipe shall use a joint two (2) feet in length and shall use an approved water stop around pipe joint entry.
- The bottom trench width in an unsupported trench shall be limited to the minimum practicable width allowing working space to place and compact the hunching material. The use of trench boxes and movable sheeting shall be performed in such a manner that removal, backfill and compaction will not disturb compacted haunching material or pipe alignment. Dewatering of the trench bottom shall be accomplished using adequate means to allow preparation of bedding, placement of the haunching material and pipe in the trench without standing water. Dewatering shall continue until sufficient backfill is placed above the pipe to prevent flotation or misalignment.
- The Contractor shall dispose of all unsuitable materials, construction debris, and other waste materials offsite in accordance with applicable regulatory agency requirements at the Contractor's expense. All backfill shall be free of unsuitable materials.

- The Contractor shall be responsible for providing a Hurricane Preparation Plan to the City's Engineering Representative for review and approval prior to commencing construction activities.
- Any damage to city, county, or state roads caused by the Contractor shall be repaired by the Contractor in a timely manner and to the satisfaction of the City's Engineering Representative. Payment shall not be made for this work.
- The Contractor shall protect private property.

SURVEY NOTES

- The City of Clearwater Control Network's Horizontal Datum is: North American Datum (N.A.D.), Florida State Plane Coordinates, Florida West Zone 83(1999).
- The City of Clearwater Control Network's Vertical Datum is: North American Vertical Datum (N.A.V.D.) 1988.
- The survey was provided by the City of Clearwater Land Survey Division. The last date of field survey is xx-xx-xxxx.
- The City Benchmark referenced is located xxxxx, having an elevation of xx.xxxx'.

TREE PROTECTION

- The Contractor will be responsible for adhering to all Tree Protection measures required by the City of Clearwater codes, ordinances and Standard Specifications. This will include all tree barricades, root pruning and tree trimming/pruning activities. These requirements will apply within the specified "limits of work" and will also be applicable in all areas where the Contractor and/or his subcontractors stage, store or park vehicles, equipment, materials and debris.
- All tree pruning and/or root pruning on existing trees to be preserved will only be performed by or under the direct supervision of an International Society of Arboriculture (ISA) Certified Arborist. Furthermore, all tree work shall conform to the American National Standards Institute (ANSI) 2001, American National Standard for Tree Care Operations - Tree, Shrub and Other Woody Plant Maintenance - Standard Practices (Pruning), ANSI A-300.
- Where called for on the plans, install tree barricades, erosion control/silt fencing or other approved protective barriers around all trees to be preserved, per City Standard Detail. Where applicable, and specifically approved by the City's Engineering Representative protective barriers may be placed in root prune trenches.
- Prior to any field changes taking place, it will be the Contractor's responsibility to review the potential impacts to existing trees with his Certified Arborist, and include any and all recommended tree protection measures in his proposal to modify the approved design. The City's Engineering Representative must approve, in writing, any changes to the approved design prior to implementation of said change.
- The Contractor will avoid any open excavations, fill or other construction activities whenever possible within the "critical root zone" of any existing tree (i.e., under the drip line/canopy).
- No vehicles, equipment or materials shall be parked or stored under/within the drip line/protective barrier area of any tree.
- Where construction activities are anticipated to last for an extended period of time near existing trees, the Contractor shall install and maintain City approved tree barricades as shown in the Standard Details and as approved by the City's Engineering Representative.
- Woodchips, mulch or another cushioning surface material approved by the City's Engineering Representative shall be placed to a minimum depth of ten (10) inches over areas where roots are present and construction traffic occurs.
- All tree protection measures shall remain in place at all times during construction until the City's Engineering Representative authorizes removal.
- The Contractor will coordinate with the City's Engineering Representative, Tim Kurtz, at (727) 562-4737, to obtain approval in advance of any and all work within the critical root zone of any existing tree.

SEDIMENT & EROSION CONTROL

- It is the responsibility of the Contractor to control and prevent erosion and the transportation of sediment to surface drains and outfalls.
- The Contractor shall prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) in accordance with Florida Department of Environmental Protection (FDEP) Criteria for a National Pollution Discharge Elimination System (NPDES) Activities Permit.
- The Contractor must obtain a FDEP Generic Permit for The Discharge of Produced Ground Water, if dewatering with offsite discharge will be required. The Contractor is responsible for all required preliminary water samples to satisfy the FDEP Generic Permit for the Discharge of Produced Ground Water. Sampling shall occur thirty (30) days prior to the start of dewatering.
- Construction operations shall be carried out in such a manner that erosion and pollution shall be minimized. The submitted SWPPP shall be complied with. All applicable federal, state, and local laws shall be complied with at all times. Please note that no hay bales are allowed on City of Clearwater projects.

ROOT PRUNING

- Root pruning shall only be performed by or under the direct supervision of an International Society of Arboriculture (ISA) Certified Arborist.
- Any proposed root pruning trenches shall be identified (i.e., staked or painted) on site, inspected and approved by the City's Engineering Representative prior to actual root pruning.
- Root pruning shall be performed as far in advance of other construction activities as is feasible, but at a minimum shall be performed prior to any impacts to the soil. Associated tree protection measures should be implemented upon completion of said root pruning.
- If there is a likelihood of excessive wind and/or rain, an exceptional care shall be taken on any root pruning activities.
- Root pruning shall be limited to a minimum of twelve inches per one inch trunk diameter from the tree base. Any exception must be approved by the City's Engineering Representative prior to said root pruning.
- Roots shall be cut cleanly, as far from the trunk of the tree as possible. Root pruning shall be done to a minimum depth of eighteen (18) inches from existing grade, or to the depth of the disturbance if less than eighteen (18) inches.
- Root pruning shall be performed using a root cutting machine designed specifically for this purpose. Alternate equipment or techniques must be approved by the City's Engineering Representative, prior to any work adjacent to trees to be preserved.
- Root pruning shall be completed, inspected and accepted prior to the commencement of any excavation or other impacts to the critical root zones of trees to be protected.
- Excavations in an area where root are present shall not cause the tearing or ripping of tree roots. Roots must first be cleanly severed prior to continuing with the excavation, or tunneled around to prevent damage to the root.
- Tree roots shall not be exposed to drying out. Root ends shall be covered with native soil or burlap and kept moist until final backfill or final grades have been established.
- When deemed appropriate (e.g. during periods of drought) the city representative may require a temporary irrigation system be utilized in the remaining critical root zones of root pruned trees.

UTILITY OWNERS

- Spectrum
Attention: Mr. Ted Bingham
700 Carillon Parkway, Suite 6
St. Petersburg, Florida 33716-1123
Phone: (727) 329-2847
- Frontier Communications, Inc.
Attention: Mr. Chris Blauvelt
MC: FLCW5033
1280 Cleveland Street
Clearwater, Florida 33782
Phone: (727) 562-1130
- Wide Open West (WOW!)
FLSP2144
Attention: Mr. James Sandman - Construction Project Coordinator
3001 Gandy Boulevard North
Pinellas Park, Florida 33782
Phone: (727) 239-0224 Office
- Duke Energy
Attention: Mr. Rico Ashley
2166 Palmetto Street, Bldg. F
Clearwater, Florida 33765
Phone: (727) 562-5767
City of Clearwater
- Clearwater Gas System
Attention: Mr. Robert Jaeger
401 North Myrtle Avenue
Clearwater, Florida 33755
Phone: (727) 562-4900 Ext. 7438
- City of Clearwater
Engineering Department - Traffic Division
Attention: Mr. Paul Bertels
100 South Myrtle Avenue, Room 220
Clearwater, Florida 33756-4748
Phone: (727) 562-4794
- City of Clearwater
Engineering Department - Survey Division
Attention: Mr. Tom Mahony
100 South Myrtle Avenue, Room 220
Clearwater, Florida 33756-4748
Phone: (727) 562-4762
- City of Clearwater
Engineering Department - Public Utilities
Attention: Mr. David Porter
1650 North Arcturas Avenue
Clearwater, Florida 33755
Phone: (727) 562-4960 Ext. 7248
- City of Clearwater
Engineering Department - Construction Management
Attention: Mr. Tim Kurtz
100 South Myrtle Avenue, Room 220
Clearwater, Florida 33756
Phone: (727) 562-4737

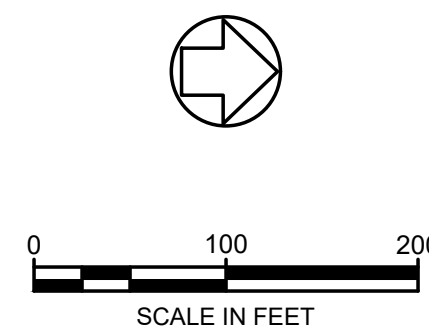
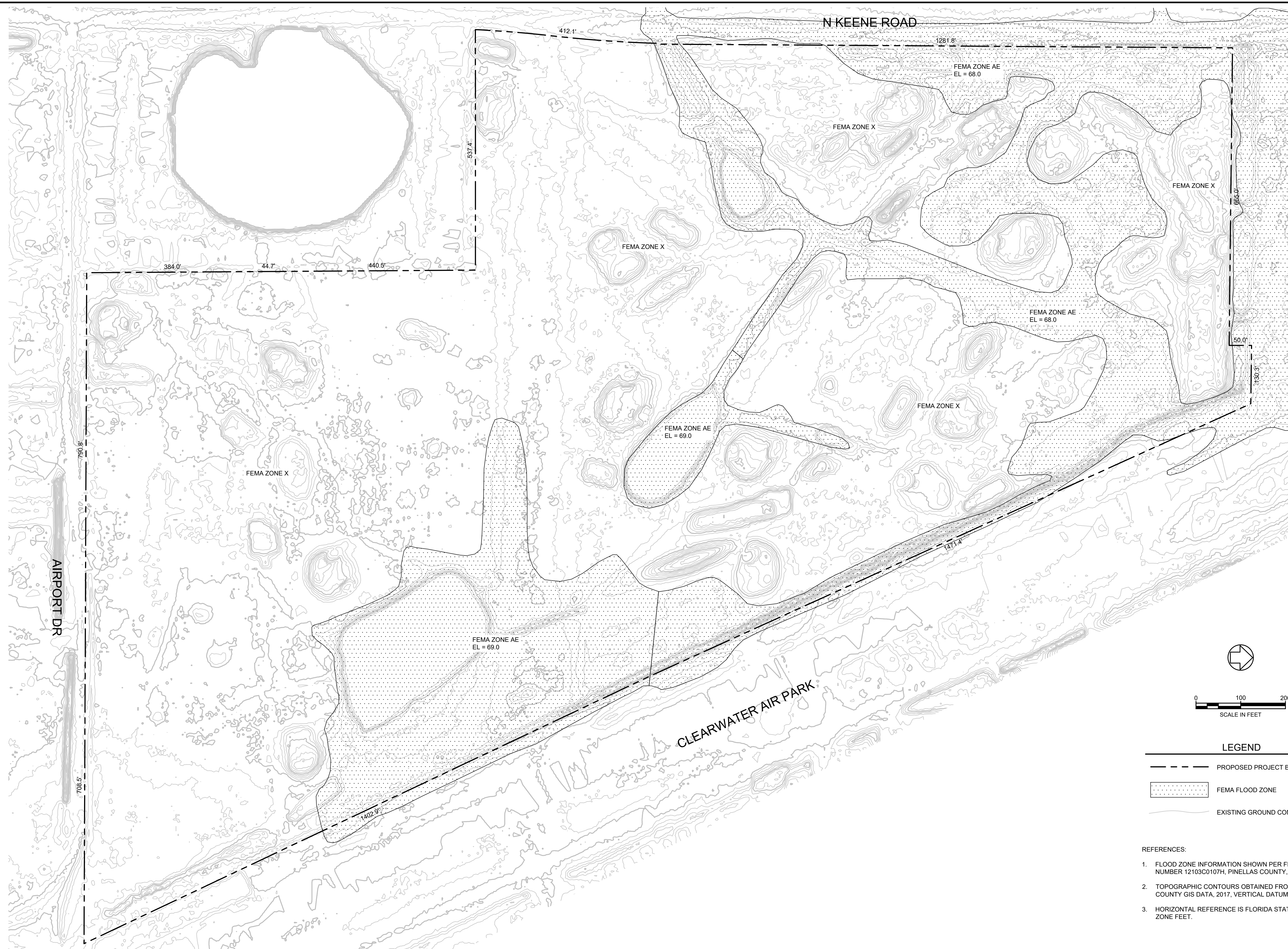
RECORD DRAWINGS		DATE	BY
SURVEYED BY:	DRAWN BY:		
REVIEWED BY:			
PROJECT ENGINEER	DATE		
APPROVED BY:			
ENGINEER	DATE	REVISION	BY DATE

CITY OF CLEARWATER, FLORIDA
ENGINEERING DEPARTMENT
100 S. MYRTLE AVE.
CLEARWATER, FL 33756



THE LANDINGS GOLF COURSE
REDEVELOPMENT FEASIBILITY STUDY
GENERAL NOTES

DWG NAME: FW3786C02	FIELD BOOK: N/A	SURVEYED BY: N/A	SCALE: N/A
CONTRACT NO.: 20-0006-29	DATE DRAWN: MARCH 2020	DRAWN BY: BL	HORIZ. N/A
JOB NO.: FW3786	DESIGNED BY: N/A	CHECKED BY: TDA	SHEET NO.: 2 OF 6
APPROVED BY: _____			



LEGEND

	PROPOSED PROJECT BOUNDARY
	FEMA FLOOD ZONE
	EXISTING GROUND CONTOURS (1 FT)

- REFERENCES:**
- FLOOD ZONE INFORMATION SHOWN PER FEMA FIRM MAP NUMBER 12103C0107H, PINELLAS COUNTY, DATE: MAY 2005.
 - TOPOGRAPHIC CONTOURS OBTAINED FROM PINELLAS COUNTY GIS DATA, 2017, VERTICAL DATUM = NAVD88.
 - HORIZONTAL REFERENCE IS FLORIDA STATE PLANE WEST ZONE FEET.

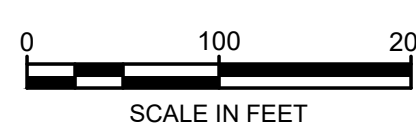
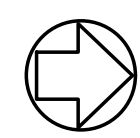
RECORD DRAWINGS		REVISION	BY	DATE
SURVEYED BY:	DRAWN BY:			
REVIEWED BY:	PROJECT ENGINEER			
APPROVED BY:	ENGINEER			

CITY OF CLEARWATER, FLORIDA
 ENGINEERING DEPARTMENT
 100 S. MYRTLE AVE.
 CLEARWATER, FL 33756



THE LANDINGS GOLF COURSE
 REDEVELOPMENT FEASIBILITY STUDY
 EXISTING CONDITIONS PLAN

DWG NAME: FW3786C03	FIELD BOOK: N/A	SURVEYED BY: N/A	SCALE: VERT. N/A
CONTRACT NO.: 20-0006-29	DATE DRAWN: MARCH 2020	DRAWN BY: BL	HORIZ. N/A
JOB NO.: FW3786	DESIGNED BY: N/A	CHECKED BY: TDA	SHEET NO.: 3 OF 6
APPROVED BY:			



LEGEND

- PROPOSED PROJECT BOUNDARY
- APPROXIMATE DEBRIS LIMITS
- ⊕ A-26 SOIL TEST / DESCRIPTION

REFERENCES:

1. GEOTECHNICAL BORING AND TEST PIT LOCATIONS PROVIDED BY TIERRA, REPORT "GEOTECHNICAL ENGINEERING SERVICES, THE LANDINGS", DATE SEPTEMBER 2019.
2. APPROXIMATE DEBRIS LIMITS WITH DEBRIS ENCOUNTERED SHOWN PER TIERRA DRAWING SHEET 9.

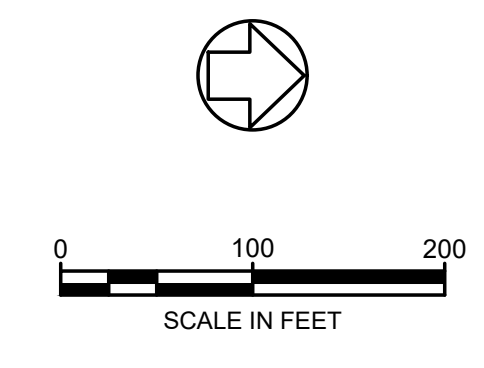
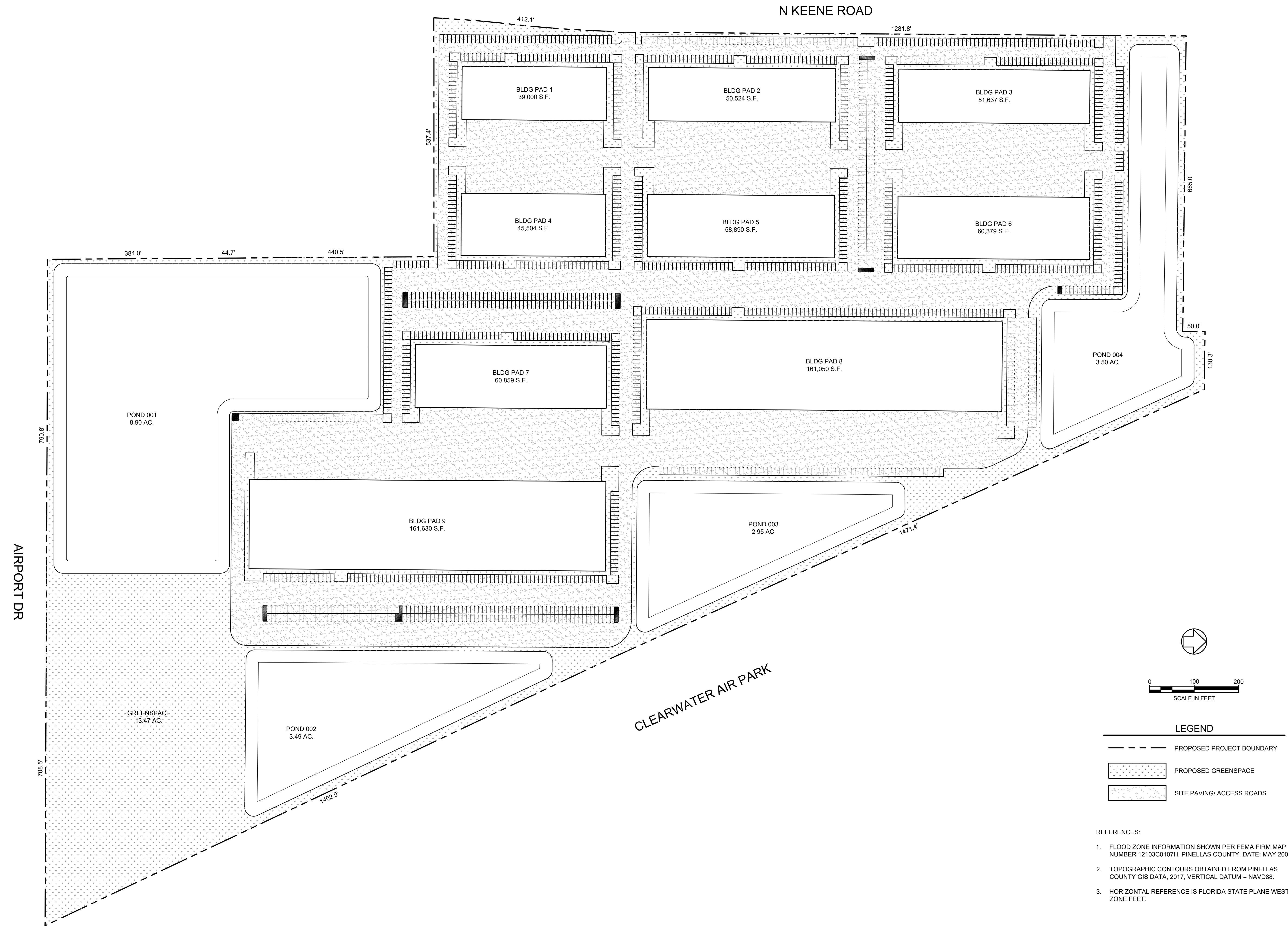
RECORD DRAWINGS		REVISION	BY	DATE
SURVEYED BY:	DRAWN BY:			
REVIEWED BY:	PROJECT ENGINEER			
APPROVED BY:	ENGINEER			

CITY OF CLEARWATER, FLORIDA
 ENGINEERING DEPARTMENT
 100 S. MYRTLE AVE.
 CLEARWATER, FL 33756



**THE LANDINGS GOLF COURSE
 REDEVELOPMENT FEASIBILITY STUDY
 DEBRIS REMOVAL PLAN**

DWG NAME:	FW3786C04	FIELD BOOK:	N/A	SURVEYED BY:	N/A	SCALE:	VERT. N/A
CONTRACT NO.:	20-0006-29	DATE DRAWN:	MARCH 2020	DRAWN BY:	BL	HORIZ.:	N/A
JOB NO.:	FW3786	DESIGNED BY:	MHS/LET	CHECKED BY:	TDA	SHEET NO.:	4 OF 6
APPROVED BY:							



LEGEND

	PROPOSED PROJECT BOUNDARY
	PROPOSED GREENSPACE
	SITE PAVING/ ACCESS ROADS

- REFERENCES:**
- FLOOD ZONE INFORMATION SHOWN PER FEMA FIRM MAP NUMBER 12103C0107H, PINELLAS COUNTY, DATE: MAY 2005.
 - TOPOGRAPHIC CONTOURS OBTAINED FROM PINELLAS COUNTY GIS DATA, 2017, VERTICAL DATUM = NAVD88.
 - HORIZONTAL REFERENCE IS FLORIDA STATE PLANE WEST ZONE FEET.

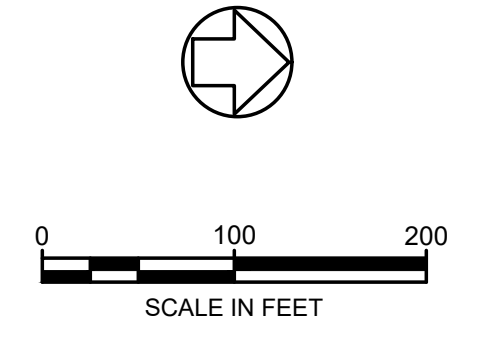
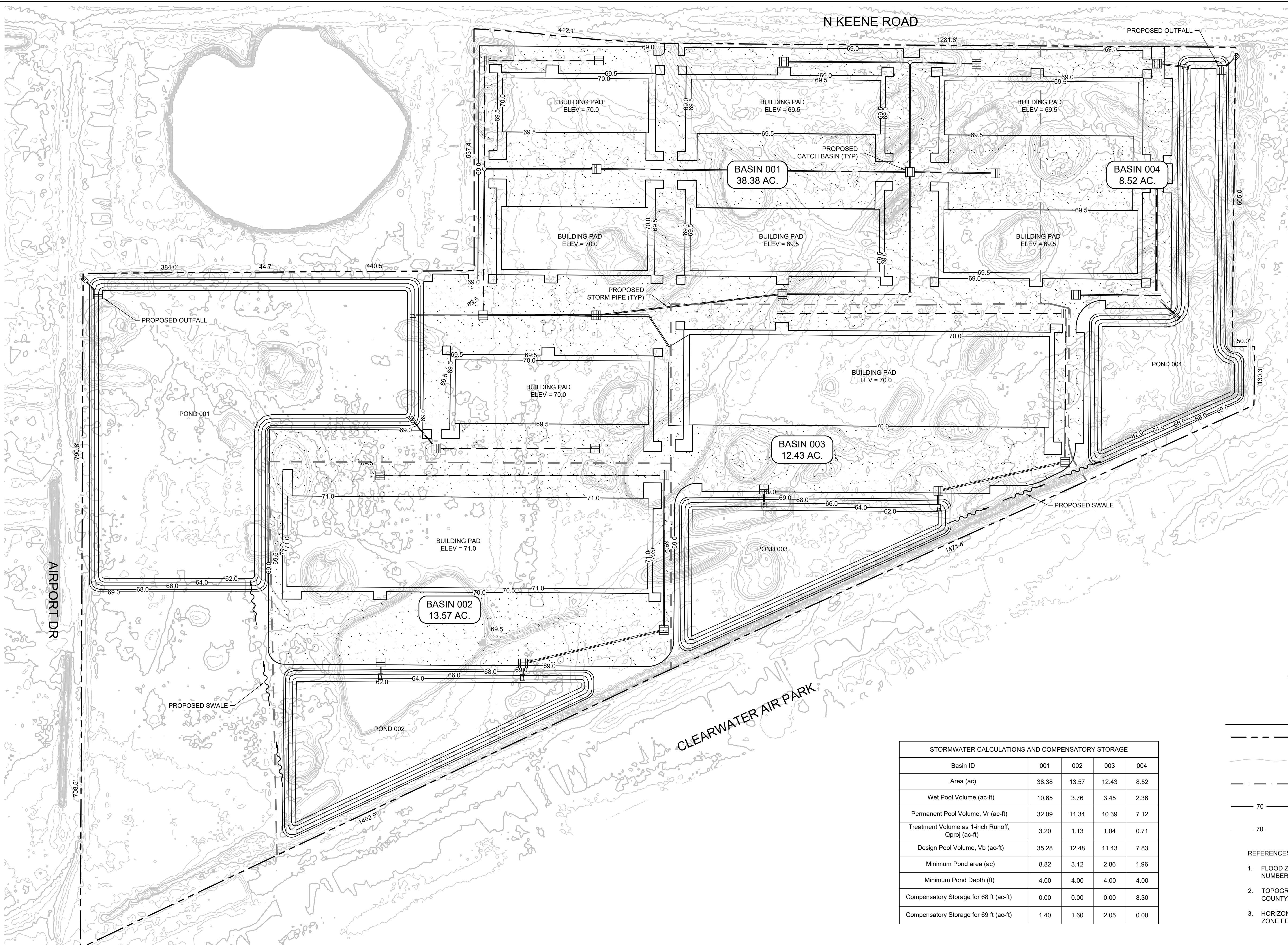
RECORD DRAWINGS		REVISION	BY	DATE
SURVEYED BY:	DRAWN BY:			
REVIEWED BY:	PROJECT ENGINEER			
APPROVED BY:	ENGINEER			

CITY OF CLEARWATER, FLORIDA
ENGINEERING DEPARTMENT
 100 S. MYRTLE AVE.
 CLEARWATER, FL 33756



THE LANDINGS GOLF COURSE
REDEVELOPMENT FEASIBILITY STUDY
CONCEPTUAL SITE PLAN

DWG NAME:	FW3786C05	FIELD BOOK:	N/A	SURVEYED BY:	N/A	SCALE:	VERT. N/A
CONTRACT NO.:	20-0006-29	DATE DRAWN:	MARCH 2020	DRAWN BY:	BL	HORIZ.	N/A
JOB NO.:	FW3786	DESIGNED BY:	MHS/ LET	CHECKED BY:	TDA	SHEET NO.:	5 OF 6
APPROVED BY:							



- LEGEND**
- PROPOSED PROJECT BOUNDARY
 - EXISTING GROUND CONTOURS (1 FT)
 - PROPOSED DRAINAGE SUB-BASIN
 - 70 --- PROPOSED GRADING MAJOR CONTOUR (1')
 - 70 --- PROPOSED GRADING MINOR CONTOUR (0.5')

STORMWATER CALCULATIONS AND COMPENSATORY STORAGE				
Basin ID	001	002	003	004
Area (ac)	38.38	13.57	12.43	8.52
Wet Pool Volume (ac-ft)	10.65	3.76	3.45	2.36
Permanent Pool Volume, V _r (ac-ft)	32.09	11.34	10.39	7.12
Treatment Volume as 1-inch Runoff, Q _{prej} (ac-ft)	3.20	1.13	1.04	0.71
Design Pool Volume, V _b (ac-ft)	35.28	12.48	11.43	7.83
Minimum Pond area (ac)	8.82	3.12	2.86	1.96
Minimum Pond Depth (ft)	4.00	4.00	4.00	4.00
Compensatory Storage for 68 ft (ac-ft)	0.00	0.00	0.00	8.30
Compensatory Storage for 69 ft (ac-ft)	1.40	1.60	2.05	0.00

- REFERENCES:**
- FLOOD ZONE INFORMATION SHOWN PER FEMA FIRM MAP NUMBER 12103C0107H, PINELLAS COUNTY, DATE: MAY 2005.
 - TOPOGRAPHIC CONTOURS OBTAINED FROM PINELLAS COUNTY GIS DATA, 2017, VERTICAL DATUM = NAVD88.
 - HORIZONTAL REFERENCE IS FLORIDA STATE PLANE WEST ZONE FEET.

RECORD DRAWINGS	
SURVEYED BY:	DRAWN BY:
REVIEWED BY:	DATE:
PROJECT ENGINEER:	DATE:
APPROVED BY:	DATE:
ENGINEER:	DATE:

CITY OF CLEARWATER, FLORIDA
 ENGINEERING DEPARTMENT
 100 S. MYRTLE AVE.
 CLEARWATER, FL 33756



THE LANDINGS GOLF COURSE
 REDEVELOPMENT FEASIBILITY STUDY
 CONCEPTUAL STORMWATER MANAGEMENT PLAN

DWG NAME: FW3786C06	FIELD BOOK: N/A	SURVEYED BY: N/A	SCALE: VERT. N/A
CONTRACT NO.: 20-0006-29	DATE DRAWN: MARCH 2020	DRAWN BY: BL	HORIZ. N/A
JOB NO.: FW3786	DESIGNED BY: MHS/LET	CHECKED BY: TDA	SHEET NO.: 6 OF 6
APPROVED BY:			

APPENDIX B

Tierra Preliminary Geotechnical Engineering and Environmental Study

TIERRA

October 3, 2019

Harrod Properties
5550 W. Executive Drive, Suite 550
Tampa, FL 33609

Attn: Mr. Robert C. Webster, II

**RE: Preliminary Geotechnical Engineering
and Limited Contamination Testing Services
The Landings Corporate Center
Clearwater, Pinellas County, Florida
Tierra Project No.: 6511-19-027**

Mr. Webster:

Tierra, Inc. has completed the preliminary geotechnical engineering and environmental study for the above referenced project. The results of the study are provided herein.

Should there be any questions regarding this report, please do not hesitate to contact our office at (813) 989-1354. Tierra would be pleased to continue providing geotechnical and environmental services throughout the implementation of the project. We look forward to working with you and your organization on this and future projects.

Respectfully Submitted,

TIERRA, INC.



Dylan A. Nelson, E.I.
Geotechnical Engineer Intern



Daniel R. Ruel, P.E.
Geotechnical Engineer
Florida License No. 82404



Kevin H. Scott, P.E.
Senior Geotechnical Engineer
Florida License No. 65514

TABLE OF CONTENTS

PROJECT DESCRIPTION	1
Project Information.....	1
Scope of Geotechnical Services.....	1
REVIEW OF PUBLISHED DATA	2
General Site Information.....	2
Pinellas County Soil Survey.....	2
SUBSURFACE EXPLORATION	4
General.....	4
Groundwater Information.....	5
Hydraulic Conductivity Tests.....	6
GPR Survey.....	6
Encountered Debris.....	6
Contamination Testing Results.....	7
EVALUATION AND RECOMMENDATIONS	7
<i>Alternative 1: Removal and Replacement of Deleterious Materials</i>	8
<i>Alternative 2: Limited Site Layout</i>	8
<i>Alternative 3: Deep Foundations</i>	8
REPORT LIMITATIONS	9
APPENDIX A	
Boring Location Plan (Sheet 1)	
Soil Profiles (Sheets 2 through 6)	
Approximate Debris Limits (Sheets 7 and 8)	
Approximate Debris Limit with Encountered Debris (Sheet 9)	
Site Area of Concern 1958 (Sheet 10)	
APPENDIX B	
Test Pit Excavation Photographs (14 Sheets)	

PROJECT DESCRIPTION

Project Information

The project site is located on the existing Landings Golf Club of Clearwater near the northeast intersection of Keene Road and Airport Drive in Clearwater, Florida. Based on information provided, the proposed development consists of warehouses (areas ranging from 39,000 to 160,000 sq-ft), paved parking, and drainage features. This report has been prepared to provide preliminary geotechnical and contamination services to support the preliminary design and assist in future designs based on the investigations described herein. Additionally, Tierra previously performed a Phase I Environmental Site Assessment (dated July 8, 2019) that identified three on-site Recognized Environmental Conditions (RECs).

If any of the project information noted is incorrect or has changed, Tierra should be notified as soon as possible so we can determine if the changes impact our recommendations.

Scope of Geotechnical Services

The objective of our study was to obtain information concerning subsurface conditions at the project site in order to base preliminary engineering estimates and recommendations by evaluating the geotechnical conditions encountered to assist in site development.

In order to meet the preceding objectives, we provided the following services:

1. Reviewed published soils and topographic information obtained from the "Clearwater, Florida" Quadrangle Map published by the United States Geological Survey (USGS) and the Soil Survey of Pinellas County, Florida, published by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).
2. Executed a program of subsurface exploration consisting of auger borings, Standard Penetration Test (SPT) borings, test pits, subsurface sampling and contamination testing.
3. Visually classified the samples in the laboratory using the Unified Soil Classification System (USCS). Performed laboratory testing to confirm visual classification. Identified soil conditions at each boring location. Performed laboratory permeability tests on recovered samples from the currently proposed pond locations.
4. Prepared a preliminary engineering report in accordance with this report, which summarizes the course of study pursued, the field data generated, subsurface conditions encountered and the results of our findings and engineering analyses.

The scope of our services did not include an environmental assessment for determining the presence or absence of wetlands. The scope of services did not include determination of potential sinkhole activity. Any statements in this report or on the boring logs regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of our client.

REVIEW OF PUBLISHED DATA

General Site Information

The subject property is currently utilized as a golf course. Golf courses are associated with contamination from residual pesticides, herbicides, and heavy metals contaminants in the soil and/or groundwater. Assessment is recommended in areas such as the tee boxes/greens and maintenance areas.

Disturbed earth in a "trench-and-fill" pattern (landfill) is apparent on the subject property's western, northern, and eastern areas in historical aerial photographs as presented in the **Site Area of Concern 1958** exhibit located in the **Appendix**. These areas were explored and are discussed herein.

Pinellas County Soil Survey

Soil data published by the USDA Soil Survey of Pinellas County, Florida was reviewed as part of the subsurface investigation. This information indicates that there are three primary mapping units within the vicinity of the proposed development. The following paragraphs and table provide a brief description of these soil units as presented in the Soil Survey.

Immokalee Soils and Urban Land (Map Unit 13) - The Immokalee component makes up 50 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, October and November. Organic matter content in the surface horizon is about 2 percent.

Matlacha and St. Augustine soils and Urban Land (Map Unit 16) - The Matlacha component makes up 32 percent of the map unit. Slopes are 0 to 2 percent. This component is on fills on ridges on marine terraces on coastal plains. The parent material consists of sandy mine spoil or earthy fill. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 30 inches during June, July, August, September and October. Organic matter content in the surface horizon is about 0 percent.

The St. Augustine component makes up 32 percent of the map unit. Slopes are 0 to 2 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of sandy mine spoil or earthy fill. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during June, July, August, September and October. Organic matter content in the surface horizon is about 2 percent.

Myakka Soils and Urban Land (Map Unit 17) - The Myakka component makes up 50 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, October and November. Organic matter content in the surface horizon is about 4 percent.

The St. Augustine component makes up 32 percent of the map unit. Slopes are 0 to 2 percent. This component is on ridges on marine terraces on coastal plains. The parent material consists of sandy mine spoil or earthy fill. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 27 inches during June, July, August, September and October. Organic matter content in the surface horizon is about 2 percent.

The Urban Land component of these soil types consists of areas where most of the soil surface is covered with impervious materials, such as buildings and paved areas. This land type consists of areas where the original soil has been modified through cutting, grading, filling, and shaping or has been generally altered for urban development.

SUMMARY OF USDA SOIL SURVEY PINELLAS COUNTY, FLORIDA								
USDA Map Unit and Soil Name	Depth (in)	Soil Classification		Permeability (in/hr)		pH	Seasonal High Water Table	
		USCS	AASHTO	Low to High	Mean		Depth (ft)	Months
(13) Immokalee Urban Land	0-6	SP, SP-	A-3	6.0 - 20.0	13.0	3.5-6.0	0.5-1.5	Jun-Nov
	6-35	SP, SP-SM	A-3	6.0 - 20.0	13.0	3.5-6.0		
	35-50	SM, SP-SM	A-2-4, A-3	0.6 - 6.0	3.3	3.5-6.0		
	50-80	SP, SP-SM	A-3	6.0 - 20.0	13.0	3.5-6.0		
Urban Land	---	---	---	---	---	---	---	---
(16) Matlacha St. Augustine Urban Land	0-42	SP, SP-SM	A-3	2.0 - 6.0	4.0	6.1-8.4	2.0-3.0	Jun-Oct
	42-80	SP, SP-SM	A-3	6.0 - 20.0	13.0	6.1-8.4		
	0-8	SP-SM, SP	A-3	6.0 - 20.0	13.0	6.1-8.4	1.5-3.0	Jun-Oct
	8-33	SP-SM	A-2-4	2.0 - 20.0	11.1	6.1-8.4		
	33-48	SP, SP-SM	A-3	6.0 - 20.0	13.0	6.1-8.4		
	48-63	SM, SP-SM	A-2-4	2.0 - 20.0	11.1	6.1-8.4		
	63-80	SP, SP-SM	A-3	6.0 - 20.0	13.0	6.1-8.4		
Urban Land	---	---	---	---	---	---	---	---
(17) Myakka Urban Land	0-4	SP, SP-SM	A-3	6.0 - 20.0	13.0	3.5-6.5	0.5-1.5	Jun-Nov
	4-22	SP, SP-SM	A-3	6.0 - 20.0	13.0	3.5-6.5		
	22-36	SM, SP-SM	A-2-4, A-3	0.6 - 6.0	3.3	3.5-6.5		
	36-80	SP, SP-SM	A-3	6.0 - 20.0	13.0	3.5-6.5		
Urban Land	---	---	---	---	---	---	---	---

It should be noted that information contained in the USDA/NRCS Soil Survey may not be reflective of current subsurface conditions, particularly if recent development in the project vicinity has modified existing soils or surface/subsurface drainage.

SUBSURFACE EXPLORATION

General

The borings and test pits were located in the field by a representative of Tierra and recorded coordinates obtained from our hand-held Global Positioning System (GPS) devices with a reported accuracy of ±10 feet. The approximate boring and test pit locations are presented on the **Boring Location Plan** in the **Appendix A**. If a more accurate determination of the boring locations and elevations is required, then Tierra recommends the boring locations be survey located by the project surveyor.

The SPT borings were performed with the use of a drill rig using bentonite mud drilling procedures utilizing an automatic hammer. The soil sampling was performed in general accordance with American Society for Testing and Materials (ASTM) Test Designation D-1586. The initial 4 feet of the SPT borings were manually performed using a hand auger to verify utility clearances. SPT resistance N-values were then taken at intervals of 2 feet to a depth of 10 feet and at intervals of 5 feet thereafter.

The hand auger borings were performed in general accordance with ASTM Test Designation D-1452 by manually twisting a bucket auger into the ground typically in six-inch increments. The soil samples were collected and classified in the field and transported to our laboratory for review by a geotechnical engineer. The test pits were performed using a mechanical tracked excavator. A representative of Tierra logged, classified, and photographed the findings within the test pit excavations prior to backfilling.

The soil strata encountered in the borings performed at the proposed development site are summarized in the following table:

Stratum Number	Soil Description	USCS Symbol
1	Light Gray to Light Brown Sand to Sand with Silt	SP/SP-SM
2	Debris - Glass, Plastic, Metal, Ceramics, Rubber, and Wood with Sand	---(1)
3	Light Brown Silty Sand	SM
---(1) USCS does not contain nomenclature for debris.		

The subsurface soil stratification is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The **Soil Profiles** sheets included in the **Appendix** should be reviewed for specific information at individual boring locations. These profiles include soil descriptions, stratifications and penetration resistances when applicable. The stratifications shown on the boring profiles represent the conditions only at the actual boring location. Variations did occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual.

Groundwater Information

The groundwater table was measured at depths ranging from approximately 1 foot to 5 feet below the existing ground surface at the boring locations. The encountered groundwater levels are presented on the **Soil Profiles** sheets in the **Appendix**. It should be noted that standing water was observed throughout the site following rain events and some of the field borings were offset to areas of non-standing water.

Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences (i.e. existing swales, drainage drainages, underdrains and areas of covered soils, such as paved parking lots). It should be noted that groundwater levels tend to fluctuate during periods of prolonged drought and extended rainfall and may be affected by man-made influences. In addition, a seasonal effect will also occur in which higher groundwater levels are normally recorded in rainy seasons.

The SHGWT levels were estimated at select boring locations. Based on the soil conditions encountered within the borings, the SHGWT is estimated to range from the existing ground surface to 3¼ feet below the existing ground surface. The SHGWT estimates are presented adjacent to the **Soil Profiles** in the **Appendix**.

Hydraulic Conductivity Tests

Tierra collected bulk samples within the locations of the currently proposed pond areas and conducted five (5) laboratory falling head hydraulic conductivity tests (Coefficient of Permeability – Falling Head Method FM 5-513). The tests were performed on samples obtained at depths ranging from 1 to 2 feet below grade at the locations of auger borings HA-15, HA-24, HA-31, HA-42 and HA-47. These boring locations are depicted on the **Boring Location Plan** in the **Appendix**. The following table summarizes the test results.

Permeability Test Location	Soil Stratum Tested	Hydraulic Conductivity Test Results ⁽¹⁾	
		Test Depth (feet)	Hydraulic Conductivity Rate (feet/day)
HA-15	1	1 – 2	40
HA-24	1	1 – 2	30
HA-31	1	1 – 2	40
HA-42	1	1 – 2	40
HA-47	1	1 – 2	40

⁽¹⁾ The hydraulic conductivity results presented above are **not** factored and are only for Stratum 1 soils. The design engineer should apply an appropriate factor of safety, as applicable.

GPR Survey

A limited GPR survey was performed throughout the project site to aid in the characterization of the subsurface conditions present in the area. Tierra performed a total of twenty-six (26) GPR transects. The GPR survey encountered nonhomogeneous shallow subsurface soils consistent with the landfill areas identified in the historical aerial review. Tierra utilized the results of the GPR survey to aid in locating soil borings.

Encountered Debris

Glass, plastic, and metal debris with sand was encountered in several of the SPT borings and auger borings performed. These areas are depicted on the **Approximate Debris Limits** (Sheets 7, 8 and 9) and **Site Area of Concern 1958** (Sheet 10) provided in the **Appendix**. These materials were encountered within the SPT borings at depths ranging from approximately 3 to 7 feet below grade and within the auger borings at depths ranging from approximately 1 to 6 feet below grade.

Test pits were completed to further characterize the subsurface conditions encountered within the SPT borings and auger borings. Five test pits were performed within the **Approximate Debris Limits**. TP-42 encountered clean sand to sand with silt to the excavation termination depth of 7 feet. Test pits TP-30, TP-37, TP-38, and TP-45 encountered buried debris consisting of glass, metal, plastic, ceramics, rubber, and wood at depths ranging from 3½ to greater than 9 feet below the existing ground surface. **The Test Pit Excavation Photographs** located in the **Appendix B** provide photographs and descriptions of the results of the test pits.

Contamination Testing Results

Tierra performed a Phase II environmental study to further evaluate the presence of contaminants across the subject property. This study included sampling and testing of soil samples based on the Recognized Environmental Conditions concluded in the subject property's Phase I Environmental Study Report. The following paragraphs provide a summary of the encountered environmental conditions.

Soil samples were collected from within the debris zone at four test pit locations for laboratory analysis. No groundwater samples were collected. Contaminant concentrations that were detected above the Soil Cleanup Target Levels (Residential Direct Exposure, Commercial/Industrial Direct Exposure, and Leachability) as provided in Chapter 62-777, Florida Administrative Code include *Arsenic and Lead*.

Soil samples were collected from the ground surface to a depth of 6 inches at three random holes at the golf course for laboratory analysis. No groundwater samples were collected. Contaminant concentrations that were detected above the Soil Cleanup Target Levels (Leachability) as provided in Chapter 62-777, Florida Administrative Code include *Dieldrin, Arsenic and Lead*.

Soil samples were collected from the ground surface to a depth of 6 inches at three locations in the vicinity of the maintenance shed for laboratory analysis. No groundwater samples were collected. Contaminant concentrations that were detected above the Soil Cleanup Target Levels ((Residential Direct Exposure, Commercial/Industrial Direct Exposure, and Leachability) as provided in Chapter 62-777, Florida Administrative Code include *Chlordane, Dieldrin, Toxaphene, Arsenic and Lead*.

EVALUATION AND RECOMMENDATIONS

As previously mentioned, debris including glass, plastic, metal, ceramics, rubber and wood were encountered within the proposed improvement areas at the site. The approximate locations and depths of the buried debris materials is shown on Sheets 7 through 10 in **Appendix A**. These materials are considered *unsuitable and detrimental* to the support of the proposed structures and pavement areas.

Based on our subsurface explorations and our understanding of the proposed development play, Tierra has developed potential development alternatives for site development considering the extent of the debris on-site. The potential alternatives include the following:

Alternative 1: Removal and Replacement of Deleterious Materials

The landfill debris material may be removed and transported off site to an appropriate disposal site prior to site development. The limits of debris removal should be at least 10 feet outside of the footprints of the proposed improvements. The unsuitable materials should be removed and the proposed finish elevations should be re-established by backfilling with a well-compacted, suitable fill such as clean sand (i.e. less than 12 percent passing the no. 200 sieve), gravel, or crushed FDOT No. 57 or FDOT No. 67 stone. Sand backfill should be placed in lifts not exceeding 12 inches in loose thickness and compacted to a dry density of at least 95% of the Modified Proctor maximum dry density.

Based on the encountered groundwater levels and estimated SHGWT levels, dewatering is anticipated to be required to facilitate the removal of the debris. In addition, special consideration will be required for dewatering, excavation and disposal of the debris based on the limited contamination services performed at the site to-date.

Alternative 2: Limited Site Layout

Alternative 2 proposes buildings, parking lots and drainage features to be designed outside of the debris limits requiring no remediation for the buried debris. The areas where debris was encountered would remain undeveloped and/or developed as landscaping features.

Alternative 3: Deep Foundations

Alternative 3 includes supporting the structures encroaching on debris on deep foundations such as driven concrete piling. Additional test borings will be required to evaluate deep foundation alternatives if this option is chosen.

Paved parking within the debris limits will require remediation to reduce the potential of pavement distress due to excessive differential settlement. However, increased maintenance should be anticipated by the owner and contingency fees secured.

REPORT LIMITATIONS

The analyses, conclusions and recommendations contained in this report are opinions based on the site conditions and project layout described herein and further assume that the conditions observed in the exploratory borings are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions elsewhere on the site are the same as those disclosed by the borings. Additional site explorations and contamination testing will be required to develop final site construction plans.

This report was prepared for the exclusive use of Harrod Properties and their clients for evaluating the design of the project as it relates to the geotechnical aspects discussed herein. It should be made available to prospective contractors for information on factual data only and not as a warranty of subsurface conditions included in this report. Unanticipated soil conditions may require that additional expense be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

APPENDIX A

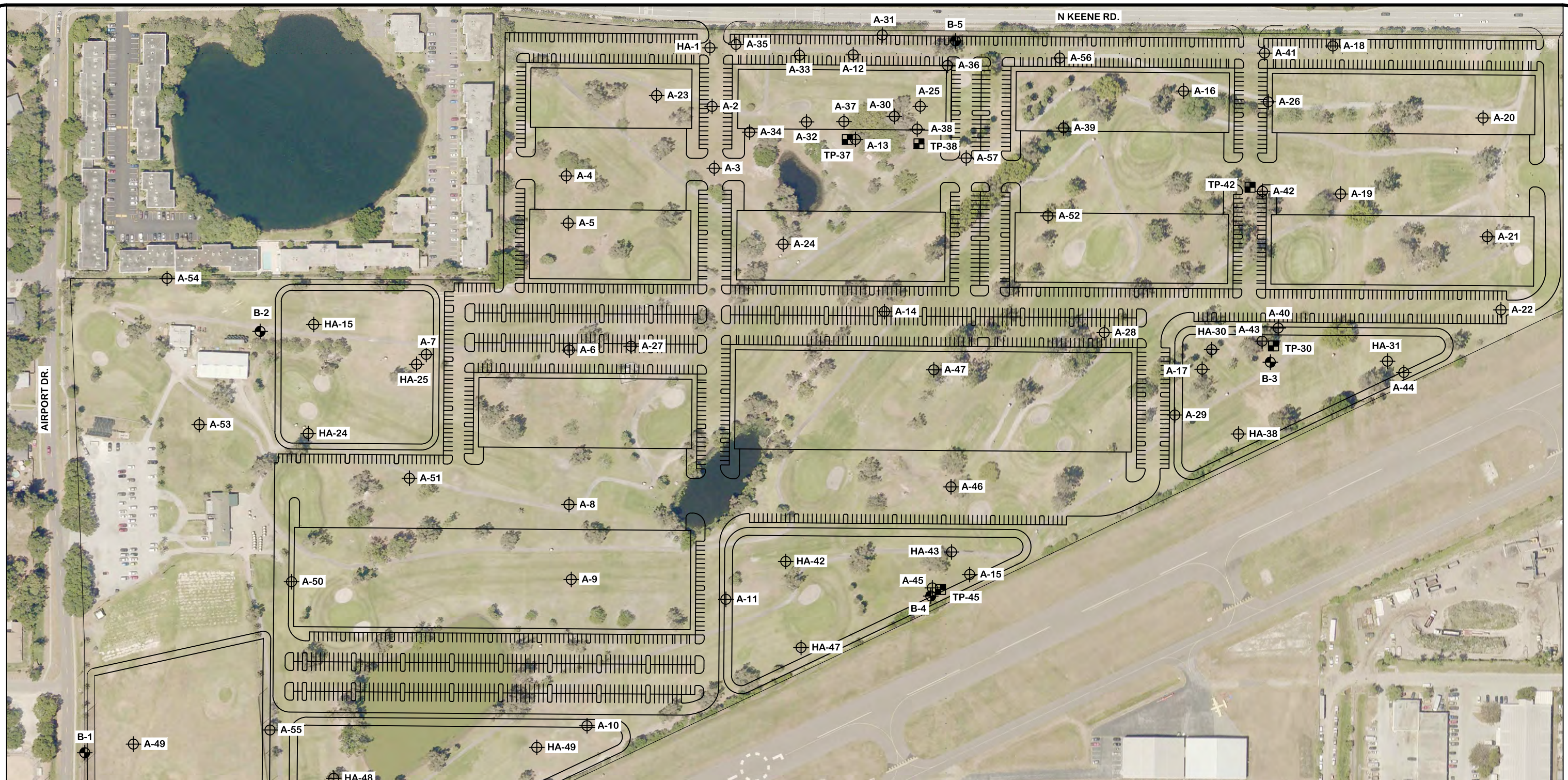
Boring Location Plan (Sheet 1)

Soil Profiles (Sheets 2 through 6)

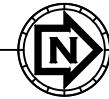
Approximate Debris Limit (Sheets 7 and 8)

Approximate Debris Limit with Encountered Debris (Sheet 9)

Site Area of Concern 1958 (Sheet 10)



BORING LOCATION PLAN



LEGEND

- APPROXIMATE LOCATION OF AUGER BORING
- APPROXIMATE LOCATION OF SPT BORING
- APPROXIMATE LOCATION OF TEST PIT

NOTE: BASE MAP PROVIDED BY AURORA CIVIL ENGINEERING

DRAWN BY:
SW
CHECKED BY:
JMN

APPROVED BY:
DRR
DATE:
SEP 2019

ENGINEER OF RECORD:
DANIEL R. RUEL, P.E.
FLORIDA LICENSE NO.:
82404



TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355
FL Cert. No.: 6486

SCALE:
NOTED

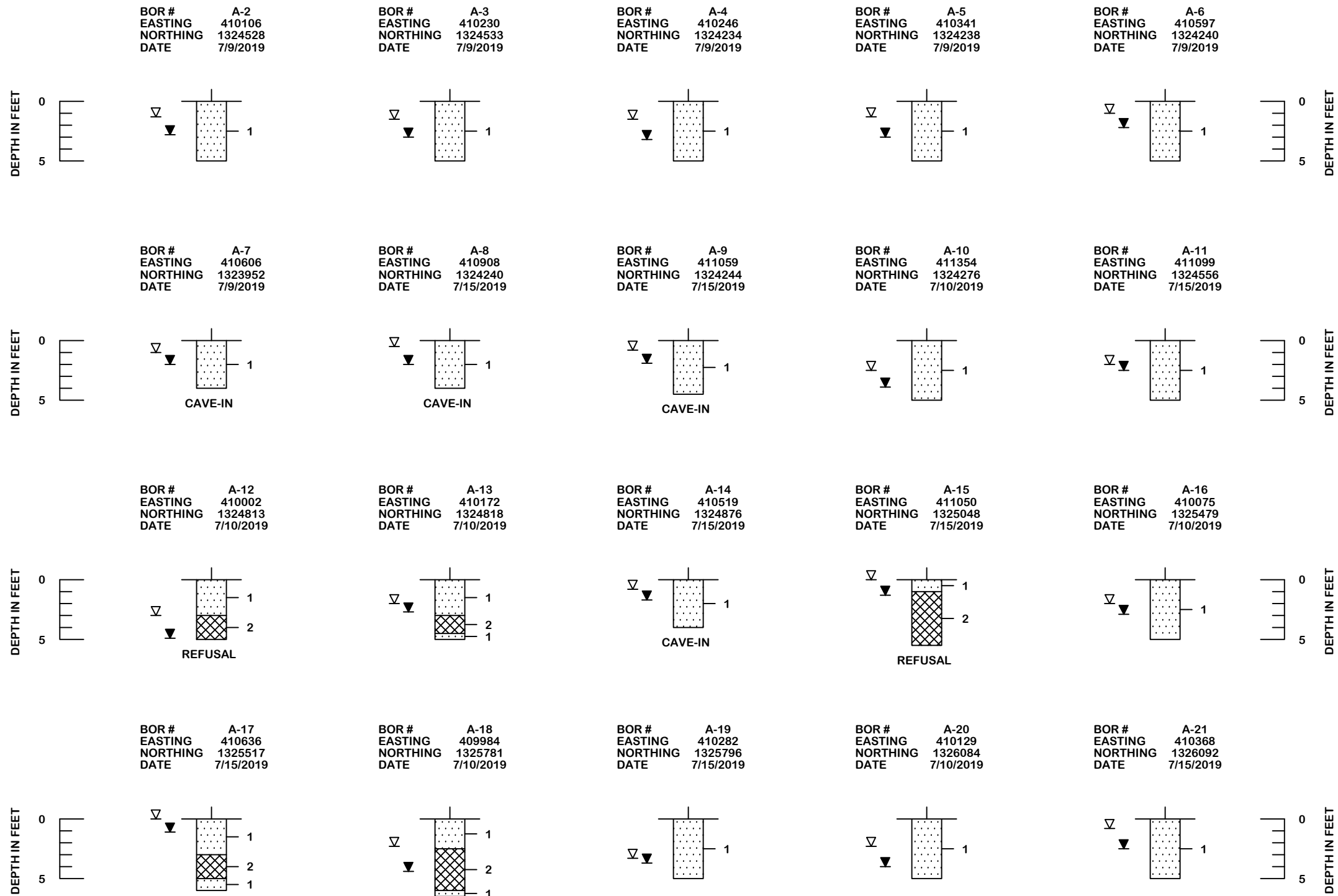
PROJECT NUMBER:
6511-19-027

GEOTECHNICAL ENGINEERING SERVICES
THE LANDINGS
PINELLAS COUNTY, FLORIDA

SHEET 1

SOIL PROFILES

LEGEND



- 1 LIGHT GRAY TO LIGHT BROWN TO BROWN SAND TO SAND WITH SILT (SP)
- 2 DEBRIS- GLASS, PLASTIC, METAL, CERAMICS, RUBBER, AND WOOD WITH SAND
- 3 LIGHT BROWN SILTY SAND (SM)
- A WITH ROOTS
- 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.
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- 200 PERCENT PASSING #200 SIEVE
- 50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
- HA HAND AUGERED TO VERIFY UTILITY CLEARANCES
- CAVE-IN CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION
- REFUSAL REFUSAL ON DEBRIS MATERIAL

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

DRAWN BY:
SW

APPROVED BY:
DRR

ENGINEER OF RECORD:
DANIEL R. RUEL, P.E.
FLORIDA LICENSE NO.:
82404

CHECKED BY:
JMN

DATE:
SEP 2019



TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355
FL Cert. No.: 6486

SCALE:
NOTED

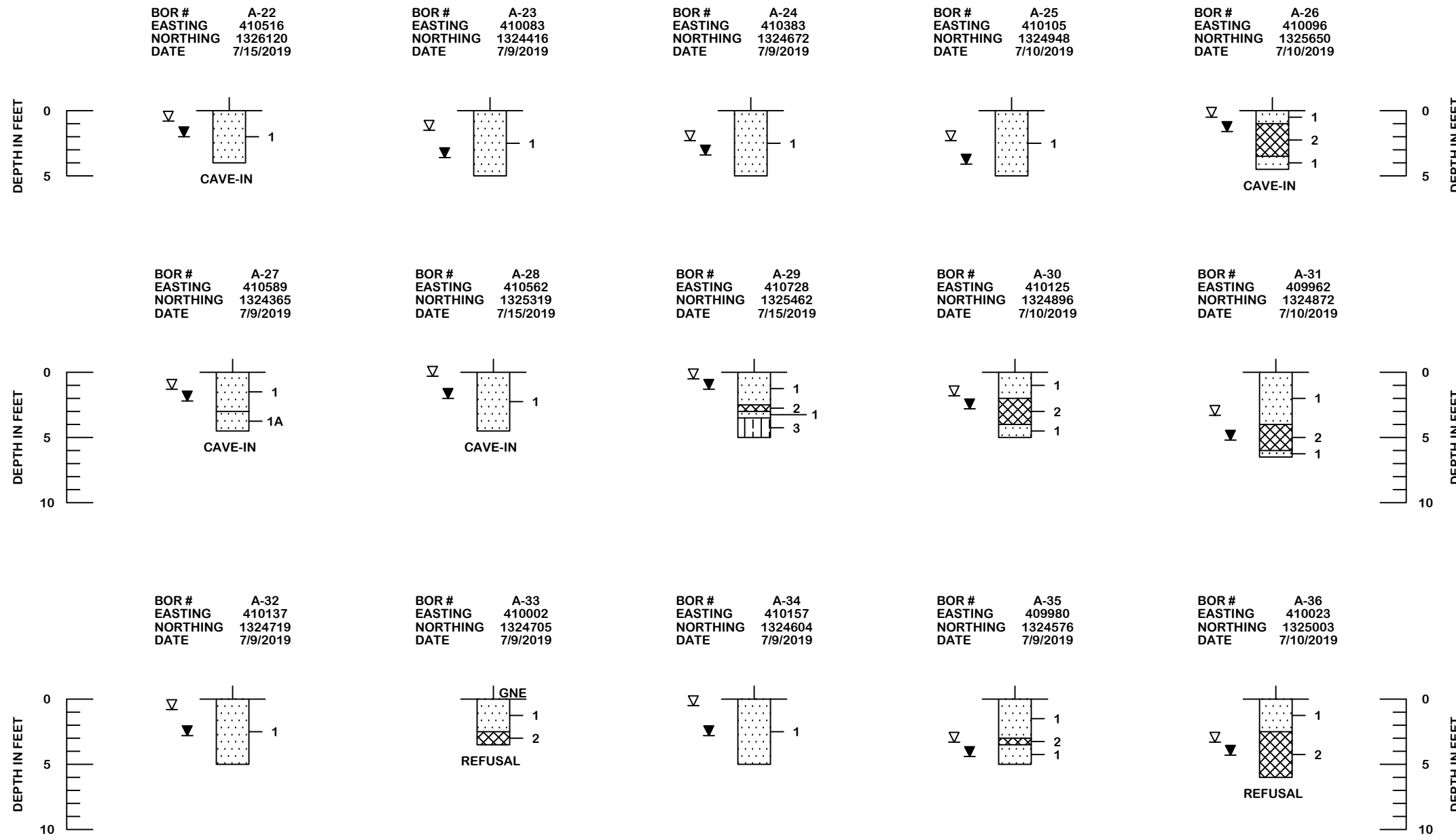
PROJECT NUMBER:
6511-19-027

GEOTECHNICAL ENGINEERING SERVICES
THE LANDINGS
PINELLAS COUNTY, FLORIDA

SHEET 2

SOIL PROFILES

LEGEND



- 1 LIGHT GRAY TO LIGHT BROWN TO BROWN SAND TO SAND WITH SILT (SP)
- 2 DEBRIS- GLASS, PLASTIC, METAL, CERAMICS, RUBBER, AND WOOD WITH SAND
- 3 LIGHT BROWN SILTY SAND (SM)
- A WITH ROOTS
- 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.
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- 200 PERCENT PASSING #200 SIEVE
- 50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
- HA HAND AUGERED TO VERIFY UTILITY CLEARANCES
- CAVE-IN CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION
- REFUSAL REFUSAL ON DEBRIS MATERIAL

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

SOIL PROFILES

LEGEND

BOR # A-37
EASTING 410136
NORTHING 1324794
DATE 7/10/2019

BOR # A-38
EASTING 410151
NORTHING 1324942
DATE 7/10/2019

BOR # A-39
EASTING 410149
NORTHING 1325237
DATE 7/10/2019

BOR # A-40
EASTING 410552
NORTHING 1325670
DATE 7/10/2019

BOR # A-41
EASTING 409998
NORTHING 1325643
DATE 7/10/2019

BOR # A-42
EASTING 410277
NORTHING 1325639
DATE 7/15/2019

BOR # A-43
EASTING 410579
NORTHING 1325638
DATE 7/15/2019

BOR # A-44
EASTING 410642
NORTHING 1325924
DATE 7/15/2019

BOR # A-45
EASTING 411076
NORTHING 1324973
DATE 7/15/2019

BOR # A-46
EASTING 410873
NORTHING 1325010
DATE 7/15/2019

BOR # A-47
EASTING 410637
NORTHING 1324976
DATE 7/15/2019

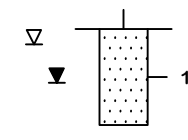
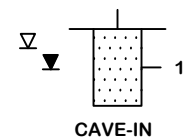
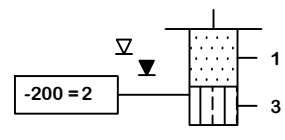
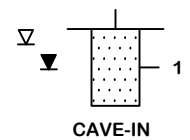
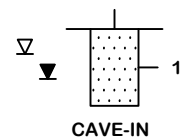
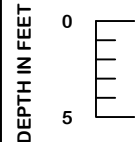
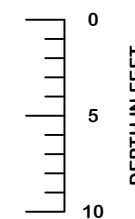
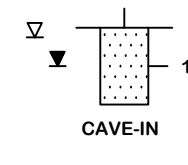
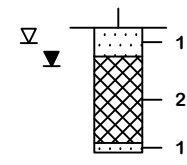
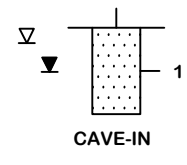
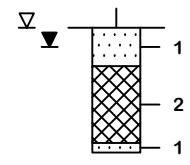
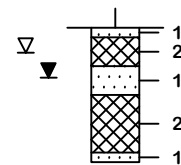
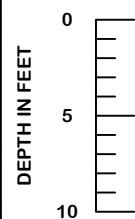
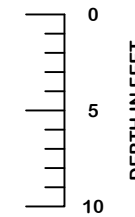
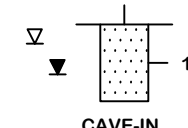
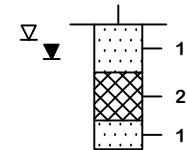
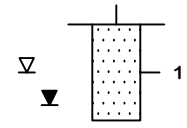
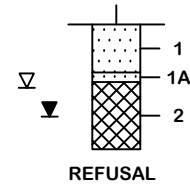
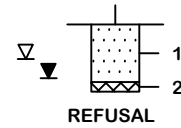
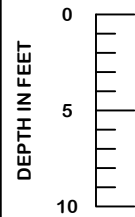
BOR # A-48
EASTING 411626
NORTHING 1323602
DATE 7/9/2019

BOR # A-49
EASTING 411391
NORTHING 1323361
DATE 7/9/2019

BOR # A-50
EASTING 411064
NORTHING 1323680
DATE 7/9/2019

BOR # A-51
EASTING 410855
NORTHING 1323918
DATE 7/10/2019

- 1 LIGHT GRAY TO LIGHT BROWN TO BROWN SAND TO SAND WITH SILT (SP)
- 2 DEBRIS- GLASS, PLASTIC, METAL, CERAMICS, RUBBER, AND WOOD WITH SAND
- 3 LIGHT BROWN SILTY SAND (SM)
- A WITH ROOTS
- 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.
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- 200 PERCENT PASSING #200 SIEVE
- 50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
- HA HAND AUGERED TO VERIFY UTILITY CLEARANCES
- CAVE-IN CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION
- REFUSAL REFUSAL ON DEBRIS MATERIAL



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

DRAWN BY:
SW

APPROVED BY:
DRR

ENGINEER OF RECORD:
DANIEL R. RUEL, P.E.
FLORIDA LICENSE NO.:
82404



TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355
FL Cert. No.: 6486

SCALE:
NOTED

PROJECT NUMBER:
6511-19-027

GEOTECHNICAL ENGINEERING SERVICES
THE LANDINGS
PINELLAS COUNTY, FLORIDA

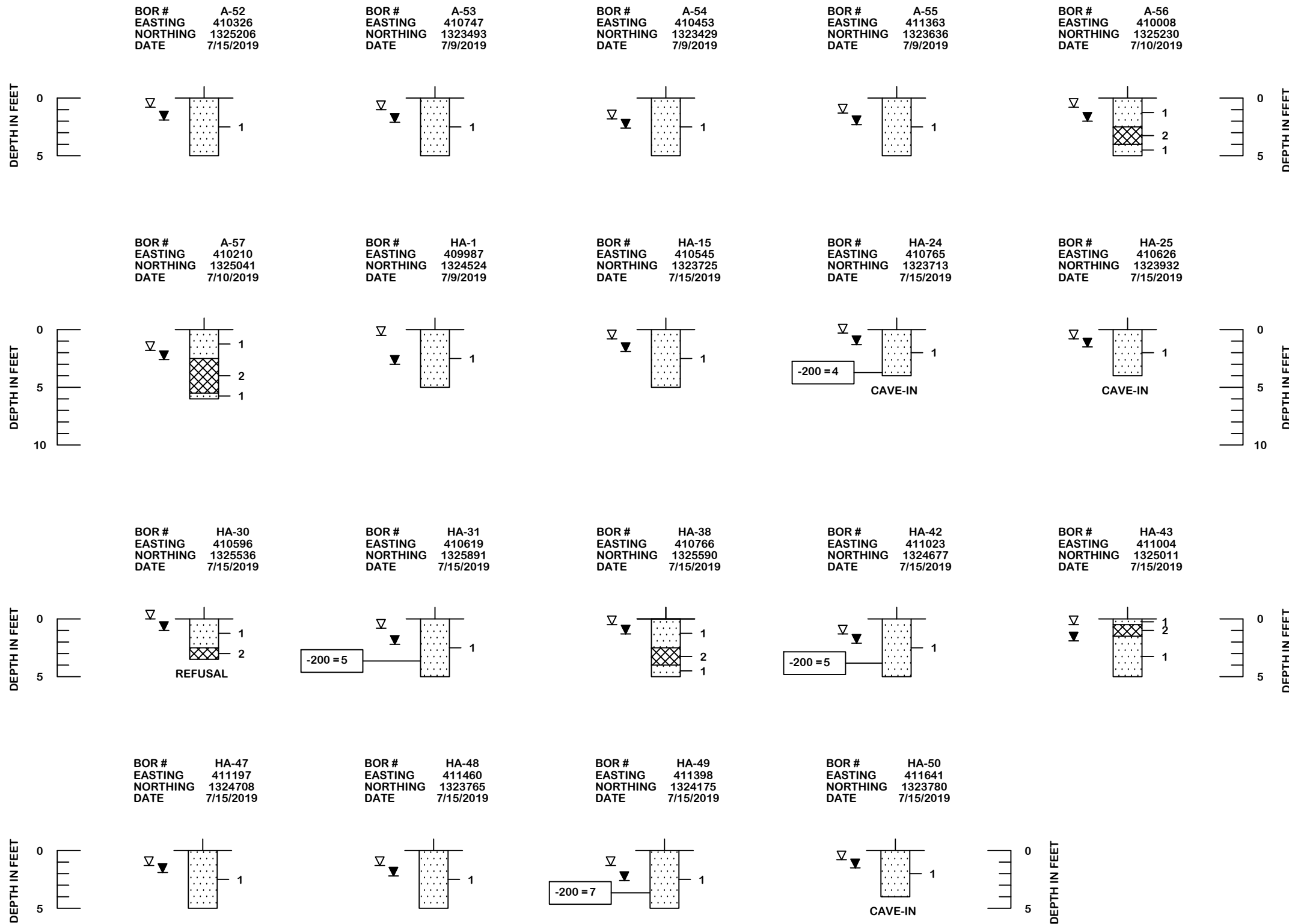
SHEET 4

CHECKED BY:
JMN

DATE:
SEP 2019

SOIL PROFILES

LEGEND



- 1 LIGHT GRAY TO LIGHT BROWN TO BROWN SAND TO SAND WITH SILT (SP)
- 2 DEBRIS- GLASS, PLASTIC, METAL, CERAMICS, RUBBER, AND WOOD WITH SAND
- 3 LIGHT BROWN SILTY SAND (SM)
- A WITH ROOTS
- 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.
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- 200 PERCENT PASSING #200 SIEVE
- 50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
- HA HAND AUGERED TO VERIFY UTILITY CLEARANCES
- CAVE-IN CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION
- REFUSAL REFUSAL ON DEBRIS MATERIAL

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

SOIL PROFILES

LEGEND

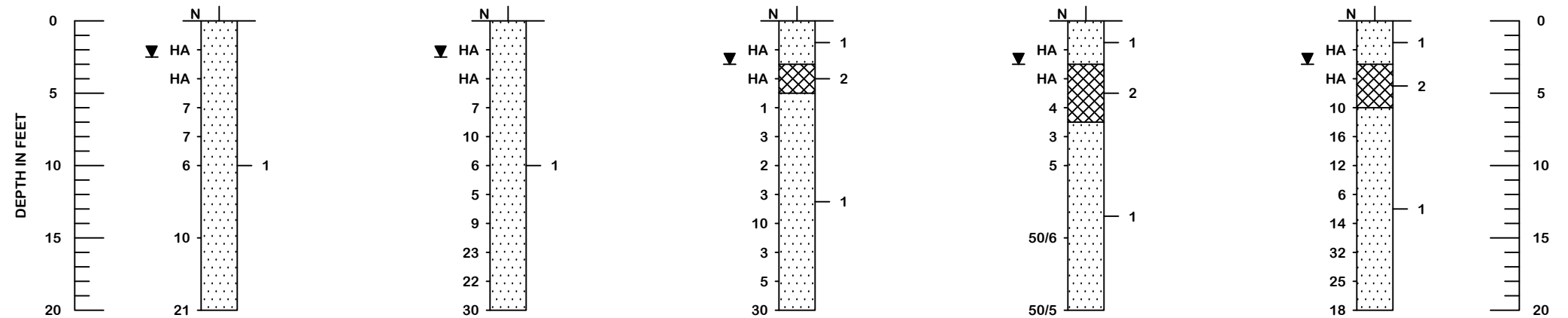
BOR # B-1
EASTING 411409
NORTHING 1323263
DATE 8/9/2019
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-25

BOR # B-2
EASTING 410559
NORTHING 1323617
DATE 8/9/2019
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-25

BOR # B-3
EASTING 410621
NORTHING 1325655
DATE 8/9/2019
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-25

BOR # B-4
EASTING 411093
NORTHING 1324969
DATE 8/9/2019
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-25

BOR # B-5
EASTING 409974
NORTHING 1325019
DATE 8/9/2019
DRILLER J. SMITH
HAMMER AUTOMATIC
RIG D-25



- 1 LIGHT GRAY TO LIGHT BROWN TO BROWN SAND TO SAND WITH SILT (SP)
- 2 DEBRIS- GLASS, PLASTIC, METAL, CERAMICS, RUBBER, AND WOOD WITH SAND
- 3 LIGHT BROWN SILTY SAND (SM)
- A WITH ROOTS
- ▼ 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.
- GNE GROUNDWATER TABLE NOT ENCOUNTERED
- 200 PERCENT PASSING #200 SIEVE
- 50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
- HA HAND AUGERED TO VERIFY UTILITY CLEARANCES
- CAVE-IN CAVE-IN DUE TO SHALLOW GROUNDWATER INTRUSION
- REFUSAL REFUSAL ON DEBRIS MATERIAL

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

DRAWN BY:
SW

CHECKED BY:
JMN

APPROVED BY:
DRR

DATE:
SEP 2019

ENGINEER OF RECORD:
DANIEL R. RUEL, P.E.
FLORIDA LICENSE NO.:
82404



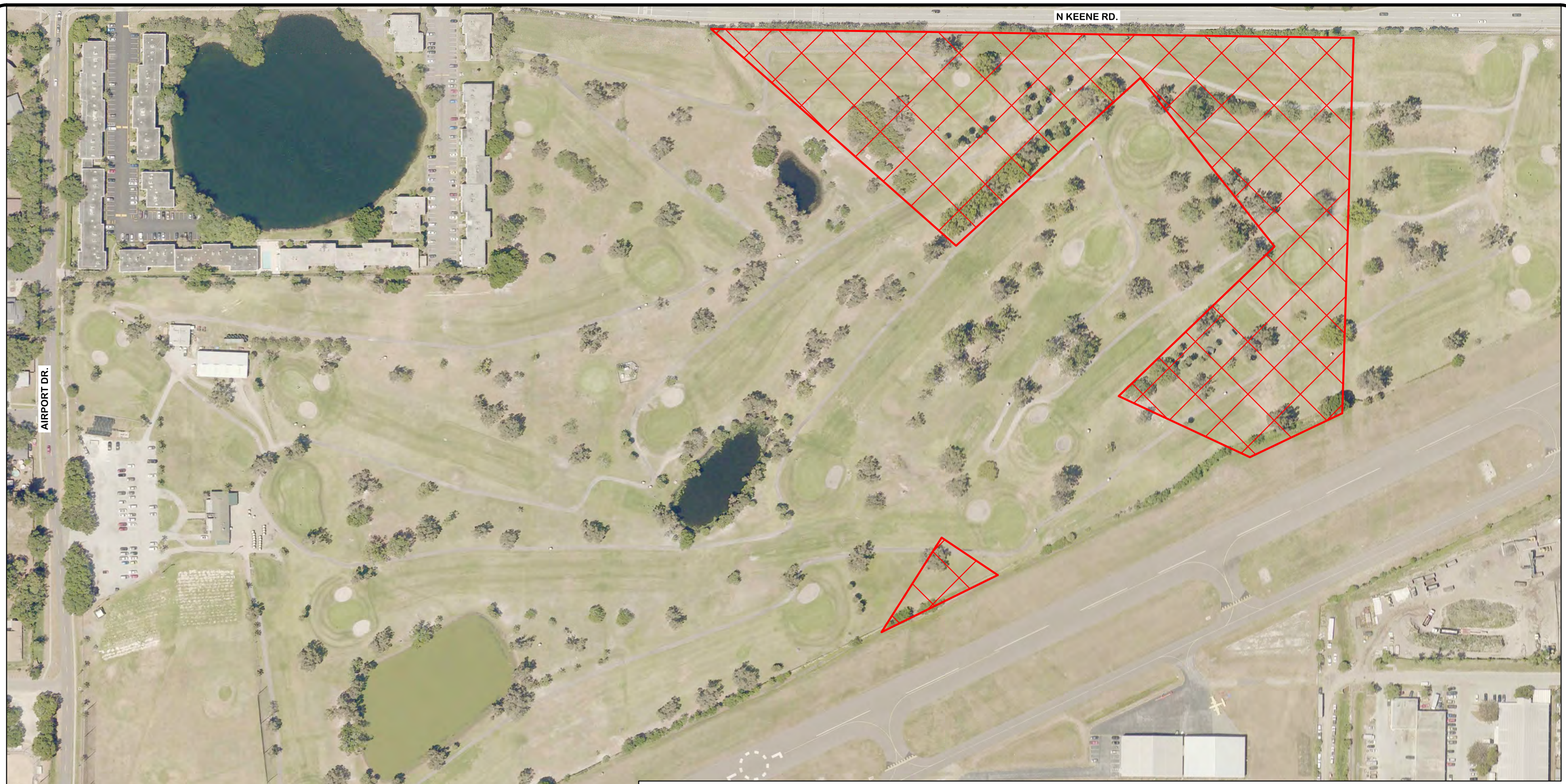
TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355
FL Cert. No.: 6486

SCALE:
NOTED

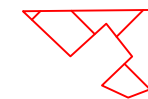
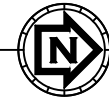
PROJECT NUMBER:
6511-19-027

GEOTECHNICAL ENGINEERING SERVICES
THE LANDINGS
PINELLAS COUNTY, FLORIDA


SHEET 6

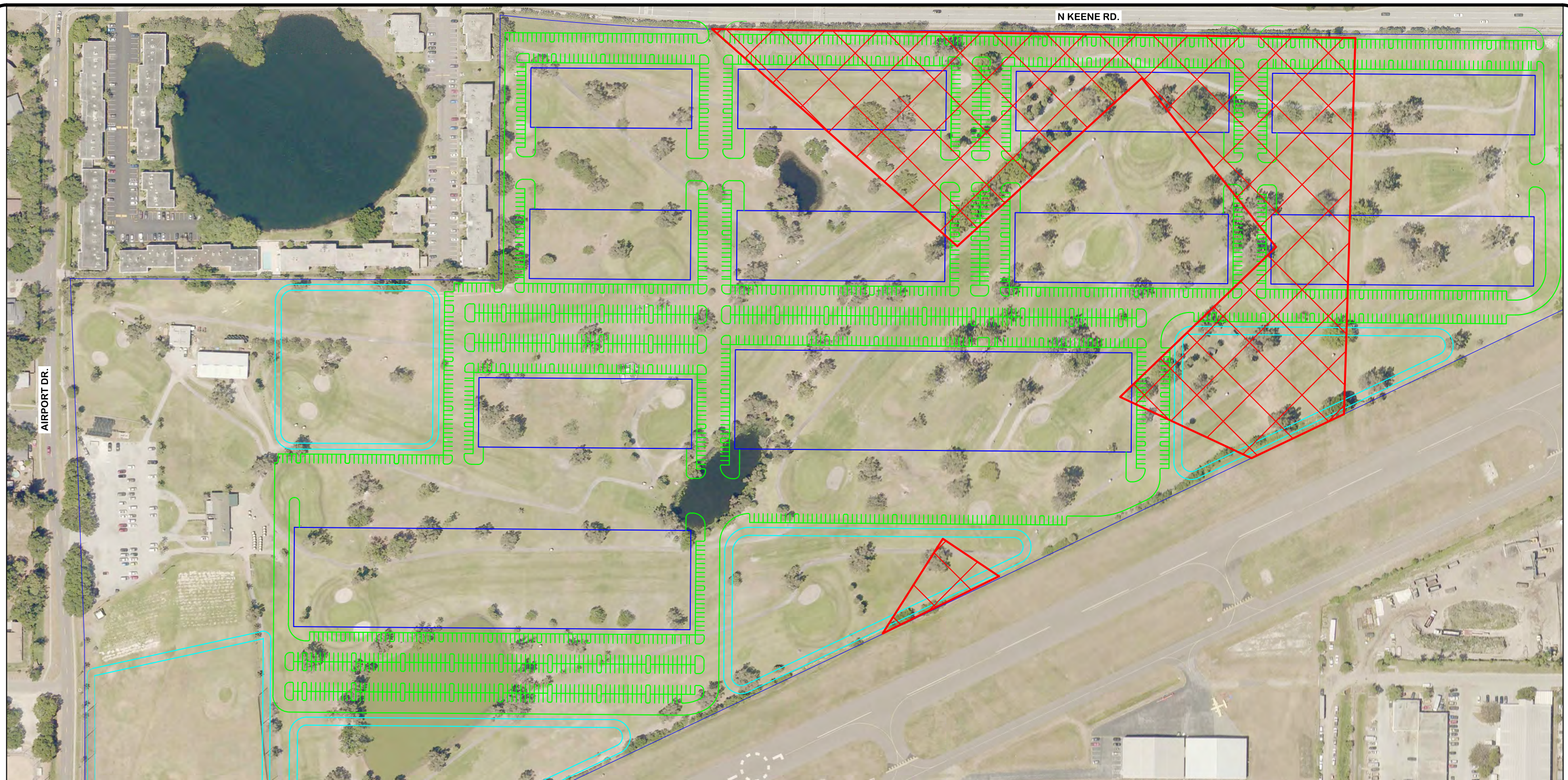


APPROXIMATE DEBRIS LIMITS

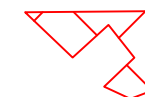


APPROXIMATE DEBRIS LIMITS

<p>DRAWN BY: SW</p> <p>CHECKED BY: JMN</p>	<p>APPROVED BY: DRR</p> <p>DATE: SEP 2019</p>	<p>ENGINEER OF RECORD: DANIEL R. RUEL, P.E.</p> <p>FLORIDA LICENSE NO.: 82404</p>	 <p>TIERRA 7351 Temple Terrace Highway Tampa, Florida 33637 Phone: 813-989-1354 Fax: 813-989-1355 FL Cert. No.: 6486</p>	<p>SCALE: NOTED</p>	<p>PROJECT NUMBER: 6511-19-027</p>	<p>GEOTECHNICAL ENGINEERING SERVICES</p> <p>THE LANDINGS</p> <p>PINELLAS COUNTY, FLORIDA</p>	<p>SHEET 7</p>
------------------------------------------------------------------	---------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------	-----------------------------------------------	-------------------------------------------------------------------------------------------------------------------	-----------------------




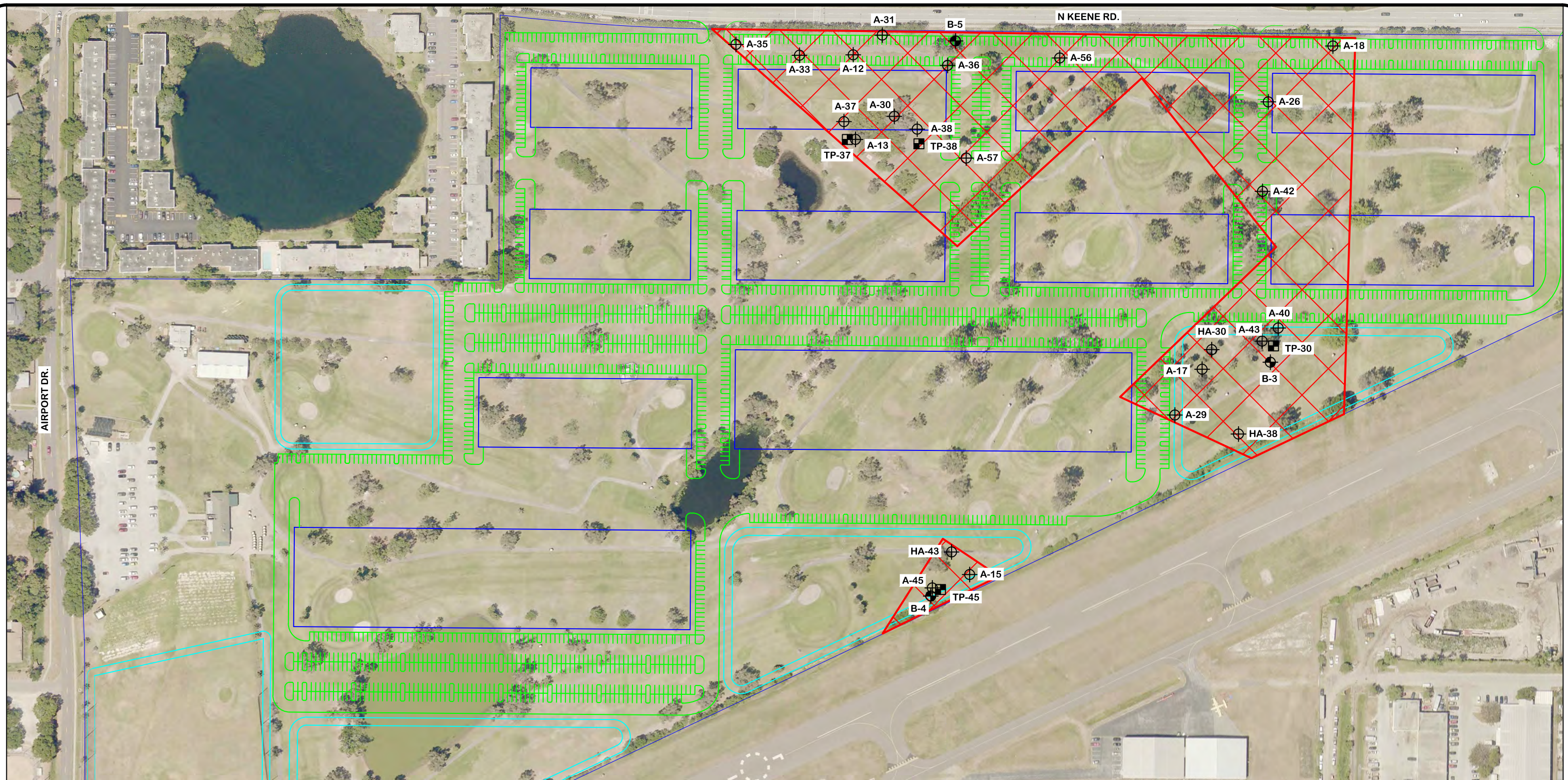
APPROXIMATE DEBRIS LIMITS



APPROXIMATE DEBRIS LIMITS

NOTE: BASE MAP PROVIDED BY AURORA CIVIL ENGINEERING

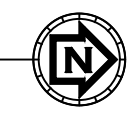
<p>DRAWN BY: SW</p> <p>CHECKED BY: JMN</p>	<p>APPROVED BY: DRR</p> <p>DATE: SEP 2019</p>	<p>ENGINEER OF RECORD: DANIEL R. RUEL, P.E.</p> <p>FLORIDA LICENSE NO.: 82404</p>	 <p>TIERRA 7351 Temple Terrace Highway Tampa, Florida 33637 Phone: 813-989-1354 Fax: 813-989-1355 FL Cert. No.: 6486</p>	<p>SCALE: NOTED</p>	<p>PROJECT NUMBER: 6511-19-027</p>	<p>GEOTECHNICAL ENGINEERING SERVICES</p> <p>THE LANDINGS</p> <p>PINELLAS COUNTY, FLORIDA</p>	<p>SHEET 8</p>
------------------------------------------------------------------	---------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------	-----------------------------------------------	-------------------------------------------------------------------------------------------------------------------	-----------------------



APPROXIMATE DEBRIS LIMITS WITH DEBRIS ENCOUNTERS

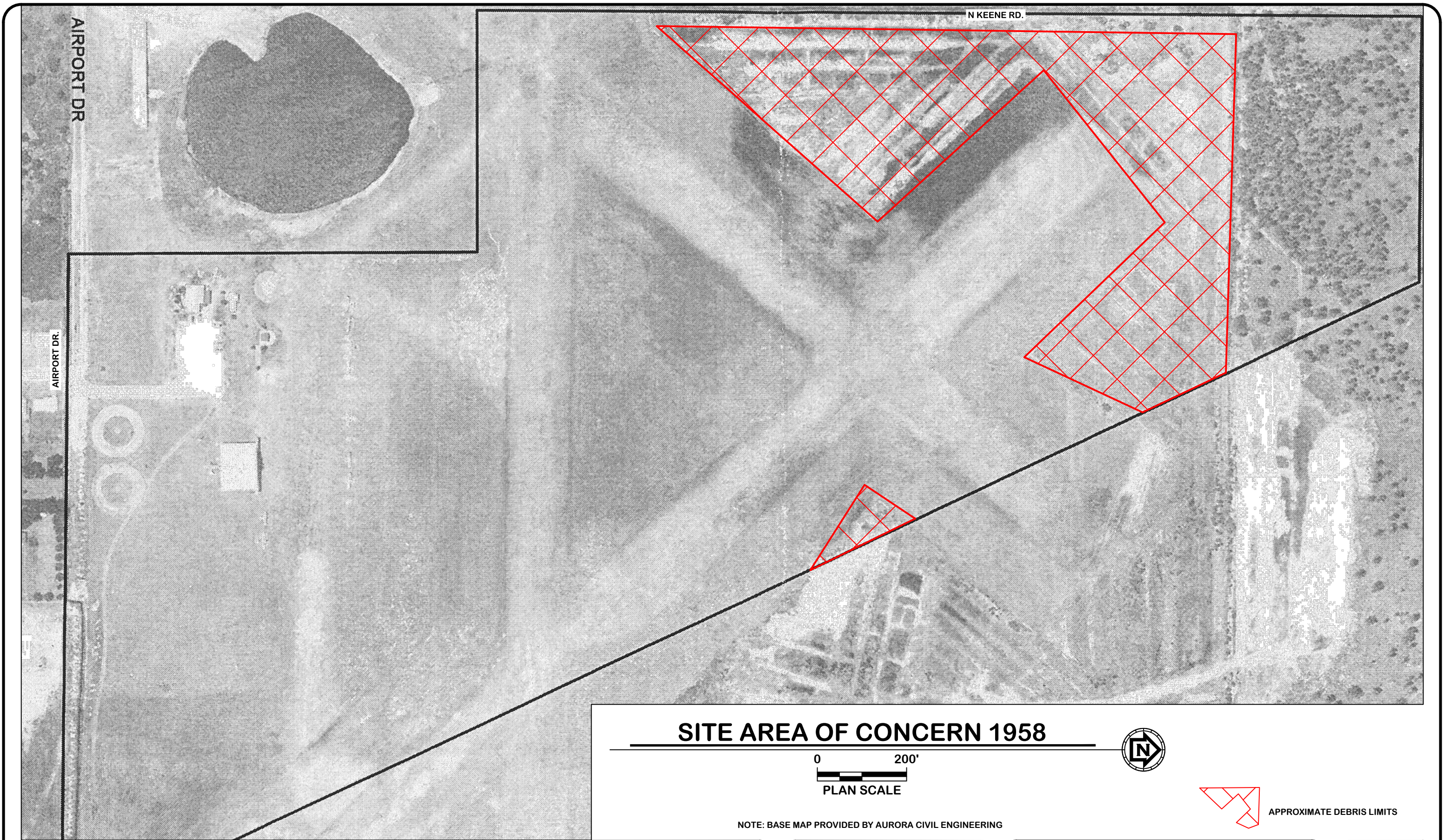


NOTE: BASE MAP PROVIDED BY AURORA CIVIL ENGINEERING

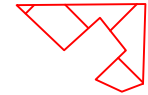


- ### LEGEND
- APPROXIMATE DEBRIS LIMITS
 - APPROXIMATE LOCATION OF AUGER BORING
 - APPROXIMATE LOCATION OF SPT BORING
 - APPROXIMATE LOCATION OF TEST PIT

DRAWN BY: SW	APPROVED BY: DRR	ENGINEER OF RECORD: DANIEL R. RUEL, P.E. <small>FLORIDA LICENSE NO.: 82404</small>	TIERRA <small>7351 Temple Terrace Highway Tampa, Florida 33637 Phone: 813-989-1354 Fax: 813-989-1355 FL Cert. No.: 6486</small>	SCALE: NOTED	PROJECT NUMBER: 6511-19-027	GEOTECHNICAL ENGINEERING SERVICES THE LANDINGS PINELLAS COUNTY, FLORIDA	SHEET 9
------------------------	----------------------------	-------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------	---------------------------------------	---------------------------------------------------------------------------------------------	----------------



SITE AREA OF CONCERN 1958



APPROXIMATE DEBRIS LIMITS

NOTE: BASE MAP PROVIDED BY AURORA CIVIL ENGINEERING

DRAWN BY: SW	APPROVED BY: DRR	ENGINEER OF RECORD: DANIEL R. RUEL, P.E. FLORIDA LICENSE NO.: 82404
CHECKED BY: JMN	DATE: SEP 2019	

TIERRA
7351 Temple Terrace Highway
Tampa, Florida 33637
Phone: 813-989-1354 Fax: 813-989-1355
FL Cert. No.: 6486

SCALE:
NOTED

PROJECT NUMBER:
6511-19-027

GEOTECHNICAL ENGINEERING SERVICES
THE LANDINGS
PINELLAS COUNTY, FLORIDA

SHEET 10

APPENDIX B

Test Pit Excavation Photographs (14 Sheets)

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-37

View of location of Test Pit TP-37.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-37

Glass, metal, plastic, ceramics, and wood encountered within test pit at approximately 3½ feet below existing ground surface.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-37

Generally clean soil excavated below the buried debris at approximately 6 feet below existing ground surface.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-38

View of location of Test Pit TP-38.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-38

Glass, metal, plastic, ceramics and wood encountered within test pit at approximately 5 feet below existing ground surface.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit T-BFD-12

Debris still encountered at maximum excavation depth of approximately 9 feet below existing ground surface.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-42

View of location of Test Pit TP-42.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-42

Clean sand encountered throughout Test Pit TP-42 terminated at approximately 6.5 feet below grades.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-30

View of location of Test Pit TP-30.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit T-BFD-8

Glass, plastic, metal, ceramics and rubber encountered at approximately 3.5 feet below existing ground surface.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-30

Generally clean sand encountered at bottom of bucket below debris approximately 8 feet below existing grades.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-45

View of location of TP-45.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit T-BFD-8

Glass, metal, ceramics, paper, and miscellaneous debris encountered at approximately 3.5 feet below the existing ground surface.

**Test Pit Excavation Photographs
The Landings Corporate Center
Pinellas County, Florida
Tierra Project No. 6511-19-027**



Test Pit TP-45

Generally clean sand excavated below debris at approximately 7.5 feet below existing ground surface.

APPENDIX C

FEMA FIRM Panel

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in the FIS report in conjunction with the data shown on this FIRM.

Elevation Reference Mark (ERM) elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (901) 715-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal Base Flood Elevations shown on this map apply only landward of 0.1° North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show scale. Floodway widths are provided in the Flood Insurance Study Report.

Corporate limits shown on this map are based on the best data available. The user should contact appropriate community officials to verify the corporate limit delineations shown on this map.

For community map revision history prior to countywide mapping, see section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

NOTE: The coordinate system used for the production of this Flood Insurance Rate Map (FIRM) is Universal Transverse Mercator (UTM), North American Datum of 1983 (NAD83), Clarke 1866 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the UTM projection Zone 17, NAD83. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not do to affect the accuracy of the information shown on the FIRM.

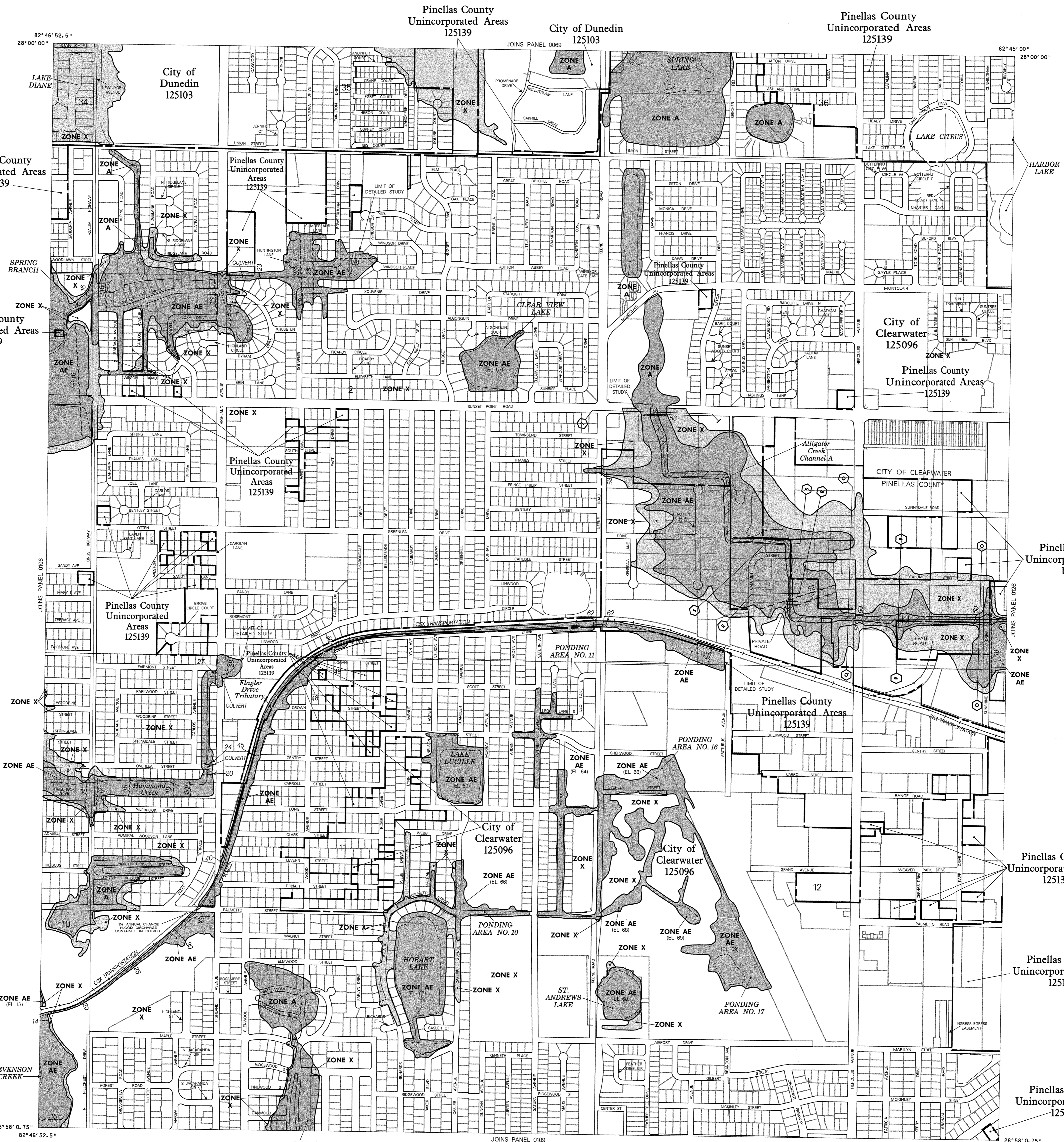
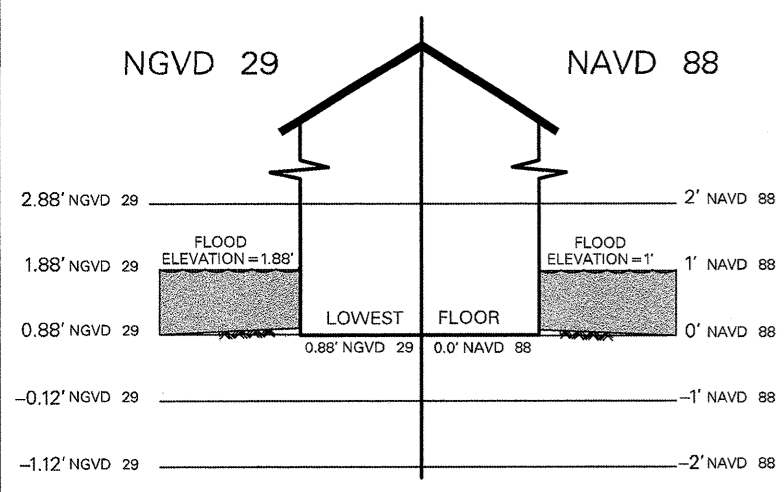
ATTENTION: Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information regarding conversion between the National Geodetic Vertical Datum of 1928 and the North American Vertical Datum of 1988, contact the National Geodetic Survey at the following address:

Vertical Network Branch, NCG13
National Geodetic Survey, NGA
Silver Spring Metro Center 3
1215 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3951

BASE MAP information shown on this FIRM was provided in digital format by the Pinellas County Board of County Commissioners Information Systems (BCCIS). Specific questions regarding Base Map features should be directed to BCCIS at (727) 853-4123. This information was compiled at a scale of 1:2,400 from tax parcel information dated November 2002. Users of this FIRM should be aware that in certain areas, roadway right-of-way are shown rather than actual paved surfaces.

Ground, structure, and flood elevations may be compared and/or referenced to NAVD 29 by applying a standard conversion factor. To get the conversion from NAVD 29 to NAVD 88, add 0.88 foot to the NAVD 29 elevation. The 0.88 foot value is an average for the entire county. The Datum Conversion Schematic shown below illustrates this conversion.

DATUM CONVERSION SCHEMATIC



LEGEND

- SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD
- ZONE A** No base flood elevations determined.
- ZONE AE** Base flood elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE A99** To be protected from 100-year flood by Federal flood protection systems under construction; no base flood elevations determined.
- ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.
- FLOODWAY AREAS IN ZONE AE
- OTHER FLOOD AREAS
- ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.
- OTHER AREAS
- ZONE X** Areas determined to be outside 500-year floodplain.
- ZONE D** Areas in which flood hazards are undetermined.
- UNDEVELOPED COASTAL BARRIERS*
- Identified 1983
- Identified 1990 or Later
- Otherwise Protected Areas Identified 1991 or Later

*Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain Boundary
Floodway Boundary
Zone D Boundary
Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513
Cross Section Line
Transect Line
Base Flood Elevation in Feet Where Uniform Within Zone**
Elevation Reference Mark
River Mile
Property Boundaries

**Referenced to the North American Vertical Datum of 1988

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
SEPTEMBER 3, 2003

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
May 17, 2005 - to change Base Flood Elevations to add Base Flood Elevations, to change Special Flood Hazard Areas, to add Special Flood Hazard Areas, and to change zone designations.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE
0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
PINELLAS COUNTY,
FLORIDA
AND INCORPORATED AREAS

PANEL 107 OF 327
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY	NUMBER	PANEL	SUFFIX
CLEARWATER, CITY OF	125096	007	H
DUNEDIN, CITY OF	125103	007	H
PINELLAS COUNTY	125139	007	H

Notice to User: The MAP NUMBER shown below should be used when ordering this map. The COMMUNITY NUMBER shown below should be used on insurance applications for the subject community.

MAP NUMBER
12103C0107H
MAP REVISED:
MAY 17, 2005

