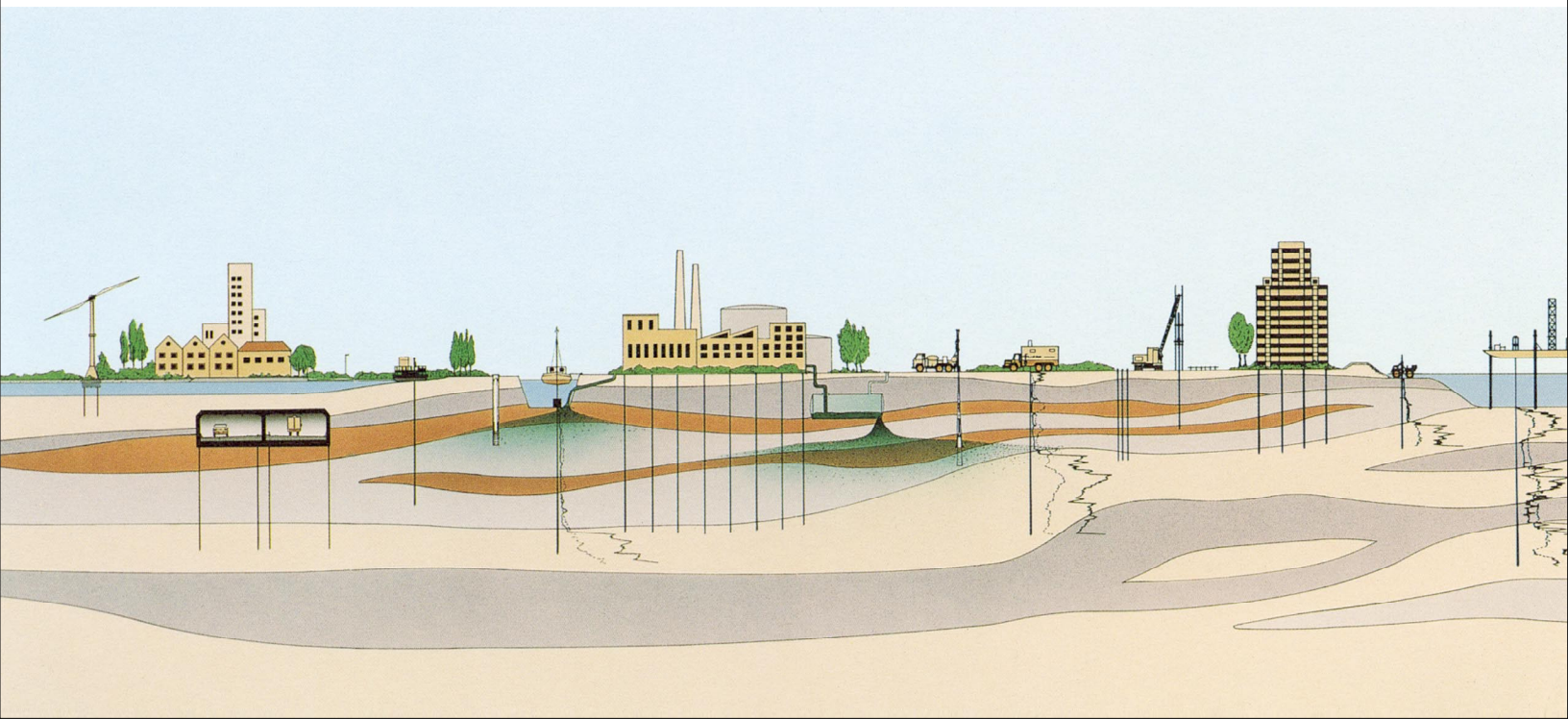
FUGRO CONSULTANTS, INC.

ONSHORE GEOTECHNICAL FIELD DATA REPORT
VOWTAP DEMONSTRATION PROJECT
OFFSHORE VIRGINIA OUTER CONTINENTAL SHELF

Prepared for:
DOMINION RESOURCES

October 2014
Fugro Project No. 04.81140004



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October 01, 2014
Project No. 04.81140004

Dominion Resources
120 Tredegar St.
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Fugro Consultants, Inc. (Fugro) has recently completed a geotechnical and geophysical field exploration program in support of the Virginia Offshore Wind Technology Advancement Project (VOWTAP). The program comprised marine drilling and in-situ testing offshore in federal and state waters off the coast of Virginia along the proposed VOWTAP marine Export and Inter-Array Cable routes and at the proposed wind turbine generator (WTG) locations. Onshore utility survey, drilling and test pit exploration were conducted along the proposed VOWTAP Interconnection Cable Route and Interconnection Station location.

The geotechnical and geophysical field program was conducted in support of the development of a grid-connected, 12 megawatt (MW) offshore wind facility comprising two Alstom HALIADE^{TM} 150 direct drive gearless, 6 MW wind turbine generators (WTGs). The investigation was performed in general accordance with the scope of work included in our proposal dated March 13, 2013 submitted to Dominion Resources (Dominion). The work was authorized by Purchase Order 70273227 dated March 20, 2014.

The site investigation activities discussed in this report consisted of onshore activities pertinent to the Export Cable after it lands within the boundaries of Camp Pendleton State Military Reservation (Camp Pendleton), in the City of Virginia Beach. These activities consisted of utility survey along the proposed cable corridor to locate buried utilities and communication lines, one deep borehole by the sand dunes in the vicinity of the Switch Cabinet connecting the Export marine to the Onshore Interconnection Cable, two shallow boreholes at the east and west side of Lake Christine, and six tests pits. Marine site investigation activities are presented in our Offshore Geotechnical Field Data Report (Fugro 2014). Due to its significance to the nearshore HDD marine Export Cable design, the results of the deep borehole, which was terminated at about 35.2 m, are presented in the same marine geotechnical field data report.

To facilitate the design of the cable crossing below the box culvert in Lake Christine, the two shallow boreholes were terminated at about 4.9 m. Fugro also logged six test pits and collected representative soil samples along the proposed Interconnection Cable corridor. Three tests pits were located along Gate 10 access road and two where located along Rifle Range road. The test pits were terminated at depths ranging from 1.2 to 2.3 m. A hand auger boring terminated at a depth of 2.3 m was also drilled at Rifle Range Road. Drilling and test pit excavation along the Interconnection Cable were conducted under subcontract to Fugro by Fishburne drilling Inc. (FDI) and W.F. Magann (Magann), respectively.

This Field Report (1) documents the methods, equipment, and procedures used for the onshore field exploration, (2) includes maps showing areas of investigation and locations of explorations, and (3) presents factual data in the form of borehole logs and utility survey maps.

It has been a pleasure working with you through this phase of the project. We look forward to receiving your comments regarding this report, as well as the opportunity to provide continued support as the project progresses.

Sincerely,

FUGRO CONSULTANTS, INC.

Mohamed Mekkawy, Ph.D., P.E.
Senior Engineer

David Sackett, P.G.
Vice President

Issue	Description	Date	Preparer	QC
1	Field Data Report	September 29, 2014	M. Mekkawy	D. Sackett
2	Final Field Data Report	October 1, 2014	M. Mekkawy	D. Sackett

Copies Submitted: PDF File

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1.0 INTRODUCTION

Dominion Resources Inc. (Dominion), proposes to construct and operate the Virginia Offshore Technology Advancement Project (VOWTAP) – a 12-megawatt (MW) grid-connected offshore wind facility off the Coast of Virginia Beach, Virginia (Figure 1). Dominion has proposed deploying two Alstom HALIADE^{TM} 150 gearless, 6 MW direct drive wind turbine generators (WTGs) supported by an Inward Battered Guide Structure (IBGS) foundation. The VOWTAP will interconnect with Dominion's existing onshore electrical infrastructure in the vicinity of the Camp Pendleton State Military Reservation (Camp Pendelton). The onshore components of the VOWTAP will consist of:

- Onshore Interconnection Cable;
- Fiber Optic Cable
- Switch Cabinet;
- Interconnection Station; and
- Construction and O&M facilities.

Dominion proposes to land the VOWTAP Export Cable via HDD within an existing parking lot located within the boundaries of the Camp Pendleton State Military Reservation (Camp Pendleton), in the City of Virginia Beach. In support the onshore Interconnection Cable design, and under subcontract to Fugro, InfraMap conducted a utility location survey covering the Interconnection Cable corridor from the HDD entry point by the Switch Cabinet to the proposed Interconnection Station. Further, Fugro drilled and sampled one deep boring at the proposed Interconnection Cable HDD entry point, two shallow boreholes at the east and west sides of Lake Christine, and logged and collected representative soil samples from six test pits excavated along the proposed onshore cable corridor. Three tests pits were located along Gate 10 access road, whereas two tests pits and one hand auger boring were located along Rifle Range road. Drilling and test pit excavation along the Interconnection Cable were conducted by Fishburne drilling Inc. (FDI) and W.F. Magann (Magann), respectively.

2.0 SCOPE OF SERVICES

The Onshore Interconnection Cable and associated Fiber Optic Cable, will initiate at a Switch Cabinet located in Camp Pendleton where it will be spliced with the marine Export Cable. In close proximity of the Switch Cabinet, Fugro drilled and sampled a deep borehole and the data is provided in the Offshore Geotechnical Field Data Report (Fugro, 2014). The Interconnection and Fiber Optic Cables will terminate at Dominion's existing infrastructure located on the southern side of South Birdneck Road. This grid connection will be supported by a newly proposed Interconnection Station to be located along Camp Pendleton's Gate 10 Access Road (Figures 2 and 3a). Dominion has proposed to install the Interconnection and Fiber Optic Cables via HDD under both paved roadways and within the existing cleared road shoulders along the entirety of the route. In support of the Interconnection and Fiber Optic Cable design, and under subcontract to Fugro, InfraMap conducted a utility location survey covering the proposed cable corridor from the Switch Cabinet to the proposed Interconnection Station. Further, Fugro drilled and sampled two shallow boreholes at the east and west sides of

Lake Christine to about 5m below ground level. Six tests pits along Rifle Range and Gate 10 access roads were excavated and soil samples obtained for laboratory testing. The locations of the test pits are shown in Figure 3. .Drilling and test pit excavation along the Interconnection and Fiber Optic Cable corridor were respectively conducted by FDI and Magann.

3.0 ONSHORE INTERCONNECTION CABLE

To support the onshore Interconnection Cable design, a utility survey was conducted by InfraMap under subcontract to Fugro. The results were used to optimize the locations of the boreholes and test pits to avoid utilities yet still be within the Interconnection Cable corridor. Due to the presence of a box culvert at Lake Christine, two shallow borings were drilled and sampled at the east and west side of the culvert to assist in the design of the proposed HDD crossing in that area. The boreholes were terminated at approximately 5 m. Relatively shallow groundwater was measured at the time of sampling at about 0.6 m. Other segments of the Interconnection Cable are expected to be buried below the ground surface at a relatively shallow depth. Along these segments, Fugro excavated and sampled six test pits. One hand auger (TP2) and two test pits (TP1 and TP3) were excavated and sampled at predetermined locations along Rifle Range Road. The remaining three test pits (TP 4 through 6) were excavated along Gate 10 access road (Figure 3). The test pits were terminated at about 2 m. A summary of the onshore borings and test pits are tabulated below. The geotechnical logs are shown in Appendix A.

Location	Easting[a], m	Northing[a], m	Termination Depth below Ground Surface (m)	Groundwater Depth Measure During Drilling (m)
B-2	413,040	4,074,709	4.9	0.6
B-3	412,971	4,074,694	4.9	0.6
TP-1	413,666	4,074,815	1.2	0.9
TP-2	413,475	4,074,781	2.3	0.8
TP-3	413,317	4,074,752	2.0	1.5
TP-4	412,886	4,074,582	2.1	1.4
TP-5	412,785	4,074,455	2.3	1.4
TP-6	412,766	4,074,444	2.0	1.8

[a] Northing and Easting coordinates are Universal Transverse Mercator, Zone 18 North, NAD83, meters

The results of borehole B-1 are shown in Fugro's 2014 Nearshore and Offshore Geotechnical Data Report.

3.1 UTILITY SURVEY

A utility survey was conducted by InfraMap Corp. (InfraMap) to detect and survey utilities near the site investigation locations and along the entire Interconnection Cable. InfraMap conducted a literature search for historical records and documentation buried utility systems located in the survey area. InfraMap also conducted a survey in a grid pattern of the site to search for utilities that do not appear on available records, and attempted to determine their type. This investigation was accomplished using active and passive type utility detection gear

that detects induced or naturally occurring energy fields present on conductive utilities. The investigated area extended from the east end of the Interconnection Cable route by B-1 to the Interconnection Station south of Birdneck Road. After identifying and marking the utility locations, a survey crew followed to survey the locations of detected utilities. The results of the utility mapping are shown on Figure 6. An electronic copy of the utility mapping was provided to the client.

In addition to the utility survey results shown on Figure 6, Fugro did encounter an abandoned communication line while drilling TP-2. Camp Pendleton acknowledged the presence of such abandoned lines. This suggests that several abandoned communication lines and possibly other types of buried utilities may be conflicting with the Interconnection Cable route yet undetectable using commonly used utility location techniques. In order to prevent damage to existing utilities, we recommend that Dominion obtains readily available information from Camp Pendleton regarding possible abandoned lines. This should be followed by physically locating these utility lines using manual labor. If no information is available, we still suggest that a search for abandoned utilities be done using manual labor along the Interconnection Cable route.

3.2 DRILLING SYSTEM AND SAMPLING METHODS

A CME-55 drilling rig operated by Fishburne was used to advance the borings using a wet, rotary drilling method. Sampling was conducted using rod-based techniques, which are standard for onshore drilling. Fugro used SPT and push tubes to test and sample sandy and clayey soils, respectively. The boreholes were grouted upon completion and soil cuttings were drummed and removed offsite. The borehole logs are shown in Appendix A.

Magann operated an excavator for the test pit explorations. Fugro observed subsurface conditions and collected representative soil samples. Below the depth of 1.2 m, we used the excavator bucket as the means to collect the sample, to eliminate the need to have a person enter the pit and without the need to excessively excavate and disturb the grounds. Test pits were nominally terminated at 2 m. Fugro monitored the water level in the test pits during the onshore exploration program. The test pits were backfilled with excavation spoils and restored to original grade before moving to the next test pit location. The test pit logs are shown in Appendix A.

3.3 OPERATIONS PERSONNEL

Key personnel for operations included:

Fugro

- Mohamed Mekkawy – Project Manager
- Bob Mosher – Project HSE
- Frank MacConochie – Senior Engineer (supervising test pit excavation)
- Bill Mack – Senior Engineer (supervising drilling operations)

InfraMap Corp.

- Mike Goodman – Project Manager
- Simon Ellis – Lead Surveyor

Fishburne Drilling, Inc.

- Mike Young – Project Manager
- Timothy Donahue – Lead Driller

W. F. Magann

- Stan Magann – Project Manager

Kellogg, Brown, and Root

- David Chisnall – Client Representatives

3.4 SUMMARY OF ONSHORE SITE CONDITIONS

The subsurface soil layers encountered onshore at boring B-1 was in good agreement with the nearshore soil information (Figure 3b). The clay layer through which the HDD will most likely drill through in the nearshore environment was encountered at approximately elevation -22m. Above that layer, alternating layers of sand and clay was observed. The SPT N-values measured at about 1.5m intervals are shown on the boring logs. Low blow counts indicating soft soil conditions were noted at the various clay layers. The results of the onshore laboratory testing, currently in progress, will be used to refine the classification of the different subsurface layers and better characterize their behavior.

Borings 2 and 3 at the east and west side of lake Christine were predominantly fat clay at the top 3 to 4m. Shelby tube and split spoon soil samples were retrieved from this layer for laboratory testing. The blow counts indicate very soft to soft clay consistency. Underlying the clay layer is poorly graded medium sand. The blow counts indicate very loose to loose relative density.

4.0 HEALTH, SAFETY, AND ENVIRONMENTAL MANAGEMENT

A Health, Safety and Environmental (HSE) Plan was established for the geotechnical site investigation. The purpose of the plan was to:

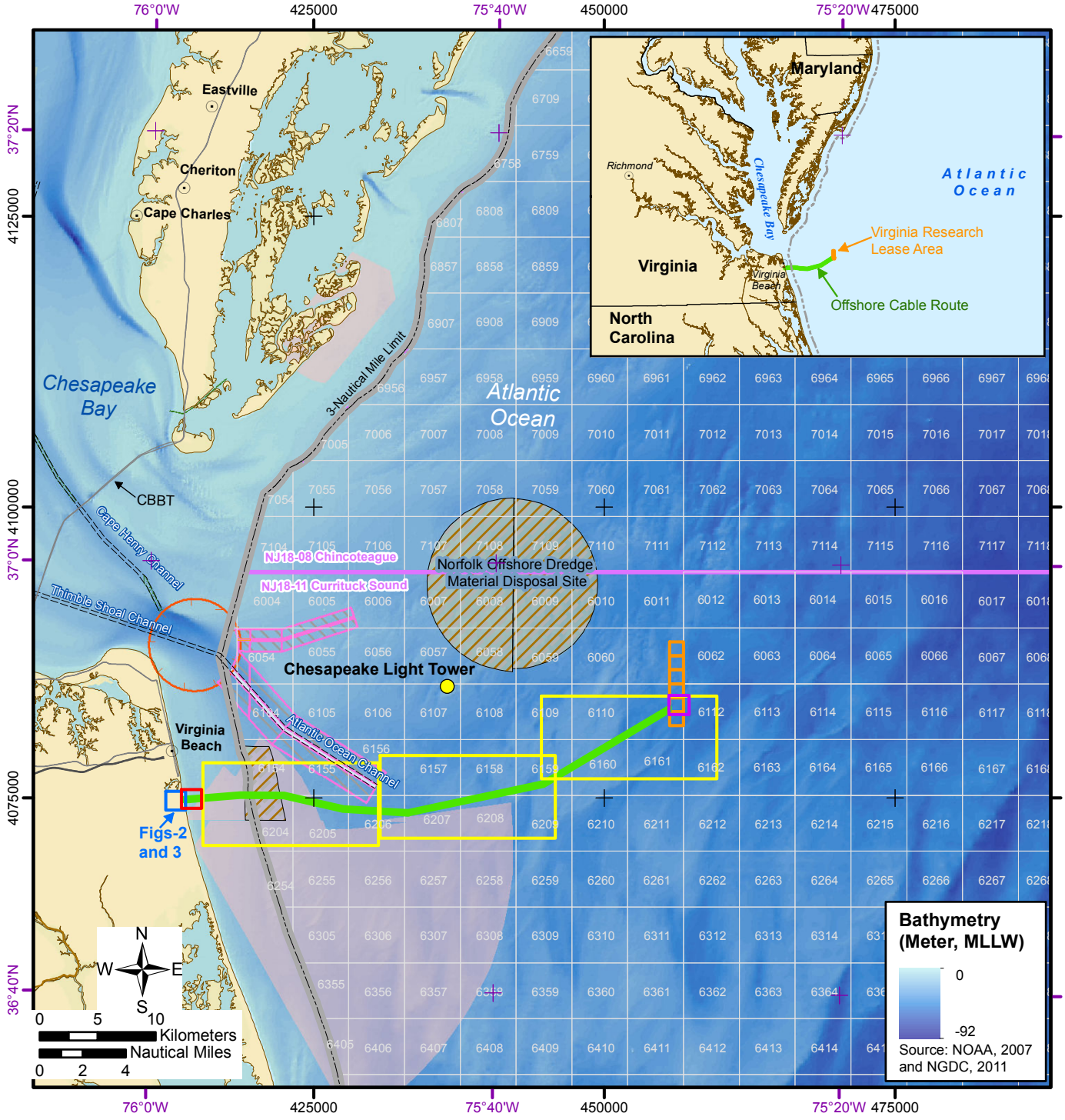
- Provide assurance of the effective working of the interface between the HSE Management Systems of Fugro Atlantic and its Subcontractors at the project specific level and to document this interface.
- Demonstrate that all parties have the necessary procedures and controls in place to achieve the work program without compromising HSE performance.
- Document any project specific hazards that are not covered in the Crew HSE Plan.
- Document the Project Emergency and Contingency Plans.

Health, Safety, and Environmental oversight during CPT testing and Marine drilling operations was successfully managed by Fugro's shift engineers. Daily Progress Reports (DPRs) were recorded during each shift. Toolbox safety meetings were conducted aboard each vessel at the start of each shift. Copies of DPRs were provided to the project team daily and are summarized in Appendix B.

5.0 REFERENCES

Fugro Consultants, Inc. (2014a), "Offshore and Nearshore Geotechnical Field Data Report, VOWTAP Demonstration Project, Offshore Virginia Outer Continental Shelf," Dated September 26, 2014.

FIGURES



LEGEND

- Offshore Cable Route (300m Wide Corridor)
- 6015 — OCS Lease Block (Virginia Commercial Lease Area OCS blocks are highlighted in yellow.)
- VOWTAP Research Lease Aliquots
- Precautionary Area
- Coordinate Grid is NAD 1983, UTM Zone 18N, Meters
- Coordinate Grid is NAD 1983, Lat/Long Degree
- Military Practice Area
- Vessel Navigational Traffic Area
- Dumping Ground Area
- Onshore Cable Route
- HDD Cable Route
- Offshore Cable Route
- Turbine Site

PROJECT LOCATION MAP
Dominion VOWTAP Geotechnical Survey
Offshore Virginia

FIGURE 1

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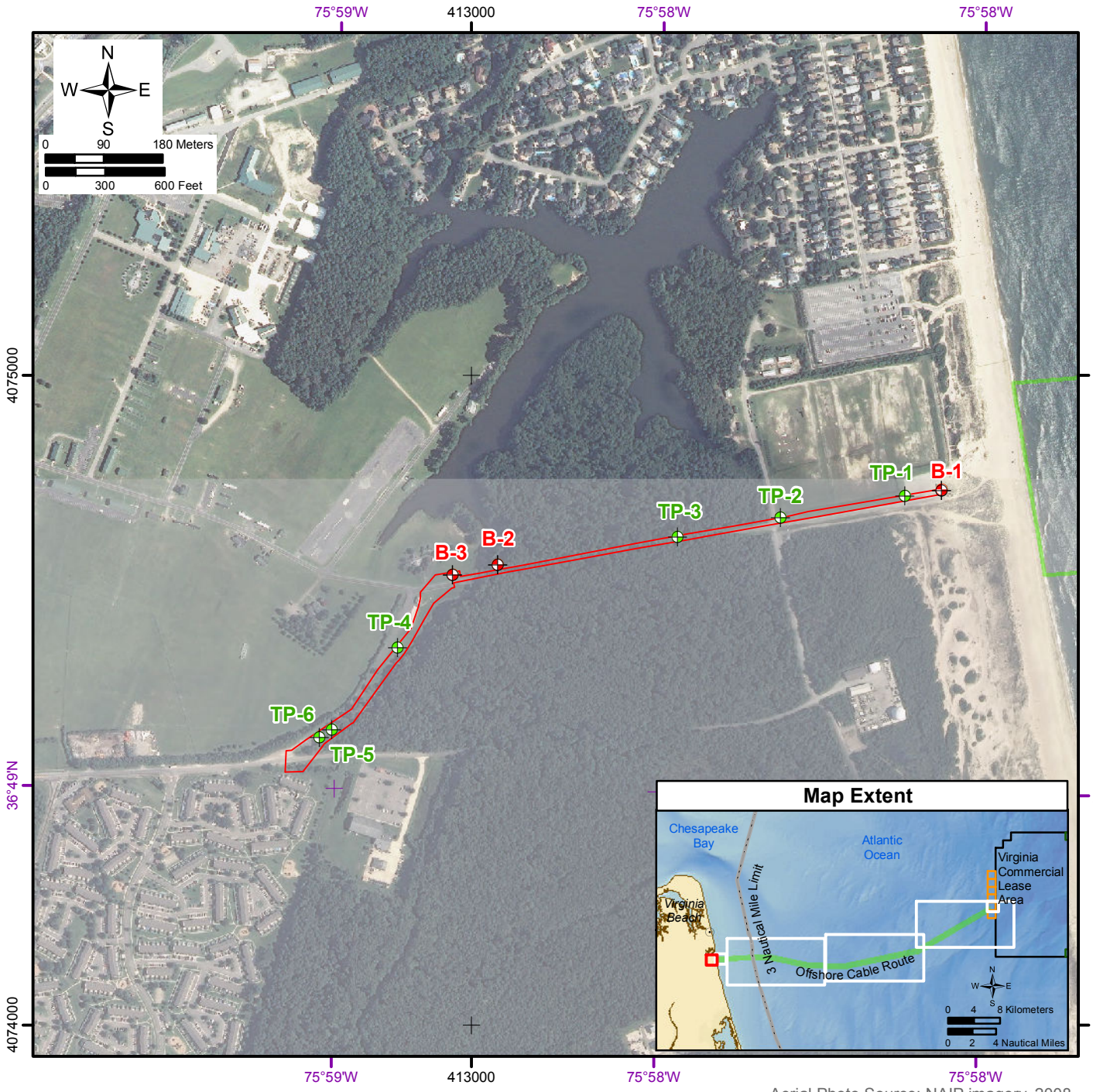

Aerial Photo Source: NAIP imagery, 2008

LEGEND

- B-1 — Onshore Boring Location
- TP-1 — Test Pit Location
- Offshore Cable Route (300m Wide Corridor)
- Limits of Utility Survey
- Coordinate Grid is NAD 1983, UTM Zone 18N, Meters.
- Coordinate Grid is NAD 1983, Lat/Long Degree

ONSHORE BOREHOLE LOCATIONS

Onshore Cable Route
Dominion VOWTAP Geotechnical Survey
Offshore Virginia

FIGURE 2

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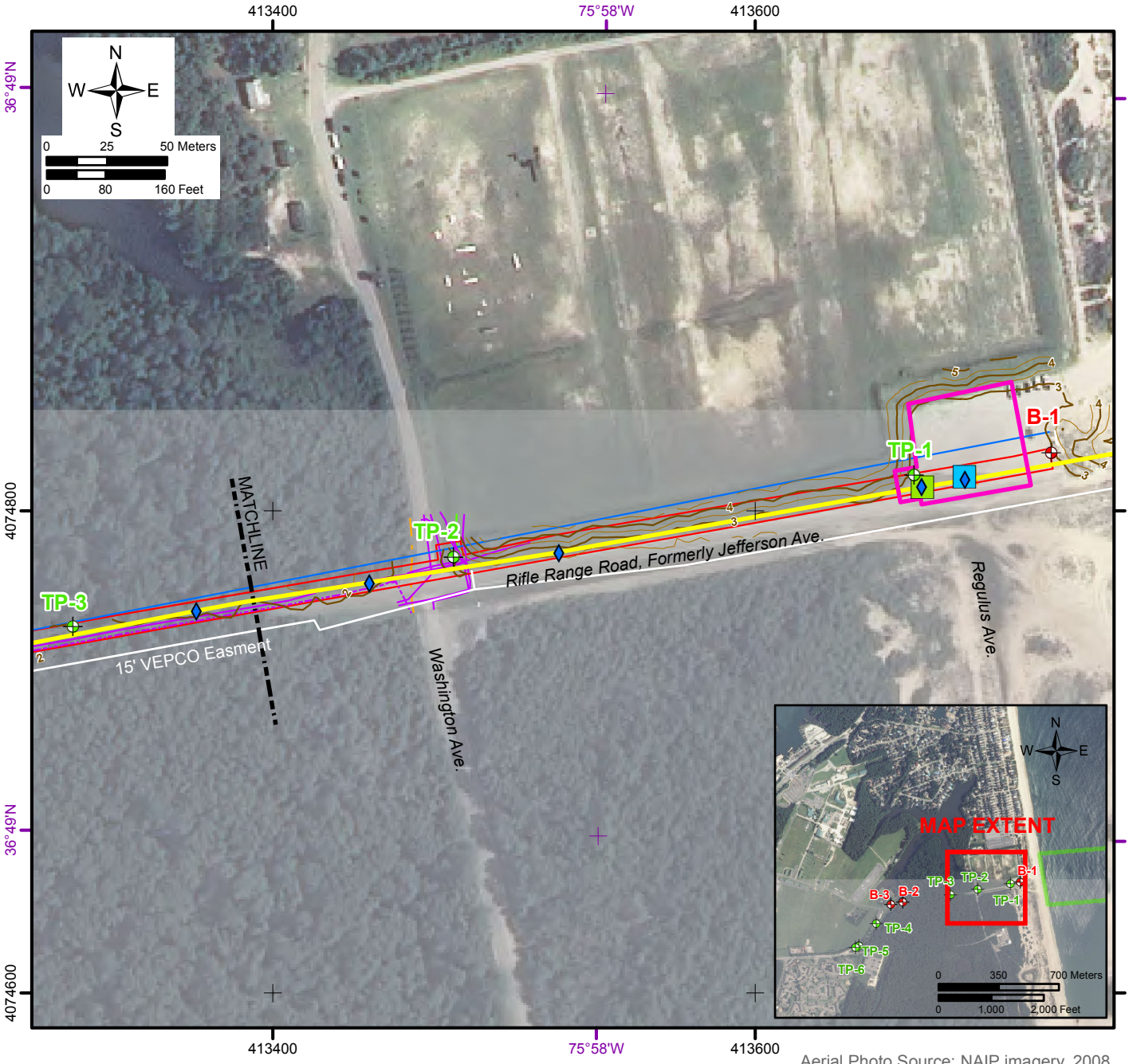

Aerial Photo Source: NAIP imagery, 2008

LEGEND

B-1 Onshore Boring Location

TP-2 Test Pit Location

Topographic Contours (Meter, NAVD 88)

Major contour interval is 1.0 meter.
Minor contour interval is 0.5 meter.

Onshore Utilities

Water
Telephone
Fiber Optic
Limits of Utility Survey

Coordinate Grid is NAD 1983, UTM Zone 18N, Meters
Coordinate Grid is NAD 1983, Lat/Long Degree

Onshore Facilities

Splice Pit
Switch Cabinet
Shore Transition HDD Pit
Onshore Interconnection Cable
Onshore HDD Work Area

ONSHORE UTILITY LOCATIONS
Onshore Cable Route
Dominion VOWTAP Geotechnical Survey
Offshore Virginia

Note:
Onshore topographic data were provided by Dominion Resources, May 8, 2014. Onshore utilities data were provided by InfraMap Corp, July 2, 2014. Onshore facilities location figure was provided by TetraTech, Oct. 1st, 2014.

FIGURE 3a

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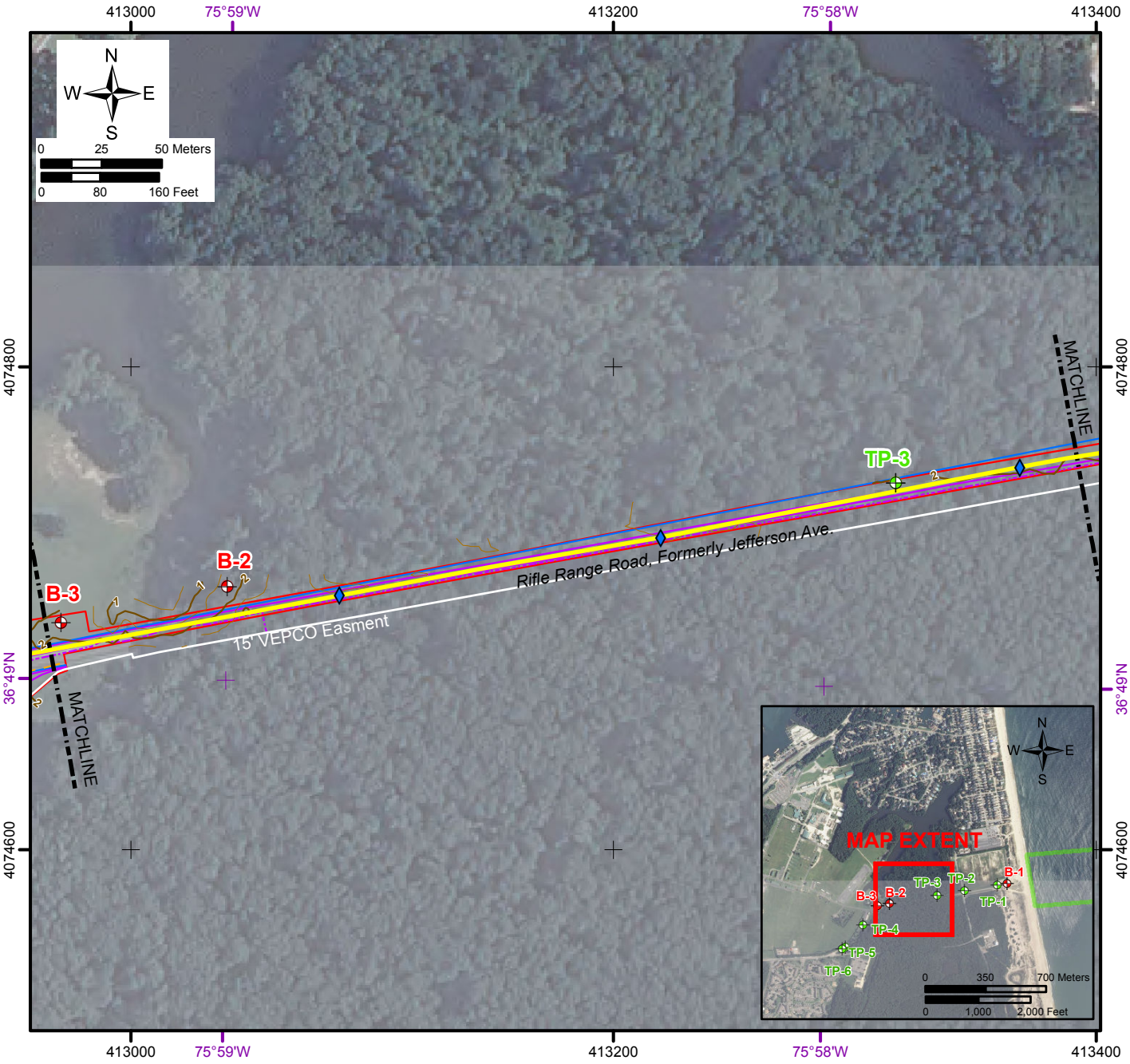

Aerial Photo Source: NAIP imagery, 2008

LEGEND

B-3 Onshore Boring Location

TP-4 Test Pit Location

Topographic Contours (Meter, NAVD 88)

Major contour interval is 1.0 meter.
Minor contour interval is 0.5 meter.

Onshore Utilities

Water
Telephone
Fiber Optic
Limits of Utility Survey

Coordinate Grid is NAD 1983, UTM Zone 18N, Meters

Coordinate Grid is NAD 1983, Lat/Long Degree

Onshore Facilities

Splice Pit
Onshore Interconnection Cable

Note:
Onshore topographic data were provided by Dominion Resources, May 8, 2014. Onshore utilities data were provided by InfraMap Corp, July 2, 2014. Onshore facilities location figure was provided by TetraTech, Oct. 1st, 2014.

ONSHORE UTILITY LOCATIONS
Onshore Cable Route
Dominion VOWTAP Geotechnical Survey
Offshore Virginia

FIGURE 3b

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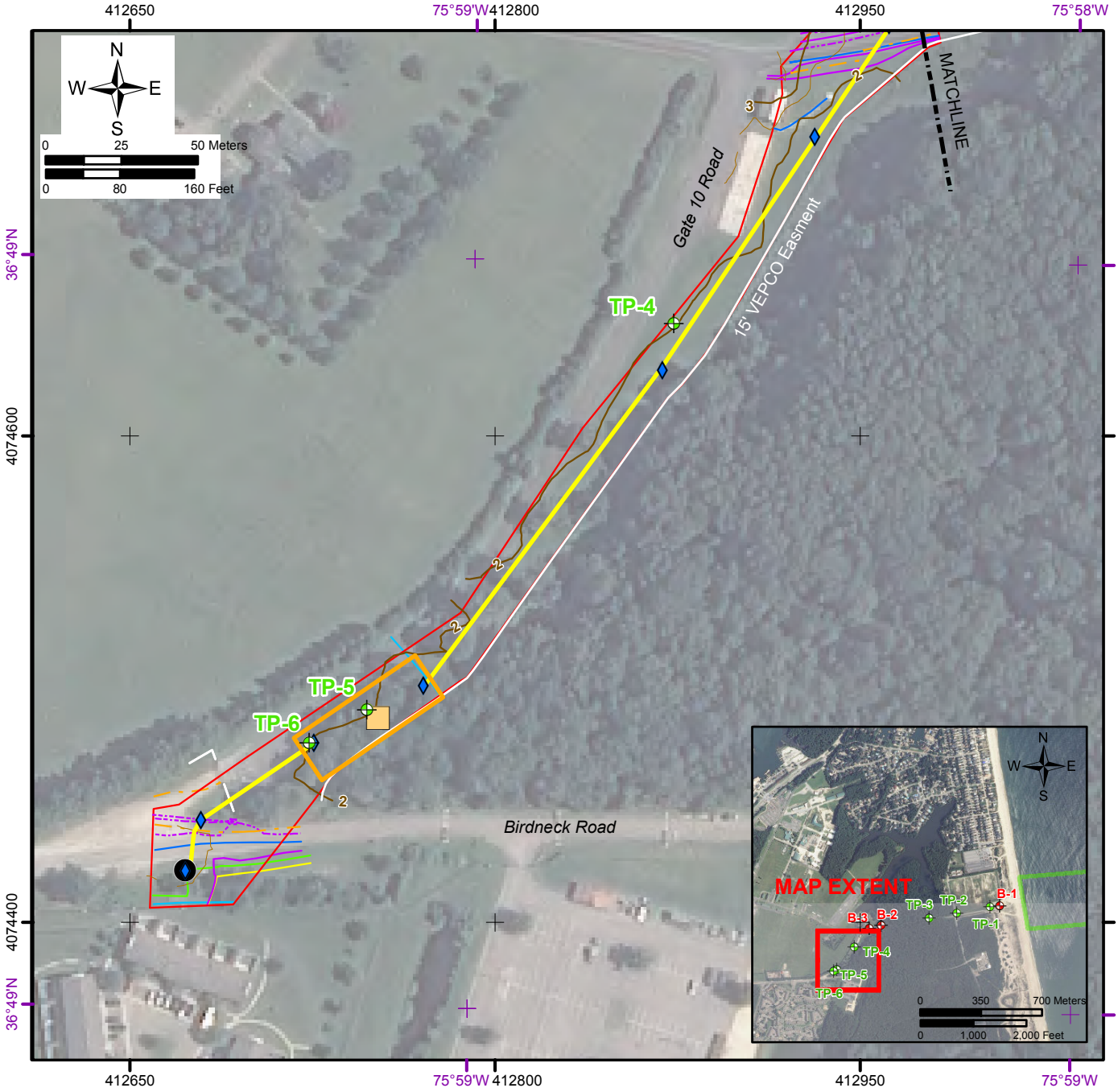

LEGEND

B-3 Onshore Boring Location

TP-4 Test Pit Location

Topographic Contours (Meter, NAVD 88)

Major contour interval is 1.0 meter.
Minor contour interval is 0.5 meter.

Onshore Utilities

- Water
- Gas
- Electric
- Storm Drain
- Unknown
- Telephone
- Fiber Optic
- Limits of Utility Survey

Coordinate Grid is NAD 1983, UTM Zone 18N, Meters

Coordinate Grid is NAD 1983, Lat/Long Degree

ONSHORE UTILITY LOCATIONS
Onshore Cable Route
Dominion VOWTAP Geotechnical Survey
Offshore Virginia

Aerial Photo Source: NAIP imagery, 2008

Onshore Facilities

- Splice Pit
- Interconnection Station
- Dominion Interconnection Point
- Onshore Interconnection Cable
- Interconnection Station Work Area

Note:
Onshore topographic data were provided by Dominion Resources, May 8, 2014. Onshore utilities data were provided by InfraMap Corp, July 2, 2014. Onshore facilities location figure was provided by TetraTech, Oct. 1st, 2014.

FIGURE 3c

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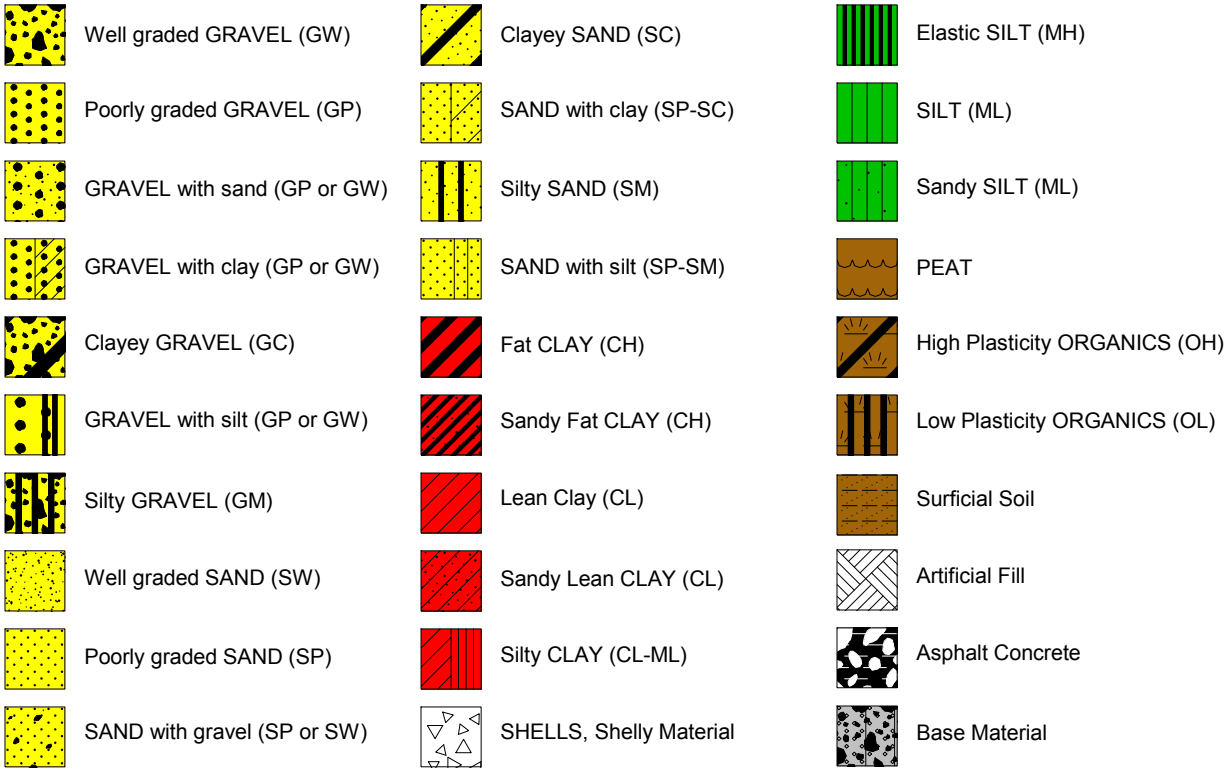
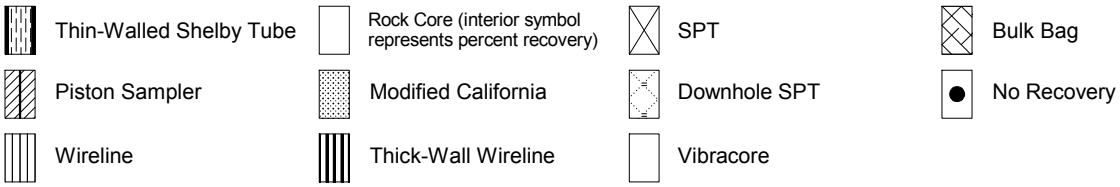
APPENDIX A
BOREHOLE LOGS

SOIL TYPES



SAMPLERS



CLASSIFICATION TEST/BLOW COUNTS

- ■ Percent Passing No. 200 Sieve
- ● Water Content (%)
- □ Submerged Unit Weight (kN/m^3)
- ○ Theoretical Submerged Unit Weight (kN/m^3)

Plastic Limit — Liquid Limit

Non-Plastic

Water Level Symbols

- Initial or perched water level
- Final ground water level

STRENGTH TESTS

- ⊗ Pocket Penetrometer
- ⌖ Torvane
- ⌖ Remote Vane
- ◆ Miniature Vane
- ⌖ Residual Vane
- ▲ Unconsolidated Undrained Triaxial
- ▣ Unconfined Compression (soil)
- ◇△ (Open symbols indicate remolded tests)
- CPT (Nk = 15 and 20)

KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

Dominion VOWTAP Geotechnical Survey
Offshore Virginia

FIGURE A-1a

TUBE AND LINER SAMPLERS

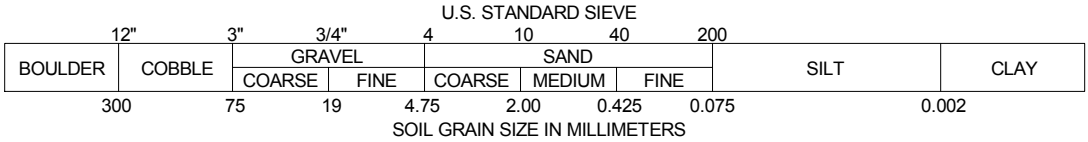
DROP	Liner sample advanced with the weight of an 80 kg hammer.
PUSH	Pushed thin-walled 7.5 cm-tube.
15/60c	Number of blows required to produce the indicated penetration using a 5.7 cm tube sampler. The sampler was driven with an 80 kg downhole hammer dropped approximately 1.5 m.

SPT AND MODIFIED CALIFORNIA LINER SAMPLERS

Sampler is driven with a 63.5 kg hammer dropped approximately 760 mm.

WOR, WOH	Weight of Rod, Weight of Hammer.
20	Number of blows to produce 30 cm penetration after an initial 15 cm seating.
86/28c	Number of blows required to produce the indicated penetration after an initial 15 cm seating.
Ref/8c	50 blows produced the indicated penetration during the initial 15 cm interval.

SOIL GRAIN SIZE



STRENGTH OF COHESIVE SOILS

Consistency	N-Value	Undrained Shear Strenth, kPa
Very Soft	0 to 2	less than 12
Soft	3 to 4	12 to 25
Firm	5 to 8	25 to 50
Stiff	9 to 16	50 to 100
Very Stiff	16 to 32	100 to 200
Hard	>32	greater than 200

DENSITY OF GRANULAR SOILS

Descriptive Term	N-Value	Relative Density (%)*
Very Loose	0 to 4	less than 15
Loose	5 to 10	15 to 35
Medium Dense	11 to 30	35 to 65
Dense	31 to 50	65 to 85
Very Dense	>50	greater than 85

* Estimated from sampler driving record and PCPT tip resistance.

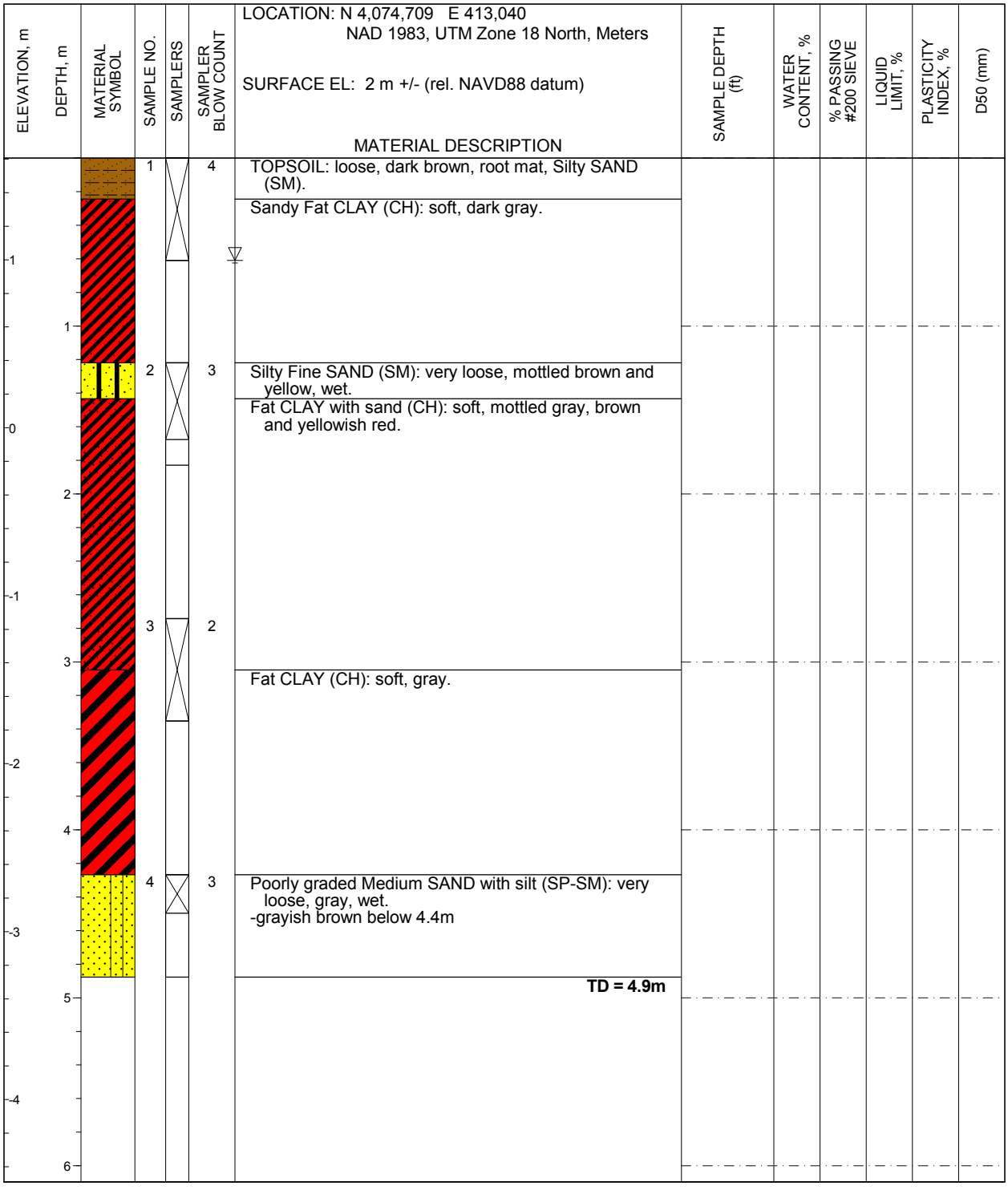
SOIL STRUCTURE

Slickensided	Having planes of weakness that appear slick and glossy. The degree of slickensidedness depends upon the spacing of slickensides and the ease of breaking along these planes.
Fissured	Containing shrinkage of relief crack, often filled with fine sand or silt, usually more or less vertical.
Pocket	Inclusion of material of different texture that is smaller than the diameter of the sample.
Parting	Inclusion less than 3 mm thick extending through the sample.
Seam	Inclusion 3 to 75 mm thick extending through the sample.
Layer	Inclusion greater than 75 mm thick extending through the sample.
Laminated	Soil sample composed of alternating partings or seams of different soil types.
Interlayered	Soil sample composed of alternating layers of different soil types.
Intermixed	Soil sample composed of pockets of different soil types and layered or laminated structure is not evident.
Calcareous	Having appreciable quantities of carbonate.

KEY TO TERMS AND SYMBOLS USED ON BORING LOGS

Dominion VOWTAP Geotechnical Survey
Offshore Virginia

FIGURE A-1b



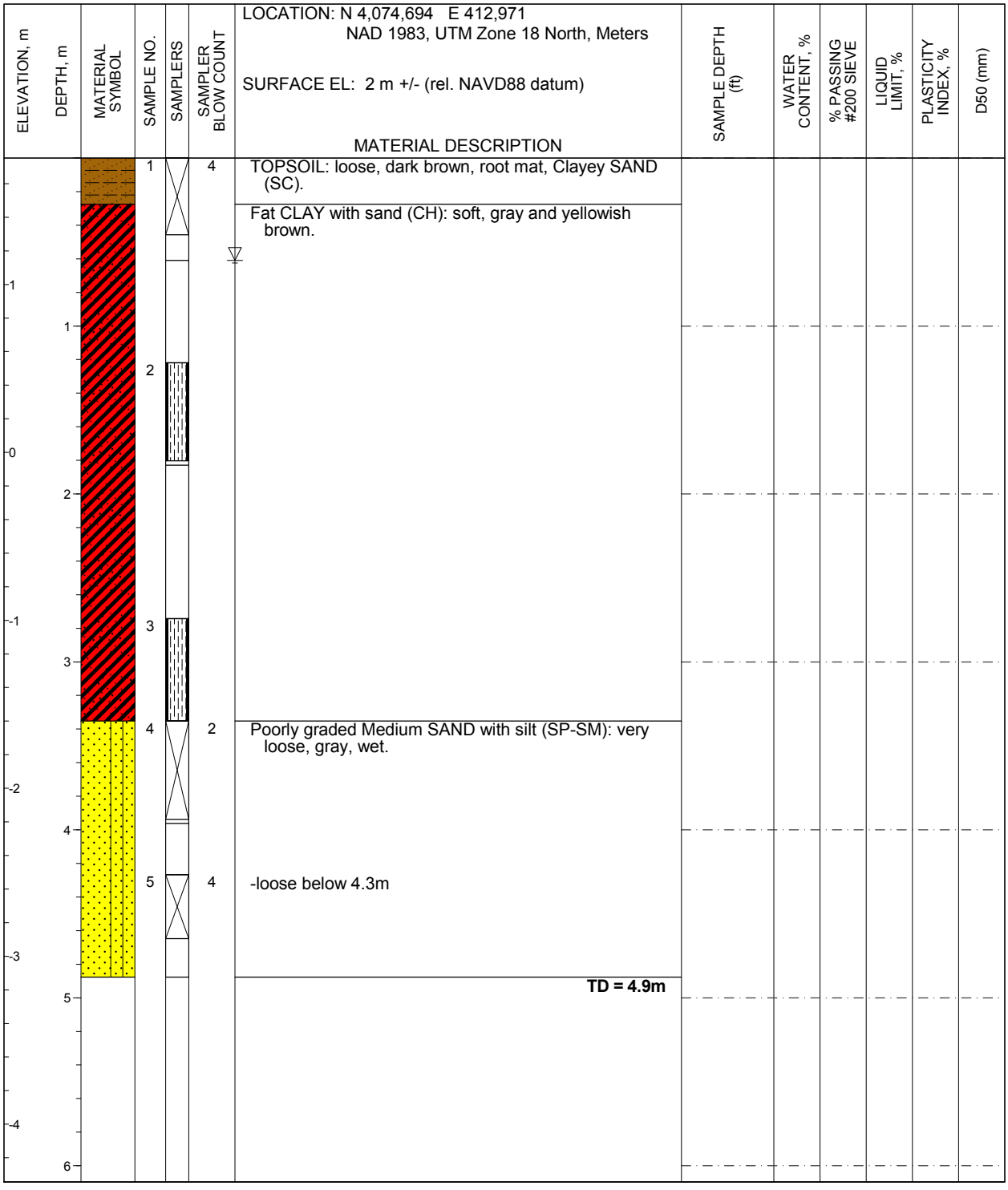
The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 4.9 m
DRILLING DATE: July 14, 2014

DRILLING METHOD: 114.3 mm dia. Mud Rotary Wash
HAMMER TYPE: Automatic Trip
DRILLED BY: Fishburne Drilling Inc.
LOGGED BY: HD
RIG TYPE: CME 55

LOG OF BORING NO. B-2

FIGURE A-2



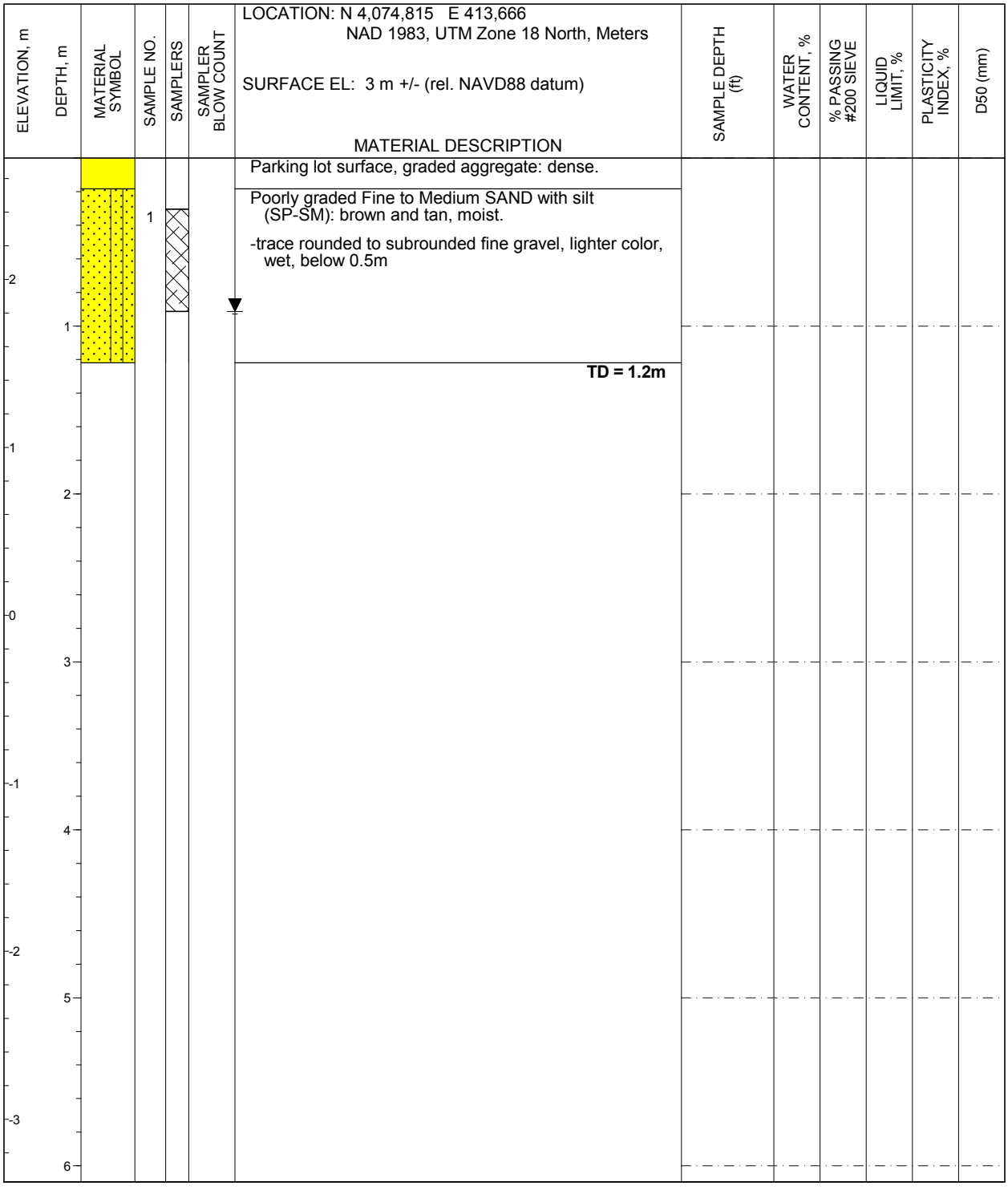
The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 4.9 m
DRILLING DATE: July 14, 2014

DRILLING METHOD: 114.3 mm dia. Mud Rotary Wash
HAMMER TYPE: Automatic Trip
DRILLED BY: Fishburne Drilling Inc.
LOGGED BY: HD
RIG TYPE: CME 55

LOG OF BORING NO. B-3

FIGURE A-3



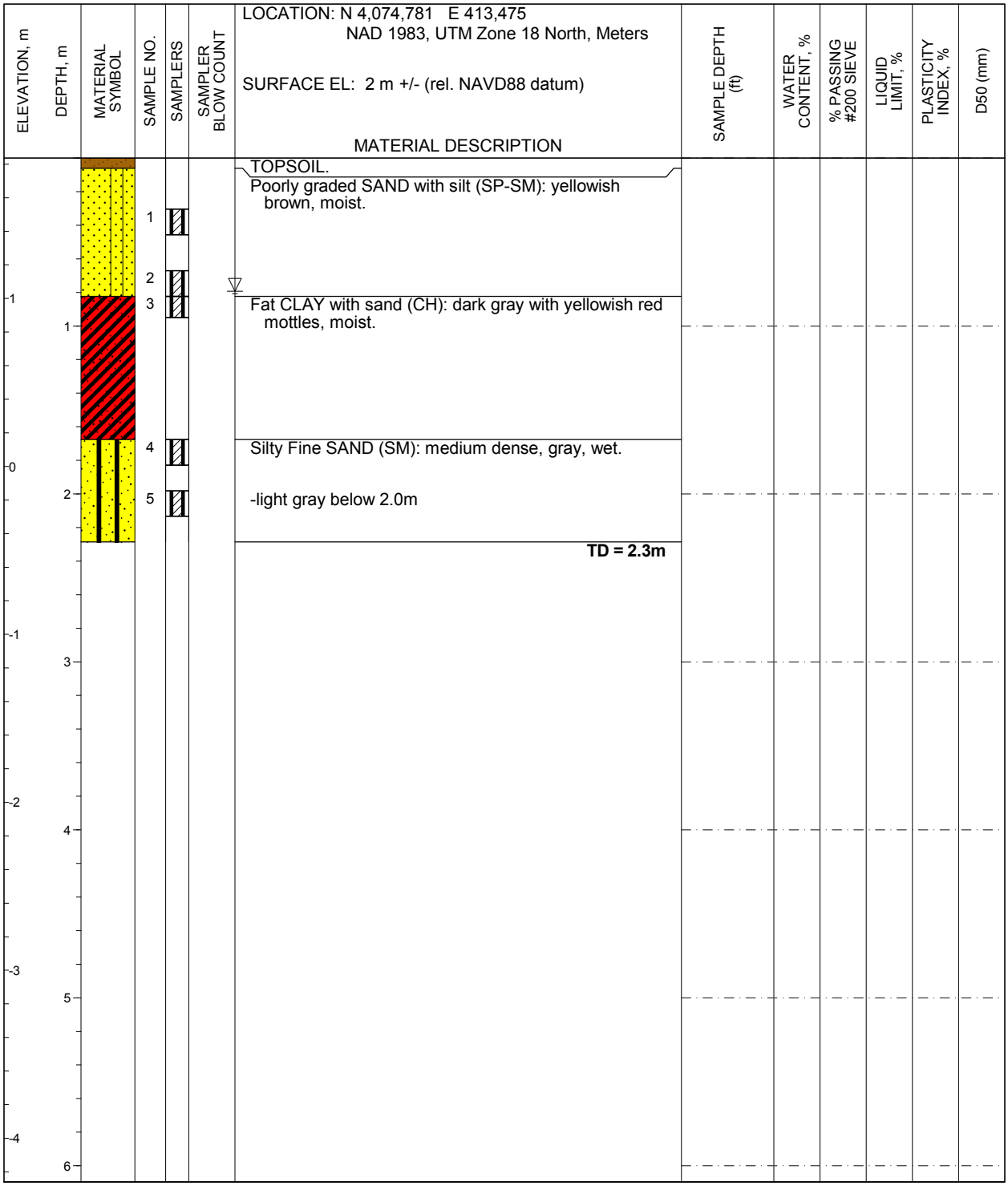
The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 1.2 m
DRILLING DATE: July 14, 2014

DRILLING METHOD: Backhoe
DRILLED BY: W. F. Magann
LOGGED BY: AFM

LOG OF TEST PIT NO. TP-1

FIGURE A-4



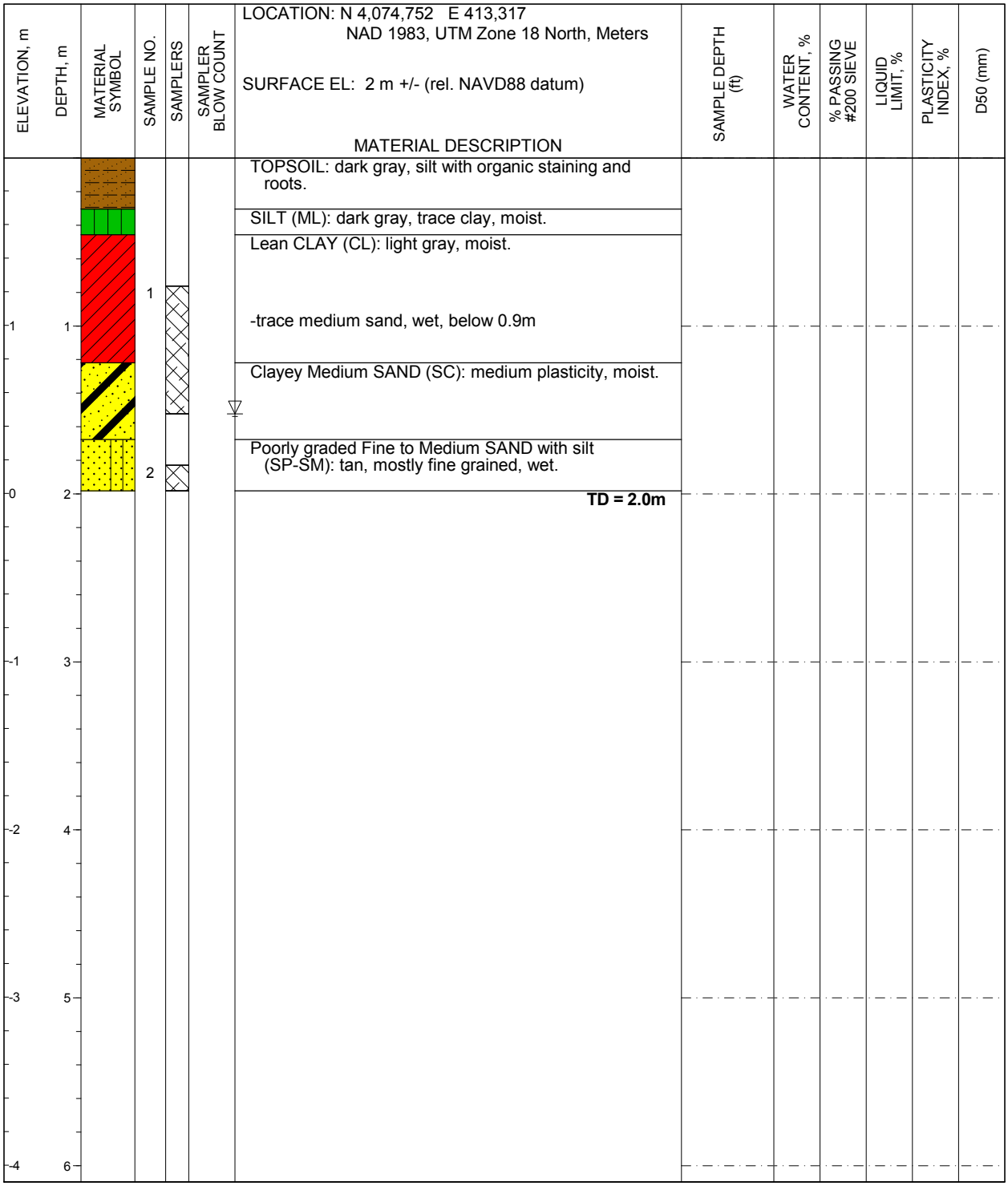
The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 2.3 m
DRILLING DATE: July 14, 2014

DRILLING METHOD: Hand Auger
DRILLED BY: Fugro
LOGGED BY: AFM
RIG TYPE: Hand Auger

LOG OF BORING NO. TP-2

FIGURE A-5



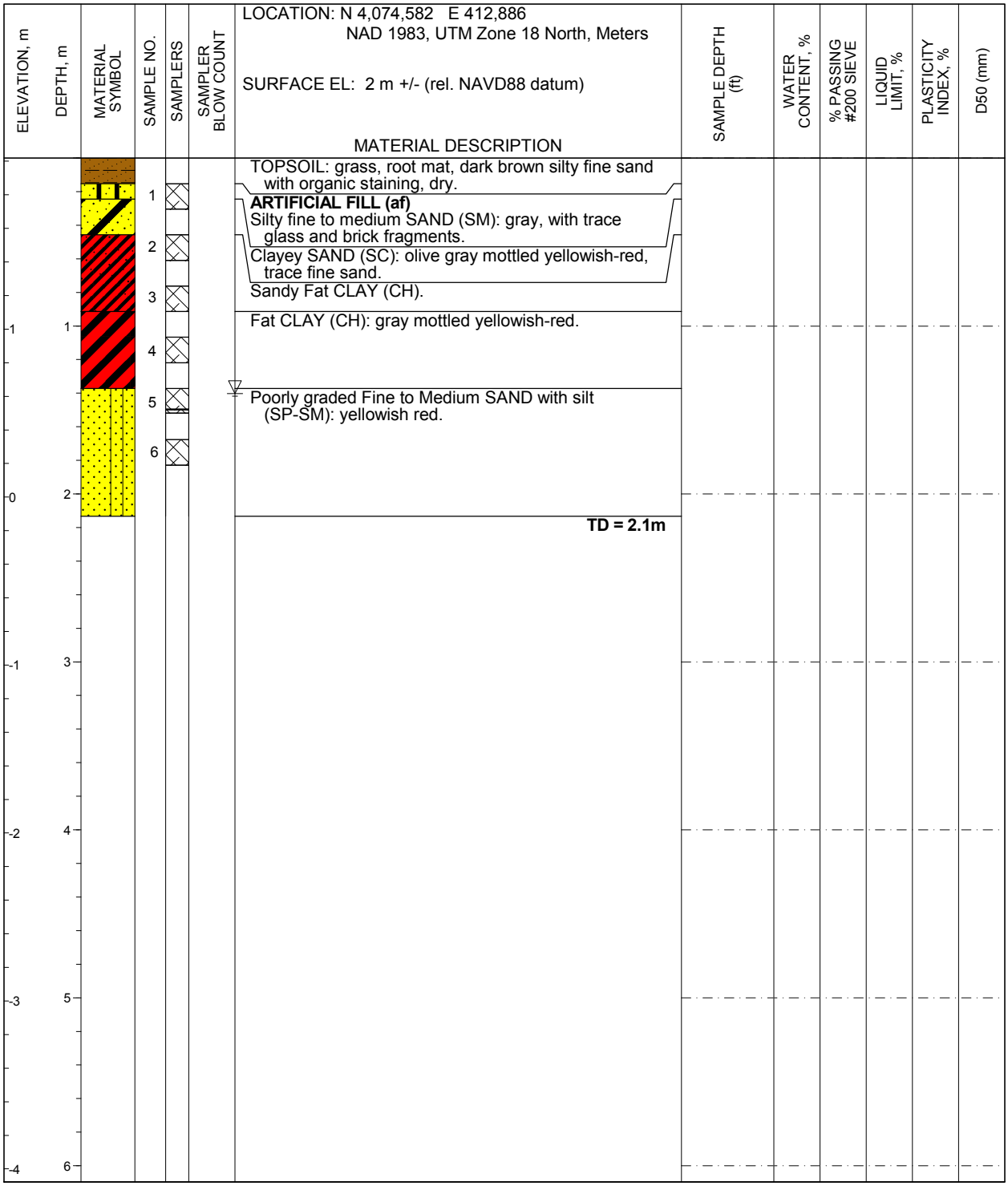
The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 2.0 m
DRILLING DATE: July 14, 2014

DRILLING METHOD: Backhoe
DRILLED BY: W. F. Magann
LOGGED BY: AFM

LOG OF TEST PIT NO. TP-3

FIGURE A-6



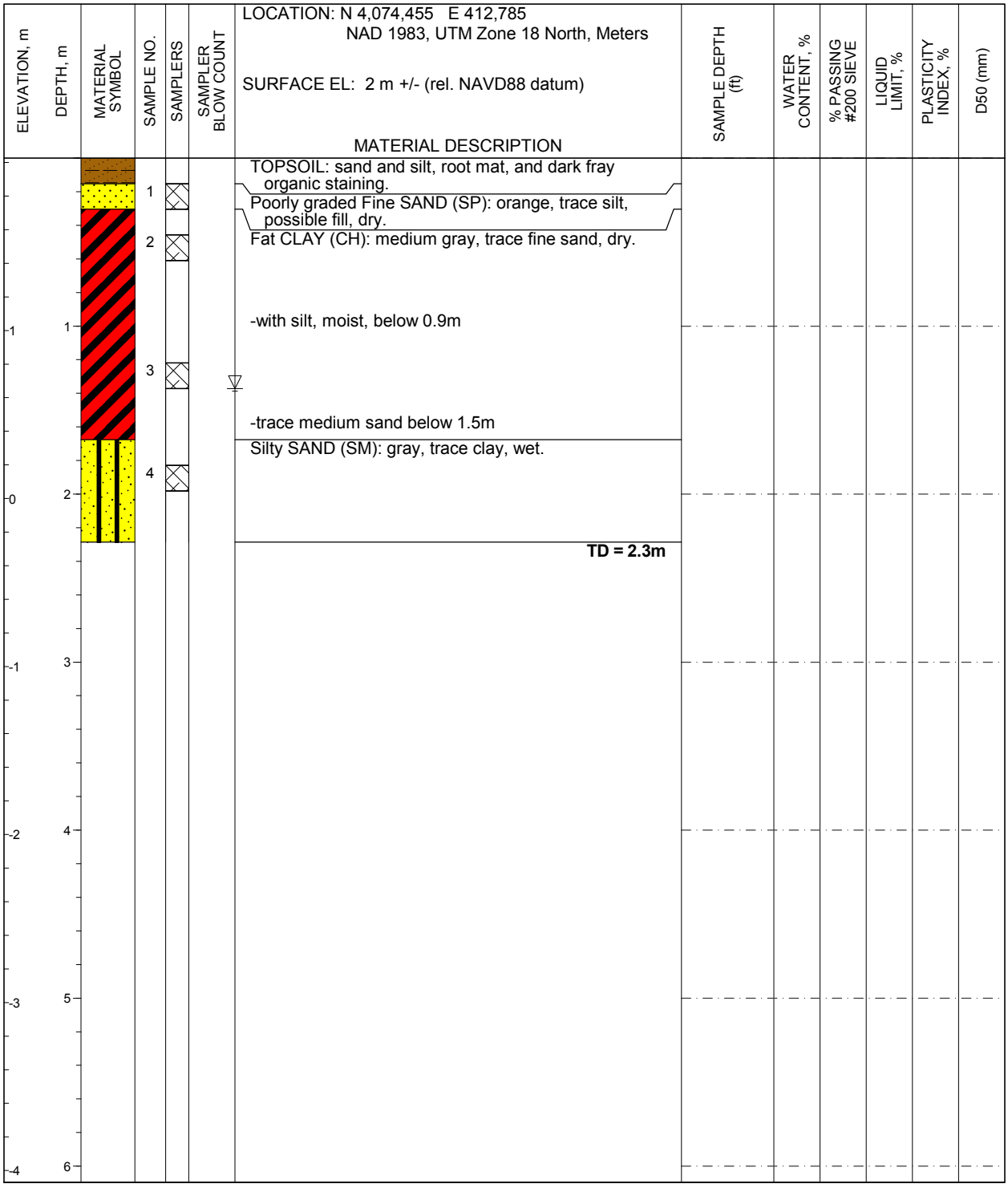
The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 2.1 m
DRILLING DATE: July 17, 2014

DRILLING METHOD: Backhoe
DRILLED BY: W. F. Magann
LOGGED BY: AFM

LOG OF TEST PIT NO. TP-4

FIGURE A-7



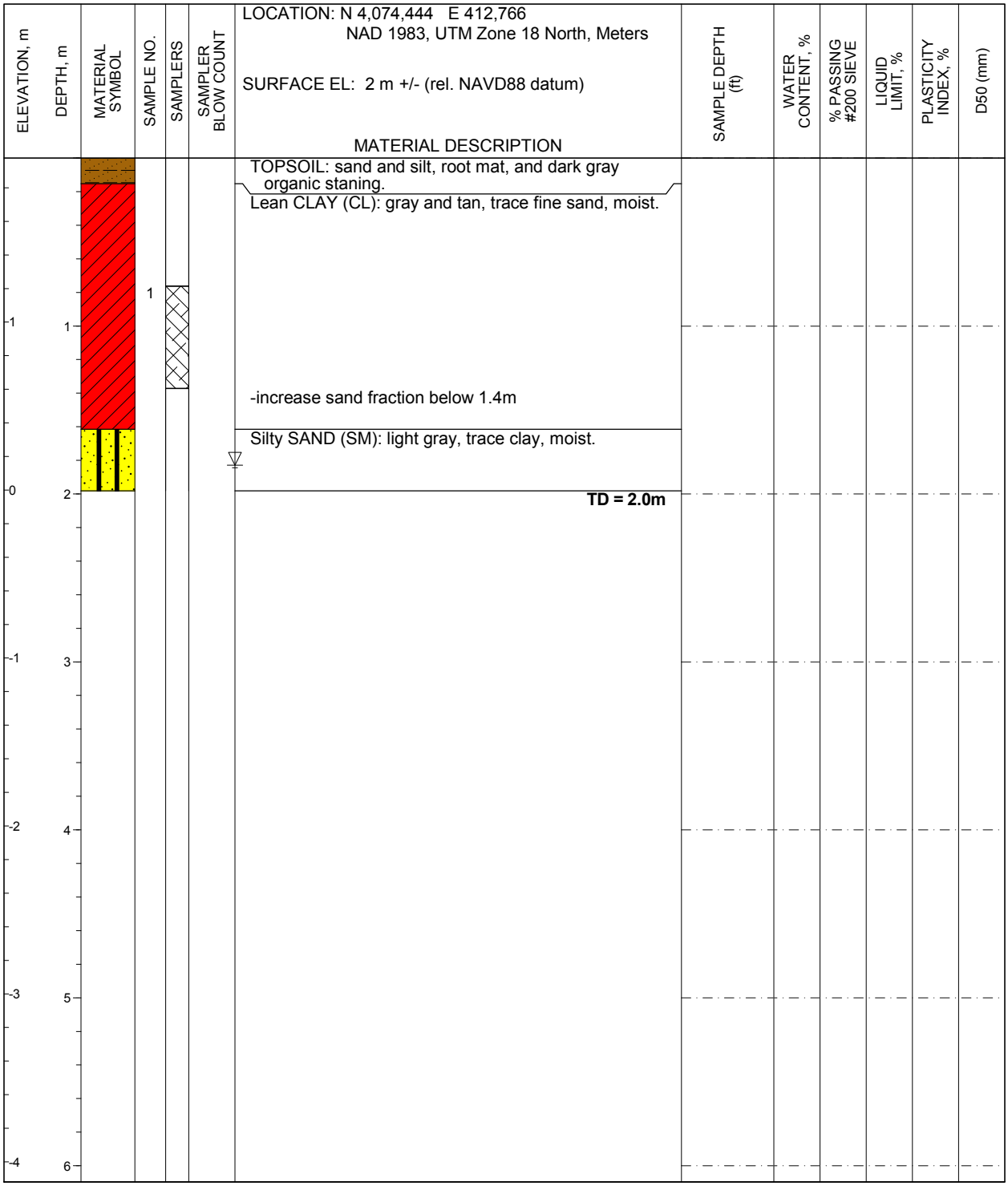
The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 2.3 m
DRILLING DATE: July 14, 2014

DRILLING METHOD: Backhoe
DRILLED BY: W. F. Magann
LOGGED BY: AFM

LOG OF TEST PIT NO. TP-5

FIGURE A-8



The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 2.0 m
DRILLING DATE: July 14, 2014

DRILLING METHOD: Backhoe
DRILLED BY: W. F. Magann
LOGGED BY: AFM

LOG OF TEST PIT NO. TP-6

FIGURE A-9

APPENDIX B

DAILY PROGRESS REPORTS

101 West Main Street, #350, Norfolk, VA 23510 / Tel: (757) 625-3350 / Fax: (757) 625-3352

Report No.: 1

ENGINEERING FIELD REPORT

Project Name:	VOWTAP Geotechnical – Onshore operations			Date	14-Jul-14	Job No.	04.81140004
Project Location:	Camp Pendleton, Virginia Beach, VA			Weather:	Clear	Temp. Range	95-85
Client :	Dominion Resources	Rep.	James Parham, David Chisnell	Present at site:	Frank MacConochie, Bill Mack, Haitham Dawood		
Contractor:	Fishburne Drilling	Rep.	Tim, Craig, Dillon				
Project Manager:	Mohamed Mekkawy	Arrival Time:		Reviewed By:			

Summary of Observations:

11:30 - 12:15 – Excavate and sample Test Pit TP-1 to 4 feet below ground surface (bgs).
13:15 - 14:30 – Excavate and sample Test Pit TP-3 to 6.5 feet bgs.
14:30 - 15:15 – Excavate and sample Test Pit TP-4 to 7.0 feet bgs.
15:30 - 16:15 – Excavate and sample Test Pit TP-5 to 7.5 feet bgs.
16:30 - 17:00 – Excavate and sample Test Pit TP-6 to 6.5 feet bgs.
17:20 – Bill Mack and Haithan Dawood arrive on site
17:30 - 18:30 – Advanced and backfilled hand auger boring HAB-02 to 7.5 feet bgs.
18:30 - 18:45 – Handover and toolbox safety meeting with Fishburne crew and Dominion reps
19:00 – 20:00 – Drill and sample boring B-2 to 16 feet bgs, and grout backfill.
20:00 – 21:00 – Drill and sample boring B-3 to 16 feet bgs and grout backfill.
21:00 - 24:00 – set up light tower, drill and sample boring B-1 to about 90 feet bgs.

Tuesday
0:00 - 1:15 – Continue drilling and sampling boring B-1 to termination depth of 115.5 feet bgs.
1:15 - 2:15 – Grout backfill B-1, load equipment and depart site.

Copies: Engr. Name: Signature:

101 West Main Street, #350, Norfolk, VA 23510 / Tel: (757) 625-3350 / Fax: (757) 625-3352

Report No.: 2

ENGINEERING FIELD REPORT

Project Name:	VOWTAP Geotechnical – Onshore operations			Date 15-Jul-14	Job No. 04.81140004
Project Location:	Camp Pendleton, Virginia Beach, VA			Weather: Clear	Temp. Range 90° F
Client :	Dominion Resources	Rep.	James Parham	Present at site:	Frank MacConochie
Contractor: Contractor:		Rep.			
Project Manager:	Mohamed Mekkawy	Arrival Time:	0930	Reviewed By:	

Summary of Observations:

Tuesday

09:30 - 10:30 James Parham, Scott Temple, and Frank MacConochie reviewed the Dominion Cable Route subsurface exploration locations and developed a punchlist of items to complete demobilization from the site, as follows:

B-1 check grout subsidence
remove drummed cuttings
TP-1 complete
HAB-2 complete
TP-3 complete
B-2 backfill to ground surface
remove drummed cuttings
B-3 backfill to ground surface
remove drummed cuttings
TP-4 rake out surface
TP-5 rake out surface
remove traffic cones
check for stabilization / subsidence
stake perimeter with warning tape, if still soft at surface
TP-6 rake out surface

return garden rake to Scott Temple
demobilize Magann backhoe

Cleanup work will be scheduled for Tuesday afternoon or Wednesday. Cleanup and demobilization activities to be coordinated with Scott Temple.

10:30 Frank MacConochie depart site.

Copies: Engr. Name: Signature:

APPENDIX C

LABORATORY TEST ASSIGNMENT FORM

GEOTECHNICAL LAB ASSIGNMENT SHEET

JOB NO. 04.81140004 | PROJECT ENGINEER Bill Mack | PROJECT SUPERVISOR Mohamed Mekkawy | Sheet _1_ of _1__

ASSIGNED BY Mohamed Mekkawy | CLIENT: Dominion Resources | DATE ASSIGNED | DATE DUE

HOLE NO.	SAMPLE NO.	DEPTH (M)	SAMPLE TYPE	PROPERTIES			LIMITS		GRAIN SIZE			BULK DENSITY	MV	TRIAXIAL			DIRECT SHEAR		COMPRES-SIBILITY		Swell Test	PERMEABILITY	RESONANT COLUMN	CYCLIC TRIAXIAL	Small Strain Cyclic TX	CYCLIC DSS	DRY DENSITY	POROSITY	CALCIUM CARBONATE CONTENT	ORGANIC CONTENT	SOLUBLE SALT	pH	REMARKS
				W	UDW	Gs	AL	LI	SIEV	-200	HYD			UU	UUr	CU	CD	CU	CD	CON	CRS												
B-1	1A	0	Bag	1																													
B-1	1B	0.5	Bag						1		1																						
B-1	2	1.2	Bag																			1										
B-1	3	2.7	Bag	1			1																										
B-1	4	4.3	Shelby	1			1				1											1											
B-1	5	5.8	Bag	1					1																								
B-1	6	7.3	Bag														1																
B-1	7	8.8	Bag	1			1															1											
B-1	8	10.4	Bag																														
B-1	9	11.9	Bag	1			1				1																						
B-1	10	13.4	Bag																														
B-1	11	14.9	Bag																														
B-1	12	16.5	Bag	1					1		1																						
B-1	13	18	Bag																														
B-1	14A	19.5	Bag																														
B-1	14B	19.7	Bag	1					1		1																						
B-1	15	21	Bag																														
B-1	16	22.6	Bag																														
B-1	17	24.1	Bag	1			1				1																						
B-1	18	25.6	Bag																														
B-1	19	27.1	Bag	1			1																										
B-1	20	28.7	Bag																														
B-1	21	30.2	Bag	1			1																										
B-1	22A	31.7	Bag																														
B-1	22B	32.2	Bag	1																													
B-1	23	33.2	Bag	1			1				1																						
B-1	24A	34.8	Bag	1					1																								
B-1	24B	35	Bag	1			1																										
B-2	1A	0	Bag																														
B-2	1B	0.2	Bag	1			1																										
B-2	2A	1.2	Bag	1					1		1																						
B-2	2B	1.4	Bag	1			1																1										
B-2	3	2.7	Bag	1			1				1												1										
B-2	4	4.3	Bag	1					1																								
B-3	1A	0	Bag																														
B-3	1B	0.3	Bag	1			1																										
B-3	2	1.2	Shelby	1																		1											
B-3	3	2.7	Shelby	1			1							1								1											
B-3	4	3.4	Bag																														
B-3	5	4.3	Bag	1					1		1																						
TP-1	1	0.3	Bulk bag	1					1		1																						
TP-2	1	0.3	Bag	1					1																								
TP-2	2	0.7	Bag																														
TP-2	3	0.8	Bag	1			1																										
TP-2	4	1.7	Bag																														
TP-2	5	2	Bag	1					1																								
TP-3	1	0.8	Bulk bag	1			1																										
TP-3	2	1.8	Bag	1					1																								
TP-4	1	0.2	Bag	1					1																								
TP-4	2	0.5	Bag																														
TP-4	3	0.8	Bag																														
TP-4	4	1.1	Bag	1			1																										
TP-4	5	1.4	Bag																														
TP-4	6	1.5	Bag	1					1																								
TP-4	7	1.7	Bag																														
TP-5	1	0.2	Bag	1					1																								
TP-5	2	0.5	Bag																														
TP-5	3	1.2	Bag	1			1				1																						
TP-5	4	1.8	Bag	1					1																								
TP-6	1	0.8	Bulk bag	1			1															1											
Total				37			19		16		12			1			1					1	7										0

REMARKS Swell test will be done in accordance with ASTM D4546 Method B.

FIGURE C-1