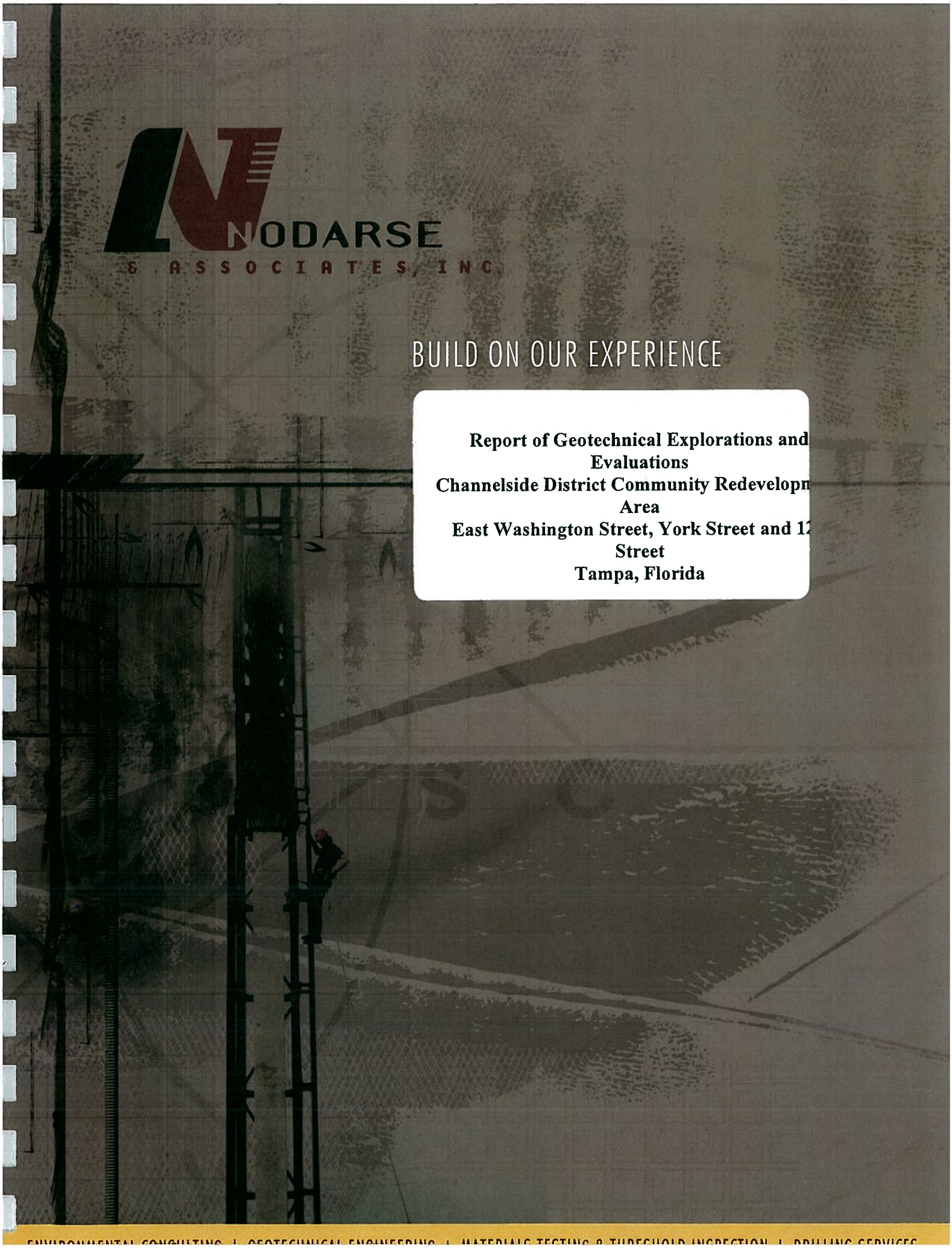

NODARSE
& ASSOCIATES, INC.
BUILD ON OUR EXPERIENCE
Report of Geotechnical Explorations and Evaluations
Channelside District Community Redevelopm
Area
East Washington Street, York Street and 12
Street
Tampa, Florida
ENVIRONMENTAL CONSULTING • GEOTECHNICAL ENGINEERING • MATERIALS TESTING & THRESHOLD INSPECTION • DRILLING SERVICES

Report of Geotechnical Explorations and Evaluations
Channelside District Community Redevelopment Area
East Washington Street, York Street and 12th Street
Tampa, Florida

ENVIRONMENTAL CONSULTING
GEOTECHNICAL ENGINEERING
MATERIALS TESTING
THRESHOLD INSPECTION
DRILLING SERVICES

NODARSE
& ASSOCIATES, INC.

May 21, 2009
Project No: 04-07-0035-102A

Hamid Sahebkar, P.E.
Regional Manager, Public Infrastructure
Wilson Miller
2205 North 20th Street
Tampa, Florida

Report of Geotechnical Explorations and Evaluations
Channelside District Community Redevelopment Area
East Washington Street, York Street and 12th Street
Tampa, Florida

Dear Mr. Sahebkar:

Nodarse & Associates, Inc (N&A) is pleased to present this report of geotechnical exploration and evaluations for the above-referenced project. The purpose of this exploration was to obtain geotechnical data to assist in the site development and foundation design for the proposed development in the project area. This report presents a brief description of the project site, exploration procedures, summary of field and laboratory test results and our recommendations.

1. PROJECT INFORMATION AND REVIEW OF AVAILABLE DATA

It is proposed to redevelop the infrastructure of the Channelside District Community Redevelopment Area including underground utilities, stormwater management, pavements and sidewalks. The proposed construction that we performed explorations for included:

- Construction of an underground storm sewer line under East Washington Street from Meridian Avenue to Channelside Drive. Based on the information provided, the proposed bottom of the structure will at the most be about 10 feet below the existing ground surface.

- Construction of a stormwater vault under York Street. We understand that the bottom of the proposed structure will be at a depth of 10 feet below current grade.

- Construction of a pump station on 12th Street, north of East Twiggs Street. The bottom of the structure will be about 20 feet below the current ground surface.

Based on the USGS quadrangle map for Tampa, the elevations at the proposed project sites are in the range of +5 to +10 feet NGVD. The USGS map for the project site is attached as **Figure 1** in the **Appendix**.

A review of the United States Department of Agriculture Soil Conservation Service (SCS) survey for Hillsborough County, Florida, indicates that surficial soils in the area belong to Urban Land (56). Urban land consists of soils which have been altered through cutting, grading, filling and shaping for urban development and is usually covered by concrete, asphalt, and other impervious structures hence no valid estimates of seasonal high ground water can be made. A portion of the USDA soil survey for project site is attached as **Figure 2** in the **Appendix**.

2. SUBSURFACE EXPLORATION

Our exploration consisted of performing 6 standard penetration test (SPT) borings, B-1 through B-6, to depths ranging from 20 to 40 feet and 1 auger boring, A-1, to 10 feet below the exiting ground surface. The field testing locations were provided by Wilson Miller, Inc and are shown on the **Boring Location Plan (Figure 3)** in the **Appendix**.

At the SPT boring locations B-1 through B-5, the initial 4 feet of the soil was hand augered to avoid damaging unmarked utilities. The standard penetration tests were then performed continuously from that depth in the boring B-1 through B-5, and from ground surface in the boring B-6, to a depth of 10 feet and at 5-foot depth intervals thereafter. Each sample was removed from the sampler in the field and was examined, packaged, and sealed for transportation to our laboratory for further examination and visual classification. Water levels were measured in the boreholes at the time of our field exploration to evaluate the depth to groundwater. Upon completion, the boreholes were backfilled appropriately.

The machine auger boring procedure consisted of hydraulically turning a 4-inch diameter continuous flight auger into the ground in 5-foot increments. Additional flights were added until the desired termination depth was achieved. The auger was then extracted without further rotation and representative soil samples were retrieved from the auger. Samples were visually classified in the field and were then collected and returned to our soils laboratory for further classification and testing. Water levels were measured at the boreholes at the time of our field exploration to evaluate the depth to groundwater. The holes were then backfilled.

3. LABORATORY TESTING

Samples recovered from the borings were returned to the laboratory for visual classification and stratification by a geotechnical engineer. Index property tests were conducted on selected samples to aid classification. The results of laboratory testing are summarized on **Table 1**, as well as shown on the **Boring Profiles (Figures 4 through 6)** in the Appendix. **Particle Size Distribution Reports** based on the two full sieve analyses results are in included in the **Appendix** as **Figures 6 and 7**. Testing was performed in general accordance with appropriate Florida methods.

4. SUBSURFACE CONDITIONS

4.1 Washington Street – Storm Sewer Line

The SPT borings B-1 and B-2 performed along the proposed storm sewer alignment initially penetrated through the existing in-place fill, classified as loose fine sand with rock and shell (SP, SP-SM), to depths in the range of 4 to 7 feet below the ground surface. Standard penetration test value (N-value) in these fill soils was measured to be 7 blows per foot (bpf).

Below the fill soils, the borings encountered loose to medium dense fine sand (SP) and loose to medium dense slightly silty fine sand (SP-SM) to depths of about 17 to 20 feet, with N-values in the range of 5 to 16 BPF. One exception to this is an organic silt (OL) layer encountered in boring B-2, from a depth of 9.5 to an approximate depth of 12.5 feet. An organic content test in the sample revealed an organic content of 11 percent. The penetration resistance of this layer was of 2 BPF. Below the slightly silty fine sand, B-1 encountered medium dense clayey fine sand (SC) from 18 to 20 feet, with N-value of 11 BPF. The borings were terminated at 20 feet.

The auger boring, A-1, encountered fill soil to 4 feet followed by relatively clean fine sand (SP) to 8 feet and slightly silty fine sand to 10 feet, at which depth the boring was terminated.

The groundwater level was observed at a depth of approximately 6 feet below the existing ground surface in the three borings, as shown on boring profiles (**Figure 4**). Groundwater conditions will be significantly influenced by the tide in the Garrison Channel and also vary depending upon recent rainfall, artificial drainage like stormwater retention systems that have already been constructed near the project area. The estimated seasonal high groundwater depths for the project are summarized in **Table 2** in the **Appendix**. These levels are location specific and are based on the encountered groundwater depth, soils encountered in the borings, review of encountered and estimated seasonal high groundwater depths from our previous task of the project (**Report dated October 23, 2008**). The seasonal high groundwater elevations can be estimated if we are provided with survey information at the boring locations.

4.2 York Street – Stormwater Vault

Borings B-3 through B-5 were performed along the York Street and initially encountered fill material to depths of 2 to 5 below existing ground surface. Below the fill, the boring encountered alternating layers of loose to medium dense fine sand (SP), silty sand (SM) and very clayey sand (SC) to depths in the range of 5 to 8 feet below the ground surface. The N-values in the sands were in the range of 8 to 12 BOF. Below these layers of sand, an approximately 3 feet thick layer of very soft to soft organic silt (OL, OH), was encountered in borings B-3 and B-4, while in the boring B-5 encountered 3 feet thick soft sandy clayey silt (ML). The organic content of the soil was found to be 6 percent. The penetration resistance values in silt were in the range of 1 to 4 BPF. Below these layers of silt, the borings again encountered alternating layers of medium dense to dense fine sand, loose slightly silty sand (SP-SM) and loose clayey sand (SC)

to a depth of 20 feet below the ground surface. N-values in these sands were in the range of 6 to 36 BPF. The borings were terminated at a depth of 20 feet.

The groundwater levels were observed at depths in the range of 4 to 6.5 feet below the existing ground surface, as shown on boring profiles (**Figure 5**). Groundwater conditions will be significantly influenced by the tide in the Garrison Channel and also vary depending upon recent rainfall, artificial drainage like stormwater retention systems that have already been constructed near the project area. The estimated seasonal high groundwater depths for the project are summarized in **Table 2** in the **Appendix**. These levels are location specific and are based on the encountered groundwater depth, soils encountered in the borings, review of encountered and estimated seasonal high groundwater depths from the previous report referenced earlier. The seasonal high groundwater elevations can be estimated if we are provided with survey information at the boring locations.

4.3 12th Street – Pump Station

Boring B-6, performed at the proposed pump station area encountered fill material, consisting of fine sand with rock and shell (SP, SP-SM)) to 2 feet below the ground surface, with an N-value of 56 BPF. The boring then encountered alternating layers of medium dense slightly silty fine sand (SP-SM), loose very clayey fine sand (SC) and medium dense fine sand (SP) to an approximate depth of 11 feet. The N-values recorded in the sands were in the range of 8 to 18 BPF. Below the sands, the boring encountered soft organic silt (OL, OH) with an N-value of 4 BPF, below which the boring again encountered loose to medium dense fine sand to a depth of 40 feet. Within the organic silt layer, the organic content was measured to be 66 percent. The N-values in the sand were in the range of 5 to 19 BPF. The boring was terminated at 40 feet below the existing ground surface.

The groundwater level was observed at a depth of 6 feet below ground surface, as shown on the boring profile (**Figure 6**). Groundwater conditions will be influenced by the tide in the Garrison Channel and also vary depending upon recent rainfall, artificial drainage like stormwater retention systems that have already been constructed near the project area. The estimated seasonal high groundwater depth is provided in **Table 2**.

5. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on the project characteristics previously described, the data obtained in our field exploration and our experience with similar subsurface conditions and construction types. If subsurface conditions different from those disclosed by the borings are encountered during construction, we should be notified immediately so that we might review the following recommendations in light of such changes.

5.1 Washington Street and York Street

Washington Street: Depending upon the depth of burial of the pipeline, it may be necessary to undercut the material to provide satisfactory bedding surface. This is particularly true at the easter end of the Washington street where very soft organic silt was encountered. Given that this depth is below the water table, backfilling should utilize granular material such as No.57 stone.

York Street: It appears that the proposed storage vault will be founded within a zone of organic silt and silt. It will be necessary to remove this material to provide a satisfactory surface to support not only the vault, but to allow construction of the vault to take place. Because this work will take place below the water table, we recommend that No.57 stone be utilized for backfill. The structure can be designed for a maximum contact pressure of 2000 psf. The structure should also be designed to resist uplift forces in the unlikely case that it is empty during a storm with the water level at the ground surface. This can be done by enlarging the footings to use the weight of the backfill to provide additional uplift resistance. Settlement of the structure is not likely to be an issue because the weight will be less than the soil that is presently there.

Excavation: Excavations for the project should be made in accordance with recommendations outlined by the Occupational Safety and Health Administration (OSHA) "Construction Standards for Excavations". This indicates a maximum slope of 1.5 horizontal to 1 vertical (1.5H:1V) is permissible for excavations up to 20 feet in depth assuming there are no space constraints and that the excavation has been properly dewatered. However, this is applicable only when the excavation will not compromise the integrity of existing roadways (i.e. the top of excavation is greater than 5 feet from existing pavement). It should be also noted that slope recommendations are based in part on the assumption that a distance equal to or greater than the excavation depth is maintained from the edge of the excavation. For pipe and vault installation along Washington Street and York Street, where the proposed bottom of the structure is about 10 feet below the existing grade, the trench faces will likely need to be vertical, supported by some form of temporary shoring. Shoring should be designed in accordance with current OSHA guidelines, taking into consideration loadings resulting from equipment and/or stockpiled fill.

The excavation shall be made to the elevation of the bottom of the pipe and should be wide enough to provide adequate working room. Strata 2, 3, 6 and 9 are acceptable as fill material at depths between 4 inches below the bottom of the pipe to 12 inches above the pipe. Backfill material from 12 inches above the top of the pipe to the ground surface shall include Strata 1, 2, 3, 4, 6, 7, 9 and 10 soils. Unsuitable materials such as organic silt (Stratum 5) and sandy clayey silt (Stratum 8) shall be excavated to a minimum depth of 12 inches or a depth necessary to establish a firm foundation.

Backfilling: The trenches should be backfilled to the original ground surface and crowned a minimum of 3 inches. Soils encountered in the upper 10 feet generally consisted of fine sand with rock and shell (Strata 1 and 2), slightly silty fine sand (Stratum 3), very clayey fine sand (Stratum 4) and silty sand (Stratum 9). These soils can be used as backfill material as describe below:

- The bedding zone is generally defined as the area from 4 inches the bottom of the pipe to a distance of 12 inches above the pipe. Strata 1 thru 3 should be utilized in this zone. The fill should be compacted to a minimum of 95 percent of the soil's standard Proctor maximum dry density as determined by ASTM Specification D-698.

- The area above the bedding zone may be backfilled with material from Strata 1, 2, 3, 4 and 9. Strata 6 and 8, if encountered during excavations, can be used in above the bedding zone. The fill should be compacted to a minimum of 95 percent of the soil's standard Proctor maximum dry density as determined by ASTM Specification D-698. Soils excavated below the groundwater table may need to be dried for proper placement. Strata 4, 7 and 10 may require additional handling as they tend to be more moisture sensitive.

- Soil strata 5 and 7 should not be used as backfill material for this project. However, these strata may be used as surficial cover soil in areas that will be landscaped.

Dewatering: Based on the encountered and estimated groundwater conditions and depth of excavation below existing grade, dewatering will be required for the excavation and backfilling operations. Dewatering can probably be accomplished by installation of horizontal flexible slotted pipe "sock" drains or sanded well points. Actual dewatering means and methods should be left up to a contractor experienced in the installation and operation of dewatering systems. The contractor should provide a dewatering plan for review and approval by the engineer prior to the installation of the dewatering systems.

5.2 12th Street Pump Station

The subsoil conditions below the proposed bottom of the pump station can support the structure utilizing a maximum allowable bearing pressure of 2,500 pounds per square foot. Given that the weight of the structure, ever filled, is likely to be less than the soil at this time, settlement is not likely to be an issue. The structure should be designed to resist uplift forces created by the buoyant force of water. Consider the case where the pump station is empty and the water table is at the ground surface such as during a storm event. This can be accomplished by designing a lip around the bottom of the lift station to utilize the soil to provide the uplift resistance.

Excavation: We understand that the proposed bottom of well is approximately 20 feet below the ground surface. Excavations for the project should be made in accordance with recommendations outlined by the Occupational Safety and Health Administration (OSHA). As per OSHA standards a maximum slope of 1.5 horizontal to 1 vertical (1.5H:1V) is permissible for excavations up to 20 feet in depth assuming there are no space constraints and that the excavation has been properly dewatered. This is applicable only when the excavation will not compromise the integrity of existing roadways (i.e. the top of excavation is greater than 5 feet from existing pavement). It should be also noted that slope recommendations are based in part on the assumption that a distance equal to or greater than the excavation depth is maintained

from the edge of the excavation. When this cannot be maintained, shoring will be required. Shoring should be designed in accordance with current OSHA guidelines, taking into consideration loadings resulting from equipment and/or stockpiled fill.

Backfilling: Backfilling of the excavation should be done simultaneously as the construction is being progressed from the bottom to the top. Soils from the strata 1, 2, 6 and 8 as encountered in the boring B-6 can be used as the backfill material. Soil from stratum 5 should not be used as backfill material for this project. However, these soils may be used as surficial cover soil in areas that will be landscaped.

Dewatering: Dewatering that is required for the excavation and backfilling operations can probably be accomplished by sanded well points. Actual dewatering means and methods should be left up to a contractor experienced in the installation and operation of dewatering systems. The contractor should provide a dewatering plan for review and approval by the engineer prior to the installation of the dewatering systems.

6. CLOSURE

N&A appreciates the opportunity to be of service to you on this project. If you should have any questions concerning the contents of this report, or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,

NODARSE & ASSOCIATES, INC.

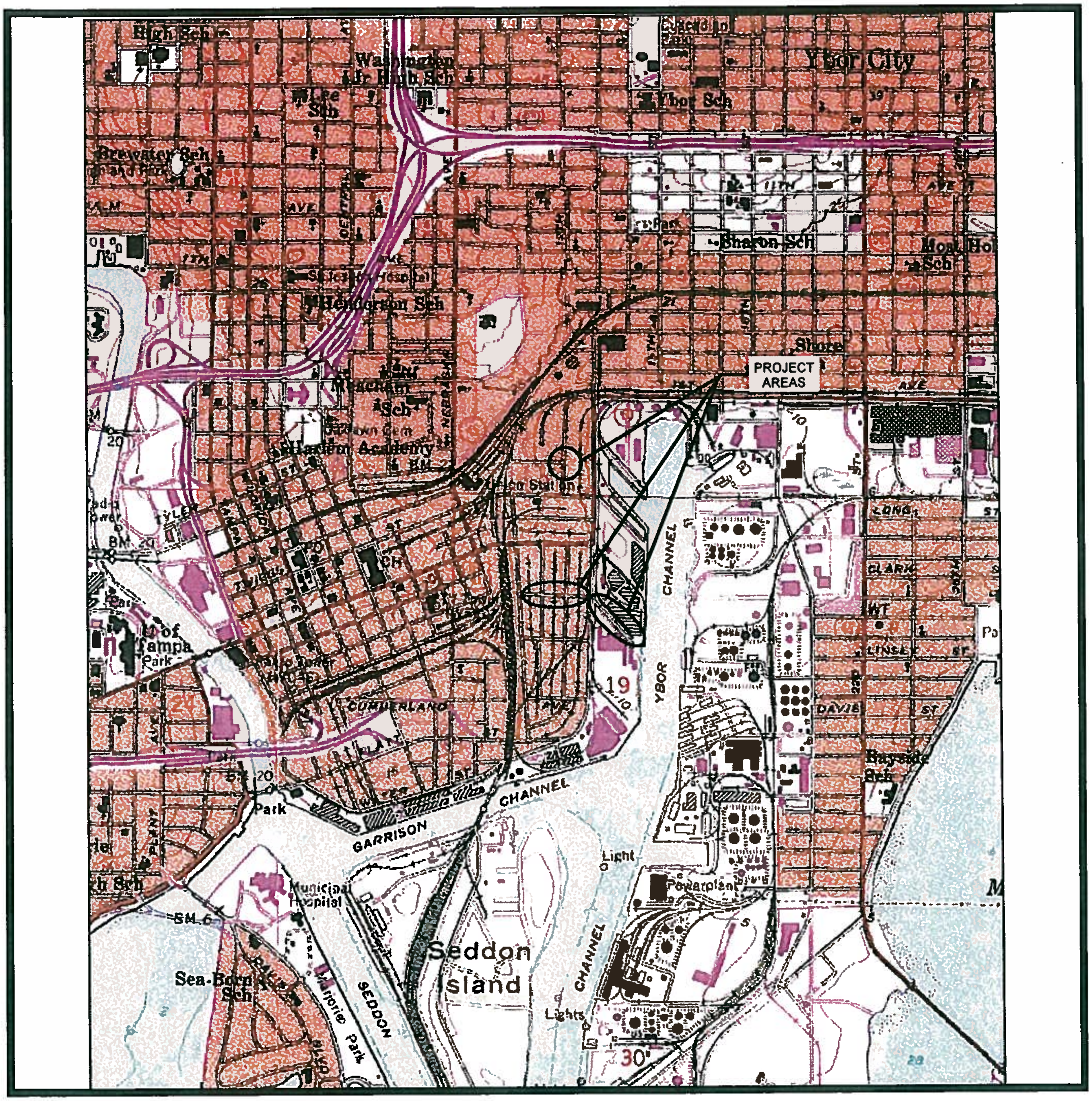
K. Chetanakumar
Chetana R. Kommireddi, E.I.
Geotechnical Engineer

5/22/09
Stephen C. Knauss, P.E.
Senior Project Engineer
Florida Registration No. 28202

Distribution: 3 – Addressee
1 – File

Appendix:
Figure 1 – USGS Vicinity Map
Figure 2 – USDA Soils Map
Figure 3 – Boring Location Plan
Figures 4 thru 6 – Soil Boring Profiles
Figures 7 thru 8 – Particle Size Distribution Reports
Table 1 Summary of Laboratory Test Results
Table 2 Estimated Seasonal High Groundwater Table

APPENDIX



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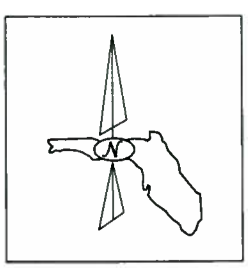
RANGE: 19 EAST

ISSUED: 1981
REVISED: NONE



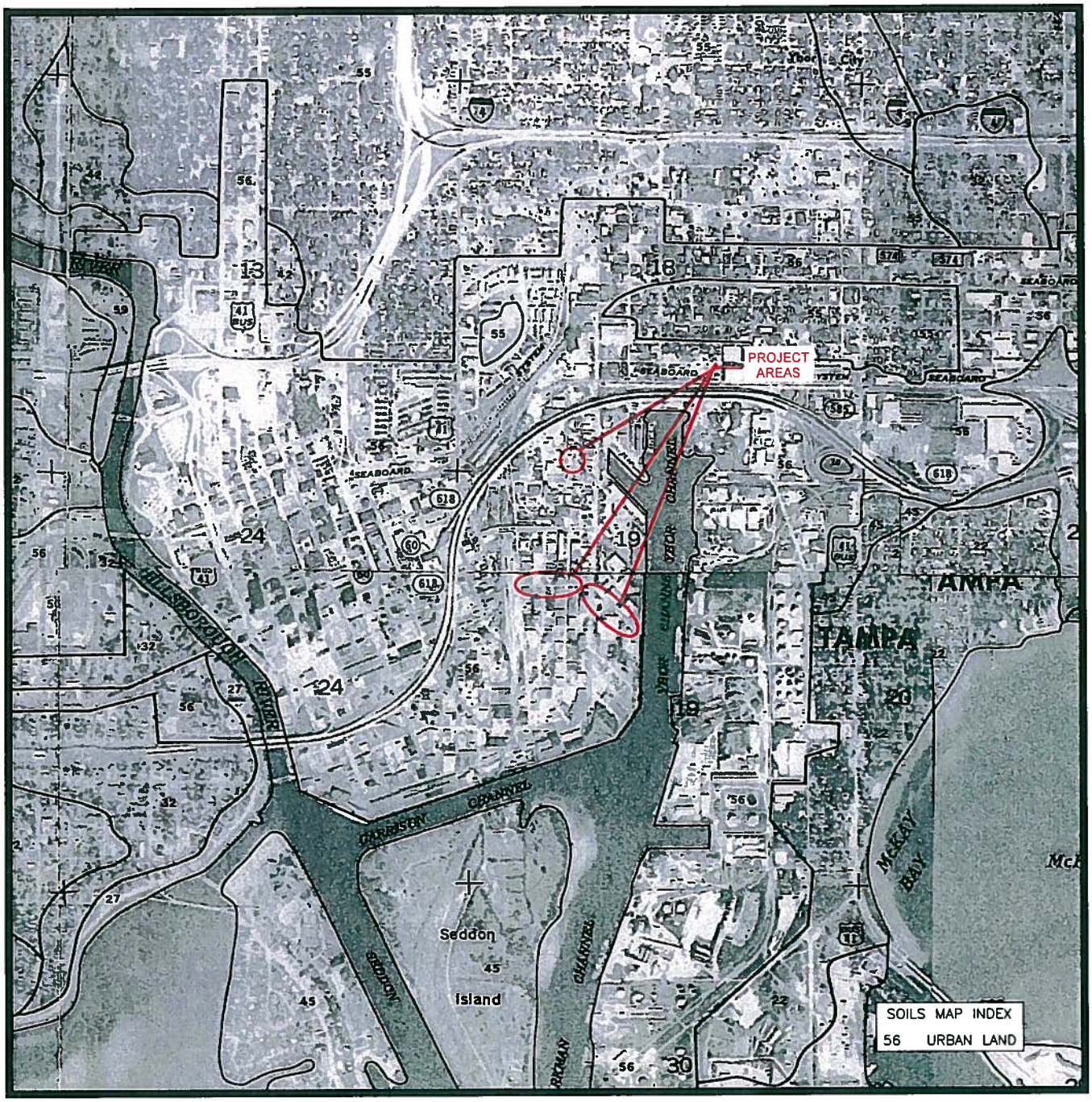
U.S.G.S. QUADRANGLE MAP
CHANNELSIDE REDEVELOPMENT
WASHINGTON, YORK AND 12TH STREETS
HILLSBOROUGH COUNTY, FLORIDA

DRAWN:	TMB
CHKD:	SCK
SCALE:	1"=2000'
DATE:	05-01-09

NODARSE & ASSOCIATES, INC.

PROJ. NO: 04-07-0035-102A

FIGURE: 1



REFERENCE: U.S.D.A. – S.C.S. SOIL SURVEY FOR HILLSBOROUGH COUNTY, FLORIDA ISSUED: 1989
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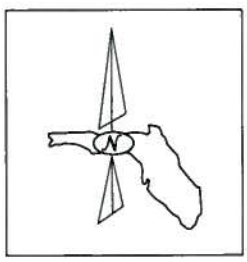
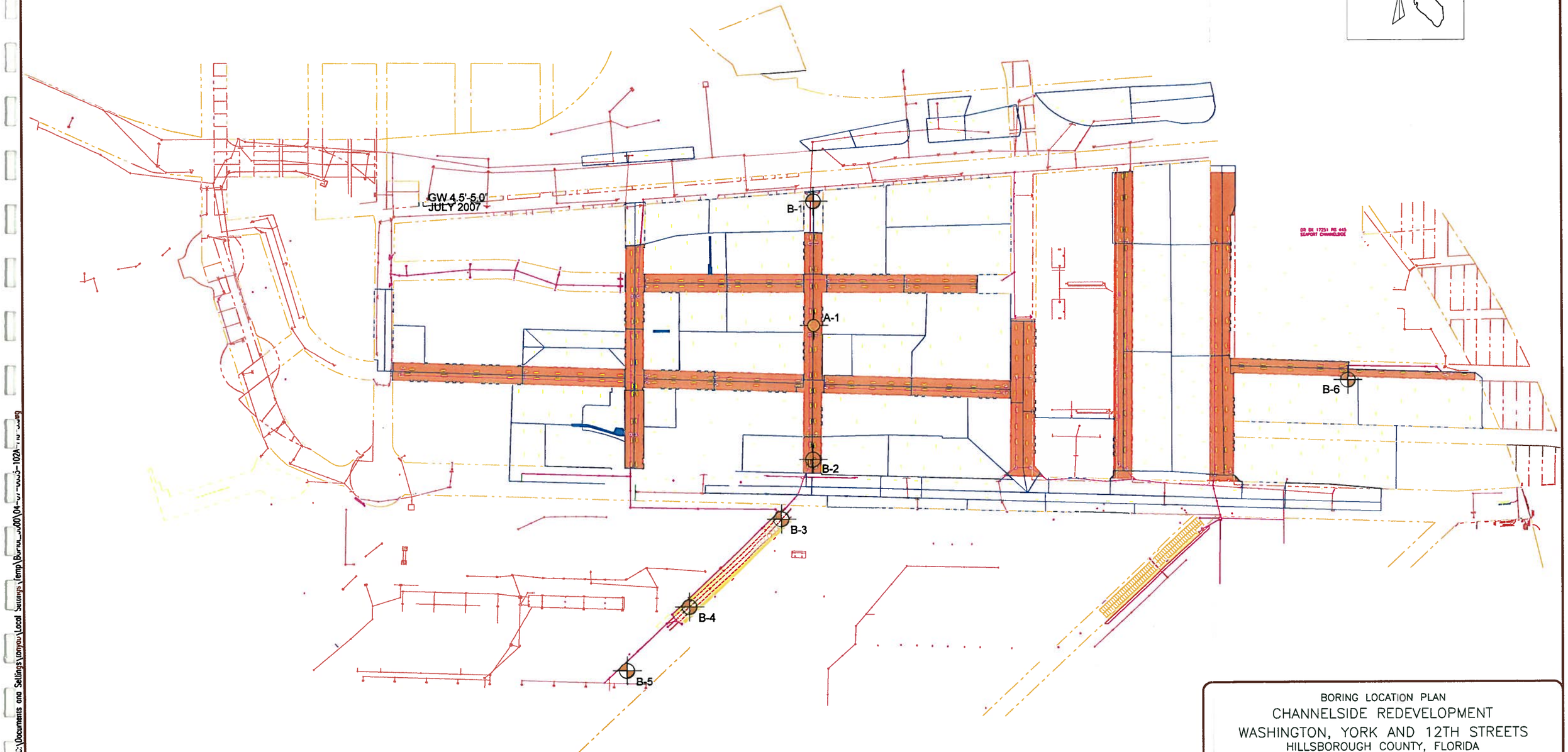
TOWNSHIP: 29 SOUTH
RANGE: 19 EAST



U.S.D.A. – SOILS MAP
CHANNELSIDE REDEVELOPMENT
WASHINGTON, YORK AND 12TH STREETS
HILLSBOROUGH COUNTY, FLORIDA

DRAWN: TMB	NODARSE & ASSOCIATES, INC.	
CHKD: SCK		
SCALE: 1"=2000'		
DATE: 05-01-09	PROJ. NO: 04-07-0035-102A	FIGURE: 2

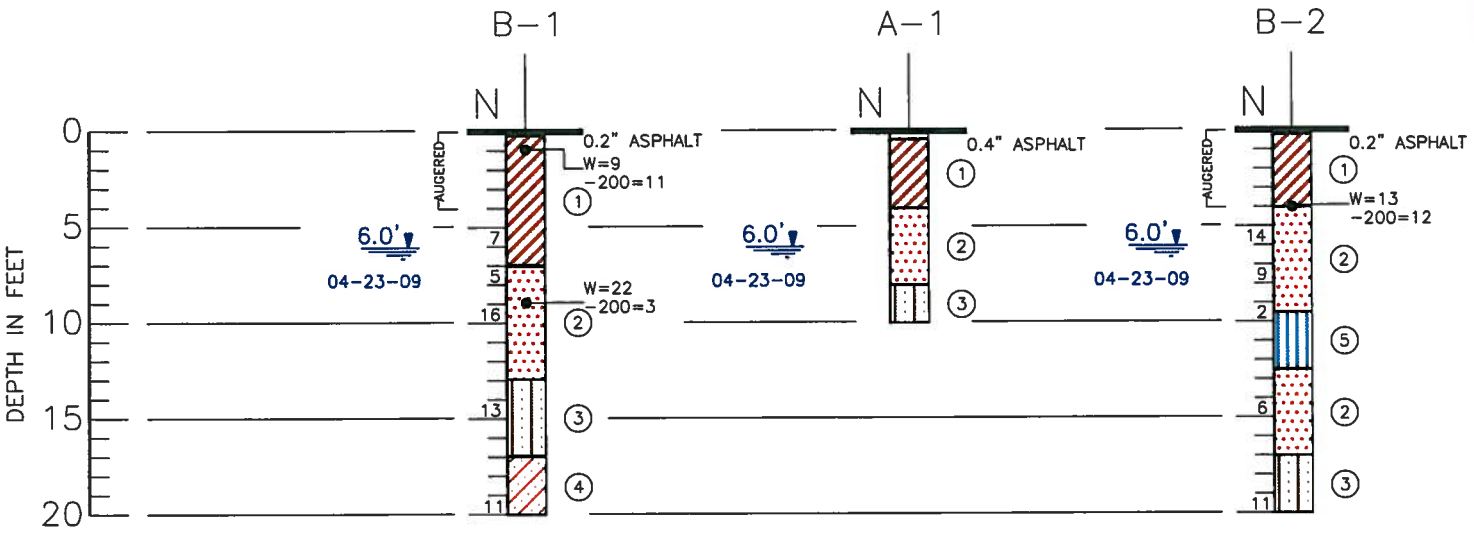


LEGEND

- APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING
- APPROXIMATE LOCATION OF AUGER BORING

BORING LOCATION PLAN
CHANNELSIDE REDEVELOPMENT
WASHINGTON, YORK AND 12TH STREETS
HILLSBOROUGH COUNTY, FLORIDA

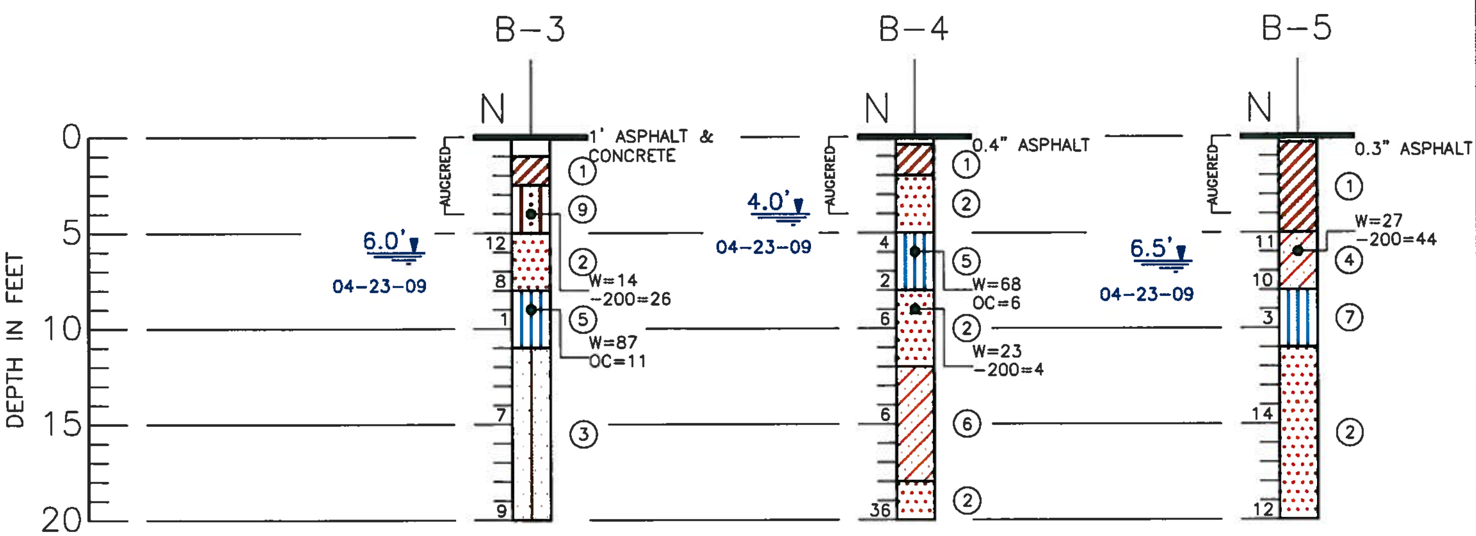
DRAWN: TMB	NODARSE & ASSOCIATES, INC.	
CHKD: SCK		
SCALE: N.T.S.		
DATE: 05-01-09	PROJ. NO: 04-07-0035-102A	FIGURE: 3



▨	1	GRAY-BROWN, DARK GRAY FINE SAND WITH ROCK AND SHELL (SP, SP-SM) (FILL)
⋯	2	LIGHT GRAY, GRAY, GRAY-BROWN, LIGHT GRAY-BROWN FINE SAND (SP)
▥	3	DARK GRAY, BROWN, LIGHT GRAY, LIGHT GRAY-BROWN SLIGHTLY SILTY FINE SAND (SP-SM)
▨	4	BLUE-GRAY VERY CLAYEY FINE SAND (SC)
▥	5	BLACK ORGANIC SILT (OL, OH)
▨	6	GRAY CLAYEY FINE SAND (SC)
▥	7	DARK GRAY SANDY CLAYEY SILT WITH GRAY SAND (ML)
▥	8	REDDISH BROWN SILTY FINE SAND WITH CEMENTED SAND (SP-SM)
▥	9	LIGHT BROWN SILTY SAND (SM)
(SP)		UNIFIED SOIL CLASSIFICATION GROUP SYMBOL AS DETERMINED BY VISUAL EXAMINATION
6.0' ▼ 04-23-09		DEPTH TO GROUNDWATER LEVEL IN FEET WITH DATE OF READING
N		STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
W		NATURAL MOISTURE
-200		FINES PASSING No. 200 SIEVE (%)
OC		ORGANIC CONTENT (%)

SOIL BORING PROFILES
CHANNELSIDE REDEVELOPMENT
WASHINGTON STREET
HILLSBOROUGH COUNTY, FLORIDA

DRAWN: TMB	NODARSE & ASSOCIATES, INC.		
CHKD: SCK			
SCALE: NOTED			
DATE: 05-01-09	PROJ. NO: 04-07-0035-102A	FIGURE: 4	

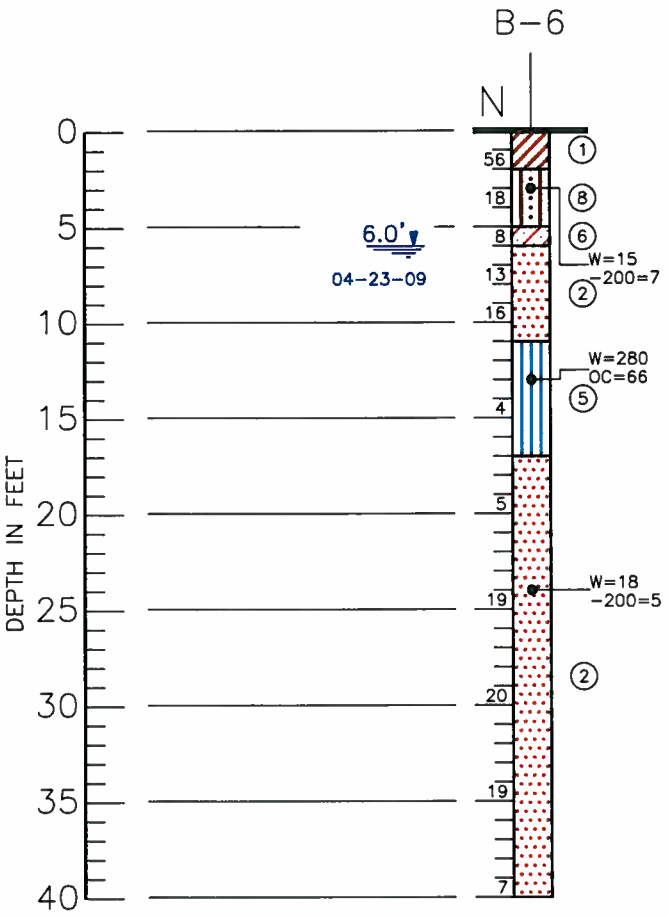


	(1)	GRAY-BROWN, DARK GRAY FINE SAND WITH ROCK AND SHELL (SP, SP-SM) (FILL)
	(2)	LIGHT GRAY, GRAY, GRAY-BROWN, LIGHT GRAY-BROWN FINE SAND (SP)
	(3)	DARK GRAY, BROWN, LIGHT GRAY, LIGHT GRAY-BROWN SLIGHTLY SILTY FINE SAND (SP-SM)
	(4)	BLUE-GRAY VERY CLAYEY FINE SAND (SC)
	(5)	BLACK ORGANIC SILT (OL, OH)
	(6)	GRAY CLAYEY FINE SAND (SC)
	(7)	DARK GRAY SANDY CLAYEY SILT WITH GRAY SAND (ML)
	(8)	REDDISH BROWN SILTY FINE SAND WITH CEMENTED SAND (SP-SM)
	(9)	LIGHT BROWN SILTY SAND (SM)
(SP)		UNIFIED SOIL CLASSIFICATION GROUP SYMBOL AS DETERMINED BY VISUAL EXAMINATION
6.0' 04-23-09		DEPTH TO GROUNDWATER LEVEL IN FEET WITH DATE OF READING
N		STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
W		NATURAL MOISTURE
-200		FINES PASSING No. 200 SIEVE (%)
OC		ORGANIC CONTENT (%)

SOIL BORING PROFILES
CHANNELSIDE REDEVELOPMENT
YORK STREET
HILLSBOROUGH COUNTY, FLORIDA

DRAWN:	TMB
CHKD:	SCK
SCALE:	NOTED
DATE:	05-01-09
PROJ. NO:	04-07-0035-102A
FIGURE:	5

NODARSE & ASSOCIATES, INC.

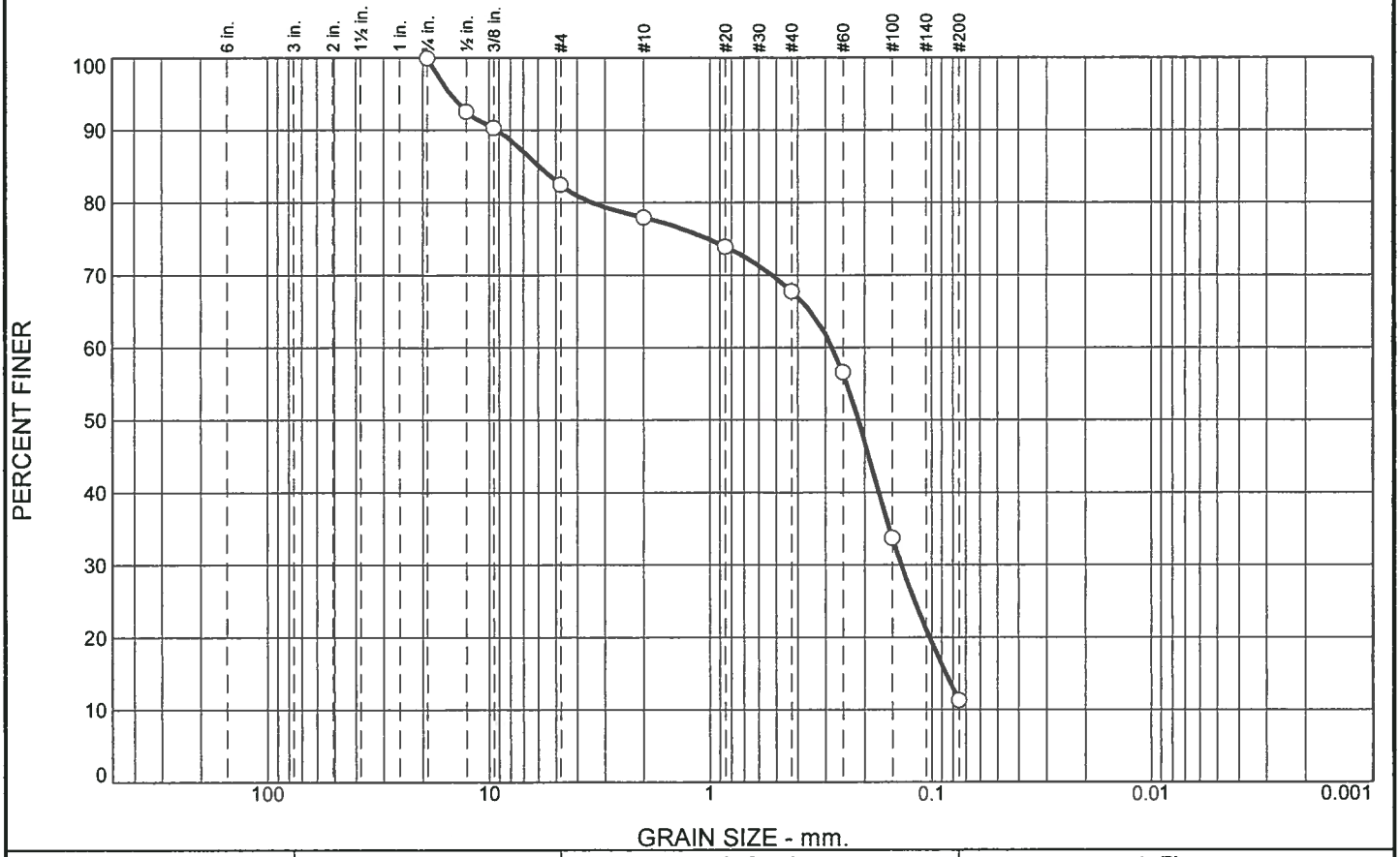


①	GRAY-BROWN, DARK GRAY FINE SAND WITH ROCK AND SHELL (SP, SP-SM) (FILL)
②	LIGHT GRAY, GRAY, GRAY-BROWN, LIGHT GRAY-BROWN FINE SAND (SP)
③	DARK GRAY, BROWN, LIGHT GRAY, LIGHT GRAY-BROWN SLIGHTLY SILTY FINE SAND (SP-SM)
④	BLUE-GRAY VERY CLAYEY FINE SAND (SC)
⑤	BLACK ORGANIC SILT (OL, OH)
⑥	GRAY CLAYEY FINE SAND (SC)
⑦	DARK GRAY SANDY CLAYEY SILT WITH GRAY SAND (ML)
⑧	REDDISH BROWN SILTY FINE SAND WITH CEMENTED SAND (SP-SM)
⑨	LIGHT BROWN SILTY SAND (SM)
(SP)	UNIFIED SOIL CLASSIFICATION GROUP SYMBOL AS DETERMINED BY VISUAL EXAMINATION
6.0' ▼ 04-23-09	DEPTH TO GROUNDWATER LEVEL IN FEET WITH DATE OF READING
N	STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT
W	NATURAL MOISTURE
-200	FINES PASSING No. 200 SIEVE (%)
OC	ORGANIC CONTENT (%)

SOIL BORING PROFILES
CHANNELSIDE REDEVELOPMENT
12TH STREET
HILLSBOROUGH COUNTY, FLORIDA

DRAWN: TMB	NODARSE & ASSOCIATES, INC.	
CHKD: SCK		
SCALE: NOTED		
DATE: 05-01-09	PROJ. NO: 04-07-0035-102A	FIGURE: 6

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	17.5	4.5	10.2	56.5	11.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
.5	92.6		
3/8	90.4		
#4	82.5		
#10	78.0		
#20	74.0		
#40	67.8		
#60	56.6		
#100	33.8		
#200	11.3		

* (no specification provided)

Material Description

Gray/Brown Fine Sand with Shell and Rock

Atterberg Limits

PL= N/A LL= N/A PI= N/A

Coefficients

D_{85}= 5.9037 D_{60}= 0.2778 D_{50}= 0.2125
D_{30}= 0.1369 D_{15}= 0.0858 D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

Natural Moisture 9.1%

Sample Number: 1 **Depth:** 0-2.5'
Location: B-1

Date: 4/28/09

Nodarse & Associates, Inc.

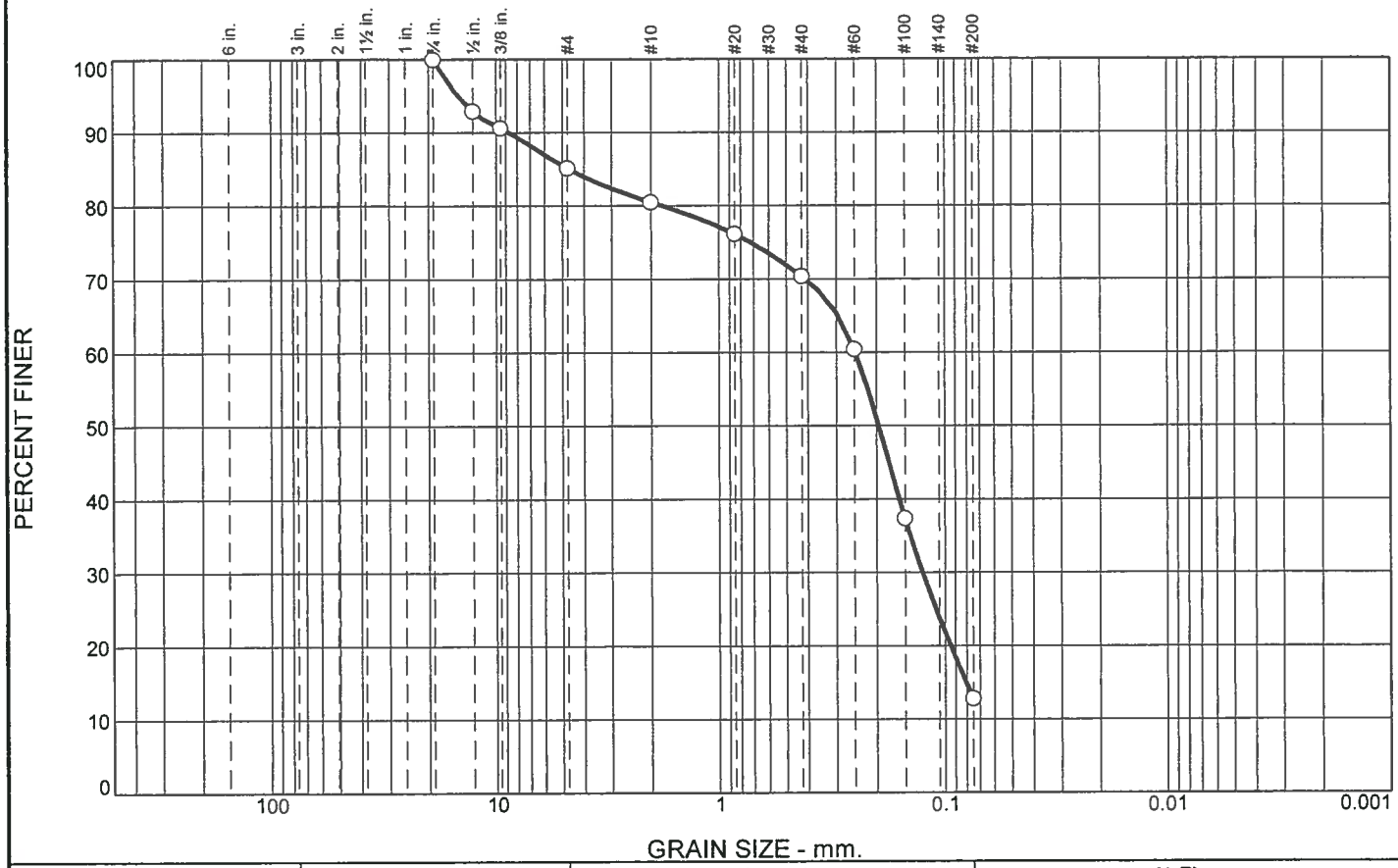
Tampa, FL

Client: Wilson Miller
Project: Channelside Redevelopment 2009

Project No: 04-07-0035-102A **Figure** 7

Tested By: G. Napolitano **Checked By:** S. Knauss

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	14.8	4.7	10.1	57.6	12.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
.5	92.9		
3/8	90.7		
#4	85.2		
#10	80.5		
#20	76.2		
#40	70.4		
#60	60.5		
#100	37.4		
#200	12.8		

* (no specification provided)

Material Description

Gray/Brown Fine Sand with Rock and Shell

Atterberg Limits

PL= N/A LL= N/A PI= N/A

Coefficients

D_{85}= 4.6340 D_{60}= 0.2466 D_{50}= 0.1951
D_{30}= 0.1256 D_{15}= 0.0805 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Natural Moisture 12.7%

Sample Number: 2 **Depth:** 3-5'
Location: B-2

Date: 4/28/09

Nodarse & Associates, Inc.

Tampa, FL

Client: Wilson Miller
Project: Channelside Redevelopment 2009

Project No: 04-07-0035-102A **Figure** 8

Tested By: G. Napolitano **Checked By:** S. Knauss

Table 1
Summary of Laboratory Test Results
Channelside District Redevlopment Project
N&A Project No.: 04-07-0035-102A

Boring ID	Sample Depth (ft)	Soil Description	USCS Classification	Stratum Number	Moisture Content (%)	Seive Analyses (Percent Passing)							Organic Content (%)
						#4	#10	#20	#40	#60	#100	#200	
B-1	0 – 2.5	Gray/Brown Fine SAND w/Rock	SP-SM	1	9	83	78	74	68	57	34	11	-
B-1	9 – 10	Dark Brown Fine SAND	SP	2	22	-	-	-	-	-	-	3	-
B-2	3 – 5	Gray/Brown Fine SAND w/Rock	SP-SM	1	13	85	81	76	59	61	37	12	-
B-3	2.5 – 5	Light Brown Silty Fine SAND	SM	9	14	-	-	-	-	-	-	26	-
B-3	8 – 10	Black Organic SILT	OL	5	87	-	-	-	-	-	-	-	11
B-4	5 – 7	Black Organic SILT	OL	5	68	-	-	-	-	-	-	-	6
B-4	8.5 – 10	Dark Gray/Brown Fine SAND	SP	2	23	-	-	-	-	-	-	4	-
B-5	5 – 8	Light Gray/Brown Clayey SAND	SC	4	27	-	-	-	-	-	-	44	-
B-6	1 – 4	Red/Brown Slightly Silty SAND w/Cement	SP-SM	8	15	-	-	-	-	-	-	7	-
B-6	13.5 – 15	Black Organic SILT	OH	5	280	-	-	-	-	-	-	-	66
B-6	23.5 – 25	Light Gray Fine SAND	SP	2	18	-	-	-	-	-	-	5	-

Table 2
Estimated Seasonal High Groundwater Table
Channelside District Redevlopment Project
N&A Project No.: 04-07-0035-102A

Boring ID	Encountered Ground Water Depth (ft)	Estimated Seasonal High Groundwater Depth (ft)
B-1	6	3
A-1	6	4
B-2	6	3.5
B-3	6	3.5
B-4	4	2
B-5	6.5	2
B-6	6	3

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