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April 13, 2015

Ms. Maria Pineda
Capital Improvement Program
City of Miami
444 S.W. 2nd Ave. Miami, FL 33130-1910

Curtis Park Soil Management Plan
Curtis Park (HWR-777)
1901 NW 24 Ave
Miami, Florida

Contaminated soils have been identified at Curtis Park in Miami, FL Miami-Dade County Property Appraiser Folio # 01-3134-000-0330. The Extent of the soil contamination is documented in a Site Assessment Report Addendum (SARA) by SCS Engineers dated July 10, 2014. The following plan is designed to guide the management of contaminated soils encountered during construction work for the Proposed Curtis Park Boat Ramp Improvements. A copy of the SARA describing the locations of the soil contamination is included as **Attachment 1**.

The following compounds have been found in the groundwater above the groundwater cleanup target level:

- Aluminum
- Antimony
- Iron

In addition to buried solid waste the following compounds have been found in the soils above the residential direct exposure clean up target level and should be considered contaminated:

- Arsenic
- Lead
- Antimony
- Barium

The following compounds were also fond above the commercial/industrial direct exposure clean up target level and should be considered contaminated:

- Arsenic
- Lead

Soil Management

Disturbance, excavation and management of soils with contaminant concentrations above the commercial/industrial direct exposure clean up target level should only be performed by a contractor experienced in hazardous waste operations and who employs workers who have received the 40 hour HAZWOPER training as per 29 CFR 1910.120. Disturbance, excavation and management of soils with contaminant concentrations below the commercial / industrial direct exposure clean up target level can be performed by a construction contractor in adherence with this plan and all applicable, federal state and local regulations.

When soils from any contaminated areas are excavated and temporarily stored or stockpiled on-site, the soil shall be placed on an impermeable surface to prevent leachate infiltration and secured in a manner that prevents human exposure to contaminated soil and prevents soil exposure to precipitation that may cause surface runoff. Any excavation shall be secured to prevent entry by the public. The temporary storage or stockpiling of excavated contaminated soil shall not exceed 60 days, unless the excavated contaminated soil contains hazardous waste and a different time frame is authorized pursuant to Chapter 62-730, F.A.C. The Contractor is advised that other federal or local laws and regulations may apply to these activities.

Erosion Control and Dewatering

The Contractor should prepare a Stormwater Pollution Prevention Plan (SWPPP) and submit a Notice of Intent to the U.S. EPA for coverage under EPA's National Pollutant Discharge Elimination System (NPDES) Construction General Permit. The SWPPP will detail methods for preventing soil erosion and pollution of downstream receiving waters due to stormwater runoff from construction zones and stockpiled soils, and will be a "living" document to be revised as construction phasing dictates. The SWPPP will include both structural and non-structural best management practices (BMPs) to be used during construction, and will require site inspections in accordance with the Permit during all periods when ground surfaces remain un-stabilized or stock piled soils are present. Locations for materials stockpiles, construction staging, construction trailers, and equipment storage will be identified.

Construction-period erosion and sediment controls will include both non-structural and structural BMPs. These controls should be designed, installed, and maintained in accordance with the SWPPP as well as the following documents:

- "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices" (EPA 832-R92-005, Sept. 1992);
- "Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices - Summary Guidance" (EPA 833-R92-001, Oct. 1992);

Operations at the site that generate dusts form contaminated soils should be minimized during the excavation, handling, storage and transport of contaminate soils. Specific air quality mitigation measures will be as follows:

- Air monitoring for the contaminants of concern, under the supervision of a Certified Industrial Hygienist, should be performed during the operations that disturb the contaminated soils.
- Use of appropriately designed construction entrances and wheel wash facilities at all construction exists by all vehicles that would otherwise track mud or dirt onto public roadways to prevent off-site migration of soils;
- Covering of stockpiled soils with plastic sheeting;
- Wetting of exposed soils, excavations and stockpiles to prevent dust generation;
- Minimizing stockpiling of contaminated soils on site;
- Minimizing the duration that soils are left exposed.

Dewatering should not be performed without a dewatering permit, a discharge permit and a plan to mitigate any groundwater discharge contaminant concentrations above the NPDES discharge parameters.

Soil Disposal

Prior to Disposal a determination shall be made as to whether or not the contaminated soil contains hazardous waste. If the soil is known to be contaminated by hazardous waste, listed in 40 CFR Part 261 Subpart D, testing is not required to make the determination. If the soil is not known to be contaminated with listed hazardous waste, but is contaminated with any of the toxic constituents identified in 40 CFR 261.24(b) (and the contamination does not result solely from manufactured gas plant waste), then USEPA Test Method 1311, Toxicity Characteristic Leaching Procedure (TCLP) and subsequent analysis of the leachate, shall be performed on a number of samples sufficient to determine whether or not the contaminated soil exceeds maximum concentrations for the toxicity characteristics. [Refer to the contaminated media guidelines referenced in subsection 62-780.100(6), F.A.C., for guidance in managing soil that contains hazardous waste.].

- Any Soils considered Hazardous waste must be disposed of in a permitted hazardous waste landfill.
- Soils containing solid waste that is not considered hazardous waste should be disposed of in a permitted Class I Landfill.
- Soils with contaminant concentrations above the commercial / industrial direct exposure clean up target levels that are not considered hazardous waste should be disposed of in permitted Class I Landfill.
- Soils with contaminant concentrations below the commercial / industrial direct exposure clean up target levels that are not considered hazardous waste can be disposed of or reused according to all applicable federal, state and local regulations.

Decontamination of all equipment that comes in contact with contaminated soils should be performed so that the wash water is collected, tested for hazardous waste determination and disposed of accordingly.

Back Fill and Final Stabilization

All soil excavations shall be backfilled with clean fill material containing no solid waste or contaminants above the soil cleanup target levels. Final stabilization for all unpaved areas where contaminated soil or solid waste remains shall include a vegetated one-foot of clean fill cover underlain by a non-woven geotextile. Specifications for the approved Geotextile fabric is included as **Attachment 2**. Paved areas should be covered with a minimum of one foot of clean fill prior to paving.

Reporting

All activities associated with the Excavation, Storage, Removal, Disposal or reuse of any and all soils from the contaminated areas will be documented and provided to the City Of Miami and the Miami-Dade County, Department of Regulatory and Economic Resources, Division of Environmental Resources Management (DERM). The documentation of contaminated soil removal shall contain the following information in detail, as applicable:

- The volume of contaminated soil excavated and treated or properly disposed;
- The disposal or recycling methods for contaminated soil;
- The disposal methods for other contaminated media and any investigation-derived waste;
- A scaled site map (including a graphical representation of the scale used) that shows the location(s) of all known on-site structures, the area of soil removal or treatment, and the approximate locations where all samples were collected;
- The type of field screening instrument, analytical methods, or other methods used;
- The dimensions and location of the excavation(s).
- A table that indicates the identification, depth, and field soil screening results of each sample collected;
- Depth to groundwater if encountered at the time of each excavation, measurement locations, and method used to obtain that information;
- A scaled site map (including a graphical representation of the scale used) that shows the locations and results of confirmatory soil samples in relation to the area of the soil removal; and
- Documentation or certification that confirms the proper treatment or proper disposal of the contaminated soil, or contaminated sediment, including disposal manifests, and a copy of the documentation or certification of treatment or acceptance of the contaminated soil or contaminated sediment.

If you have any questions regarding the soil management plan please contact the undersigned at 305-818-2648 or 305-818-2640 respectively.

Joshua Blanco
Environmental Scientist

4/13/15
Yudex Hasbun P.E.
Senior Engineer
#54810

Attachments:

1. Site Assessment Report Addendum (SARA) by SCS Engineers dated July 10, 2014
2. Geotextile Fabric Specifications

FIGURES

KACO
KADERABEK COMPANY
• Geotechnical Engineering • Foundation Engineering • Construction Materials Testing • Soil Borings/Monitor Wells
9565 NW 40th Street Rd.
Miami, Florida 33178
Phone: 305/666-3563
Fax: 305/666-3069

February 6, 2013

Mr. Marty Morlan, P.E.
Shaw Environmental & Infrastructure
725 US Highway 301 South
Tampa, Florida

Re: Report of Subsurface Exploration
Curtis Park Improvements
NW North River Drive
Miami, Florida
KACO Project No. 13-145939

Dear Mr. Morlan:

Pursuant to your request Kaderabek Company (KACO) submits this Report in fulfillment of our scope of services described in our proposal dated October 11, 2012; which was authorized via KACO's Professional Services Agreement. This Report contains the data collected and procedure used for the Hand Auger Boring and Borehole Drainage Testing.

PROJECT INFORMATION

Information about this project was received from Mr. Marty Morlan, P.E. Improvements at the City of Miami Curtis Park will include parking addition, stormwater improvements, seawall repairs and boat ramp repairs.

We have been provided a schematic of the conceptual improvements dated 09/20/12 and no further drawings or documents regarding this project.

OBJECTIVE

The purpose of this phase of the study was to obtain information on the subsurface condition and drainage data in the project area.

FIELD EXPLORATION

The subsurface conditions were explored using Two (2) Hand Augers and two (2) Borehole Drainage Tests. The test location is as requested and identified in the field by KACO engineering personnel. A Test Location Plan identifying the location where the drainage testing was done is shown in appended Drawing No. 2.

Hand Excavations –The subsurface conditions were also explored using 2-hand excavations. The excavations were conducted using manual equipment and advanced to a depth of 5 feet below grade.

Drainage Tests - Two (2) drainage tests were performed for this project. The borehole drainage tests were performed by rotating a roller bit and casing to the test depths of 15 feet below grade. A slotted PVC pipe (minimum diameter of 6") was installed within the full hole. Next, with the borehole open, water was pumped into the borehole to develop a test hydraulic head. Once the hydraulic head was stabilized, the average flow rate into the borehole was recorded. A formula developed by the South Florida Water Management District was used to estimate hydraulic conductivity.

The result of the borehole percolation test is summarized in the table below, and appended on the sheets entitled Results of Constant Head Field Borehole Drainage Test. Included with the results are descriptions of the subsurface conditions encountered at each test location.

Test Number	Test Depth (feet)	Hydraulic Conductivity (K) (cfs per square foot per foot of head)
DRN-1	15	0.00056
DRN-2	15	0.00870

LOCAL GEOLOGY/SUBSURFACE CONDITIONS

Miami-Dade County is located on the southern flank of a stable carbonate platform on which thick deposits of limestones, dolomites and evaporites have accumulated. The upper two hundred feet of the soil profile is composed predominantly of limestone and quartz sand. These sediments were deposited during several glacial and interglacial stages when the ocean was at elevations higher than present. In many portions of Miami-Dade County, surface sand deposits of the Pamlico Formation are encountered. The Pamlico sands have a thickness of 2 to 5 feet and overlie the Miami Limestone. In western Miami-Dade County, portions of the Everglades Region interfinger with the Pamlico sand. The Everglades soil consists of peat and calcareous silt (marl).

The Miami Limestone is a soft to moderately hard, white, porous to very porous, sometimes sandy, oolitic calcareous cemented grainstone. The Miami Limestone outcrops in portions of Miami-Dade County. The Miami Limestone has a maximum thickness of about 35 feet along the Atlantic Coastal Ridge and thins sharply near the coastline and more gradually in a westerly direction. The Miami Limestone was formed about 130,000 years ago at a time when the sea level was twenty-five feet higher than it is today. This environment facilitated formation of concentrically layered sand sized carbonate grains called oolites. These grains formed by repeated precipitation of calcium carbonate around the nucleus of a sand or shell grain.

The Miami Limestone is underlain by the Fort Thompson formation. The Fort Thompson Formation includes sand, sandstone and limestone. The Fort Thompson Formation is wedge shaped, having a thickness of about sixty feet in the Miami area and thinning to a thickness of about ten feet in western Miami-Dade County. The upper reaches of the Fort Thompson Formation contain non-cemented sand having a thickness ranging from five to twenty-five feet. The remainder of the formation consists of coralline limestone, quartz sandstone, sandy limestone and freshwater limestone. The type of material within the formation and the degree of cementation is variable with lateral extent and depth.

Within the Miami-Dade County area, the Fort Thompson Formation is underlain by the Tamiami Formation. The Tamiami Formation consists of sands, silts and clays and sometimes fossiliferous limestone. The upper portions of the Tamiami Formation are permeable and make up the lower Biscayne Aquifer. This formation ranges in thickness from zero to three hundred feet in South Florida.

The field tests performed for this project disclose subsurface conditions which are consistent with the geology described above. Generally, a layer of fill comprised of sand and limestone fragments overlies a peat layer. The detailed subsurface conditions are presented in more detail in the attached Record of Hand Auger Boring.

GROUNDWATER HYDROLOGY

Two principal aquifer systems have been defined in South Florida, the Floridian Aquifer and the Biscayne Aquifer. The depth of the top of the Floridian Aquifer, locally, is approximately 1,000 feet with the base occurring at approximately 3,700 feet. The Biscayne Aquifer varies in thickness and is the primary source of potable water in Dade County. The maximum aquifer thickness of approximately 200 feet occurs along the Atlantic Coast in northeast Dade County. Primarily, the aquifer is recharged by local rainfall. Aquifer discharge occurs principally by evapotranspiration, pumping for public water supply, and general unrestricted flow into the ocean. The aquifer, however, is regulated by the South Florida Water Management District through a network of natural rivers and man-made canals to maintain a degree of consistency in the groundwater level. Unusual conditions, such as hurricanes and extended drought periods, may result in uncontrolled large scale fluctuations of the groundwater level.

Groundwater measurements were taken before conducting the drainage test. The depth to the groundwater was on the order of 2½ to 5 feet below the existing ground surface. In general, over the past thirty years, variations in water levels in the general vicinity of the project, on an average basis, have ranged from elevation +1 to +4 feet NGVD.

CLOSURE

We have appreciated the opportunity in providing geotechnical engineering services on this phase of the project and we trust that the foregoing is responsive to your needs at this time. In the event that you have any questions or if you require additional information, please contact the undersigned.

Sincerely,

KADERABEK COMPANY

Steven Becca P.E.
Project Engineer
Florida License No. 73776

ERIC J. STERN LICENSE No. 57604 STATE OF FLORIDA PROFESSIONAL ENGINEER

Eric J. Stern, P.E.
Project Manager
Florida License No. 57604

Attachments: Drawing No. 1: Vicinity Map (A-1)
Drawing No. 2-Test Location Plan (A-2)
Results of Drainage Tests (A-3 to A-4)
Record of Hand Auger Boring (A-5)

Distribution: Original & 3 Copies to Addressee via U.S. Mail
Copy to Addressee via Email
Copy to KACO File

File: KACO Reports- 13-145939 – Curtis Park Improvements –Miami-Shaw Environmental & Infrastructure-Rpt-02-06-13

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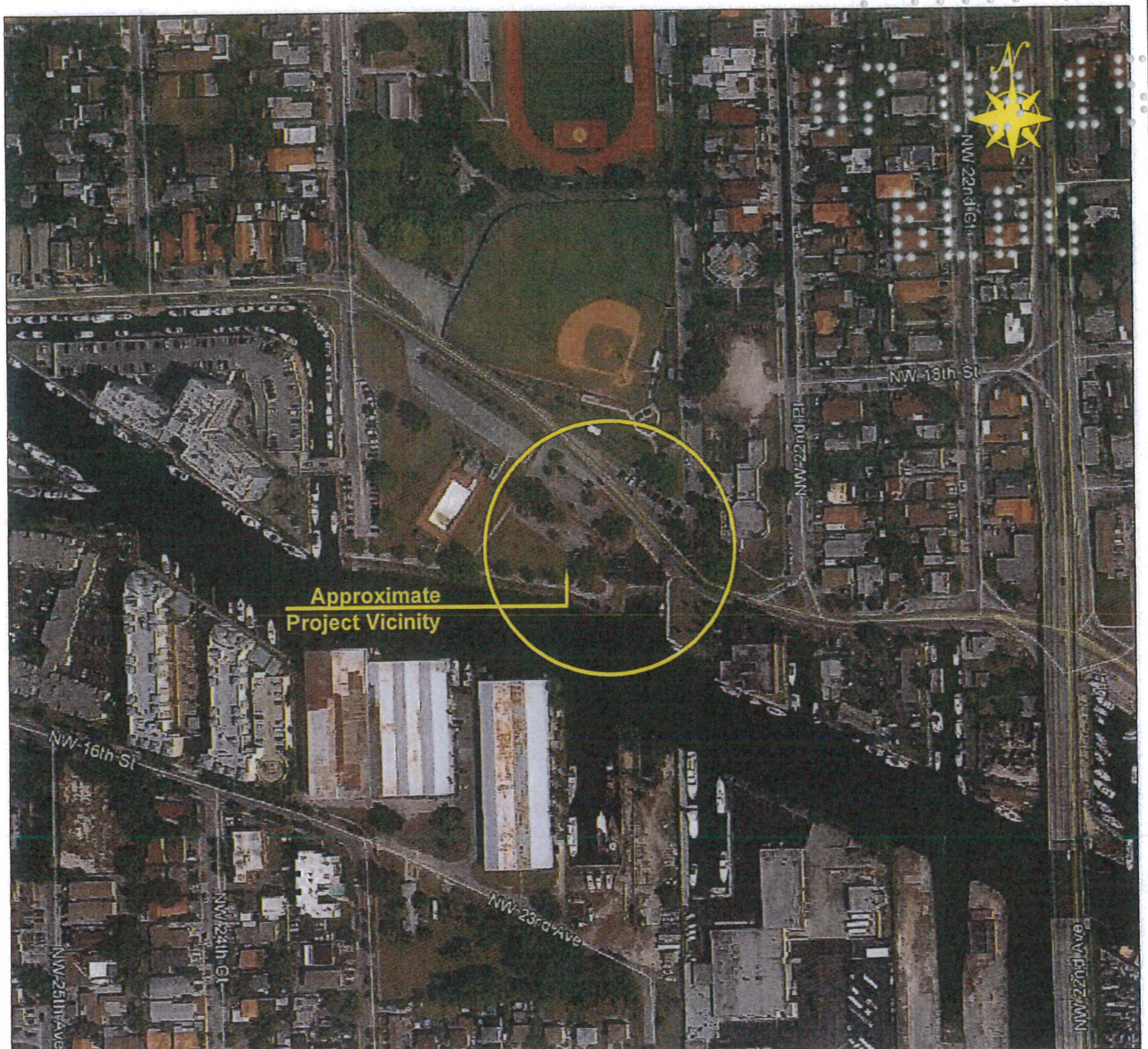
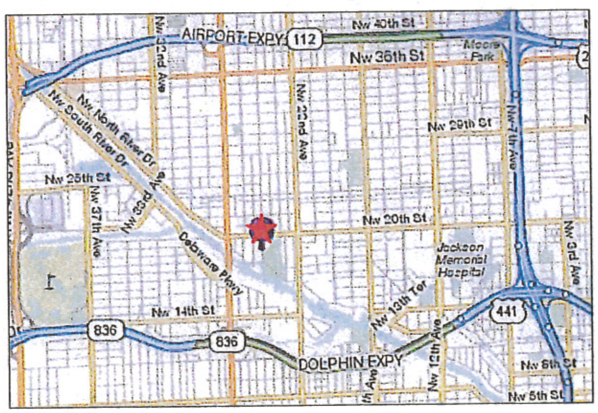
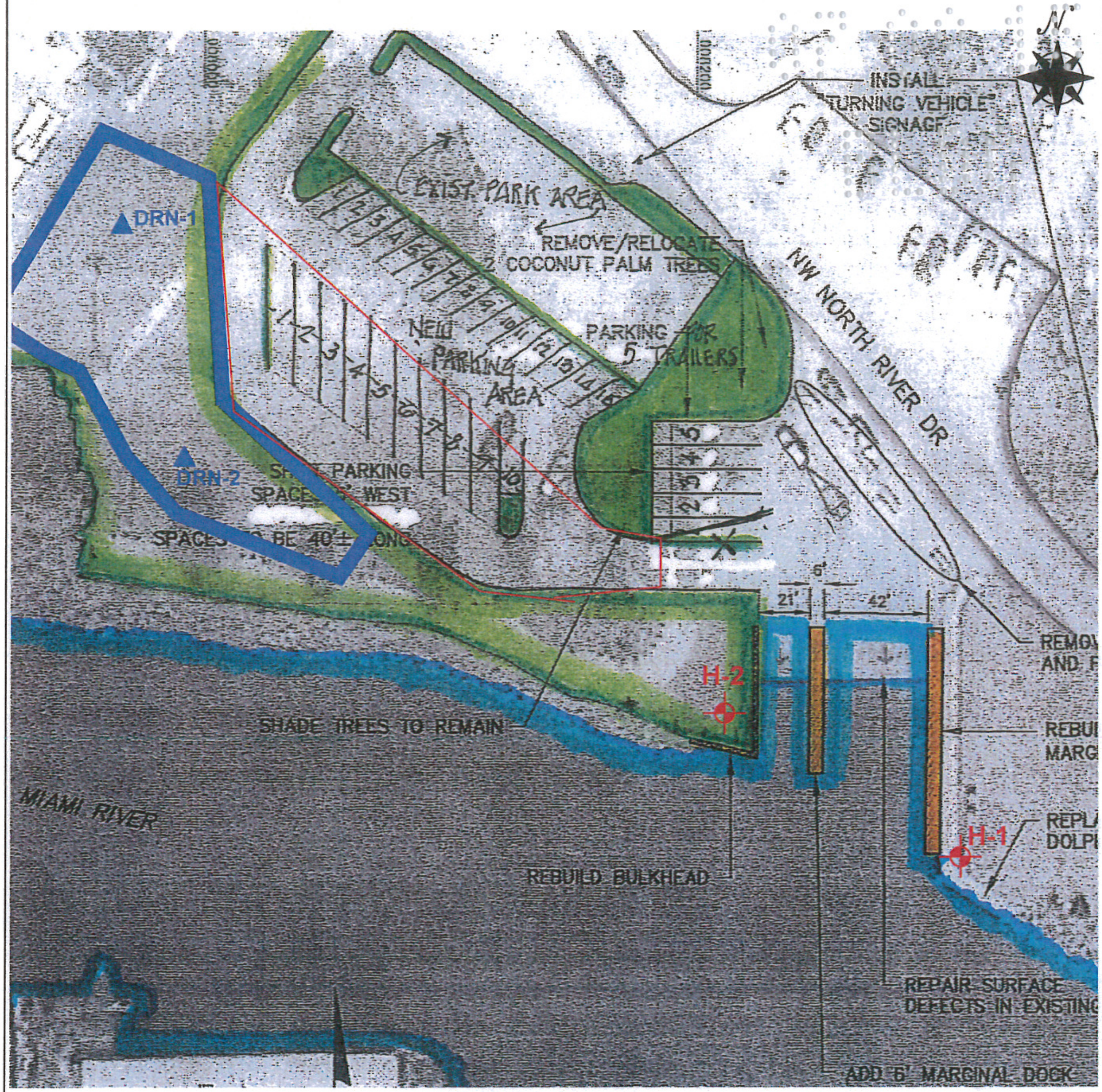


Notes: Aerial photograph is courtesy of Google-Earth, 2012.



KACO KADERABEK COMPANY Geotechnical Engineering Construction Materials Testing Soil Borings/Monitor Wells	DWG TITLE: *Vicinity Map*			DWN BY: *JJB*
	PROJ NAME: *Curtis Park*			CKD BY: *SJB*
	PROJ. NO: *13-145939*	DATE: *02/05/13*	DWG NO: *1*	APD BY ____



Legend

- Hand Auger Test Location (H-1)
- Drainage Test Location (DRN-1)

Notes:
1. Test locations shown are approximate.
2. Test location symbols are not to scale.
3. Aerial Photograph - Google Earth, 2012

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Geotechnical Engineering
Construction Materials Testing
Soil Borings/Monitor Wells

DWG TITLE: Test Location Plan			DWN BY: JJB
PROJ NAME: Curtis Park			CKD BY: SJB
PROJ. NO: 13-145939	DATE: 02/05/13	DWG NO: 2	APD BY —

RESULTS OF CONSTANT HEAD FIELD BOREHOLE DRAINAGE TEST
KADERABEK COMPANY, MIAMI, FLORIDA
KACO PROJECT NO. 13-145939

PROJECT NAME: Curtis Park
LOCATION: Refer to Test Location Plan
TEST NO.: DRN-1 TEST DATE: 31-Jan-13
TEST PERFORMED BY: D. Correa/Rey J

APPROXIMATE GROUND SURFACE ELEVATION, FEET, NGVD:	+ N/A
DEPTH TO STABILIZED GROUNDWATER, FEET:	5.0
DEPTH TO WATER SURFACE DURING TEST, FEET:	2.0
HEAD, TEST HEAD, TEST HYDRAULIC HEAD, (H), FEET:	3.0
DEPTH OF OPEN HOLE AFTER DRILLING, FEET:	15.0
PERFORATED CASING LENGTH, FEET:	15.0
PERFORATED CASING DIAMETER, OR HOLE DIAMETER, (D), FEET:	0.5
LENGTH OF BOREHOLE BELOW STABILIZED GROUNDWATER, (S), FEET:	10.0
TIME TO STABILIZE TEST HEAD, MINUTES:	1.0
AVERAGE FLOW RATE AT CONSTANT HEAD, (Q), CFS:	0.03077
HYDRAULIC CONDUCTIVITY, (K) CFS/SQ. FT. - FOOT HEAD:	0.00056

FORMULA USED: SFWMD

SFWMD USUAL OPEN HOLE FORMULA

$$K = \frac{4Q}{3.14(D)[2(H)(H)+4(H)(S)+(H)(D)]}$$

TIME, MINUTES	WATER METER READING,	WATER METER READING, END	FLOW RATE (Q) GALLONS/MINUTE
1	40	90	50
2	90	130	40
3	130	136	6
4	136	142	6
5	142	148	6
6	148	154	6
7	154	160	6
8	160	166	6
9	166	172	6
10	172	178	6

Average (Q) = 14 GPM x 0.00223 = 0.0308 CFS

DEPTH BELOW GROUND SURFACE, (ft)	SOIL/ROCK DESCRIPTION
0.0 to 0.5	Tan silty **SAND** (Probable Fill)
0.5 to 0.7	Brown organic **SAND** (Probable Fill)
0.7 to 1.5	Gray **SAND** (Probable Fill)
1.5 to 2.0	Brown **LIMESTONE FRAGMENTS & SAND** (Probable Fill)
2.0 to 7.0	Brown **SAND**
7.0 to 15.0	Tan **LIMESTONE** with some Sand

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RESULTS OF CONSTANT HEAD FIELD BOREHOLE DRAINAGE TEST
KADERABEK COMPANY, MIAMI, FLORIDA
KACO PROJECT NO. 13-145939

PROJECT NAME: Curtis Park
LOCATION: Refer to Test Location Plan
TEST NO.: DRN-2 TEST DATE: 31-Jan-13
TEST PERFORMED BY: D. Correa/Rey J

APPROXIMATE GROUND SURFACE ELEVATION, FEET, NGVD:	+ N/A
DEPTH TO STABILIZED GROUNDWATER, FEET:	2.6
DEPTH TO WATER SURFACE DURING TEST, FEET:	2.0
HEAD, TEST HEAD, TEST HYDRAULIC HEAD, (H), FEET:	0.6
DEPTH OF OPEN HOLE AFTER DRILLING, FEET:	15.0
PERFORATED CASING LENGTH, FEET:	15.0
PERFORATED CASING DIAMETER, OR HOLE DIAMETER, (D), FEET:	0.5
LENGTH OF BOREHOLE BELOW STABILIZED GROUNDWATER, (S), FEET:	12.4
TIME TO STABILIZE TEST HEAD, MINUTES:	1.0
AVERAGE FLOW RATE AT CONSTANT HEAD, (Q), CFS:	0.10174
HYDRAULIC CONDUCTIVITY, (K) CFS/SQ. FT. - FOOT HEAD:	0.00870

FORMULA USED: SFWMD

SFWMD USUAL OPEN HOLE FORMULA

$$K = \frac{4Q}{3.14(D)[2(H)(H)+4(H)(S)+(H)(D)]}$$

TIME, MINUTES	WATER METER READING,	WATER METER READING, END	FLOW RATE (Q) GALLONS/MINUTE
1	60	110	50
2	110	155	45
3	155	200	45
4	200	245	45
5	245	290	45
6	290	335	45
7	335	380	45
8	380	425	45
9	425	End of Water	

Average (Q) = 46 GPM x 0.00223 = 0.1017 CFS

DEPTH BELOW GROUND SURFACE, (ft)	SOIL/ROCK DESCRIPTION
0.0 to 0.5	Brown organic **SAND**
0.5 to 2.0	Gray **SAND** with traces of concrete
2.0 to 3.5	Brown **LIMESTONE FRAGMENTS & SAND** (Probable Fill)
3.5 to 9.0	Brown **SAND**
9.0 to 15.0	Tan **LIMESTONE** with some Sand

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RECORD OF HAND AUGER BORING
KADERABEK COMPANY/MIAMI, FLORIDA
CURTIS PARK IMPROVEMENTS
NW NORTH RIVER DRIVE, MIAMI, FLORIDA
KACO PROJECT NO. 13-145939

HAND AUGER BORING NUMBER:	HA- 1
DATE OF EXCAVATION:	January 31, 2013
OBSERVED BY:	D. Correa
TERMINATION DEPTH, INCHES:	60
DEPTH TO GROUNDWATER, FEET:	NOT ENCOUNTERED

DEPTH BELOW GROUND SURFACE, INCHES	SOIL/ROCK DESCRIPTION
0.0 – 6.0	Brown SAND
6.0 – 48.0	Brown SAND with limestone fragments
48.0 – 60.0	Brown PEAT

HAND AUGER BORING NUMBER:	HA- 2
DATE OF EXCAVATION:	January 31, 2013
OBSERVED BY:	D. Correa
TERMINATION DEPTH, INCHES:	60
DEPTH TO GROUNDWATER, FEET:	NOT ENCOUNTERED

DEPTH BELOW GROUND SURFACE, INCHES	SOIL/ROCK DESCRIPTION
0.0 – 6.0	Brown SAND
6.0 – 42.0	Brown SAND with limestone fragments
42.0 – 60.0	Brown PEAT

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