Long Island Rail Road

Substation Delineation Phase II Site Assessment/ Remedial Investigation/Feasibility Study

Investigation Work Plan

June 2005

DVIRKA AND BARTILUCCI
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

RLA/JOBS/MTA2229(03/31/05)

DUPLICATE

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

INVESTIGATION WORK PLAN
for
SUBSTATION DELINEATION PHASE II SITE ASSESSMENT
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Prepared for:

METROPOLITAN TRANSPORTATION AUTHORITY
LONG ISLAND RAIL ROAD

Prepared by:

DVIRKA AND BARTILUCCI CONSULTING ENGINEERS
WOODBURY, NEW YORK 11797

JUNE 2005

INVESTIGATION WORK PLAN
for
SUBSTATION DELINEATION PHASE II SITE ASSESSMENT
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

TABLE OF CONTENTS

Section | Title | Page

Title Page

1.0 INTRODUCTION 1-1

2.0 PROJECT SUMMARY 2-1

2.1 Project Background 2-1
2.2 Site Description 2-2
2.2.1 Babylon Yard (V00385-1) 2-4
2.2.2 Far Rockaway (V00391-1) 2-7
2.2.3 Floral Park (V00389-1) 2-10
2.2.4 Hempstead (V00390-1) 2-13
2.2.5 Nassau Boulevard (V00399-1) 2-16
2.2.6 Little Neck (V00395-1) 2-19
2.2.7 Lindenhurst (V00394-1) 2-22
2.2.8 Bayside (V00386-2) 2-25
2.2.9 Bellaire (V00387-2) 2-28
2.2.10 Saint Albans (V00402-2) 2-28
2.2.11 Cedar Manor (V00388-2) 2-33
2.2.12 Kew Gardens (V00393-2) 2-36
2.2.13 Shea (V00403-2) 2-38
2.2.14 Mineola (V00398-1) 2-42
2.2.15 Valley Stream (V00404-1) 2-45
2.2.16 Port Washington (V00400-1) 2-48
2.2.17 Rockville Centre (V00401-1) 2-51
2.3 Technical Approach 2-51
2.3.1 Task 1 – Delineation of Scope, Schedule and Budget 2-54
2.3.1.1 Draft/Final Investigation Work Plan 2-55
2.3.1.2 Draft/Final Health and Safety Plan 2-55
2.3.1.3 Underground Injection Control (UIC) Closure Work Plan 2-56
2.3.1.4 Finalization of Project Schedules and Budgets 2-57
2.3.2 Task 2 – Identification of Type, Size and Location of Facilities through Sketches, Site Surveys,

TABLE OF CONTENTS (continued)

Section	Title	Page
	Soil Samples and Site Visits	2-57
2.3.3	Task 3 – Environmental Assessment	2-58
2.3.3.1	Field Investigation	2-58
2.3.3.2	Fish and Wildlife Resources Impact Analysis	2-58
2.3.3.3	Public Health Exposure Assessments	2-60
2.3.4	Task 4 – Historical Assessment	2-62
2.3.5	Task 5 – Research, Evaluation and Recommendation of Options	2-62
2.3.6	Task 6 – Preparation of Schedule(s)	2-63
2.3.6.1	Update of Project Schedules	2-63
2.3.6.2	Remedial Design and Construction Schedules	2-67
2.3.7	Task 7 – Preparation of Cost Estimates	2-67
2.3.8	Task 8 – Presentation of Recommendation(s)	2-67
2.3.9	Task 9 – Integration of Comments	2-68
2.3.10	Task 10 – Final Report	2-68
2.3.10.1	Draft/Final Delineation Phase II Site Assessment Report	2-69
2.3.10.2	Monthly Progress Reports	2-70
2.3.11	Task 11 – Biddable Plans and Specifications	2-70
2.3.12	Task 12 – Remediation Oversight and Remediation Oversight Report	2-72
2.3.12.1	Remediation Oversight	2-72
2.3.12.2	Remediation Oversight Report	2-73
2.3.12.3	Underground Injection Control (UIC) Closure Oversight	2-74
2.3.12.4	Underground Injection Control (UIC) Closure Oversight Report	2-74
2.3.13	Task 13 – NYSDEC Meetings	2-74
2.3.13.1	Technical Meetings/Conference Calls	2-75
2.3.13.2	NYSDEC Briefing Meetings	2-75
2.4	Project Management	2-75
2.5	Citizen Participation	2-76
2.5.1	Investigations	2-76
2.5.2	Interim Remedial Measures (IRMs)	2-76
2.5.3	Remediation	2-78
3.0	**GENERIC SAMPLING AND ANALYSIS PLAN**	3-1
3.1	Surface Soil Sampling	3-2
3.2	Sediment Sampling	3-2
3.3	Test Pit Excavation and Sampling	3-3
3.4	Direct Push Soil Sampling	3-4

TABLE OF CONTENTS (continued)

Section	Title	Page
	3.5 Direct Push Groundwater Screening and Sampling	3-4
	3.6 Monitoring Well Drilling and Groundwater Monitoring	3-5
	3.6.1 Drilling Methods	3-5
	3.6.1.1 Hollow Stem Augers	3-6
	3.6.1.2 Cable Tool	3-6
	3.6.1.3 Air Rotary	3-7
	3.6.1.4 Air Rotary with Casing Hammer	3-7
	3.6.1.5 Reverse Circulation Rotary	3-7
	3.6.1.6 Mud Rotary	3-8
	3.6.2 Subsurface Soil Sampling	3-9
	3.6.3 Overburden Monitoring Wells and Microwells/Piezometers	3-9
	3.6.4 Borehole and Monitoring Well Logging	3-15
	3.6.5 Monitoring Well Development	3-15
	3.6.6 Groundwater Level Measurement	3-15
	3.6.7 Groundwater Sampling	3-16
	3.7 Probe Hole, Borehole and Well Abandonment	3-17
	3.8 Air Screening	3-17
	3.9 Geophysical Surveys	3-19
4.0	**QUALITY ASSURANCE/QUALITY CONTROL PLAN**	4-1
	4.1 Data Usage	4-1
	4.2 Sampling Program Design and Rationale	4-1
	4.3 Analytical Parameters	4-2
	4.4 Data Quality Requirements	4-2
	4.4.1 Data Representativeness	4-9
	4.4.2 Data Comparability	4-17
	4.4.3 Data Completeness	4-17
	4.5 Detailed Sampling Procedures	4-17
	4.5.1 Sample Identification	4-18
	4.5.2 Sample Handling, Packaging and Shipping	4-19
	4.5.3 Surface Water Sediment (Pond, Lake, River, Stream)	4-20
	4.5.4 Soil (Surface)	4-21
	4.5.5 Soil (Probe)	4-21
	4.5.6 Soil (Borehole, Split Spoon)	4-22
	4.5.7 Groundwater (Probe)	4-22
	4.5.8 Groundwater (Monitoring Well)	4-23
	4.6 Decontamination Procedures	4-24
	4.6.1 Field Decontamination Procedures	4-24
	4.6.2 Decontamination Procedure for Drilling/Probing Equipment	4-25
	4.6.3 Decontamination Procedure for Sampling Equipment	4-26

TABLE OF CONTENTS (continued)

Section	Title	Page
	4.6.4 Decontamination Procedure for Well Casing and Development Equipment	4-26
4.7	Laboratory Sample Custody Procedures	4-27
4.8	Field Management Documentation	4-27
	4.8.1 Location Sketch	4-28
	4.8.2 Sample Information Record	4-28
	4.8.3 Chain of Custody	4-29
	4.8.4 Split Samples	4-30
	4.8.5 Field Log Book	4-31
	4.8.6 Daily Field Activity Report	4-32
	4.8.7 Field Changes and Corrective Actions	4-32
4.9	Calibration Procedures and Preventive Maintenance	4-32
4.10	Performance of Field Audits	4-33
4.11	Control and Disposal of Contaminated Material	4-33
4.12	Documentation, Data Reduction and Reporting	4-34
4.13	Data Validation	4-34
4.14	Performance and System Audits	4-35
4.15	Corrective Action	4-35
4.16	Trip Blanks	4-36
4.17	Method Blanks/Holding Blanks	4-37
4.18	Matrix Spikes/Matrix Spike Duplicates and Spiked Blanks	4-37
4.19	Field Blank (Field Rinsate Blank)/Equipment Blank	4-37
5.0	**SITE-SPECIFIC WORK PLANS**	5-1
5.1	Babylon Yard (V00385-1)	5-1
	5.1.1 Surface and Subsurface Soil Sampling	5-1
	5.1.2 Geophysical Survey	5-37
	5.1.3 Groundwater Sampling	5-38
	5.1.4 Suffolk County Department of Health Services Sampling	5-38
5.2	Far Rockaway (V00391-1)	5-39
	5.2.1 Surface and Subsurface Soil Sampling	5-39
	5.2.2 Groundwater Sampling	5-40
5.3	Floral Park (V00389-1)	5-40
	5.3.1 Surface and Subsurface Soil Sampling	5-40
	5.3.2 Groundwater Sampling	5-42
5.4	Hempstead (V00390-1)	5-42
	5.4.1 Surface and Subsurface Soil Sampling	5-42
	5.4.2 Test Pit Excavation	5-43
	5.4.3 Groundwater Sampling	5-43

TABLE OF CONTENTS (continued)

Section	Title	Page
5.5	Nassau Boulevard (V00399-1)	5-44
5.5.1	Surface and Subsurface Soil Sampling	5-44
5.5.2	Geophysical Survey	5-45
5.5.3	Test Pit Excavation	5-45
5.5.4	Groundwater Sampling	5-45
5.6	Little Neck (V00395-1)	5-46
5.6.1	Surface and Subsurface Soil Sampling	5-46
5.6.2	Test Pit Excavation	5-47
5.6.3	Groundwater Sampling	5-47
5.7	Lindenhurst (V00394-1)	5-48
5.7.1	Surface and Subsurface Soil Sampling	5-48
5.7.2	Groundwater Sampling	5-49
5.8	Bayside (V00386-2)	5-49
5.8.1	Surface and Subsurface Soil Sampling	5-49
5.8.2	Geophysical Survey	5-50
5.8.3	Groundwater Sampling	5-50
5.9	Bellaire (V00387-2)	5-51
5.9.1	Surface and Subsurface Soil Sampling	5-51
5.9.2	Test Pit Excavation	5-52
5.9.3	Groundwater Sampling	5-52
5.10	Saint Albans (V00402-2)	5-53
5.10.1	Surface and Subsurface Soil Sampling	5-53
5.10.2	Groundwater Sampling	5-54
5.11	Cedar Manor (V00388-2)	5-54
5.11.1	Surface and Subsurface Soil Sampling	5-54
5.11.2	Groundwater Sampling	5-55
5.12	Kew Gardens (V00393-2)	5-56
5.12.1	Surface and Subsurface Soil Sampling	5-56
5.12.2	Test Pit Excavation	5-57
5.12.3	Groundwater Sampling	5-57
5.13	Shea (V00403-2)	5-57
5.13.1	Surface and Subsurface Soil Sampling	5-57
5.13.2	Groundwater Sampling	5-59
5.14	Mineola (V00398-1)	5-59
5.14.1	Surface and Subsurface Soil Sampling	5-59
5.14.2	Groundwater Sampling	5-60
5.15	Valley Stream (V00404-1)	5-61
5.15.1	Surface and Subsurface Soil Sampling	5-61
5.15.2	Groundwater Sampling	5-62

TABLE OF CONTENTS (continued)

Section	Title	Page
5.16	Port Washington (V00400-1)	5-62
5.16.1	Surface and Subsurface Soil Sampling	5-62
5.16.2	Groundwater Sampling	5-63
5.17	Rockville Centre (V00401-1)	5-64
5.17.1	Surface and Subsurface Soil Sampling	5-64
5.17.2	Groundwater Sampling	5-64
5.18	Air Monitoring	5-65
5.19	Health and Safety	5-65
5.20	Waste Disposal	5-66

List of Appendices

Field Forms .... A

Résumé of the D&B QA/QC Officer .... B

List of Figures

2-1	Overall Site Location Map	2-3
2-2	Site Location Map - Babylon Yard Substation	2-5
2-3	Site Plan - Babylon Yard Substation	2-6
2-4	Site Location Map - Far Rockaway Substation	2-8
2-5	Site Plan - Far Rockaway Substation	2-9
2-6	Site Location Map - Floral Park Substation	2-11
2-7	Site Plan - Floral Park Substation	2-12
2-8	Site Location Map - Hempstead Substation	2-14
2-9	Site Plan - Hempstead Substation	2-15
2-10	Site Location Map - Nassau Boulevard Substation	2-17
2-11	Site Plan - Nassau Boulevard Substation	2-18
2-12	Site Location Map - Little Neck Substation	2-20
2-13	Site Plan - Little Neck Substation	2-21
2-14	Site Location Map - Lindenhurst Substation	2-23
2-15	Site Plan - Lindenhurst Substation	2-24
2-16	Site Location Map - Bayside Substation	2-26
2-17	Site Plan - Bayside Substation	2-27
2-18	Site Location Map - Bellaire Substation	2-29
2-19	Site Plan - Bellaire Substation	2-30

List of Figures (continued)

2-20 Site Location Map - Saint Albans Substation 2-31
2-21 Site Plan - Saint Albans Substation 2-32
2-22 Site Location Map - Cedar Manor Substation 2-34
2-23 Site Plan - Cedar Manor Substation 2-35
2-24 Site Location Map - Kew Gardens Substation 2-37
2-25 Site Plan - Kew Gardens Substation 2-39
2-26 Site Location Map - Shea Substation 2-40
2-27 Site Plan - Shea Substation 2-41
2-28 Site Location Map - Mineola Substation 2-43
2-29 Site Plan - Mineola Substation 2-44
2-30 Site Location Map - Valley Stream Substation 2-46
2-31 Site Plan - Valley Stream Substation 2-47
2-32 Site Location Map - Port Washington Substation 2-49
2-33 Site Plan - Port Washington Substation 2-50
2-34 Site Location Map - Rockville Centre Substation 2-52
2-35 Site Plan - Rockville Centre Substation 2-53
2-36 Project Schedule 2-64
2-37 Project Organization and Key Staff 2-77

3-1 Plan for Construction of Overburden Monitoring Wells 3-13
3-2 Plan for Construction of Monitoring Wells with Locking Vault 3-14

5-1 Sample Location Map - Babylon Yard Substation 5-2
5-2 Sample Location Map - Far Rockaway Substation 5-3
5-3 Sample Location Map - Floral Park Substation 5-4
5-4 Sample Location Map - Hempstead Substation 5-5
5-5 Sample Location Map - Nassau Boulevard Substation 5-6
5-6 Sample Location Map - Little Neck Substation 5-7
5-7 Sample Location Map - Lindenhurst Substation 5-8
5-8 Sample Location Map - Bayside Substation 5-9
5-9 Sample Location Map - Bellaire Substation 5-10
5-10 Sample Location Map - Saint Albans Substation 5-11
5-11 Sample Location Map - Cedar Manor Substation 5-12
5-12 Sample Location Map - Kew Gardens Substation 5-13
5-13 Sample Location Map - Shea Substation 5-14
5-14 Sample Location Map - Mineola Substation 5-15
5-15 Sample Location Map - Valley Stream Substation 5-16
5-16 Sample Location Map - Port Washington Substation 5-17
5-17 Sample Location Map - Rockville Centre Substation 5-18

TABLE OF CONTENTS (continued)

List of Tables

4-1 Summary of Analytical Parameters 4-3
4-2 Data Quality Requirements - Objectives for Precision, Accuracy and Completeness 4-10
4-2a Data Quality Requirements - Accuracy Requirements for VOCs 4-12
4-2b Data Quality Requirements - Objectives for Precision and Accuracy of Extractable Compounds Based Upon Recovery of Surrogate and Matrix Spike Compounds 4-13
4-2c Data Quality Requirements - Advisory Recovery Limits Surrogate and Matrix Spike Compounds for Pesticides/PCBs 4-16

5-1 Sampling and Analysis Summary - Babylon Yard Substation 5-19
5-2 Sampling and Analysis Summary - Far Rockaway Substation 5-21
5-3 Sampling and Analysis Summary - Floral Park Substation.......................5-22
5-4 Sampling and Analysis Summary - Hempstead Substation.......................5-23
5-5 Sampling and Analysis Summary - Nassau Boulevard Substation 5-24
5-6 Sampling and Analysis Summary - Little Neck Substation.......................5-25
5-7 Sampling and Analysis Summary - Lindenhurst Substation 5-26
5-8 Sampling and Analysis Summary - Bayside Substation............................5-27
5-9 Sampling and Analysis Summary - Bellaire Substation 5-28
5-10 Sampling and Analysis Summary - Saint Albans Substation.....................5-29
5-11 Sampling and Analysis Summary - Cedar Manor Substation 5-30
5-12 Sampling and Analysis Summary - Kew Gardens Substation....................5-31
5-13 Sampling and Analysis Summary - Shea Substation.................................5-32
5-14 Sampling and Analysis Summary - Mineola Substation 5-33
5-15 Sampling and Analysis Summary - Valley Stream Substation...................5-34
5-16 Sampling and Analysis Summary - Port Washington Substation..............5-35
5-17 Sampling and Analysis Summary - Rockville Centre Substation 5-36

Section 1

1.0 INTRODUCTION

The purpose of this Investigation Work Plan is to describe the detailed screening, sample collection and analytical procedures that will ensure high quality, valid data for use in site assessments to be conducted for 17 electric substations, which are owned and operated by the Long Island Rail Road (LIRR). The LIRR is investigating these substations as part of a Voluntary Cleanup Agreement (VCA) with the New York State Department of Environmental Conservation (NYSDEC). The substations are located throughout Queens, Nassau and Suffolk Counties in New York. Specifically, the locations and VCA index numbers for each of the substations are as follows:

- Babylon Yard (V00385-1)
- Far Rockaway (V00391-1)
- Floral Park (V00389-1)
- Hempstead (V00390-1)
- Nassau Boulevard (V00399-1)
- Little Neck (V00395-1)
- Lindenhurst (V00394-1)
- Bayside (V00386-2)
- Bellaire (V00387-2)
- Saint Albans (V00402-2)
- Cedar Manor (V00388-2)
- Kew Gardens (V00393-2)
- Shea (V00403-2)
- Mineola (V00398-1)
- Valley Stream (V00404-1)
- Port Washington (V00400-1)
- Rockville Centre (V00401-1)

This Work Plan has been prepared in accordance with the NYSDEC guidelines for preparation of Quality Assurance and Quality Control Plans including the 2000 Analytical Services Protocol (ASP) and the NYSDEC Technical Guidance for Site Investigation and Remediation, dated December 25, 2002.

This Work Plan provides the following information relative to conducting the Site Assessment process:

- Project/Site Background;
- Data Use Objectives;
- Sampling Program;
- Quality Assurance/Quality Control Samples;
- Sampling and Handling Procedures;
- Decontamination Procedures;
- Laboratory Sample Custody Procedures;
- Sample Documentation;
- Equipment Calibration and Preventative Maintenance;
- Control and Disposal of Investigation-derived Material;
- Documentation, Data Reduction and Reporting;
- Data Validation;
- Performance and System Audits; and
- Corrective Action.

Investigation activities and media addressed in this Work Plan include:

- Sediment Soil Sampling;
- Surface Soil Sampling;
- Mercury Vapor Screening and Sampling;
- Groundwater Monitoring Well Installation;
- Groundwater Sampling;
- Soil Boring Construction and Subsurface Soil Sampling;
- Test Pit Excavations;
- Geophysical Surveys; and

- Fish and Wildlife Resources Impact Analysis.

Section 2

2.0 PROJECT SUMMARY

2.1 Project Background

The LIRR designed, constructed and operated substations from the early 1930s through 1951 that utilized mercury rectifiers. These rectifiers allowed the LIRR to receive 60-cycle, alternating current (AC) from local utilities and convert it to direct current (DC) for use as a source of electric power for its locomotives and electric passenger car fleet. The LIRR identified 20 substations located throughout Queens, Nassau and Suffolk Counties that once utilized mercury containing rectifiers.

It is believed that during the early 1980s, the remaining mercury rectifiers were taken out of service and physically removed from these LIRR substations and replaced with non-mercury containing solid state equipment. However, due to uncertainties surrounding the work practices that may have been employed when managing the operation and maintenance of these mercury rectifiers, the LIRR believed it necessary to conduct environmental assessments at these 20 electric substations to determine the potential effects that may have occurred to the surroundir environment.

The environmental assessments conducted at the electric substations, as docume the report entitled, "Site Assessment of 20 Substations for Mercury Contaminati December 2000, which was prepared by Dvirka and Bartilucci Consulting Engin identified elevated levels of mercury in soil at all 20 substations.

Based on the findings of the Site Assessment activities, several substat contain elevated levels of mercury in soil that had the potential to pos pathway. As a result, an Interim Remedial Measures (IRM) program was the potential human exposure pathway by excavating mercury impacte transportation and disposal. IRM activities were completed at 11 s Stream, Lindenhurst, Far Rockaway, Floral Park, Shea, Bayside, P Hempstead, Kew Gardens, and Island Park. The IRM progra

2.0 PROJECT SUMMARY

2.1 Project Background

The LIRR designed, constructed and operated substations from the early 1930s through 1951 that utilized mercury rectifiers. These rectifiers allowed the LIRR to receive 60-cycle, alternating current (AC) from local utilities and convert it to direct current (DC) for use as a source of electric power for its locomotives and electric passenger car fleet. The LIRR identified 20 substations located throughout Queens, Nassau and Suffolk Counties that once utilized mercury containing rectifiers.

It is believed that during the early 1980s, the remaining mercury rectifiers were taken out of service and physically removed from these LIRR substations and replaced with non-mercury containing solid state equipment. However, due to uncertainties surrounding the work practices that may have been employed when managing the operation and maintenance of these mercury rectifiers, the LIRR believed it necessary to conduct environmental assessments at these 20 electric substations to determine the potential effects that may have occurred to the surrounding environment.

The environmental assessments conducted at the electric substations, as documented by the report entitled, "Site Assessment of 20 Substations for Mercury Contamination," dated December 2000, which was prepared by Dvirka and Bartilucci Consulting Engineers (D&B), identified elevated levels of mercury in soil at all 20 substations.

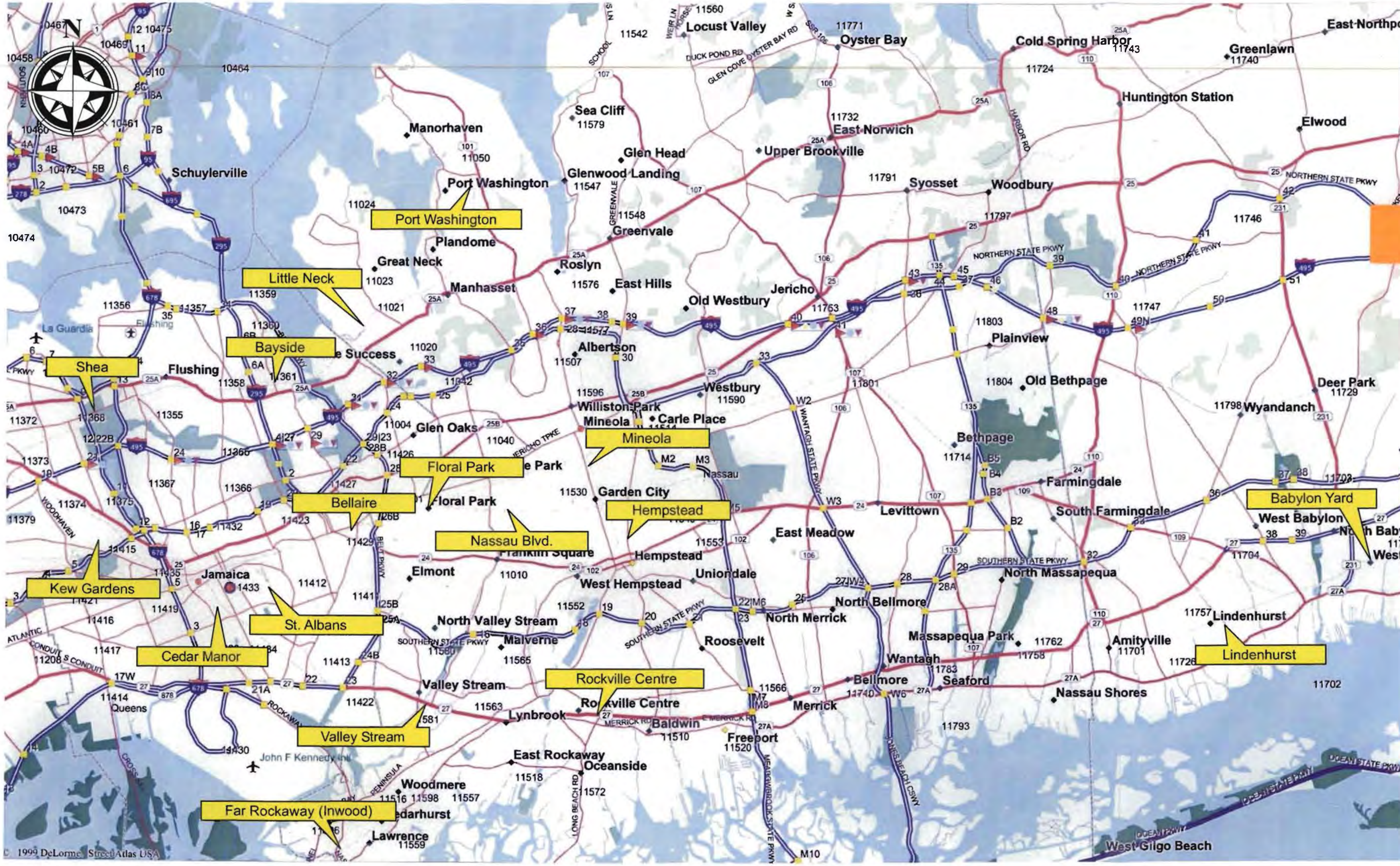
Based on the findings of the Site Assessment activities, several substations were found to contain elevated levels of mercury in soil that had the potential to pose a human exposure pathway. As a result, an Interim Remedial Measures (IRM) program was conducted to eliminate the potential human exposure pathway by excavating mercury impacted soil for proper off-site transportation and disposal. IRM activities were completed at 11 substations including Valley Stream, Lindenhurst, Far Rockaway, Floral Park, Shea, Bayside, Port Washington, Massapequa, Hempstead, Kew Gardens, and Island Park. The IRM program is documented in the report entitled, "Site Assessment of 20 Substations for Mercury Contamination - Interim Remedial Measures Oversight Report," dated January 2001, which was prepared by D&B. It should be noted that elevated levels of mercury still exist in subsurface soil at these 11 substations.

The LIRR agreed to undertake and complete Delineation Phase II Site Assessments and remedial activities at the 20 substations under the NYSDEC's Voluntary Cleanup Program (VCP), in February 2002. To date, the LIRR has undertaken such investigations at 3 of the 20 substations, which are located in Manhasset, Massapequa and Island Park, respectively. The NYSDEC Division of Environmental Remediation, located in Albany, New York provided oversight of the site assessment activities conducted at the three substations under the VCP.

The Scope of Work for this project includes Delineation Phase II Site Assessment activities at the remaining 17 electric substations. The Scope of Work was adapted from the recommendations of the initial site assessments conducted by D&B at the 17 substations and incorporates comments from NYSDEC, Nassau County Department of Health (NCDH) and the United States Environmental Protection Agency (USEPA).

2.2 Site Description

Delineation Phase II Site Assessments will be completed at 17 LIRR electric substations. An overall site location map which depicts the general location of all 17 substations is provided on Figure 2-1. Provided below is a brief description of each substation based on available sources of information, as well as D&B's initial investigation of the 17 substations as part of the Site Assessment of 20 LIRR Substations conducted in 1999 and site visits conducted on March 25th and April 1st of 2004.



RLA/FIGURES/MTA2229(03/02/04)

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENTS
17 SUBSTATIONS

OVERALL SITE LOCATION MAP

FIGURE 2-1

2.2.1 Babylon Yard (V00385-1)

The Babylon Yard substation site is located in Babylon, Suffolk County, New York (see Figure 2-2). The substation consists of an approximately 2,200 square foot one-story brick building shown on Figure 2-3. An approximate 2,200 square foot transformer yard is located adjacent to the substation to the west and is enclosed by a chain link fence. There is also a motor generator garage building located immediately adjacent to the north side of the substation. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Babylon line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking.

The Babylon substation is equipped with a basement, sanitary services (inactive) and water services. The substation interior consists of three active solid-state rectifiers. Rectifiers one and two are located over two pits that lead to the basement that once serviced mercury-containing rectifiers. The third rectifier rests on the substation concrete floor and is not associated with a pit. During the initial site investigation conducted in 1999, D&B observed that the basement was flooded with approximately 2 to 3 inches of water.

The initial site investigation revealed a signal house and a positive cable pit located along the south side of the substation. A communication cable pit, a metal box with cable supplies and a wooden storage box were observed along the east side of the substation. The site investigation also revealed a high-voltage manhole and control cables manhole located off the north side of the substation. In addition, a high-tension cable pit was observed immediately west of the transformer yard and a drainage swale was identified approximately 61 feet from the northern substation fence.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 5 to 7 feet below grade.

KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

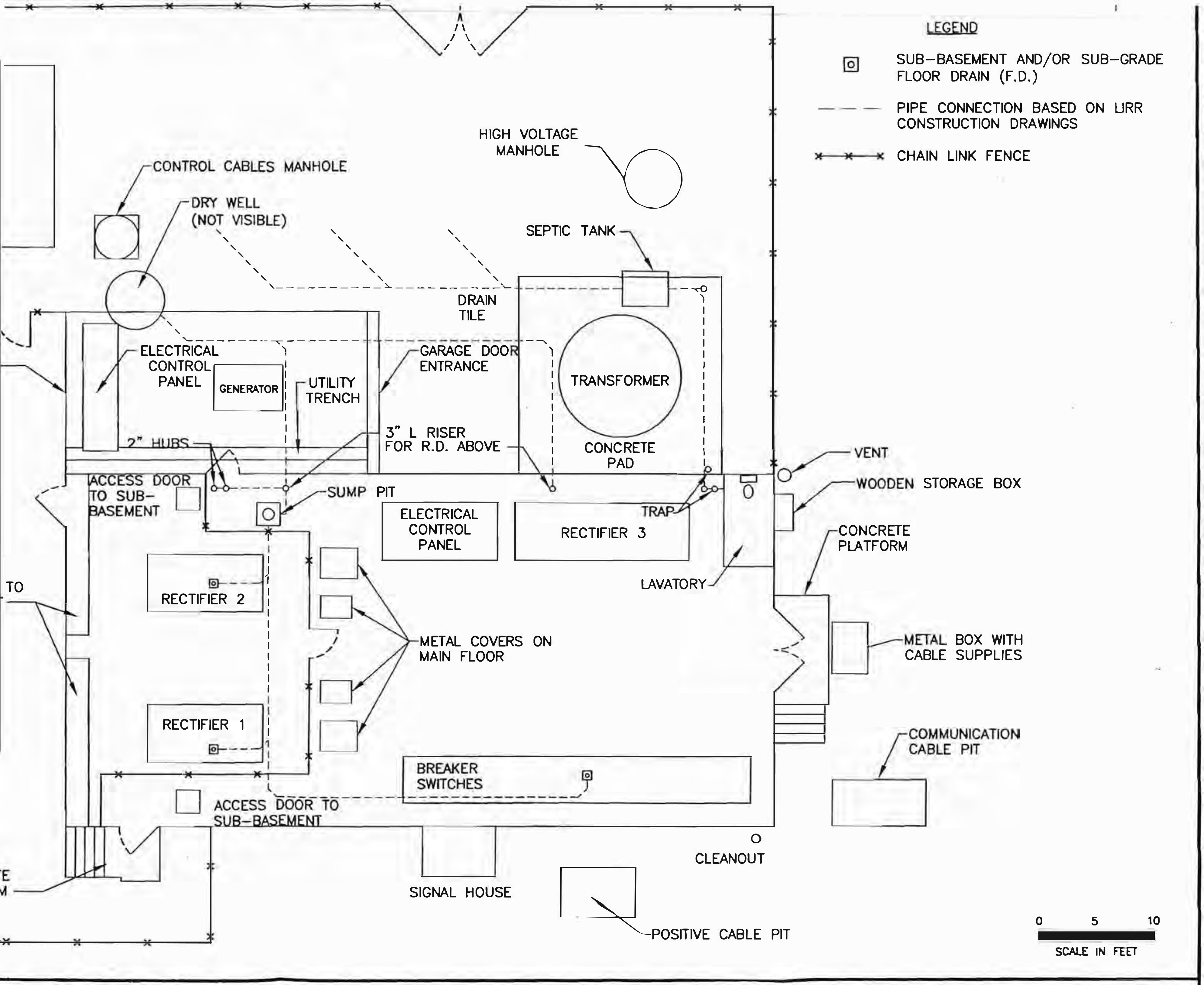
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
BABYLON YARD SUBSTATION (V00385-1)

NOT TO SCALE

FIGURE 2-2



LEGEND
SUB-BASEMENT AND/OR SUB-GRADE FLOOR DRAIN (F.D.)
PIPE CONNECTION BASED ON LIRR CONSTRUCTION DRAWINGS
CHAIN LINK FENCE
HIGH VOLTAGE MANHOLE
CONTROL CABLES MANHOLE
DRY WELL (NOT VISIBLE)
SEPTIC TANK
DRAIN TILE
ELECTRICAL CONTROL PANEL
GENERATOR
UTILITY TRENCH
GARAGE DOOR ENTRANCE
TRANSFORMER
CONCRETE PAD
2" HUBS
3" L RISER FOR R.D. ABOVE
VENT
WOODEN STORAGE BOX
ACCESS DOOR TO SUB-BASEMENT
SUMP PIT
ELECTRICAL CONTROL PANEL
RECTIFIER 3
TRAP
CONCRETE PLATFORM
LAVATORY
TO
RECTIFIER 2
METAL COVERS ON MAIN FLOOR
METAL BOX WITH CABLE SUPPLIES
RECTIFIER 1
COMMUNICATION CABLE PIT
BREAKER SWITCHES
ACCESS DOOR TO SUB-BASEMENT
CLEANOUT
SIGNAL HOUSE
POSITIVE CABLE PIT
0 5 10
SCALE IN FEET

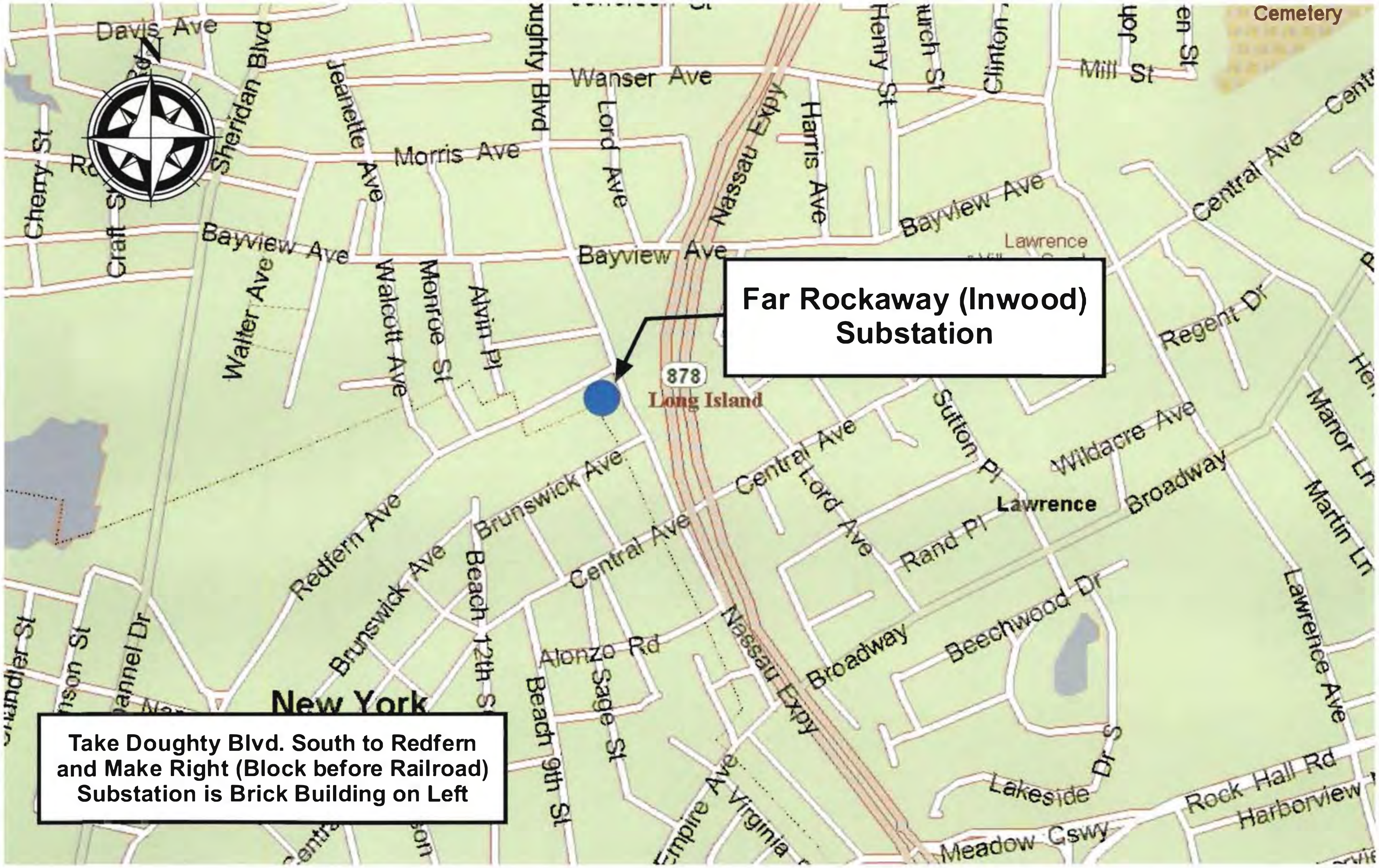
2.2.2 Far Rockaway (V00391-1)

The Far Rockaway substation site is located in Far Rockaway, Nassau County, New York (see Figure 2-4). The substation consists of a 25-foot by 25-foot one-story brick building, approximately 75 feet north of the existing tracks as shown on Figure 2-5. A 70-foot by 30-foot transformer yard is located adjacent to the substation to the south and is enclosed by a chain link fence. The remaining portion of the site is an elongated shaped, parcel of land used by the LIRR as an easement. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Far Rockaway line. The areas surrounding the substation and the transformer yard are developed or in the process of being developed as commercial buildings. It is important to note that the "front" of the Far Rockaway substation is located on Redfern Avenue which immediately fronts a pedestrian sidewalk.

The Far Rockaway substation is not equipped with a basement, nor any sanitary or office facilities. The interior of the substation consists of an active solid-state rectifier located over a pit that once serviced a mercury-containing rectifier. The substation is equipped with a second pit, referred to as a "water trough" on LIRR construction drawings, which is covered by a metal utility plate. In addition, there is a pipe trench with a concrete solid bottom located in the northeast corner of the substation that is covered with a steel plate. An exterior water meter pit with an earthen bottom is also located off the northeast corner of the substation. Lastly, a conduit pit with an earthen bottom is located along the west side of the substation and a control cable manhole with an earthen bottom is located to the south of the substation.

It should be noted that a new motor generator was observed within the transformer yard during the March 25, 2004 site inspection.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 3 to 5 feet below grade.



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

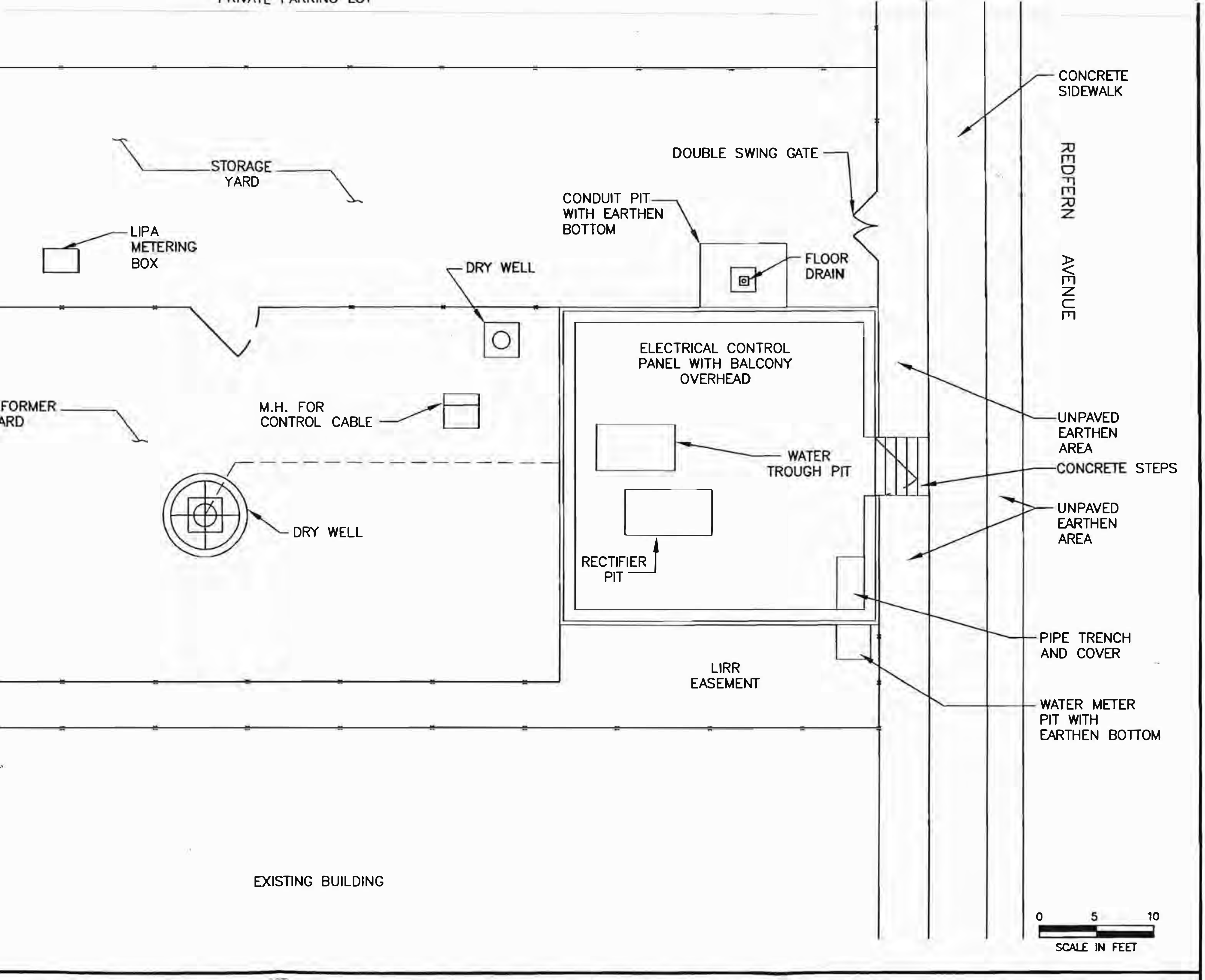
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

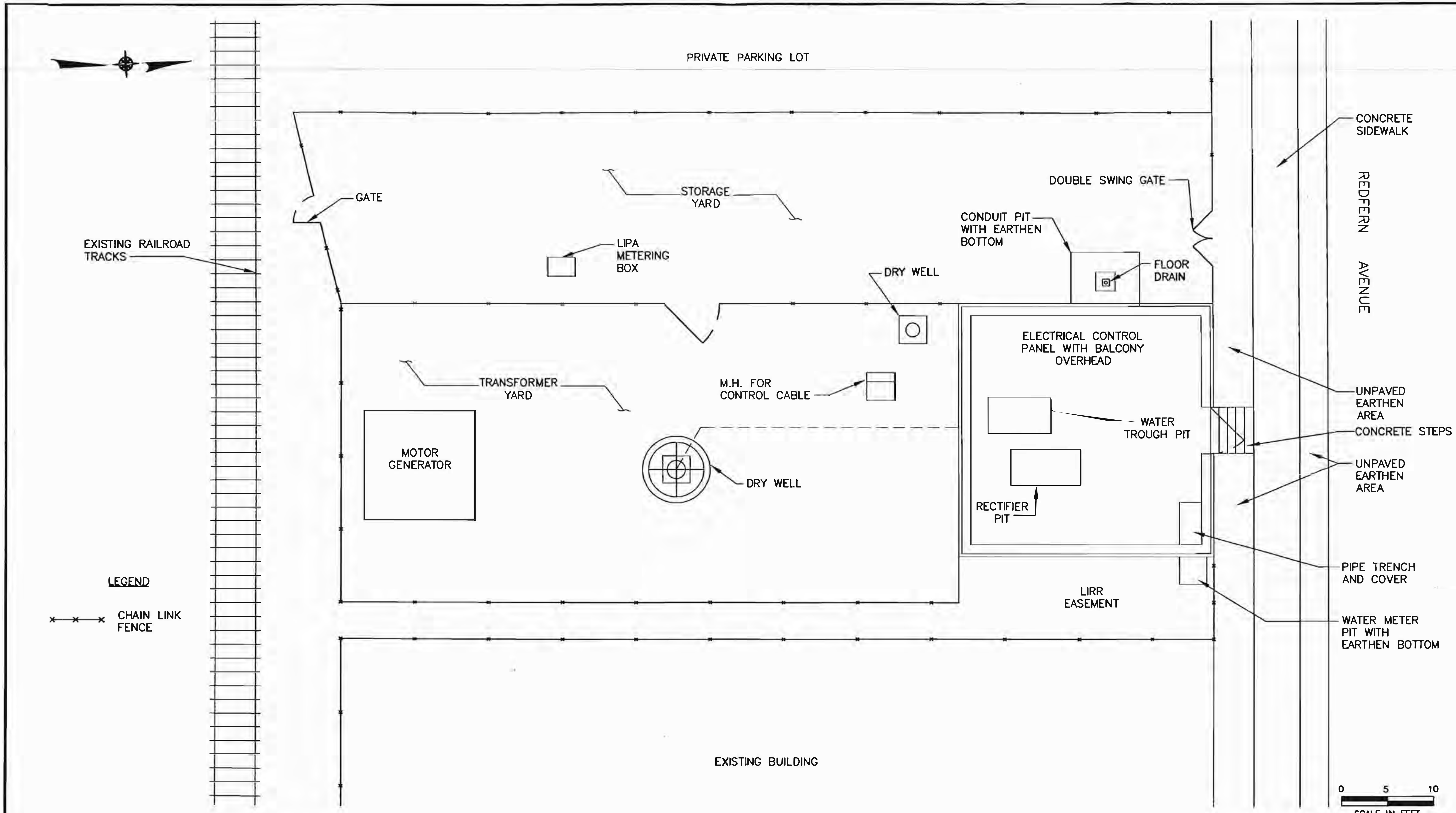
LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
FAR ROCKAWAY/INWOOD SUBSTATION (V00391-1)

NOT TO SCALE

FIGURE 2-4


CONCRETE SIDEWALK
STORAGE YARD
DOUBLE SWING GATE
REDFERN AVENUE
CONDUIT PIT WITH EARTHEN BOTTOM
LIPA METERING BOX
FLOOR DRAIN
DRY WELL
ELECTRICAL CONTROL PANEL WITH BALCONY OVERHEAD
FORMER
ARD
M.H. FOR CONTROL CABLE
UNPAVED EARTHEN AREA
WATER TROUGH PIT
CONCRETE STEPS
UNPAVED EARTHEN AREA
DRY WELL
RECTIFIER PIT
PIPE TRENCH AND COVER
LIRR EASEMENT
WATER METER PIT WITH EARTHEN BOTTOM
EXISTING BUILDING
0
5
10
SCALE IN FEET



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
FAR ROCKAWAY SUBSTATION (V00391-1)

FIGURE 2-5

F:\2229\2229-3A.dwg, SITE, 03/31/05 12:16:54 PM, DCortes

2.2.3 Floral Park (V00389-1)

The Floral Park substation site is located in Floral Park, Nassau County, New York (see Figure 2-6). The substation consists of an approximately 1,700-square foot one-story brick building as shown on Figure 2-7. An approximate 5,400-square foot transformer yard is located adjacent to the substation to the northeast and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Hempstead and Port Jefferson lines. The areas surrounding the substation and the transformer yard are currently utilized for vehicular parking by the LIRR.

The Floral Park substation is equipped with sanitary facilities, water service and a slop sink. The interior of the substation consists of two active solid-state rectifiers located over two separate pits that once serviced mercury-containing rectifiers. There are also two water trough pits, each located adjacent to the rectifier pits. During an initial site investigation conducted in 1999, D&B observed that the easternmost water trough pit contained one floor drain and the westernmost water trough pit contained two floor drains. The Floral Park substation is not equipped with a basement or a utility trench system. However, the substation does house a small office area and a room located in the southwest corner of the substation containing active lead-acid batteries designed to provide back-up electricity. It should be noted that there are two control conduit pits with earthen bottoms along the south side of the substation and two additional conduit pits with earthen bottoms located within the transformer yard area. In addition, there is a vent pit with an earthen bottom located off the southwest corner of the substation. There are five other electrical manhole vaults located along the substation perimeter that contained floor drains.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 65 to 70 feet below grade.

KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

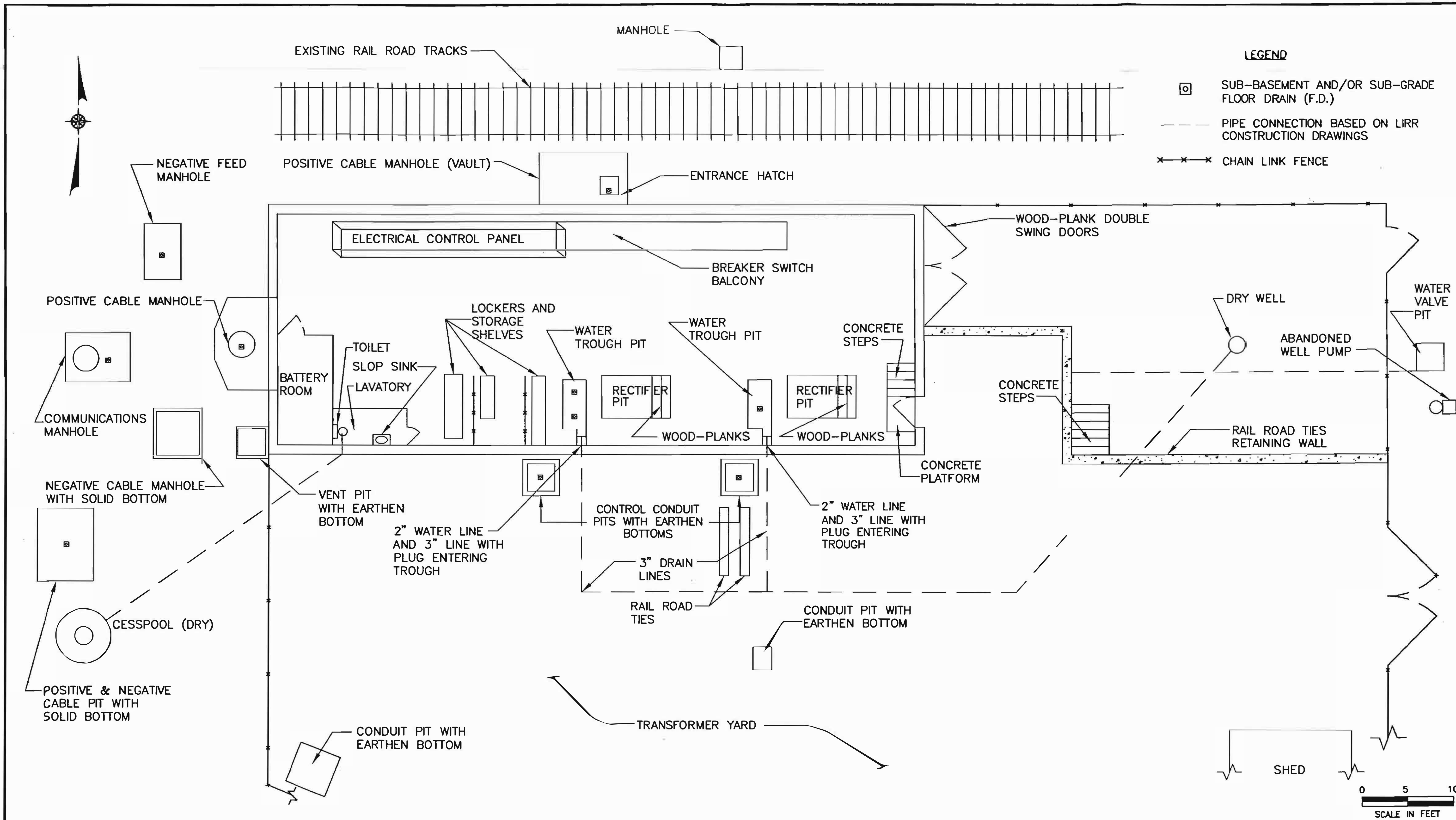
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
FLORAL PARK SUBSTATION (V00389-1)

NOT TO SCALE

FIGURE 2-6



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
FLORAL PARK SUBSTATION (V00389-1)

FIGURE 2-7

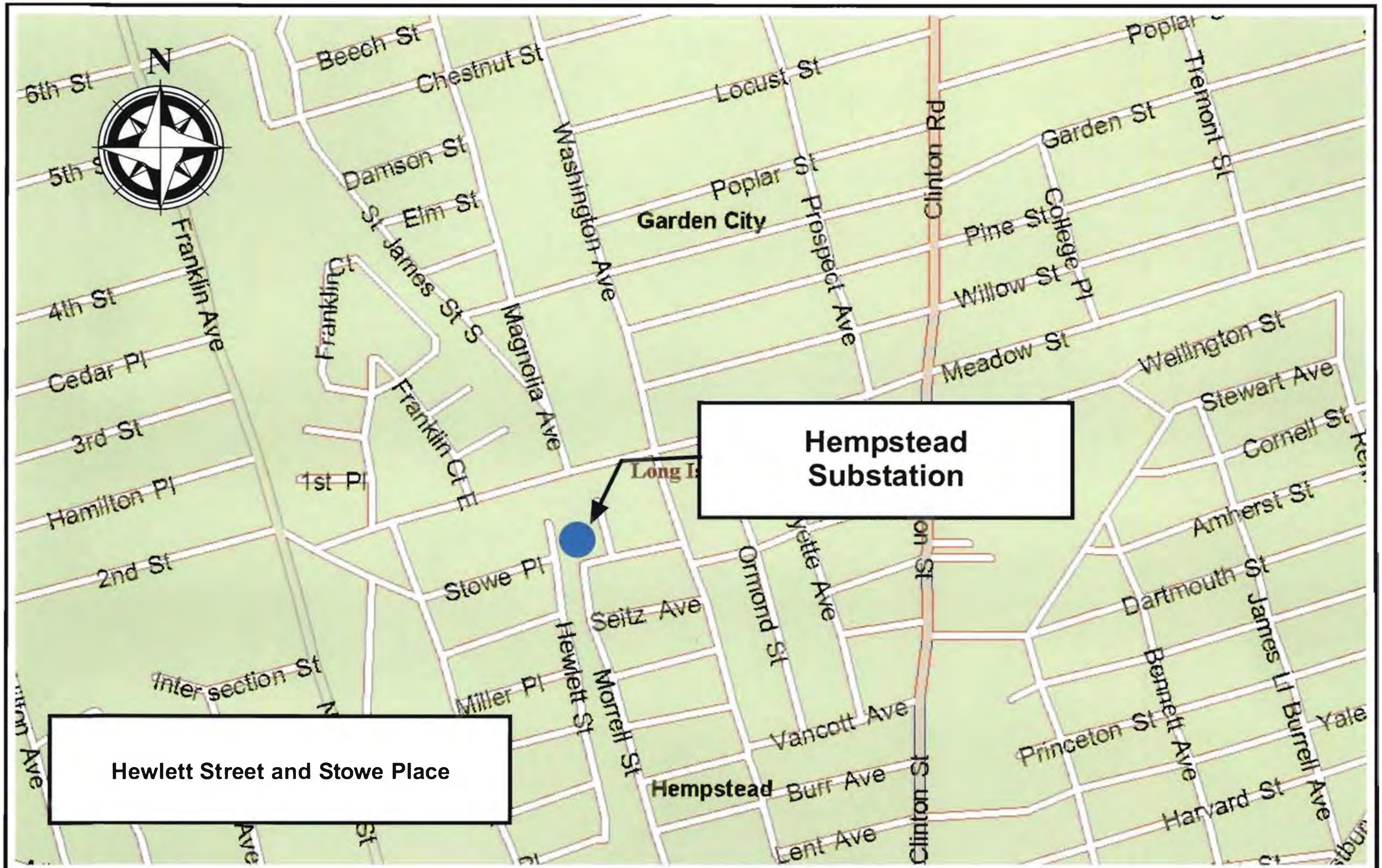
F:\2229\2229-19A.dwg, SITE, 03/31/05 12:20:42 PM, DCortes

2.2.4 Hempstead (V00390-1)

The Hempstead substation site is located in Hempstead, Nassau County, New York (see Figure 2-8). The substation consists of an approximate 625-square foot one-story brick building as shown on Figure 2-9. An approximate 2,100-square foot transformer yard is located adjacent to the substation to the north and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Hempstead line. The areas surrounding the substation and the transformer yard consist of residential areas.

The Hempstead substation is equipped with water service and a slop sink. The interior of the substation consists of one active solid-state rectifier located over a separate pit that once serviced a mercury-containing rectifier. The substation is equipped with a second pit, which was covered by a metal utility plate, referred to as a "water trough" on LIRR construction drawings. During an initial site investigation conducted in 1999, D&B observed that the rectifier pit contained one drain pipe and the water trough contained another drain pipe. The Hempstead substation is not equipped with a basement or a utility trench system but does have a slop sink which is located along the northern wall that discharges to surface soil within the transformer yard. It should also be noted that the Hempstead substation is equipped with a bank of active lead-acid batteries to provide back-up electricity located in the southwest corner of the substation. In addition, the site investigation revealed the presence of a pipe trench with a solid bottom located in the southwest corner of the substation.

The initial site investigation revealed a meter pit covered by a metal plate located along the southern wall of the substation. This pit was observed to be filled to grade with sand. There was also a conduit pit located approximately 40 feet south of the substation that contained a floor drain that discharges directly to the ground. In addition, there was a communications manhole with a floor drain that drained directly to the soil located approximately 10 feet north of the substation within the transformer yard. It should also be noted that an "earthen depression" was observed in the central portion of the transformer yard.



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

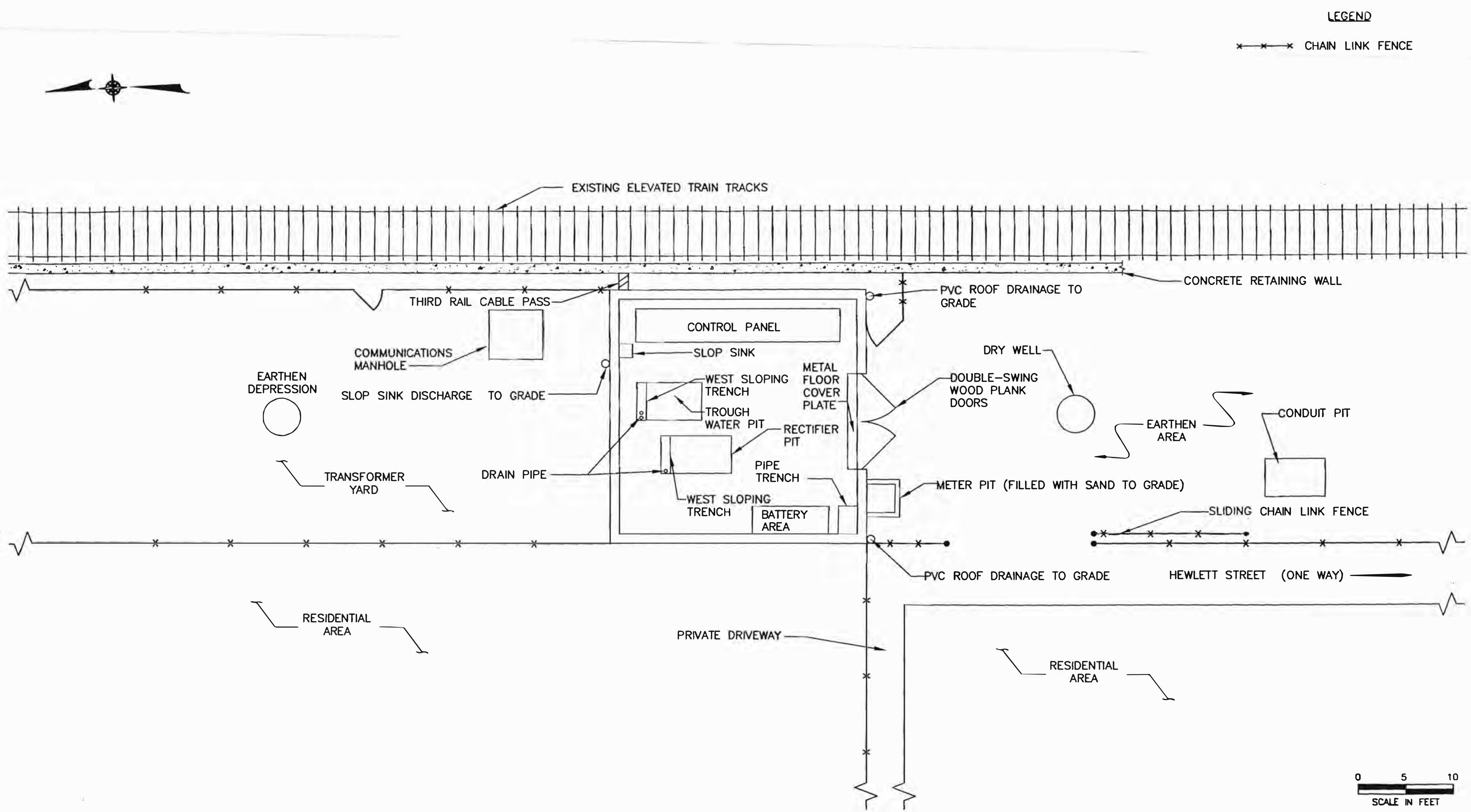
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
HEMPSTEAD SUBSTATION (V00390-1)

NOT TO SCALE

FIGURE 2-8



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
HEMPSTEAD SUBSTATION (V00390-1)

FIGURE 2-9

:\2229\2229-17A.dwg, SITE, 04/04/05 10:12:54 AM, DCortes

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 25 to 30 feet below grade.

2.2.5 Nassau Boulevard (V00399-1)

The Nassau Boulevard substation site is located in Garden City, Nassau County, New York (see Figure 2-10). The substation consists of an approximate 625-square foot one-story brick building as shown on Figure 2-11. An approximate 2,100-square foot transformer yard is located adjacent to the substation to the southwest and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Hempstead line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking and residential areas.

The Nassau Boulevard substation is equipped with sanitary and water services along with a utility trench system. The interior of the substation consists of one active solid-state rectifier located over a separate pit that once serviced a mercury-containing rectifier. The existing rectifier pit leads to a basement that extends throughout the majority of the substation.

The initial site investigation conducted in 1999 revealed a water meter pit located along the southern wall of the substation with an earthen bottom covered by a metal plate. Two PVC pipes were also observed to discharge from the roof along the southern exterior wall of the substation (see Figure 2-11). During the site investigation, a trap and cleanout was observed along the west side of the substation.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 40 to 45 feet below grade.

KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

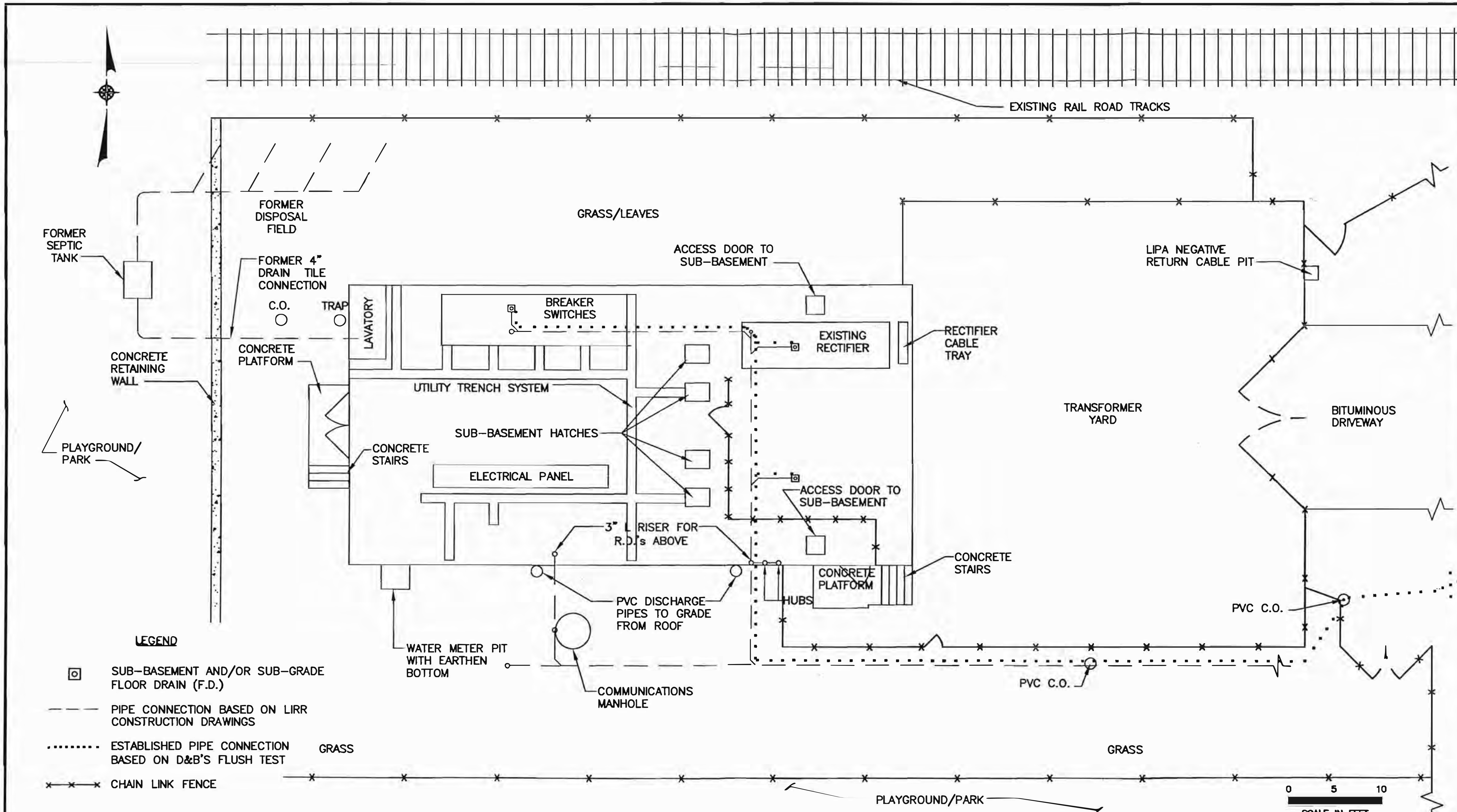
Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
NASSAU BOULEVARD SUBSTATION (V00399-1)

NOT TO SCALE

FIGURE 2-10



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
NASSAU BLVD. SUBSTATION (V00399-1)

FIGURE 2-11

F:\2229\2229-14A.dwg, SITE, 04/04/05 10:13:41 AM, DCortes

2.2.6 <u>Little Neck (V00395-1)</u>

The Little Neck substation site is located in Great Neck, Nassau County, New York (see Figure 2-12). The substation consists of an approximate 2,500-square foot two-story brick building as shown on Figure 2-13. An approximate 2,100-square foot transformer yard is located adjacent to the substation to the west and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Port Washington line. The areas surrounding the substation and the transformer yards are located within the LIRR right-of-way.

The Little Neck substation is equipped with a basement, sanitary and water services, and a utility trench system. The substation interior consists of two active solid-state rectifiers located over two separate pits leading to the basement that once serviced mercury-containing rectifiers. The substation is also equipped with a third rectifier pit which is not currently in use. It should also be noted that the Little Neck substation contains a bank of active lead-acid batteries located along the south interior side of the substation to provide back-up electricity. During the initial site investigation conducted in 1999, D&B observed that the basement was flooded with approximately 2 to 3 inches of water.

The initial site investigation revealed a conduit pit located along the southern wall of the substation. This pit was observed to have an earthen bottom. In addition, a negative cable manhole containing a floor drain was observed within the transformer yard and a steel-covered manhole, with what appeared to be asbestos-covered positive cables, was located along the north side of the substation. A drainage pipe was also observed along the west side of the substation leading towards the transformer yard. This discharge pipe did not appear to be connected to a drainage feature within the substation. It should also be noted that a hopper drain connected to a pipe leading to the east was observed off the southeast corner of the substation.

During the investigation, D&B observed a drainage creek, flowing from east to west, located about 80 feet south of the substation. This drainage creek appears to discharge to the headwaters of Little Neck Bay.

KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

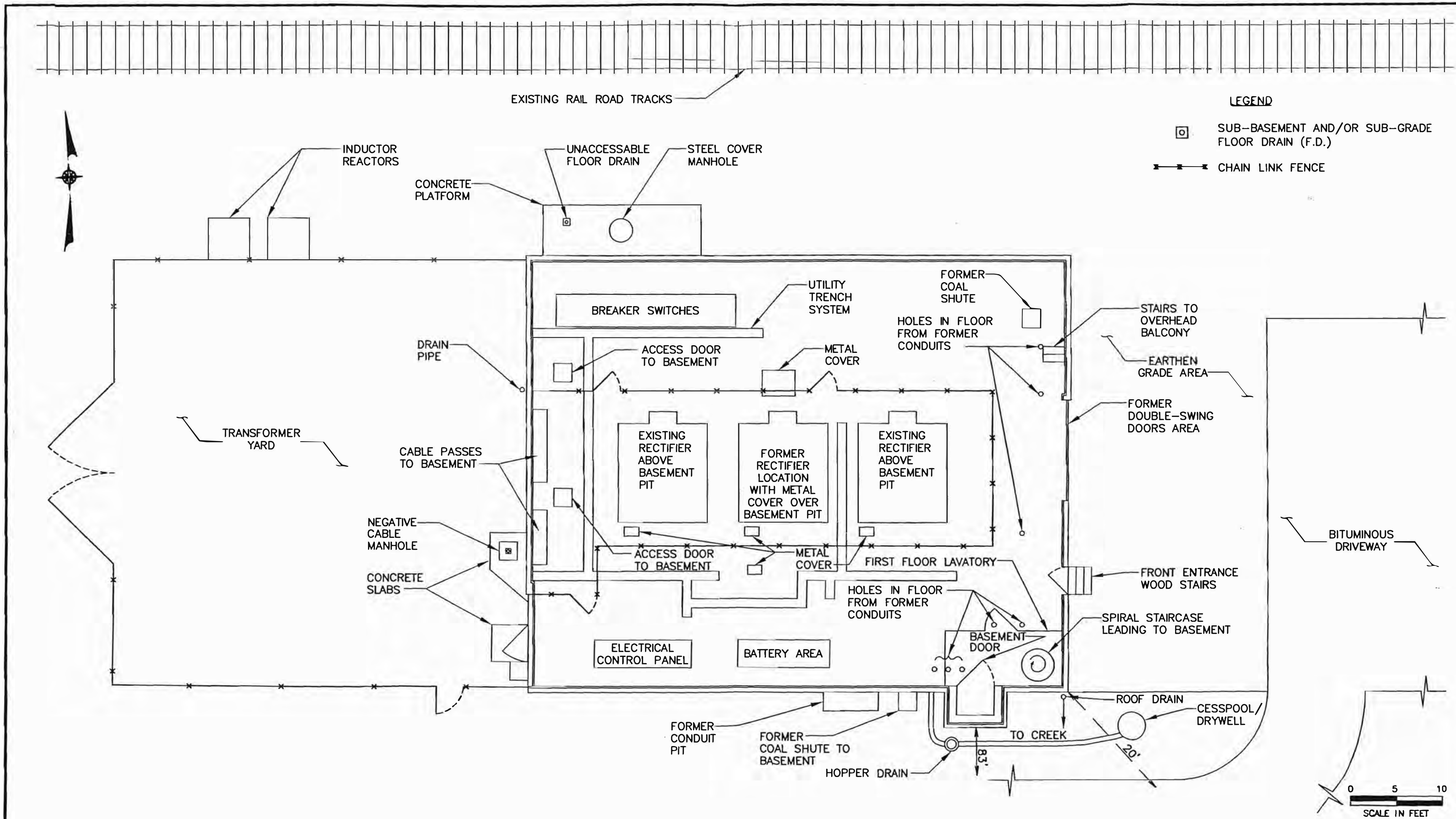
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
LITTLE NECK SUBSTATION (V00395-1)

NOT TO SCALE

FIGURE 2-12



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
LITTLE NECK SUBSTATION (V00395-1)

FIGURE 2-13

F:\2229\2229-11A.dwg, SITE, 04/04/05 10:15:22 AM, DCortes

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 20 feet below grade.

2.2.7 Lindenhurst (V00394-1)

The Lindenhurst substation site is located in Babylon, Suffolk County, New York (see Figure 2-14). The substation consists of an approximate 1,400-square foot one-story brick building shown on Figure 2-15. An approximate 1,800-square foot transformer yard is located adjacent to the substation to the north and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Babylon line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking and residential areas. It is important to note that the "front" of the Lindenhurst substation is adjacent to East Hoffman Avenue which fronts a pedestrian sidewalk.

The Lindenhurst substation is equipped with a basement, sanitary and water services, and a utility trench system. The substation interior consists of two active solid-state rectifiers located over two pits that lead to the basement that once serviced mercury-containing rectifiers. It should also be noted that the Lindenhurst substation contains a bank of lead-acid batteries located in the southwest corner of the substation to provide back-up electricity.

The initial site investigation conducted in 1999 revealed two negative and one positive feed manholes located off the southeast corner of the substation that were filled with water. The investigation also revealed a positive cable manhole located off the southwest corner of the substation. In addition, there was a dry well covered by a metal plate located off the northeast corner of the substation.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 3 to 5 feet below grade.

KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

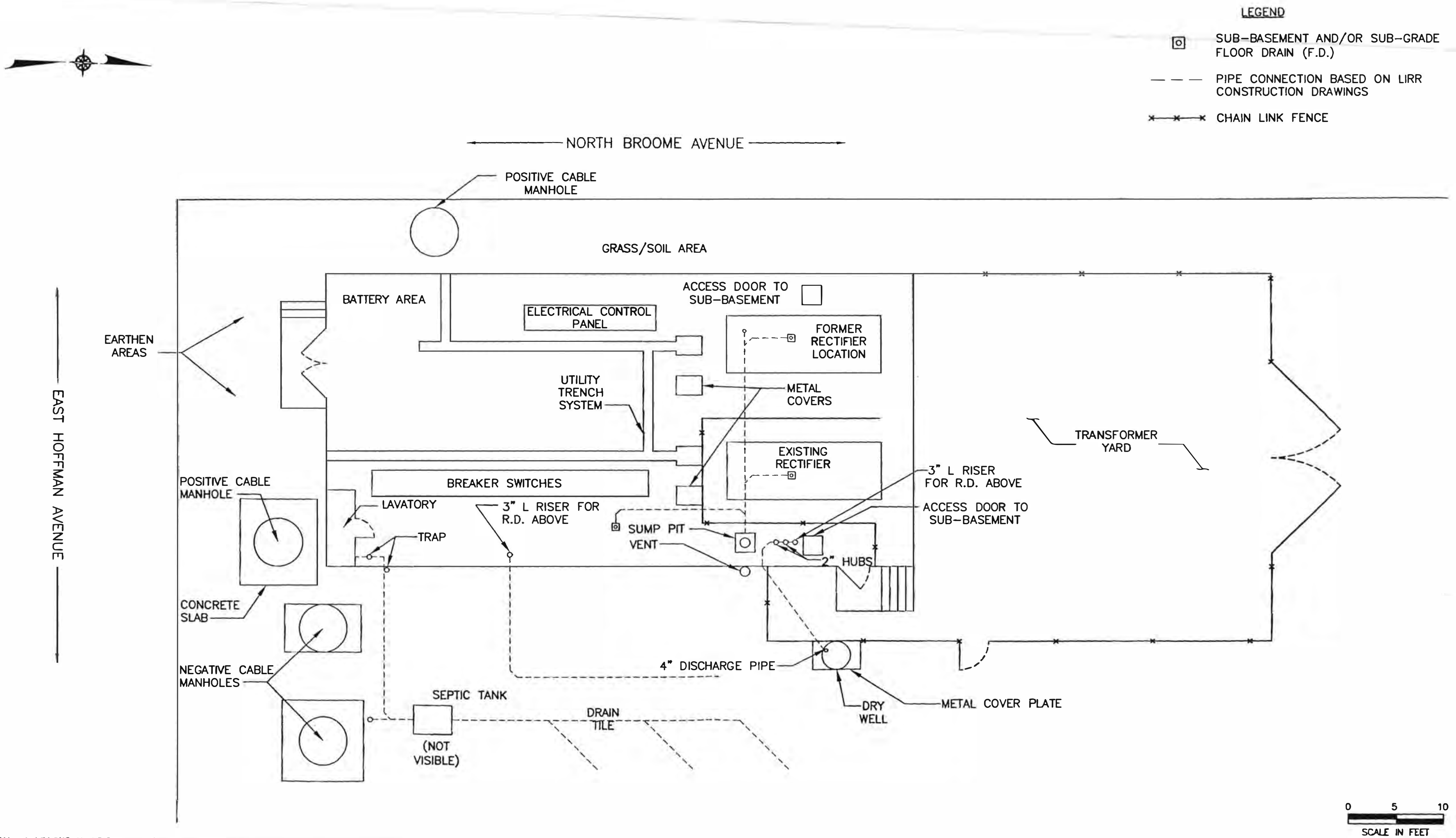
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
LINDENHURST SUBSTATION (V00394-1)

NOT TO SCALE

FIGURE 2-14



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
LINDENHURST SUBSTATION (V00394-1)

Dvirka and Bartilucci CONSULTING ENGINEERS

FIGURE 2-15

29-10A.dwg, SITE, 03/31/05 12:30:35 PM, DCortes

2.2.8 Bayside (V00386-2)

The Bayside substation site is located in Bayside, Queens County, New York (see Figure 2-16). The substation consists of an approximate 1,800-square foot one-story brick building as shown on Figure 2-17. An approximate 3,600-square foot transformer yard is located adjacent to the substation to the east and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Port Washington line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking and residential areas.

The Bayside substation is equipped with a basement, sanitary and water services, and a utility trench system, as well as an office area utilized by LIRR personnel. The interior of the substation consists of an active solid-state rectifier located over a pit leading to the basement that once serviced a mercury-containing rectifier. In addition, the substation contained a second wooden covered rectifier pit not currently in use. It should also be noted that the Bayside substation contains a bank of active lead-acid batteries located in the northwest corner of the substation to provide back-up electricity.

The initial site investigation conducted in 1999 revealed a water meter pit with an earthen bottom located along the western wall of the substation, as well as a communications manhole filled with water and debris located off the northwest corner of the substation. In addition, a steel-covered manhole conduit filled with water and debris was located approximately 5 feet north of the substation. There was also a steel-covered conduit pit containing a floor drain filled with ballast located within the transformer yard.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 70 feet below grade.

KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

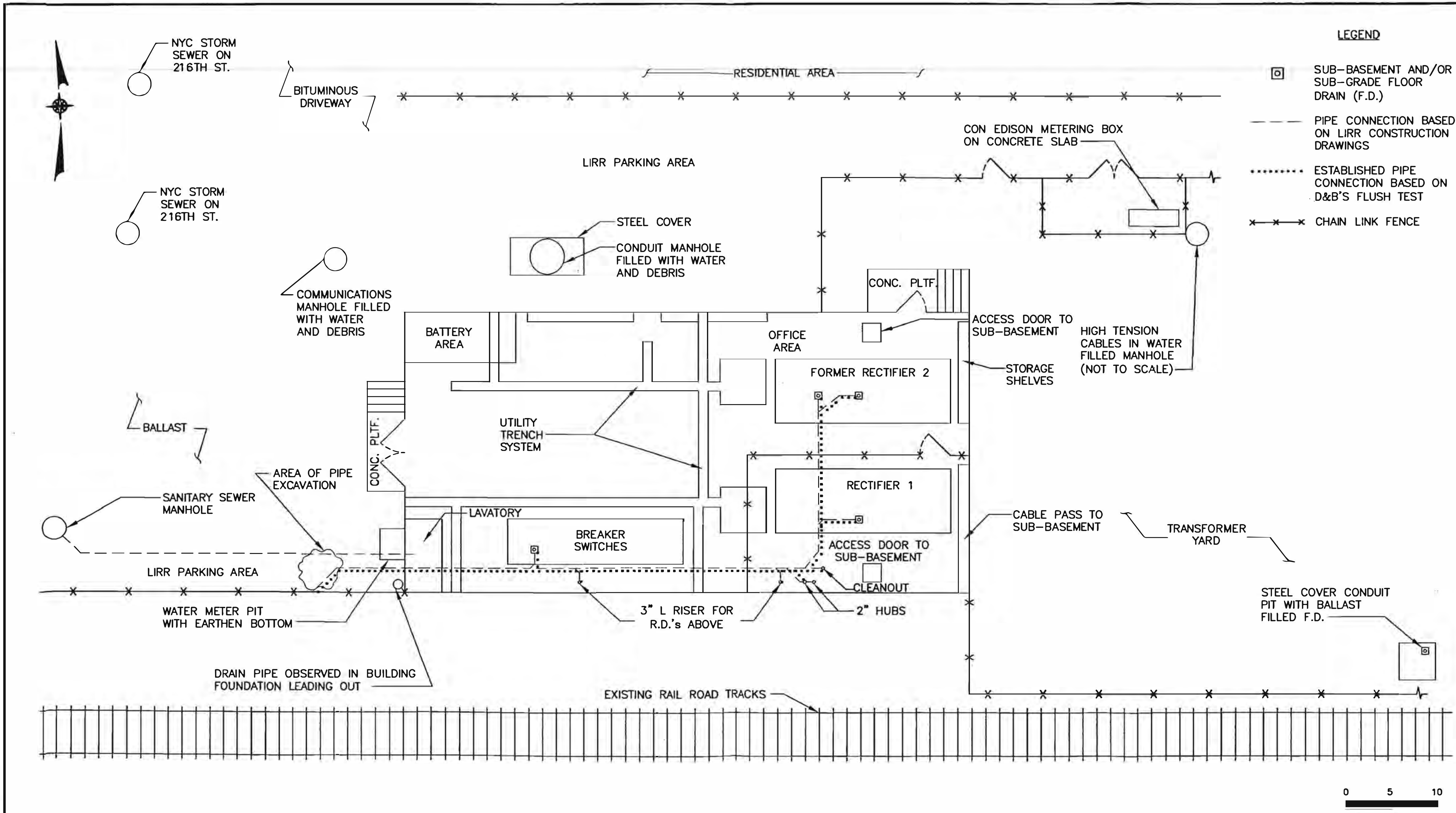
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
BAYSIDE SUBSTATION (V00386-2)

NOT TO SCALE

FIGURE 2-16



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
BAYSIDE SUBSTATION (V00386-2)

FIGURE 2-17

F:\2229\2229-12A.dwg, SITE, 03/31/05 12:36:51 PM, DCortes

2.2.9 Bellaire (V00387-2)

The Bellaire substation site is located in Bellaire, Queens County, New York (see Figure 2-18). The substation consists of an approximate 1,800-square foot one-story brick building shown on Figure 2-19. Two transformer yards totaling approximately 2,200 square feet are located to the east and west of the substation, and are enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Hempstead line. The areas surrounding the substation and the transformer yards are located within the LIRR right-of-way.

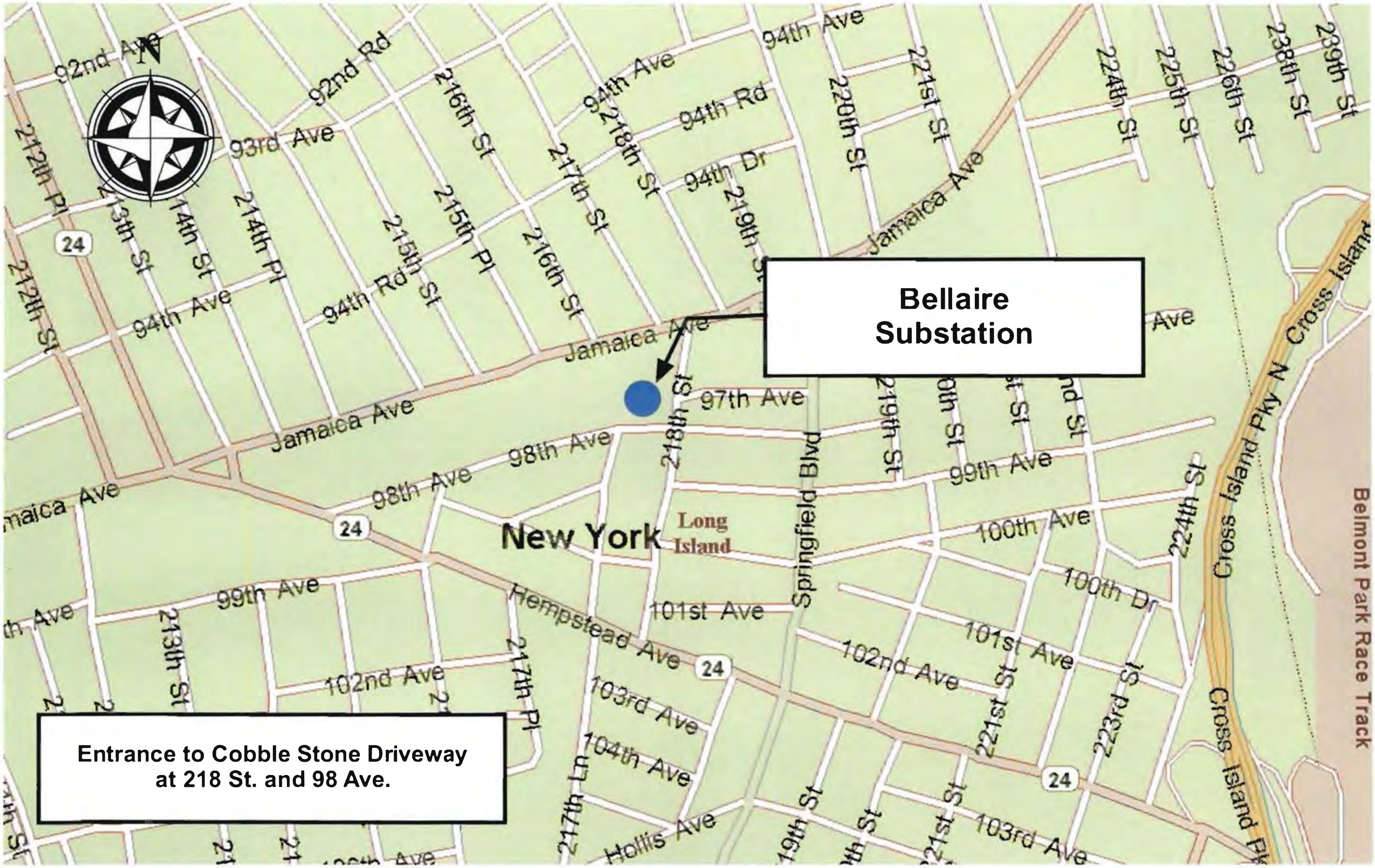
The Bellaire substation is equipped with a basement, sanitary and water services (currently not functioning), and a utility trench system. The substation interior consists of two active solid-state rectifier located over two separate pits leading to the basement that once serviced mercury-containing rectifiers. It should also be noted that the Bellaire substation contains a bank of active lead-acid batteries located in a room in the southwest corner of the substation to provide back-up electricity.

The initial site investigation conducted in 1999 revealed two electric-power manholes filled with water and debris located along the southeast wall of the substation. Another electric-power manhole containing a ballast-filled floor drain was located along the northern side of the substation. It should also be noted that a cleanout and vent were observed off the northwest corner of the substation.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 65 to 70 feet below grade.

2.2.10 St. Albans (V00402-2)

The St. Albans substation site is located in St. Albans, Queens County, New York (see Figure 2-20). The substation consists of an approximate 1,800-square foot one-story brick building shown on Figure 2-21. An approximate 2,500-square foot transformer yard is located



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

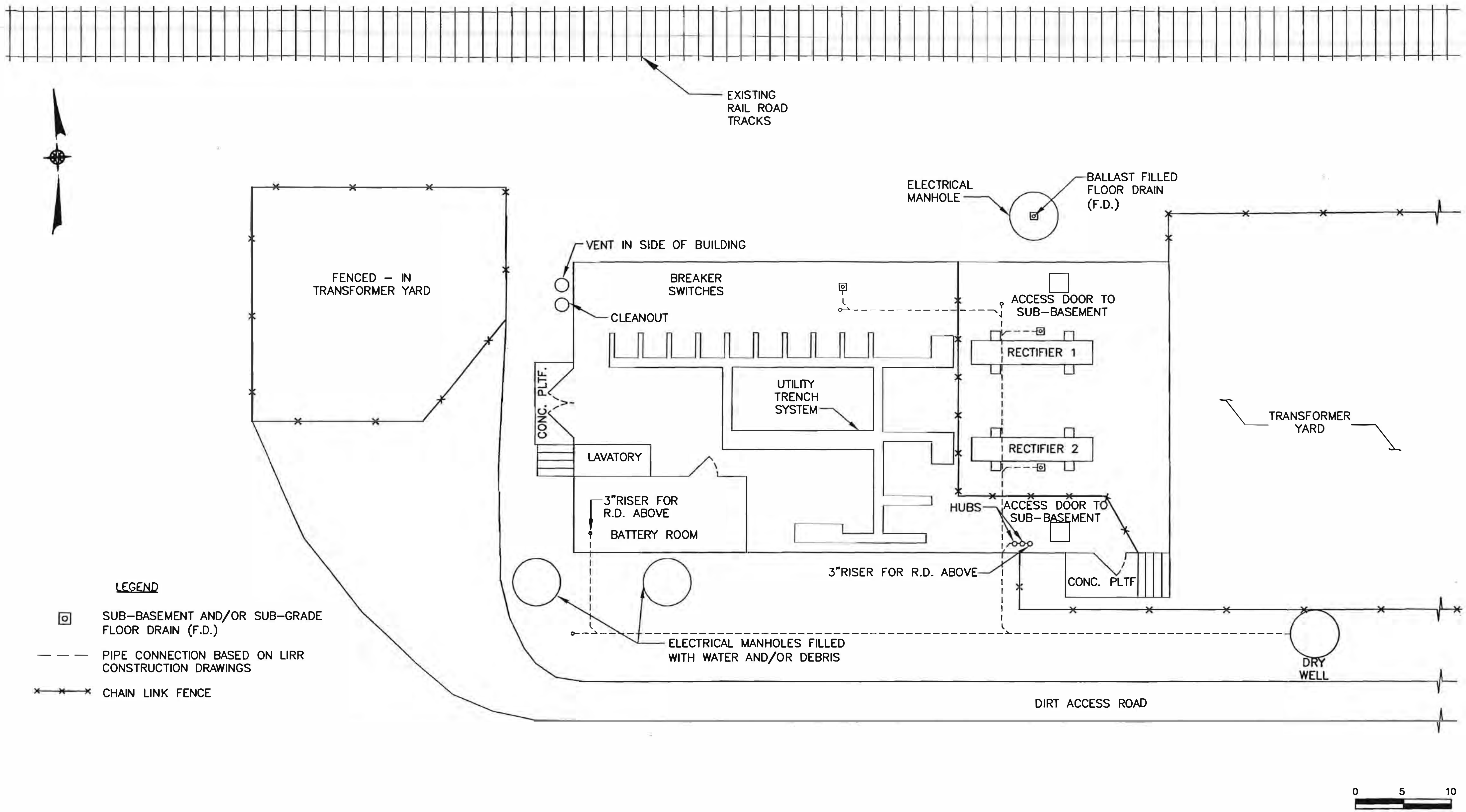
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
BELLAIRE SUBSTATION (V00387-2)

NOT TO SCALE

FIGURE 2--18



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

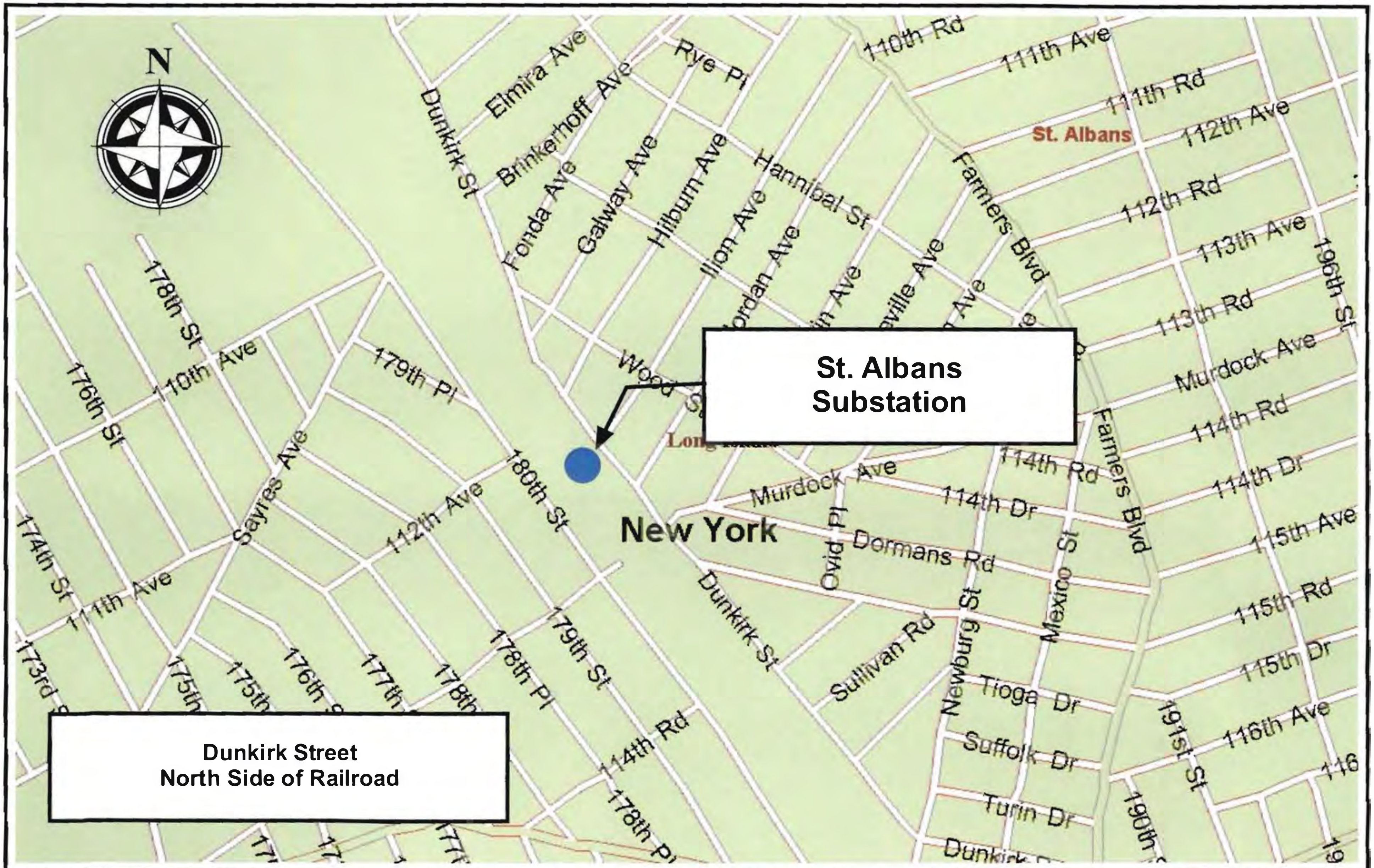
Dvirka
and
Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
BELLAIRE SUBSTATION (V00387-2)

FIGURE 2-19

F:\2229\2229-16A.dwg, SITE, 03/31/05 02:06:17 PM, DCortes



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

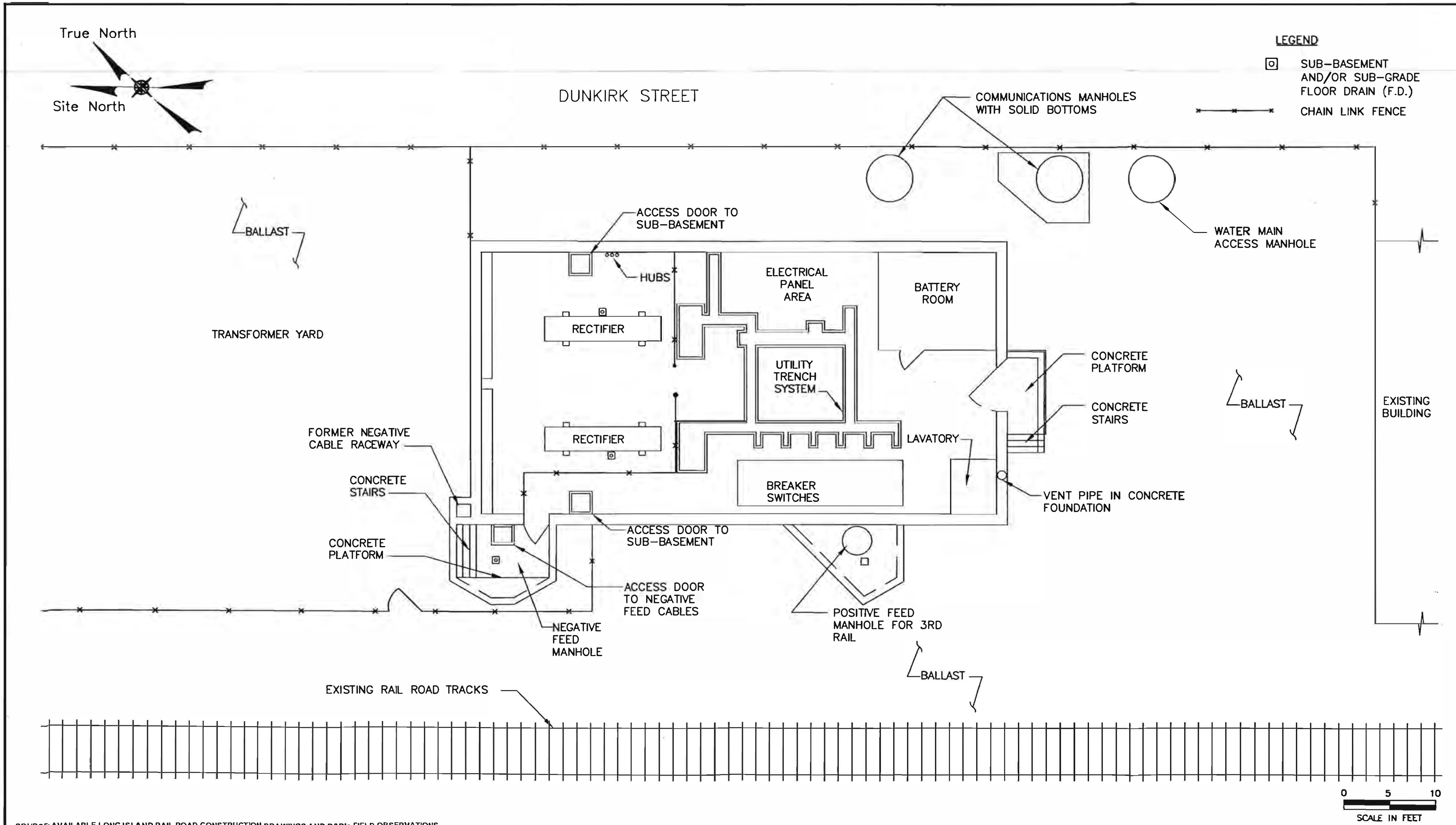
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
ST. ALBANS SUBSTATION (V00402-2)

NOT TO SCALE

FIGURE 2-20



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
ST. ALBANS SUBSTATION (V00402-2)

FIGURE 2-21

F:\2229\2229-7A.dwg, SITE, 04/04/05 10:16:20 AM, DCortes

adjacent to the substation to the north and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-West Hempstead line. The areas surrounding the substation and the transformer yard are located within the LIRR right-of-way.

The St. Albans substation is equipped with a basement, sanitary and water services, and a utility trench system. The substation interior consists of two active solid-state rectifiers located over two pits that lead to the basement that once serviced mercury-containing rectifiers. It should also be noted that the St. Albans substation contains a bank of active lead-acid batteries located in a room in the southeast corner of the substation to provide back-up electricity.

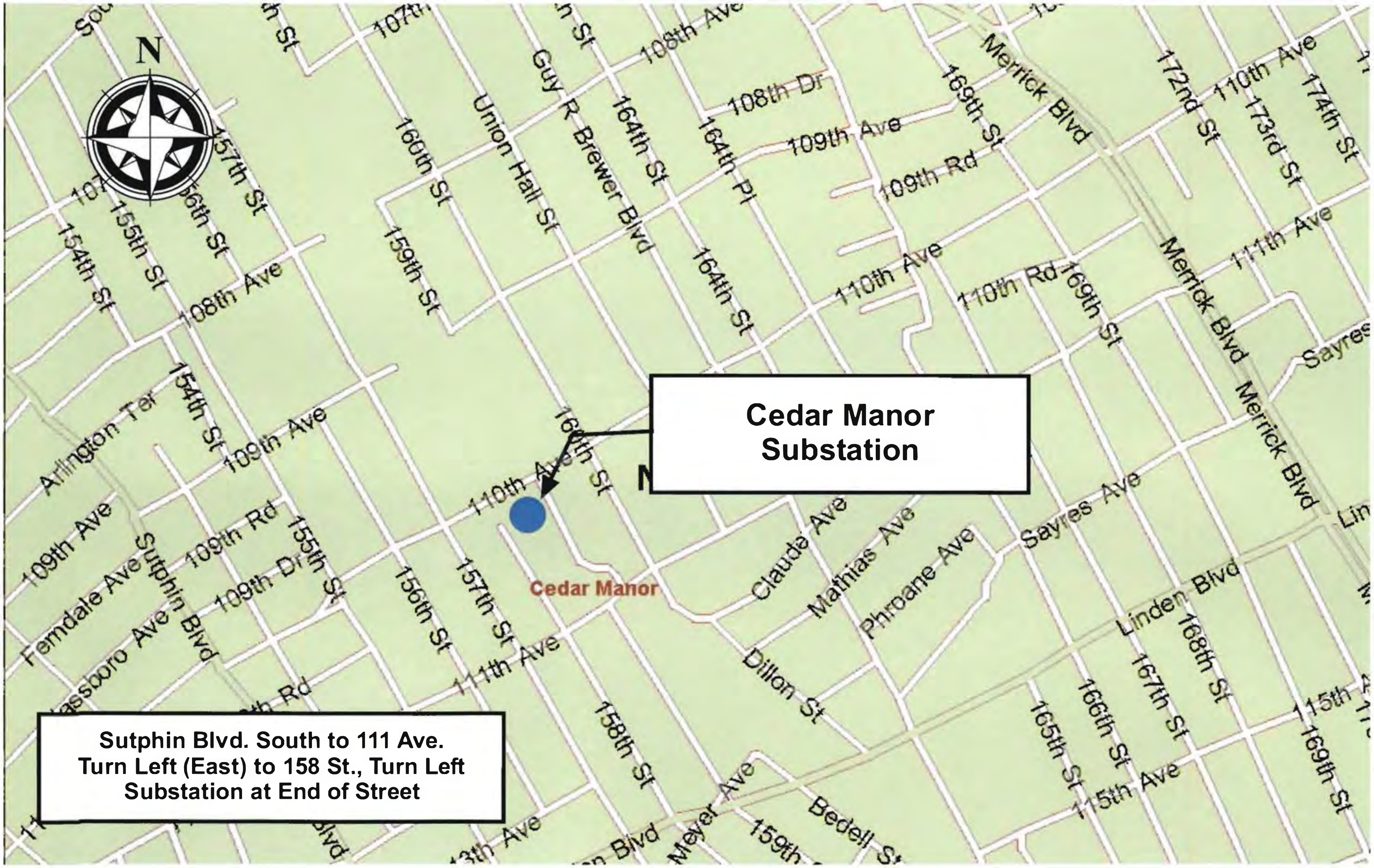
The initial site investigation conducted in 1999 revealed a negative and a positive feed manhole located adjacent to the western substation wall that each contained a floor drain. The investigation also revealed two newly installed (according to LIRR representatives) communications manholes with solid bottoms located off the southeast corner of the substation. In addition, there was a water main access manhole with an earthen bottom (filled with water) located off the southeast corner of the substation.

It should be noted that the St. Albans substation was renovated subsequent to the initial site investigation. Renovation activities included the installation of new transformers, the addition of ballast to the substation grounds and painting of the interior substation building.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 40 to 45 feet below grade.

2.2.11 Cedar Manor (V00388-2)

The Cedar Manor substation site is located in Cedar Manor, Queens County, New York (see Figure 2-22). The substation consists of an approximate 1,800-square foot one-story brick building shown on Figure 2-23. An approximate 1,600-square foot transformer yard is located adjacent to the substation to the north and is enclosed by a chain link fence. The substation



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

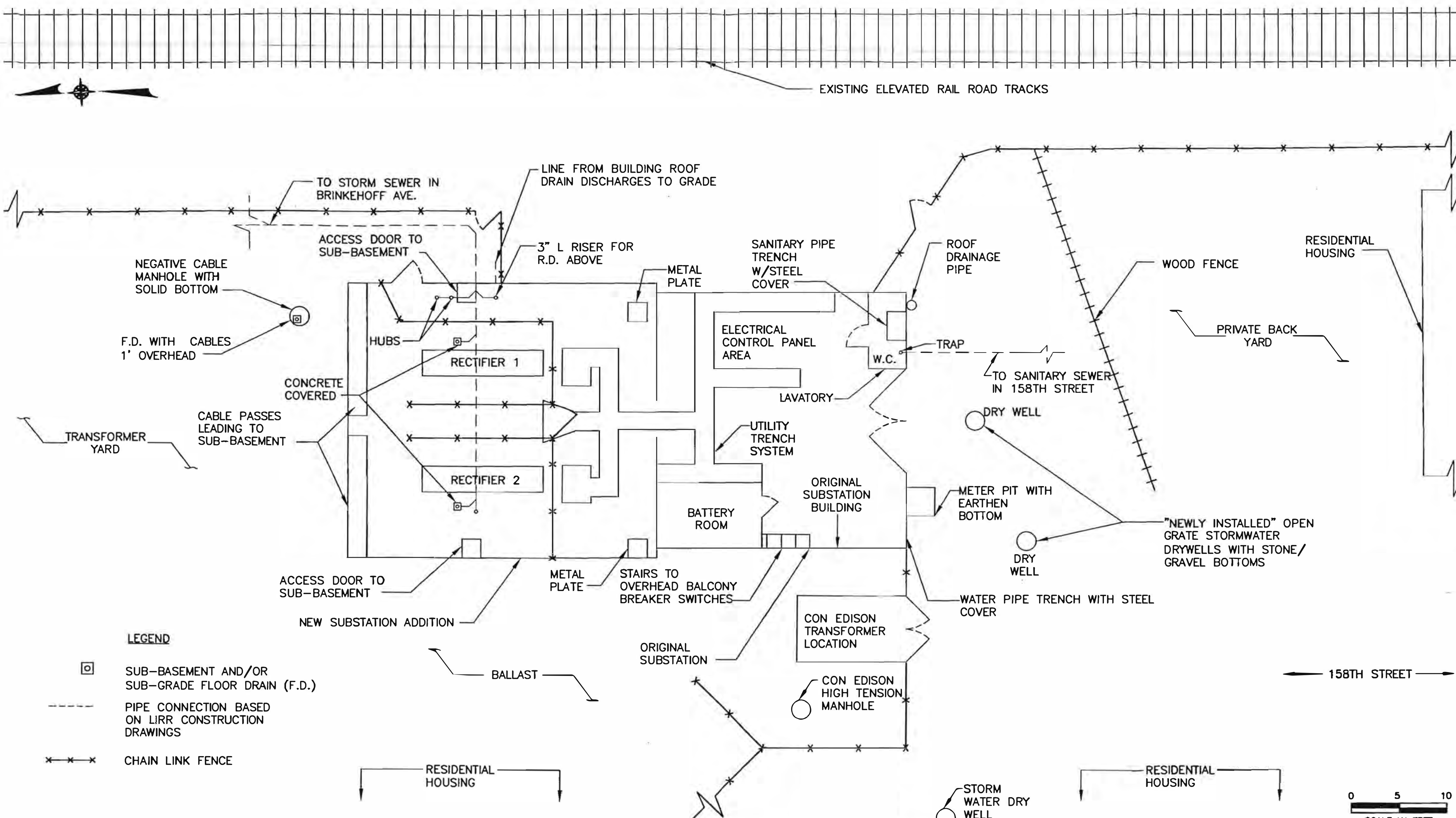
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
CEDAR MANOR SUBSTATION (V00388-2)

NOT TO SCALE

FIGURE 2-22



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

SITE PLAN
CEDAR MANOR SUBSTATION (V00388-2)

FIGURE 2-23

F:\2229\2229-13A.dwg, SITE, 04/04/05 10:18:21 AM, DCortes

complex is presently utilized to convert alternating current to direct current for the LIRR-Far Rockaway line. There is also a 90-square foot Consolidated Edison transformer area located to the west of the substation. The land surrounding the substation and the transformer yard consist of residential areas.

The Cedar Manor substation is equipped with a basement, sanitary and water services, and a utility trench system. The interior of the substation consists of two active solid-state rectifiers located over two pits that lead to the basement that once serviced mercury-containing rectifiers. The substation is also equipped with a water pipe trench with an earthen bottom located in the southwest corner of the substation. It should be noted that the Cedar Manor substation contains a bank of active lead-acid batteries located in a room along the west side of the substation to provide back-up electricity.

The initial site investigation conducted in 1999 revealed two newly installed open grate dry wells located to the south of the substation, as well as a meter pit with an earthen bottom located along the southwest corner of the substation. In addition, a roof drainage line was observed to discharge to surface soil along the east side of the substation. It should also be noted that a cleanout and vent were observed off the northwest corner of the substation.

It should be noted that the Cedar Manor substation was renovated subsequent to the initial site investigation. Renovation activities included the installation of new storm water dry wells, the addition of ballast to the substation grounds and interior painting of the substation building.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 10 feet below grade.

2.2.12 Kew Gardens (V00393-2)

The Kew Gardens substation site is located in Kew Gardens, Queens County, New York (see Figure 2-24). The substation consists of an approximate 1,800-square foot one-story brick

KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
KEW GARDENS SUBSTATION (V00393-2)

NOT TO SCALE

FIGURE 2-24

building shown on Figure 2-25. An approximate 3,100-square foot transformer yard is located adjacent to the substation to the south and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current. The areas surrounding the substation and the transformer yards are located within the LIRR right-of-way.

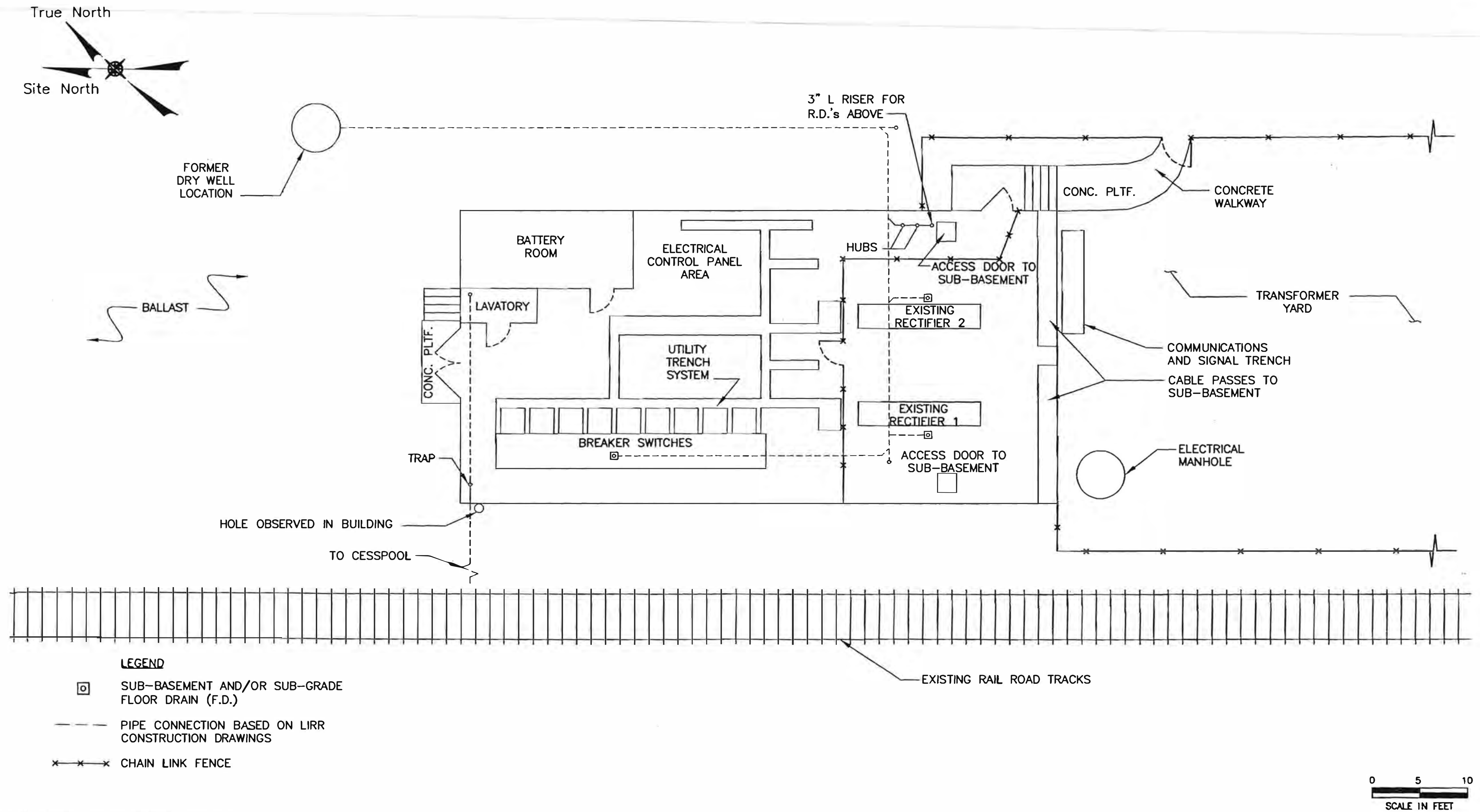
The Kew Gardens substation contains a basement, sanitary and groundwater services, and a utility trench system. The substation interior consists of two active solid-state rectifiers located over two pits that once serviced mercury-containing rectifiers and that lead to the basement. It should also be noted that the Kew Gardens substation contains a bank of active lead-acid batteries located in a room in the northeast corner of the substation to provide back-up electricity. The initial site investigation conducted in 1999 revealed a newly installed electrical manhole located within the transformer yard.

It should be noted that the Kew Garden substation was renovated subsequent to the initial site investigation. Renovation activities included the installation of new transformers, the addition of ballast to the substation grounds and interior painting of the substation building.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 45 feet below grade.

2.2.13 Shea (V00403-2)

The Shea substation site is located in Flushing, Queens County, New York (see Figure 2-26). The substation consists of a 25-foot by 40-foot one-story brick building and is located within the LIRR right-of-way, 14 feet north of the existing train tracks as shown on Figure 2-27. A 40-foot by 40-foot transformer yard is located immediately adjacent to the substation to the west and is enclosed by a chain link fence. The remaining portion of the site is a rectangular-shaped, partially-developed, parcel of land. The substation building has recently been decommissioned and is no longer utilized by the LIRR. An entirely new substation has been erected immediately to the west of the existing transformer yard which is currently used to convert alternating current to direct current for the LIRR-Port Washington line. The areas



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

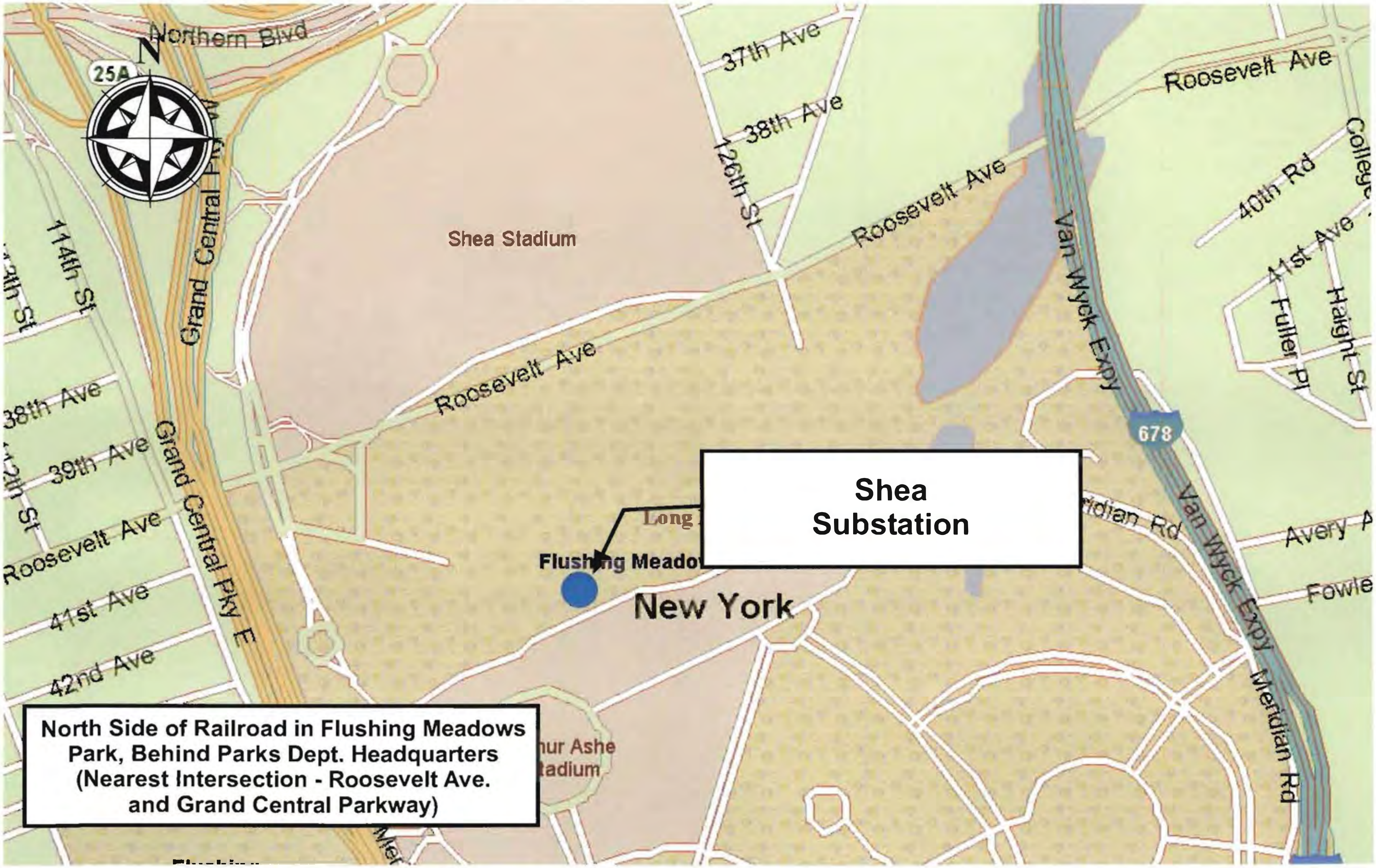
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
KEW GARDENS SUBSTATION (V00393-2)

FIGURE 2-25

F:\2229\2229-15A.dwg, SITE, 03/31/05 02:29:45 PM, DCortes



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

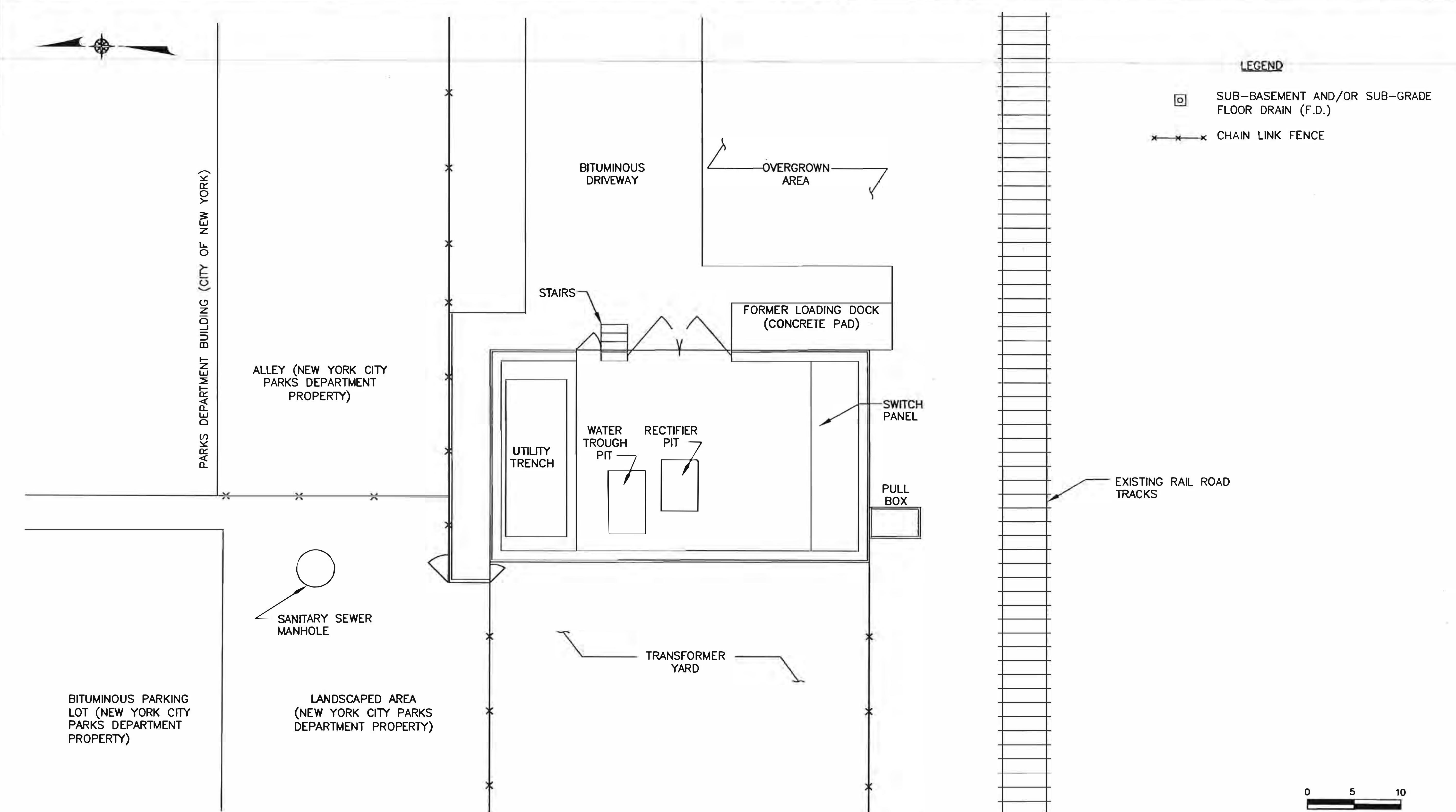
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
SHEA SUBSTATION (V00403-2)

NOT TO SCALE

FIGURE 2-26



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
SHEA SUBSTATION (V00403-2)

FIGURE 2-27

F:\2229\2229-1A.dwg, SITE, 03/31/05 02:30:28 PM, DCortes

surrounding the two substations and the transformer yard are owned and operated by the New York City Parks Department.

The Shea substation is not equipped with a basement, nor any sanitary or office facilities. The interior of the substation consists of a concrete pit that once serviced a mercury-containing rectifier, as well as two other pits, referred to as "water troughs" by LIRR construction drawings, which were covered by a metal utility plate, and an inactive utility trench. The initial site investigation conducted in 1999 revealed a metal plate-covered pull box located along the southern wall of the substation. This pull box was observed to have an earthen bottom.

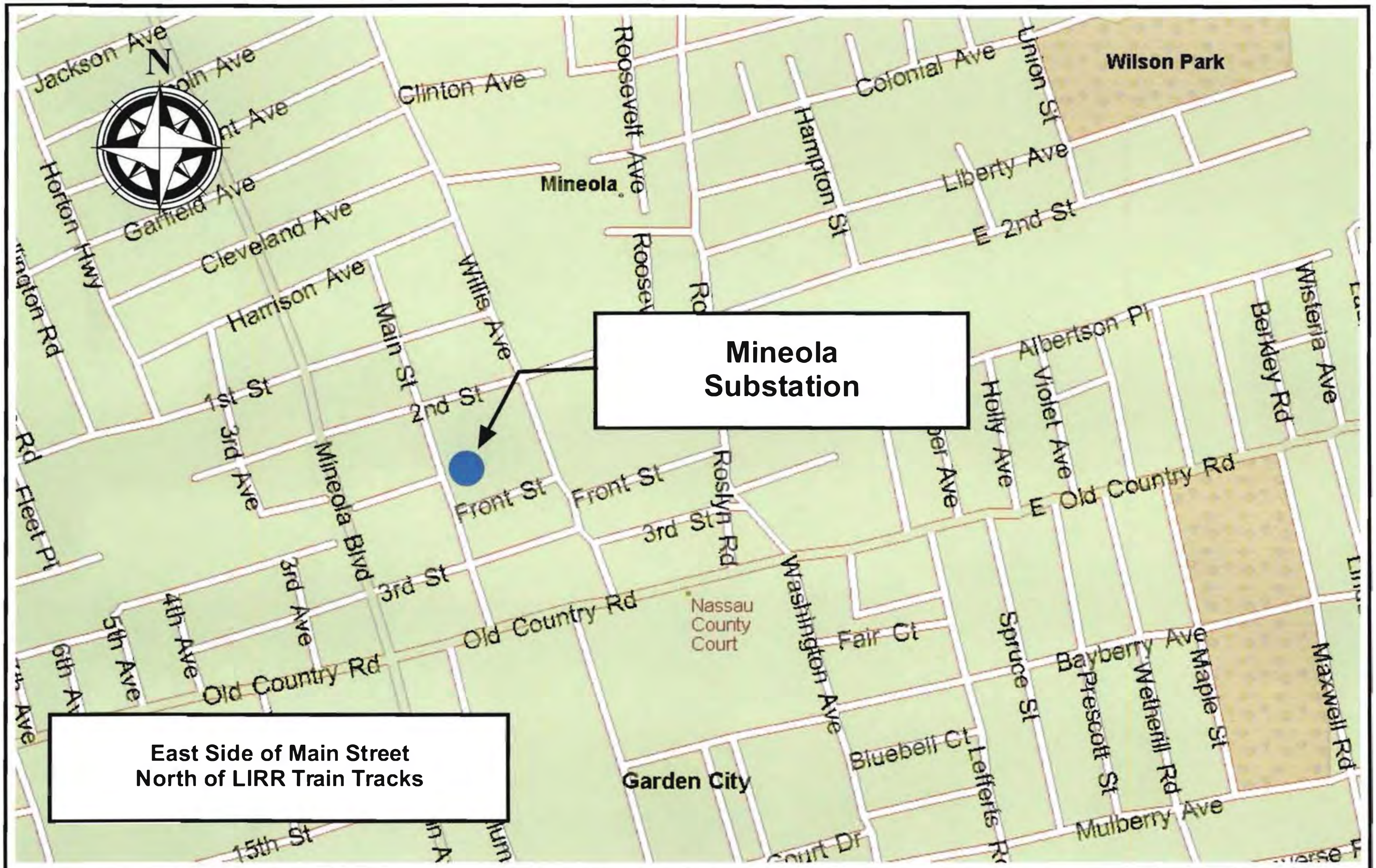
It should be noted that several cracks in the concrete floor were observed during the site investigation, as well as locations where the floor was separating from the concrete floor.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 3 to 5 feet below grade.

2.2.14 Mineola (V00398-1)

The Mineola substation site is located in Mineola, Nassau County, New York (see Figure 2-28). The substation consists of an approximate 2,400-square foot two-story brick building. An approximate 800-square foot transformer yard is located adjacent to the substation to the west and is enclosed by a chain link fence. There is also a garage located adjacent to the substation and transformer yard as shown on Figure 2-29 that contains a motor generator. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Port Jefferson line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking areas.

The Mineola substation is equipped with a basement, sanitary facilities and water services. In addition, there are two offices and a second floor mezzanine utilized for storage located inside the Mineola substation. The interior of the substation consists of two separate pits that are capped with concrete that, according to LIRR representatives, once serviced mercury-



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

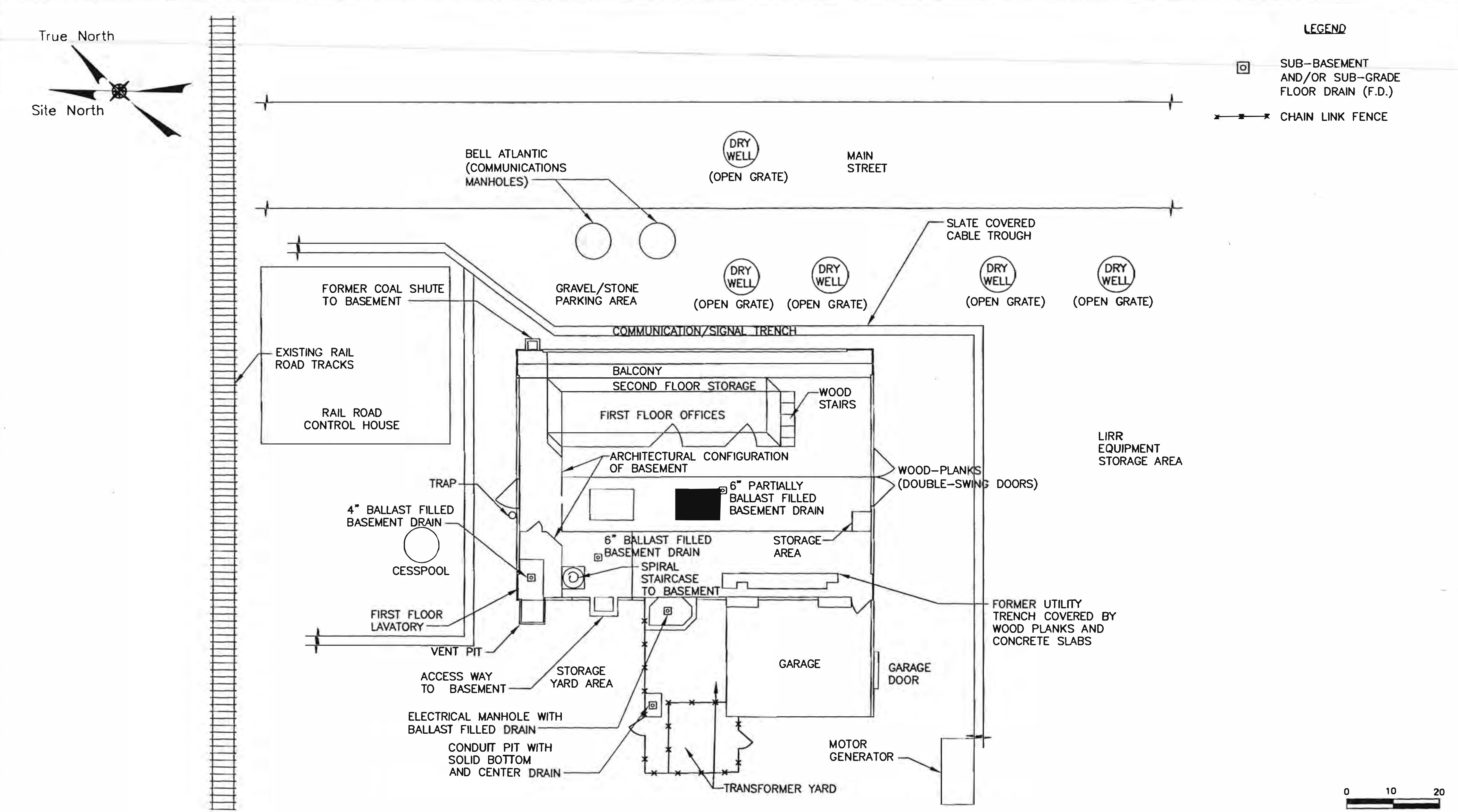
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
MINEOLA SUBSTATION (V00398-1)

NOT TO SCALE

FIGURE 2-28



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
MINEOLA SUBSTATION (V00398-1)

FIGURE 2-29

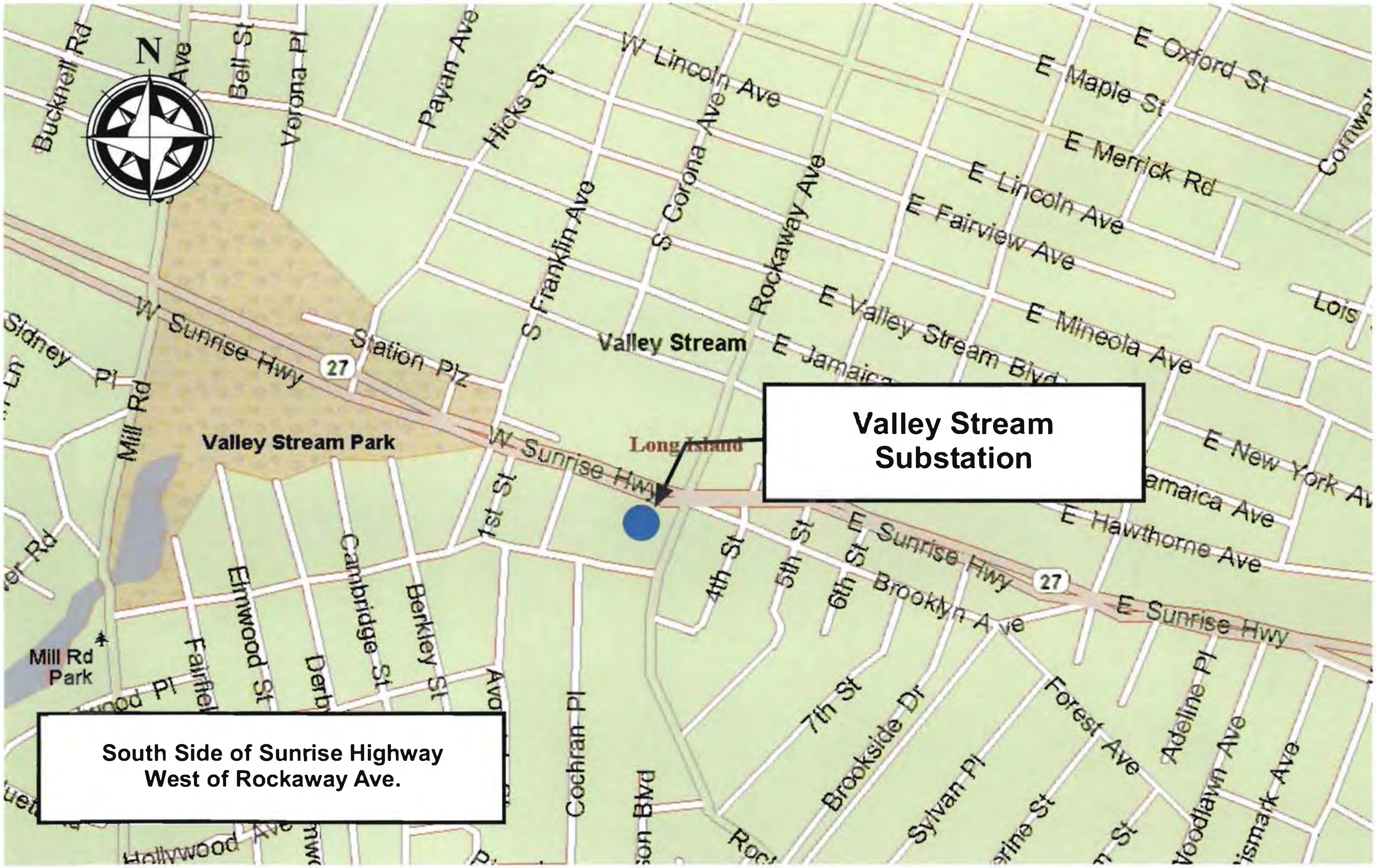
:\2229\2229-8A.dwg, SITE, 04/04/05 10:18:58 AM, DCortes containing rectifiers. During the initial site investigation, D&B observed that the basement contained three floor drains, as well as a utility trench system along the southwest side of the substation that was covered with wood planks. Four open grate dry wells were observed during the site investigation along the east side of the substation. There was also a vent pit with an earthen bottom located off the northwest corner of the substation. The initial site investigation also revealed a cesspool located approximately 25 feet north of the substation. It should be noted that the cesspool was filled with sanitary waste.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 40 to 45 feet below grade.

2.2.15 Valley Stream (V00404-1)

The Valley Stream substation site is located in Valley Stream, Nassau County, New York (see Figure 2-30). The substation consists of a 25-foot by 25-foot one-story brick building, approximately 80 feet northeast of the existing tracks as shown on Figure 2-31. A 75-foot by 30-foot transformer yard is located adjacent to the substation to the south and is enclosed by a chain link fence. The remaining portion of the site is an elongated shaped parcel of land used by the LIRR as an easement. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Far Rockaway line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking areas. It is important to note that the "front" of the Valley Stream substation is located on Sunrise Boulevard which immediately fronts a pedestrian sidewalk.

The Valley Stream substation is not equipped with a basement, nor any sanitary or office facilities. The interior of the substation consists of an active solid-state rectifier located over a pit that once serviced a mercury-containing rectifier. The substation is equipped with a second pit, referred to as a "water trough" on LIRR construction drawings, which is covered by a metal utility plate. In addition, there is a water meter pit with a concrete solid bottom located in the northeast corner of the substation that is covered with a steel plate. It should be noted that there is also a conduit pit with a solid bottom located off the southwest corner of the substation in the



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

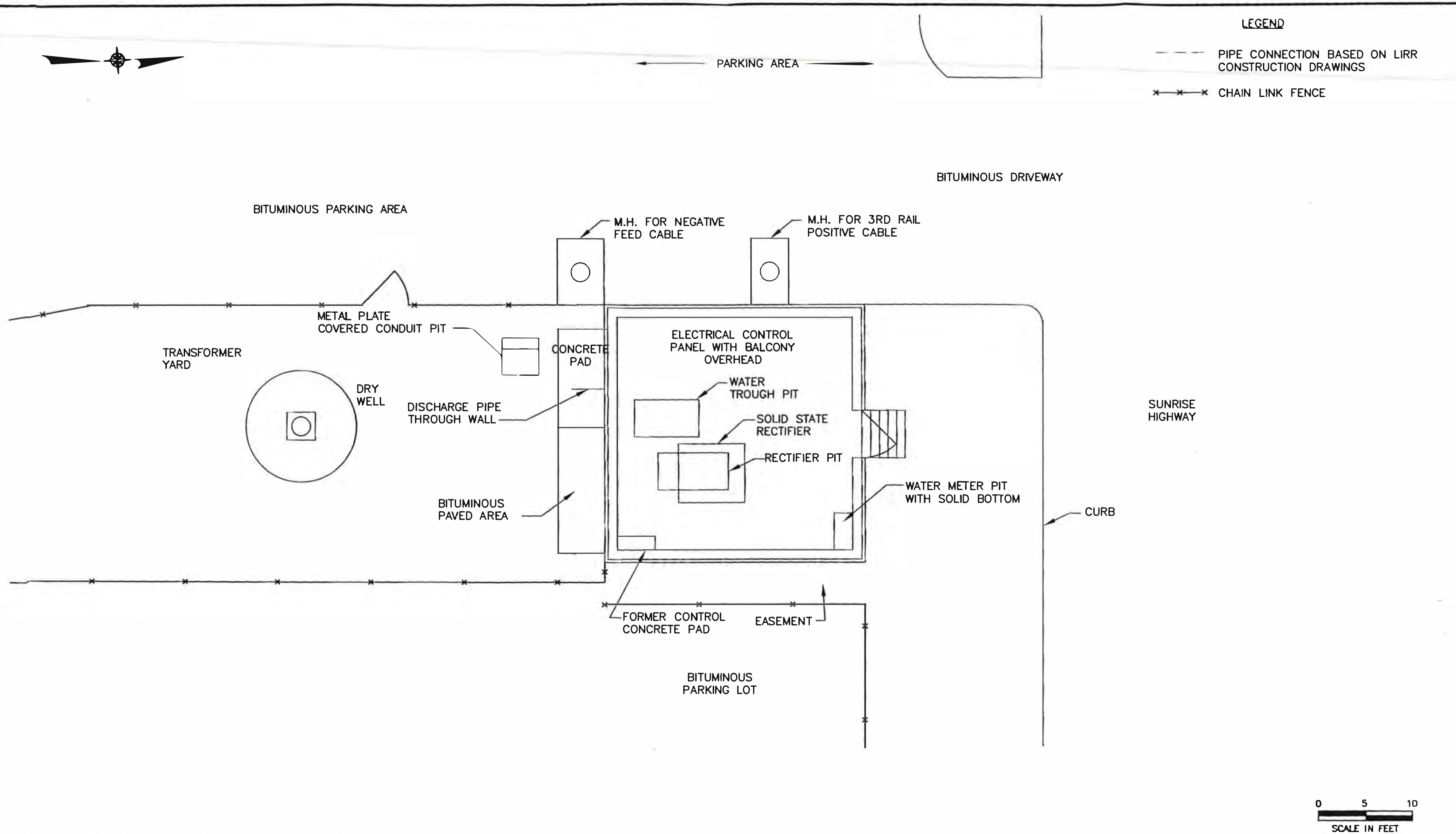
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
VALLEY STREAM SUBSTATION (V00404-1)

NOT TO SCALE

FIGURE 2-30



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
VALLEY STREAM SUBSTATION (V00404-1)

FIGURE 2-31

2229\2229-4A.dwg, SITE, 03/31/05 02:32:34 PM, DCortes transformer yard which is covered with a metal plate. A negative-feed manhole located along the west side of the substation was found to contain an earthen bottom and a positive-feed manhole along the west side of the substation was found to contain a solid bottom. The site investigation conducted in 1999 revealed a discharge pipe that ran through the south side of the substation that appeared to discharge onto a concrete pad located in the transformer yard. This discharge pipe did not appear to be connected to a drainage feature within the substation.

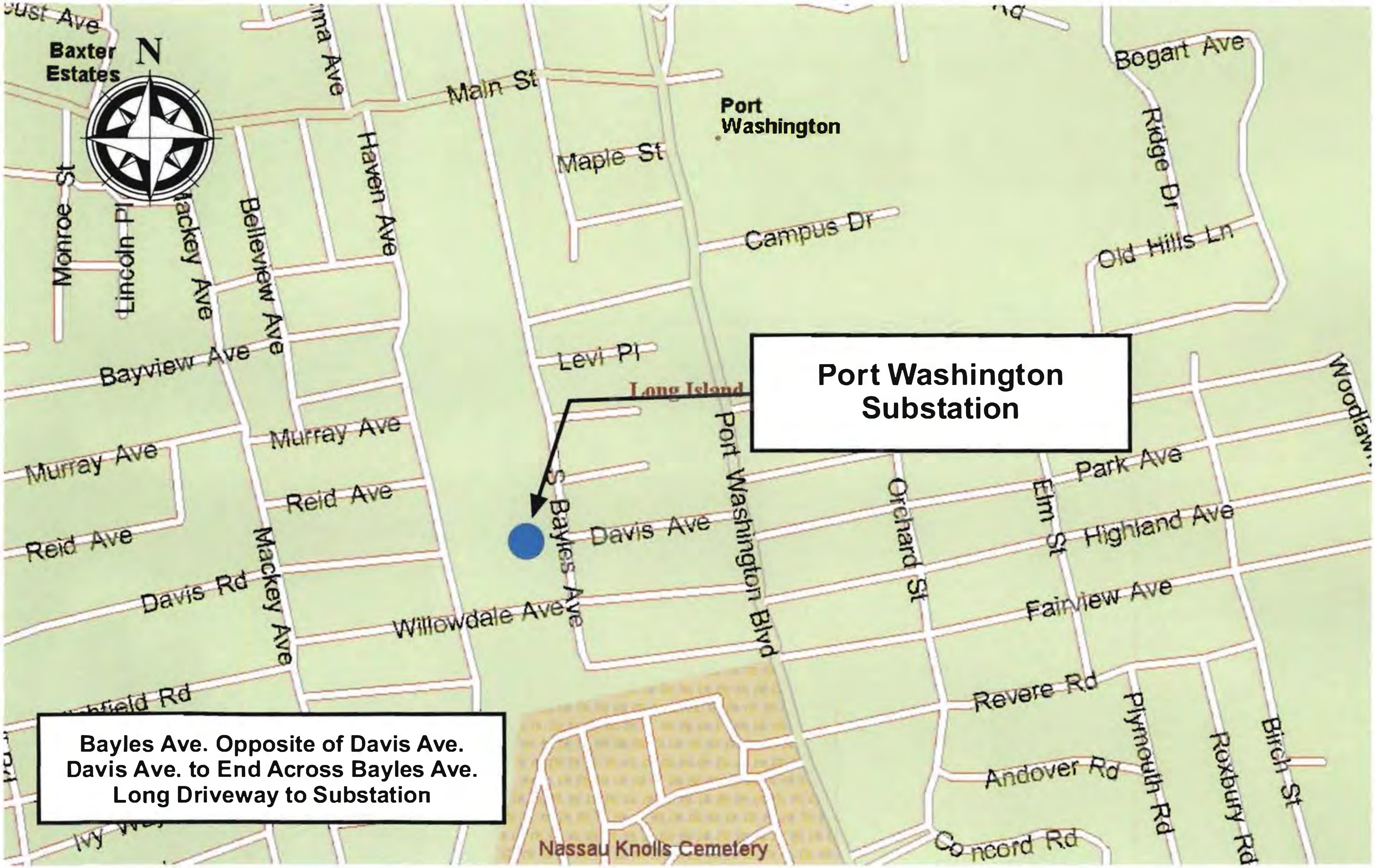
Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 5 feet below grade.

2.2.16 Port Washington (V00400-1)

The Port Washington substation site is located in Port Washington, Nassau County, New York (see Figure 2-32). The substation consists of an approximately 2,400 square foot one-story brick building as shown on Figure 2-33. An approximate 5,800-square foot transformer yard is located adjacent to the substation to the west and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Port Washington line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking areas.

The Port Washington substation is equipped with a basement, sanitary facilities, water service and a utility trench system. The interior of the substation consists of two active solid-state rectifiers located over two separate pits leading to the basement that once serviced mercury-containing rectifiers. In addition, there is a water meter pit with an earthen bottom located off the south side of the substation that is covered with a steel plate.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 40 feet below grade.



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

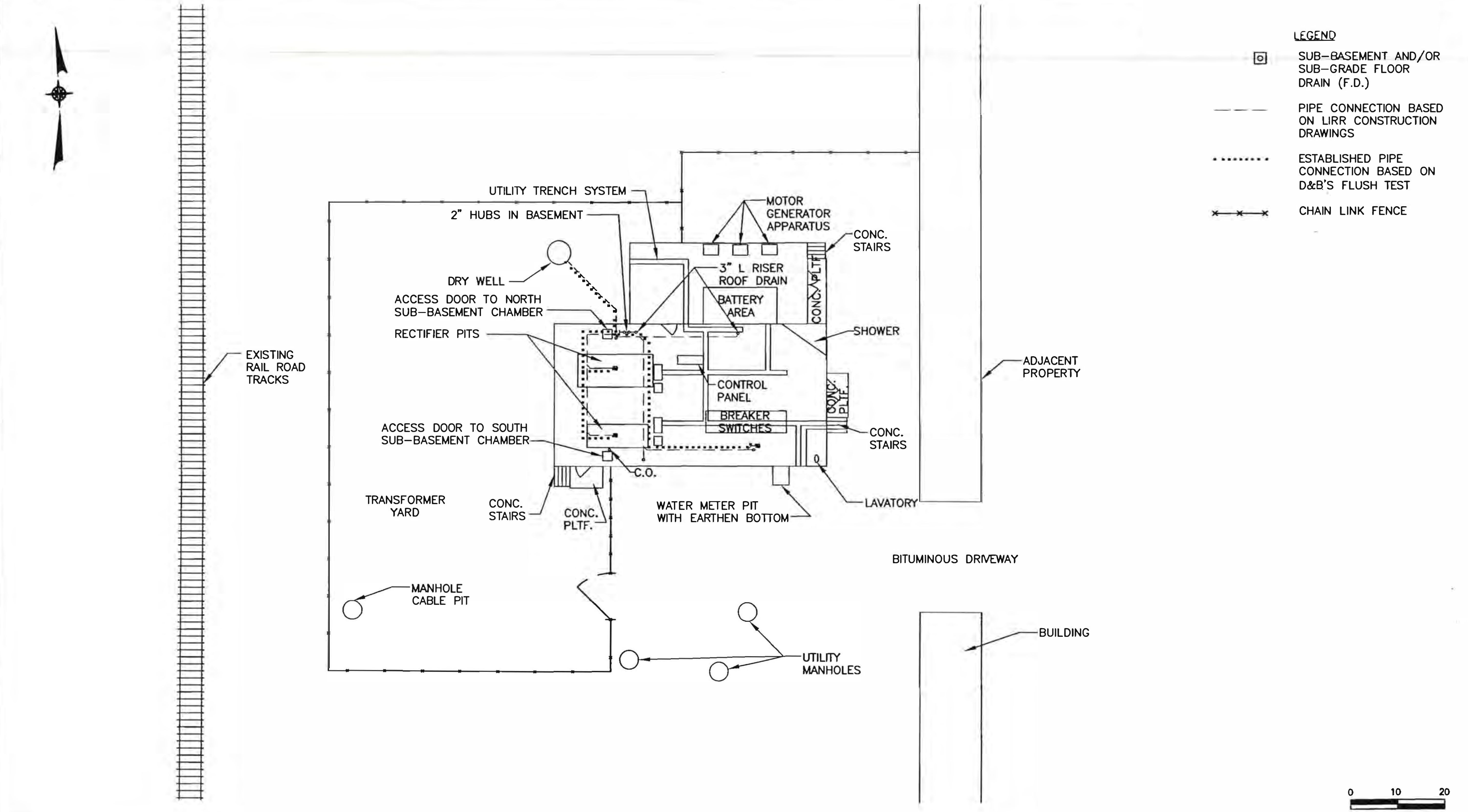
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
PORT WASHINGTON SUBSTATION (V00400-1)

NOT TO SCALE

FIGURE 2-32



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
PORT WASHINGTON SUBSTATION (V00400-1)

FIGURE 2-33

F:\2229\2229-18A.dwg, SITE, 03/31/05 02:34:38 PM, DCortes

2.2.17 Rockville Centre (V00401-1)

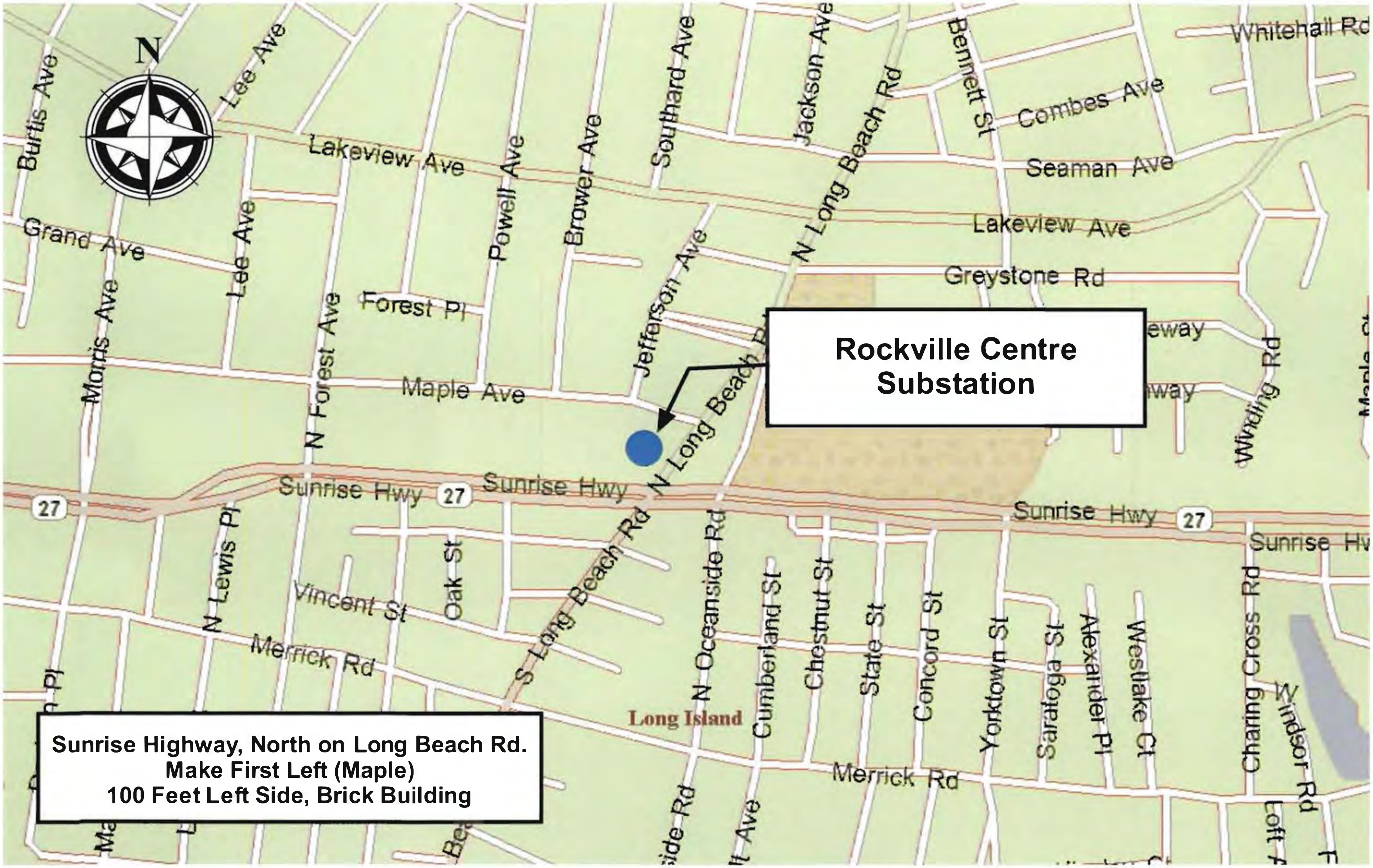
The Rockville Centre substation site is located in Rockville Centre, Nassau County, New York (see Figure 2-34). The substation consists of a 58-foot by 30-foot one-story brick building as shown on Figure 2-35. A 54-foot by 40-foot transformer yard is located adjacent to the substation to the south and is enclosed by a chain link fence. The substation complex is presently utilized to convert alternating current to direct current for the LIRR-Babylon line. The areas surrounding the substation and the transformer yard are currently utilized as vehicular parking areas.

The Rockville Centre substation is equipped with a basement, sanitary facilities, water service and a utility trench system. The interior of the substation consists of an active solid-state rectifier located over a pit leading to the basement that once serviced a mercury-containing rectifier enclosed by a chain link fence. In addition, the substation is equipped with a second pit leading to the basement that is covered with a steel plate which was utilized in conjunction with a second mercury-containing rectifier that has since been removed from the substation. Located in the southeast portion of the basement is a sump pump, which is utilized for flood prevention and discharges outside the east wall of the building to a 4-foot by 10-foot parcel of land in the southeast exterior corner of the substation building. In addition, there is a water meter pit with an earthen bottom that is located off the northwest corner of the substation and is covered with a steel plate.

Based on available topographic and groundwater elevation data, the depth to groundwater at this site is estimated to be approximately 15 feet below grade.

2.3 Technical Approach

Based on our understanding of the 17 substations from the 1999 initial environmental site assessments, the site inspections conducted with representatives of the LIRR, and our experience in recent assignments investigating and remediating mercury contamination at railroad electrical substations, we offer the following technical approach.



KRB/2229 (LIRR)/sitemaps.cdr(03/29/04)

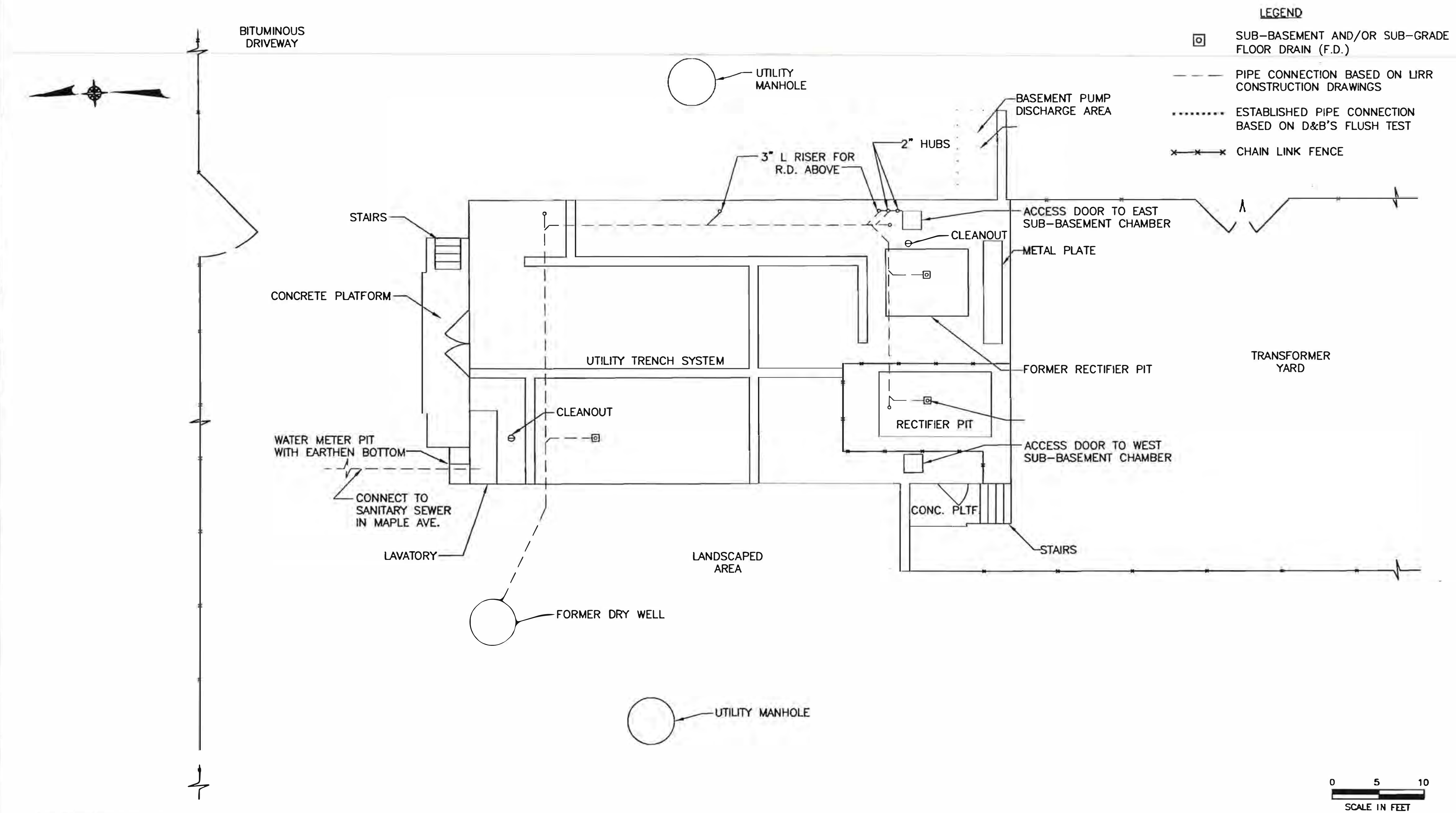
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE LOCATION MAP
ROCKVILLE CENTRE SUBSTATION (V00401-1)

NOT TO SCALE

FIGURE 2-34



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SITE PLAN
ROCKVILLE CENTRE SUBSTATION (V00401-1)

FIGURE 2-35

F:\2229\2229-5A.dwg, SITE, 03/31/05 02:35:38 PM, DCortes

We have organized the overall assignment into the following 13 tasks:

Task 1 - Delineation of Scope, Schedule and Budget

Task 2 - Identification of type, size and location of facilities through sketches, site surveys, soil samples and site visits

Task 3 - Environmental Assessment

Task 4 - Historical Assessment

Task 5 - Research, Evaluation and Recommendation of Option(s)

Task 6 - Preparation of Schedule(s)

Task 7 - Preparation of Cost Estimate(s)

Task 8 - Presentation of Recommendation(s) to LIRR

Task 9 - Integration of Comments

Task 10 - Final Report

Task 11 - Biddable Plans and Specifications

Task 12 - Remediation Oversight and Remediation Oversight Report

Task 13 - NYSDEC Meetings

Using these tasks, D&B's approach to this project will be consistent with the implementation of D&B's Delineation Phase II Site Assessment for the Manhasset, Massapequa and Island Park Substations. Presented below is a discussion of the technical activities that will be completed by D&B under each of the 13 specified tasks.

2.3.1 Task 1 - Delineation of Scope, Schedule and Budget

The following provides a discussion of the various subtasks which comprise Task 1.

2.3.1.1 - Draft/Final Investigation Work Plan

This document presents the generic and site-specific work plans to conduct the Delineation Phase II Site Assessments of the 17 substations. A detailed Generic Sampling and Analysis Plan is presented in Section 3.0. Detailed Site-Specific Work Plans are presented in Section 5.0.

2.3.1.2 - Draft/Final Health and Safety Plan

As part of this task, D&B will prepare a draft and final Health and Safety Plan (HASP) to address worker safety at the sites. The HASP (provided under separate cover) will outline our Project Team's health and safety program for this assignment. Site-specific information shall be provided in individual sections marked with tabs and/or contrasting color pages to allow quick access in emergencies. The HASP shall contain at a minimum:

- Project Team Key Personnel (including names, titles, telephone numbers and pager numbers)
- Responsibilities of Key Personnel
- Emergency Telephone Numbers (Fire, Police, EMS, LIRR Movement Bureau, LIRR System Safety and any site-specific information such as phone numbers at each substation if available)
- Map with route to nearest hospital indicated from each substation.
- Text description of route to nearest hospital from each substation.
- Description of site and work to be performed.
- Delineation of site, including access points, security, sign-in log, location of HASP, decontamination area, equipment storage area and waste staging area for each substation.
- Material Safety Data Sheets or other approved information sources representing materials reasonably expected to be encountered on-site (i.e., transformer oil, PCB, lead, asbestos, etc.).

- Physical hazards which may be encountered; trenching/excavation hazards, confined space entry, hot work (welding), fall protection, lock-out/tag-out, heavy equipment and noise.

- Personal Protective Equipment (PPE) to be used on-site, and exposure monitoring levels or conditions where PPE upgrades are required.

- Instruction on proper use of PPE including donning/doffing, testing, decontaminating, and signs of PPE failure.

- Decontamination procedures for exposed workers.

- List of personnel decontamination materials and equipment, and their location on site for each substation.

- Methods for protecting equipment from contamination or decontaminating any equipment.

- List of equipment decontamination materials and equipment, and their location on site.

- Procedures to be followed in case of emergencies (i.e., fire, worker injury, etc.) for each substation.

- Methods and procedures to be used to comply with OSHA exposure monitoring requirements.

- Accident/Incident Reporting Forms and other forms used on site for health and safety.

2.3.1.3 - Underground Injection Control (UIC) Closure Work Plan

An underground injection control closure work plan will be prepared, which specifies the procedures to be employed for sealing any floor drains and disconnecting any slop sinks which are determined to discharge to the dry wells along with the decommissioning of any distribution/ septic tanks, dry wells or any feature determined by a Qualified Regulatory Agency to require closure. All closure activities will be in accordance with Part C of the federal Safe Drinking Water Act. Regulations concerning the UIC program are contained at 40 CFR Parts 124, 144, 145, 146 and 147. In accordance with typical UIC requirements, the steps outlined in this closure plan will be implemented for drainage structures that are determined to require closure pursuant to the UIC program.

A total of nine of the 17 substations will require UIC closures, including:

- Bellaire
- Far Rockaway
- Floral Park
- Hempstead
- Lindenhurst
- Little Neck
- Mineola
- Port Washington
- Valley Stream

Note that site inspections by Qualified Regulatory Agencies, including the local health departments, the NYSDEC and/or the USEPA, may add to the current total of nine sites requiring UIC closures, and/or the current total number of features requiring a UIC closure.

2.3.1.4 - Finalization of Project Schedules and Budgets

Upon regulatory approval of the Investigation Work Plan discussed under Section 2.3.1.1, D&B will update and finalize the project schedules and budgets. Based on D&B's experience with similar projects, the project schedules often require updating due to the request of additional field sampling and other activities by the regulatory agencies that are charged with approving the work plan. Similarly, project budgets have to be updated to reflect any increases in the investigation scope of work required by the reviewing agencies.

2.3.2 Task 2 - Identification of Type, Size and Location of Facilities through Sketches, Site Surveys, Soil Samples and Site Visits

As part of our initial site assessment of the 20 substations for the LIRR completed in December 2000, D&B developed scaled site maps for each of the 17 substations to be investigated as part of this project. Since then, D&B has visited each substation in order to determine if the site maps require revision. Updated site maps are presented above, in Section 2.2 of this work plan. As part of this task, D&B will continue to update the site maps, as necessary, due to any changes in the layout of the substations which may occur.

2.3.3 Task 3 - Environmental Assessment

The following provides a discussion of the various subtasks which comprise Task 3.

2.3.3.1 - Field Investigation

The field investigation program will consist of the following elements:

- Surface Soil and Subsurface Soil Sampling,
- Sediment Sampling,
- Test Pit Excavation,
- Direct Push Groundwater Screening and Sampling,
- Groundwater Monitoring Well Sampling,
- Air Screening/Monitoring, and
- Geophysical Surveying.

Site-specific work plans summarizing all proposed field work in support of the Delineation Phase II Site Assessment are presented in Section 5.0.

2.3.3.2 - Fish and Wildlife Resources Impact Analysis

Appendix 3C of the Draft DER-10 document will be used to substantiate the need for a Fish and Wildlife Resources Impact Analysis (FWRIA). The decision key present in Appendix 3C will be used, if there is any doubt, as a final determination as to whether a FWRIA is needed. The following substation sites will require a determination as to whether or not a FWRIA will be performed based on the site characteristics and previous environmental studies indicating that regulated wetlands are located on the site or adjacent properties according to the criteria stated in the Draft DER-10 regulatory guidance document.

- Babylon Yard
- Rockville Center
- Port Washington
- Nassau Boulevard
- Little Neck
- Cedar Manor
- Lindenhurst

Based on the assessment discussed above, a wildlife habitat survey will be conducted at each substation determined to require a FWRIA. The survey will be performed in accordance with Step I and IIa of the NYSDEC Division of Fish and Wildlife document entitled, "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites," dated October 1994.

The goals of the Fish and Wildlife Resources Impact Analysis are to:

- Identify the potential impacts to flora and fauna posed by existing contamination at the site; and
- Provide a basis for determining required remediation and contaminant levels that can remain on-site and off-site, while providing adequate protection of ecological resources.

The Step I analysis will include the following:

- Preparation of a location map with the site perimeter clearly defined;
- Documentation of fish and wildlife resources capable of utilizing the site including species and/or their habitats considered endangered, threatened, rare or of special concern;
- Preparation of a cover-type map presenting major vegetative communities in the vicinity of the site;
- Correlation table of the value of the cover types to the fish and wildlife resources of the vicinity;
- Qualitative assessment of contaminant-induced stress on local flora/fauna; and
- A qualitative evaluation of the fish and wildlife resources present and their value to humans.

A Step IIa analysis will include observed and expected fish and wildlife receptors of any potential contamination, as well as identifiable vectors of contamination, and a qualitative assessment of impacts from site-related contaminants.

The information and findings associated with the FWRIA will be utilized to determine if further investigation and/or quantification of fish and wildlife impacts are warranted.

The information and findings associated with the FWRIA will be presented in the final report for this project (Task 10).

2.3.3.3 - Public Health Exposure Assessments

A qualitative public health exposure assessment will be prepared based upon the results of the Delineation Phase II Site Assessment, as well as the results of the previous investigations conducted at the 17 substations.

The goals of the public health exposure assessment are to:

- Determine the potential human health risk under current/baseline site conditions, including identification of the contaminants of concern, contaminant migration pathways, routes of exposure and potential receptors;
- Identify areas, on-site and off-site, that may require remediation where significant impacts or potential impacts have been identified; and
- Provide a basis for determining contaminants that can remain on-site and off-site, while providing adequate protection of human health for both current and anticipated site use.

The contaminants of concern (COCs) will be developed for the substation sites from validated investigation data and based on the exceedances of standards, criteria and guidelines (SCGs) selected for the sites. The COCs will represent the most toxic, mobile and persistent contaminants at the sites, as well as those contaminants which are detected most frequently and at the highest concentrations. Identification of the COCs will focus the exposure assessment on those contaminants which pose the greatest threat to human health.

Utilizing information from the Delineation Phase II Site Assessments, site reconnaissance and previous site investigations, the contaminant sources, migration pathways and human exposure points will be identified and evaluated. Potential human exposures to contaminants and contaminated media include ingestion, inhalation and dermal contact with waste, groundwater, surface soil, subsurface soil, surface water and surface water sediment. Potential receptors on-site will be adult workers and occasional adult visitors, while off-site potential receptors will include neighboring residents. The information and findings associated with the qualitative public health exposure assessment will be presented in the final report for this project.

With regard to the selection of SCG, the following will be used to screen the data to identify, ***on a preliminary basis***, the COCs.

- Surface and Subsurface Soil - NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046, Determination of Soil Cleanup Objectives and Levels for initial screening, and USEPA Risk-Based Concentrations for Industrial Land Use for secondary screening;
- Surface Water Sediment - TAGM 4046 for human exposure and NYSDEC Technical Guidance for Screening Contaminated Sediment for ecological exposure; and
- Groundwater - NYSDEC Technical and Operational Guidance Series (TOGS) (1.1.1), Ambient Water Quality Standards and Guidance Values.

Exceedances of SCGs will identify the contaminants, media and areas of concern for the substation sites to determine if the potential of an unacceptable risk to human health exists based on current and anticipated use of the site, potential on-site and off-site receptors and potential contaminant migration pathways. While it is the intention of the LIRR to maintain the 17 substations as electric substations for the foreseeable future, at the request of the NYSDOH, the public health exposure assessment will evaluate potential future exposures based on the substations being used for residential purposes.

The information and findings associated with the public health exposure assessment will be presented in the final report for this project (Task 10).

2.3.4 Task 4 - Historical Assessment

As part of our initial site assessment of 20 electrical substations completed in December of 2000, D&B reviewed all available historic records and plans associated with all of the 17 substations to be investigated under this program. As part of this task, D&B reviewed Sanborn maps, aerial photographs and available LIRR construction drawings. In addition, D&B submitted Freedom of Information Law (FOIL) requests and reviewed available files from various New York City and Long Island municipal agencies. The findings of this historical assessment were discussed in Section 2.0 of the report entitled, "Site Assessment of 20 Substations for Mercury Contamination," dated December 2000. As part of the Delineation Phase II Site Assessment report, D&B will update this information for the 17 substations and present it in the Draft/Final Delineation Phase II Assessment Report as described under Task 10.

2.3.5 Task 5 - Research, Evaluation and Recommendation of Options

As part of this task, D&B will apply a "focused feasibility study"/presumptive remedy approach to the evaluation and selection of remedial alternatives for each of the 17 substations. Based on our experience, the primary exposure pathways at mercury-contaminated substations that require mitigation include direct exposure to mercury-contaminated surface soil and direct exposure to subsurface soil. In addition, reduction or control of the mercury source material (i.e., removal or capping of hot spots) is an important remedial goal. Rarely is the impact to groundwater an issue at these sites. Another important factor in the selection of remedial alternatives for the LIRR electric substation sites is the fact that the sites will remain as electric substations in the future and that access to the sites is limited to LIRR employees and its maintenance contractors.

Therefore, based on the results of the FWRIA and the human health exposure assessment, the likely remedial options to be employed at each of the substations include the following:

- Limited soil removal in hot spot areas containing elevated levels of mercury or other contaminants in order to reduce/eliminate contaminant source areas;

- Capping of surface soil with either pavement or bluestone within or adjacent to substations in order to prevent direct exposure to surface soil;

- Use of institutional controls such as deed restrictions; and

- Environmental monitoring

While the remedial actions to be undertaken at each site will likely be limited to the above-listed remedial options, D&B will evaluate other remedial options or technologies if warranted based on the results of the site assessment, FWRIA or the human health exposure assessment. For example, a number of the substations are located in close proximity to tidal creeks and wetlands. Therefore, remediation of surface water sediments may require evaluation for these sites if the results of the site assessment indicate that these resources have been impacted.

The results of the remedial alternatives study will be presented in the Delineation Phase II Report (Task 10) for each substation.

2.3.6 Task 6 - Preparation of Schedule(s)

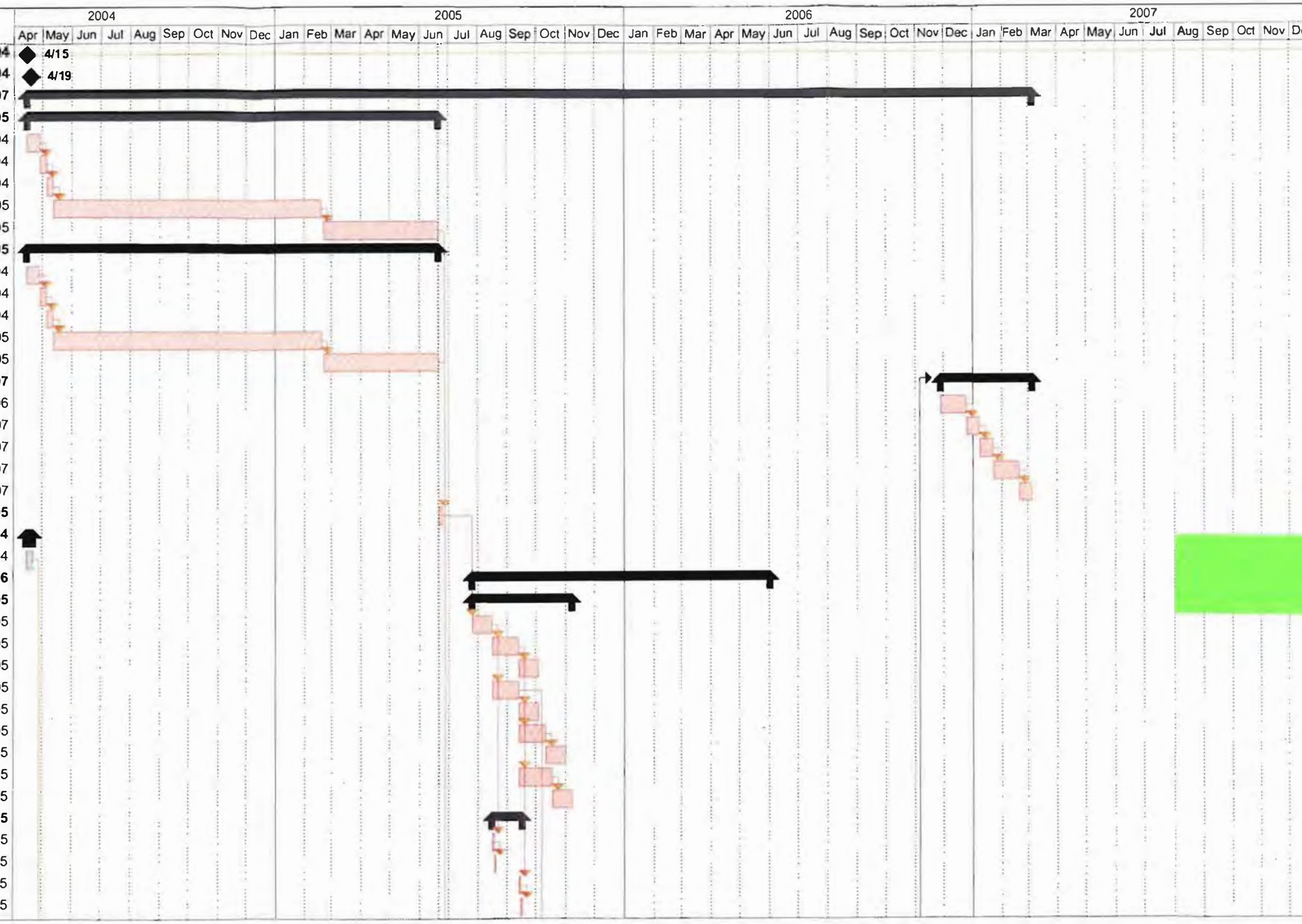
The schedule for implementation of this project is provided in Figure 2-36. Specific deadlines for completion of tasks and subtasks are established throughout the project schedule to ensure timely completion of the work.

2.3.6.1 - Update of Project Schedules

In accordance with the VCA, D&B will update the project schedules on a monthly basis as the project progresses to reflect any changes (additions or deletions) in the scope of work of the investigation at each of the substations.

LONG ISLAND RAIL ROAD
Substation Delineation Phase II Site Assessment/ Remedial Investigaiton/Feasibility Study

ID	Task Name	Duration	Start	Finish
1	**Notice to Proceed**	**0 days**	**4/15/2004**	**4/15/2004**
2	**Project Kickoff Meeting**	**0 days**	**4/19/2004**	**4/19/2004**
3	**Subtask 1 - Delineation of Scope, Schedule and Budget**	**753 days**	**4/15/2004**	**3/5/2007**
4	**1.1 - Draft/Final Work Plan for 17 Substations**	**308 days**	**4/15/2004**	**6/20/2005**
5	- Develop Draft Work Plan	10 days	4/15/2004	4/28/2004
6	- LIRR Review of Draft Work Plan	5 days	4/29/2004	5/5/2004
7	- Address LIRR Comments/Finalize Work Plan	5 days	5/6/2004	5/12/2004
8	- Regulatory Review of Work Plan	202 days	5/13/2004	2/18/2005
9	- Address Regulatory Comments/Finalize Work Plan	86 days	2/21/2005	6/20/2005
10	**1.2 - Draft/Final Health and Safety Plan (HASP)**	**308 days**	**4/15/2004**	**6/20/2005**
11	- Develop Draft HASP	10 days	4/15/2004	4/28/2004
12	- LIRR Review of Draft HASP	5 days	4/29/2004	5/5/2004
13	- Address LIRR Comments/Finalize HASP	5 days	5/6/2004	5/12/2004
14	- Regulatory Review of HASP	202 days	5/13/2004	2/18/2005
15	- Address Regulatory Comments/Finalize HASP	86 days	2/21/2005	6/20/2005
16	**1.3 - Draft/Final UIC Closure Work Plan**	**70 days**	**11/28/2006**	**3/5/2007**
17	- Develop Draft Work Plan	20 days	11/28/2006	12/25/2006
18	- LIRR Review of Draft Work Plan	10 days	12/26/2006	1/8/2007
19	- Address LIRR Comments/Finalize Work Plan	10 days	1/9/2007	1/22/2007
20	- Regulatory Review of Work Plan	20 days	1/23/2007	2/19/2007
21	- Address Regulatory Comments/Finalize Work Plan	10 days	2/20/2007	3/5/2007
22	**1.4 Finalize Project Schedules and Budgets**	**4 days**	**6/21/2005**	**6/24/2005**
23	**Subtask 2 - Identification of Facilities**	**5 days**	**4/15/2004**	**4/21/2004**
24	2.1 Identification of Facilities	5 days	4/15/2004	4/21/2004
25	**Subtask 3 - Environmental Assessment**	**223 days**	**7/26/2005**	**6/1/2006**
26	**3.1 - Field Investigation**	**75 days**	**7/26/2005**	**11/7/2005**
27	- Project Mobilization	15 days	7/26/2005	8/15/2005
28	- Complete Field Investig. for Group A Sites* (Team 1)	20 days	8/16/2005	9/12/2005
29	- Lab Analysis for Group A Sites	15 days	9/13/2005	10/3/2005
30	- Complete Field Investig. for Group B Sites* (Team 2)	20 days	8/16/2005	9/12/2005
31	- Lab Analysis for Group B Sites	15 days	9/13/2005	10/3/2005
32	- Complete Field Investig. for Group C Sites* (Team 1)	20 days	9/13/2005	10/10/2005
33	- Lab Analysis for Group C Sites	15 days	10/11/2005	10/31/2005
34	- Complete Field Investig. for Group D Sites* (Team 2)	25 days	9/13/2005	10/17/2005
35	- Lab Analysis for Group D Sites	15 days	10/18/2005	11/7/2005
36	**3.2 - Fish and Wildlife Assessments**	**24 days**	**8/16/2005**	**9/16/2005**
37	- Group A Sites*	2 days	8/16/2005	8/17/2005
38	- Group B Sites*	2 days	8/18/2005	8/19/2005
39	- Group C Sites*	2 days	9/13/2005	9/14/2005
40	- Group D Sites*	2 days	9/15/2005	9/16/2005

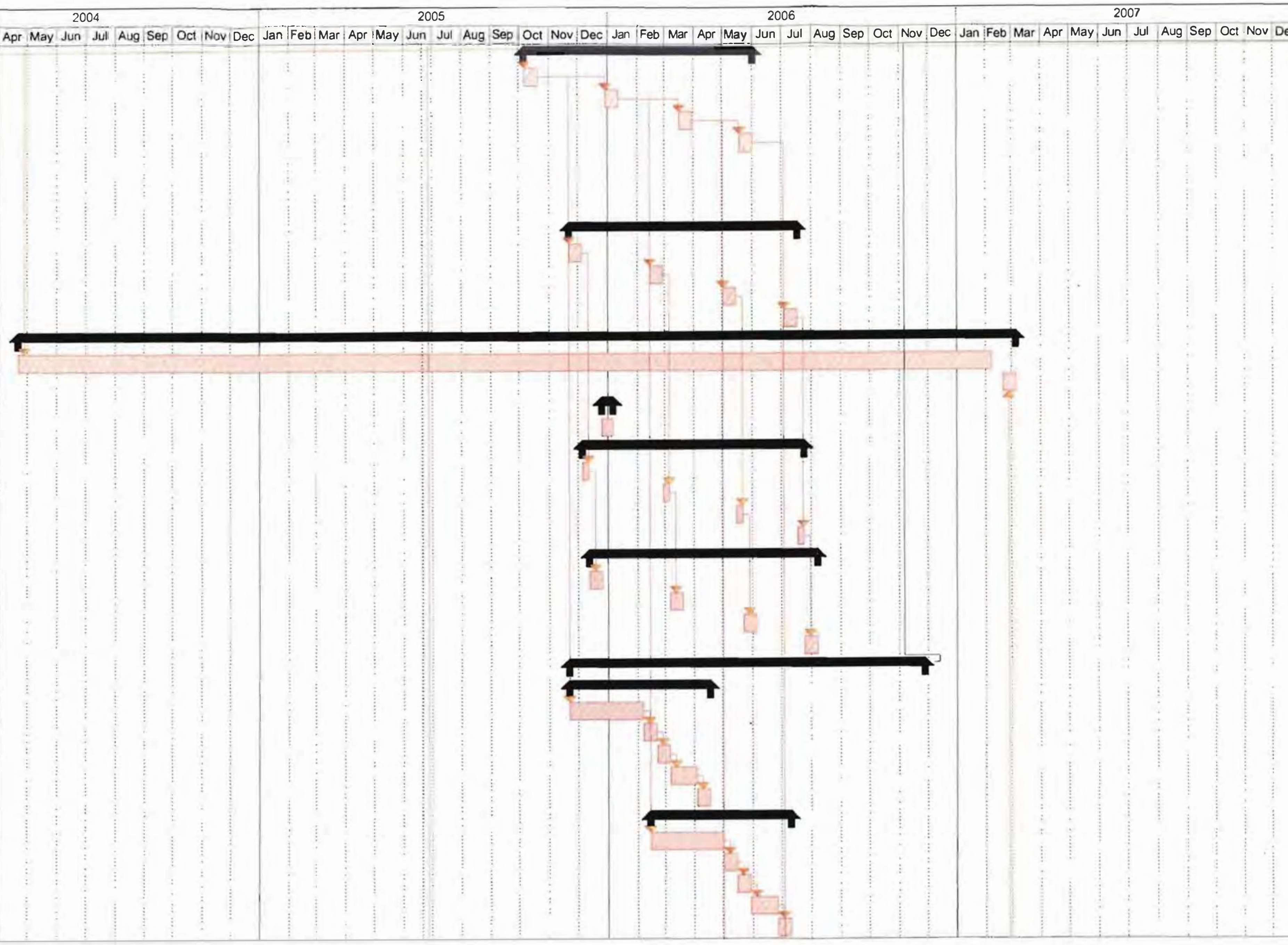


Legend: Task | Milestone ◆ | Summary

Proposed Project Schedule
Figure 2-36

LONG ISLAND RAIL ROAD
Substation Delineation Phase II Site Assessment/
Remedial Investigaiton/Feasibility Study

ID	Task Name	Duration	Start	Finish
41	**3.3 - Health Risk/Exposure Assessment**	**170 days**	**10/7/2005**	**6/1/2006**
42	- Group A Sites*	10 days	10/7/2005	10/20/2005
43	- Group B Sites*	10 days	12/30/2005	1/12/2006
44	- Group C Sites*	10 days	3/17/2006	3/30/2006
45	- Group D Sites*	10 days	5/19/2006	6/1/2006
46	**Subtask 4 - Historical Assessment**	**0 days**	**4/1/2004**	**4/1/2004**
47	**4.1 - Historical Assessment (Completed) ****	**0 days**	**4/1/2004**	**4/1/2004**
48	**Subtask 5 - Research, Eval. and Recommendation of Option(s)**	**170 days**	**11/22/2005**	**7/17/2006**
49	**5.1 - Remedial Alternatives Study**	**170 days**	**11/22/2005**	**7/17/2006**
50	- Group A Sites*	10 days	11/22/2005	12/5/2005
51	- Group B Sites*	10 days	2/14/2006	2/27/2006
52	- Group C Sites*	10 days	5/2/2006	5/15/2006
53	- Group D Sites*	10 days	7/4/2006	7/17/2006
54	**Subtask 6 - Preparation of Schedule(s)**	**748 days**	**4/22/2004**	**3/5/2007**
55	**6.1 - Update Project Schedules**	**730 days**	**4/22/2004**	**2/7/2007**
56	**6.2 - Remedial Design and Construction Schedules**	**10 days**	**2/20/2007**	**3/5/2007**
57	**Subtask 7 - Preparation of Cost Estimate(s)**	**10 days**	**12/26/2005**	**1/6/2006**
58	**7.1 - Preparation of Cost Estimate(s)**	**10 days**	**12/26/2005**	**1/6/2006**
59	**Subtask 8 - Presentation of Recommendation(s) to LIRR**	**165 days**	**12/6/2005**	**7/24/2006**
60	- Group A Sites	5 days	12/6/2005	12/12/2005
61	- Group B Sites	5 days	2/28/2006	3/6/2006
62	- Group C Sites	5 days	5/16/2006	5/22/2006
63	- Group D Sites	5 days	7/18/2006	7/24/2006
64	**Subtask 9 - Integration of LIRR Comments**	**170 days**	**12/13/2005**	**8/7/2006**
65	- Group A Sites	10 days	12/13/2005	12/26/2005
66	- Group B Sites	10 days	3/7/2006	3/20/2006
67	- Group C Sites	10 days	5/23/2006	6/5/2006
68	- Group D Sites	10 days	7/25/2006	8/7/2006
69	**Subtask 10 - Final Reports**	**265 days**	**11/22/2005**	**11/27/2006**
70	**10.1 - Final Report for Group A Sites**	**105 days**	**11/22/2005**	**4/17/2006**
71	- Develop Draft Report	55 days	11/22/2005	2/6/2006
72	- LIRR Review of Draft Report	10 days	2/7/2006	2/20/2006
73	- Address LIRR Comments/Finalize Report	10 days	2/21/2006	3/6/2006
74	- Regulatory Review of Report	20 days	3/7/2006	4/3/2006
75	- Address Regulatory Comments/Finalize Report	10 days	4/4/2006	4/17/2006
76	**10.2 - Final Report for Group B Sites**	**105 days**	**2/14/2006**	**7/10/2006**
77	- Develop Draft Report	55 days	2/14/2006	5/1/2006
78	- LIRR Review of Draft Report	10 days	5/2/2006	5/15/2006
79	- Address LIRR Comments/Finalize Report	10 days	5/16/2006	5/29/2006
80	- Regulatory Review of Report	20 days	5/30/2006	6/26/2006
81	- Address Regulatory Comments/Finalize Report	10 days	6/27/2006	7/10/2006

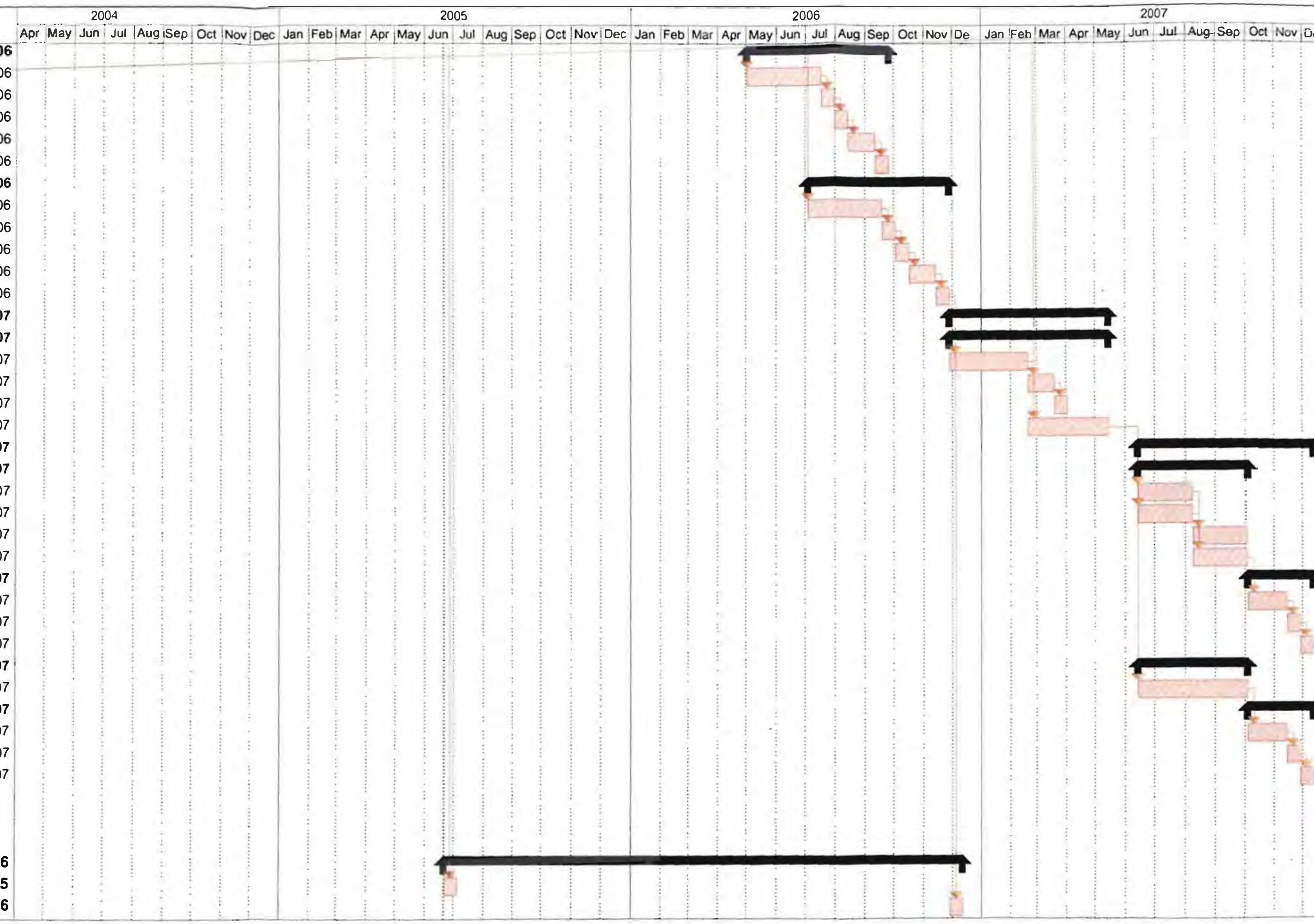


Legend: Task Milestone ◆ Summary

Proposed Project Schedule
Figure 2-36

LONG ISLAND RAIL ROAD
Substation Delineation Phase II Site Assessment/ Remedial Investigaiton/Feasibility Study

ID	Task Name	Duration	Start	Finish
82	**10.3 - Final Report for Group C Sites**	**105 days**	**5/2/2006**	**9/25/2006**
83	- Develop Draft Report	55 days	5/2/2006	7/17/2006
84	- LIRR Review of Draft Report	10 days	7/18/2006	7/31/2006
85	- Address LIRR Comments/Finalize Report	10 days	8/1/2006	8/14/2006
86	- Regulatory Review of Report	20 days	8/15/2006	9/11/2006
87	- Address Regulatory Comments/Finalize Report	10 days	9/12/2006	9/25/2006
88	**10.4 - Final Report for Group D Sites**	**105 days**	**7/4/2006**	**11/27/2006**
89	- Develop Draft Report	55 days	7/4/2006	9/18/2006
90	- LIRR Review of Draft Report	10 days	9/19/2006	10/2/2006
91	- Address LIRR Comments/Finalize Report	10 days	10/3/2006	10/16/2006
92	- Regulatory Review of Report	20 days	10/17/2006	11/13/2006
93	- Address Regulatory Comments/Finalize Report	10 days	11/14/2006	11/27/2006
94	**Subtask 11 - Biddable Plans and Specifications**	**120 days**	**11/28/2006**	**5/14/2007**
95	**11.1 - Biddable Plans and Specifications**	**120 days**	**11/28/2006**	**5/14/2007**
96	- Develop Draft Plans and Specifications	60 days	11/28/2006	2/19/2007
97	- LIRR Review of Draft Plans and Specifications	20 days	2/20/2007	3/19/2007
98	- Address LIRR Comments/Finalize Plans and Specs.	10 days	3/20/2007	4/2/2007
99	- Support LIRR in Bid Selection	60 days	2/20/2007	5/14/2007
100	**Subtask 12 - Remediation Oversight and Remed. Report**	**130 days**	**6/14/2007**	**12/12 2007**
101	**12.1 - Remediation Oversight**	**80 days**	**6/14/2007**	**10/3/2007**
102	- Group A Sites (Team 1)	40 days	6/14/2007	8/8/2007
103	- Group B Sites (Team 2)	40 days	6/14/2007	8/8/2007
104	- Group C Sites (Team 1)	40 days	8/9/2007	10/3/2007
105	- Group D Sites (Team 2)	40 days	8/9/2007	10/3/2007
106	**12.2 - Remediation Report**	**50 days**	**10/4/2007**	**12/12/2007**
107	- Develop Draft Remediation Report	30 days	10/4/2007	11/14/2007
108	- LIRR Review of Draft Remediation Report	10 days	11/15/2007	11/28/2007
109	- Address LIRR Comments/Finalize Remediation Report	10 days	11/29/2007	12/12/2007
110	**12.3 - UIC Closures**	**80 days**	**6 14/2007**	**10/3/2007**
111	- 9 Sites Total	80 days	6/14/2007	10/3/2007
112	**12.4 - UIC Closure Report**	**50 days**	**10/4/2007**	**12/12/2007**
113	- Develop Draft UIC Closure Report	30 days	10/4/2007	11/14/2007
114	- LIRR Review of Draft UIC Closure Report	10 days	11/15/2007	11/28/2007
115	- Address LIRR Comments/Finalize UIC Closure Report	10 days	11/29/2007	12/12/2007
116	**Subtask 13 - Meetings**			
117	**13.1 - Technical Meetings with LIRR (as Needed)**			
118	**13.2 - Meetings with NYSDEC (as Needed)**			
119	**Subtask 14 - Citizen Participation**	**385 days**	**6/21/2005**	**12/11/2006**
120	**14.1 - NYSDEC Issues Investigation Fact Sheets**	**10 days**	**6/21/2005**	**7/4/2005**
121	**14.2 - NYSDEC Issues Notice of Availability of Final Reports**	**10 days**	**11/28/2006**	**12/11/2006**



Legend: Task Milestone Summary

Proposed Project Schedule
Figure 2-36

2.3.6.2 - Remedial Design and Construction Schedules

Based on the selection of the remedial alternative for each substation completed under Task 5, D&B will develop a remediation schedule in consultation with the LIRR Capital Program Management Department, working through the Co-Project Managers in the System Safety Department. The remediation schedule will include the following elements:

- Remedial design
- Preparation of plans and specifications
- Contractor procurement support
- Contractor selection support
- Remedial construction phase services

Again working through the System Safety Department, D&B will consult with the Capital Program Management Department to optimize the remedial design/construction schedules in order to facilitate the LIRR's substation upgrade program, as appropriate and necessary.

2.3.7 Task 7 - Preparation of Cost Estimates

Based on the findings of the Remedial Alternatives Study completed as part of Task 5, D&B will develop an engineering cost estimate to undertake and complete the selected remedial alternative for each of the 17 substations. The engineering cost estimate will be submitted to the LIRR representatives for discussion.

2.3.8 Task 8 - Presentation of Recommendation(s)

As part of this Task, D&B will submit a brief letter report summarizing our findings of the completed investigation work (Task 3) and our Remedial Alternatives Study (Task 5). Shortly after submitting the letter report, D&B will meet with the LIRR to present the findings and discuss our proposed recommendations with regard to remedial actions. Separate letter reports will be prepared for each of the 17 substations. The letter reports will be grouped and completed in the following order:

- **Group A**
  - *Babylon Yard*
  - *Far Rockaway (Inwood)*
  - *Floral Park*
  - *Hempstead*
- **Group B**
  - *Nassau Boulevard*
  - *Little Neck*
  - *Lindenhurst*
  - *Bayside*
- **Group C**
  - *Bellaire*
  - *St. Albans*
  - *Cedar Manor*
  - *Kew Gardens*
- **Group D**
  - *Shea*
  - *Mineola*
  - *Valley Stream*
  - *Port Washington*
  - *Rockville Centre*

2.3.9 Task 9 - Integration of Comments

D&B will address one set of comments from the LIRR concerning the draft Delineation Phase II Site Assessment Report for each of the 17 substations and revise the draft reports accordingly.

2.3.10 Task 10 - Final Report

As part of this task, D&B will prepare draft and final Delineation Phase II Site Assessment Reports, as well as monthly progress reports, for each of the 17 substations. All final reports will be provided in hard copy format, as well as in a single, electronic ".pdf" file. The following provides a description of each of these subtasks.

2.3.10.1 - Draft/Final Delineation Phase II Site Assessment Report

D&B will prepare a draft/final Delineation Phase II Site Assessment Report for each of the 17 substations. The reports will include site location maps, photographs and analytical results in tabular format, along with sample location maps with sample results noted. Each report will include the results of the FWRIA and Public Health Exposure Assessments completed at each substation as detailed under Task 3. Geologic and analytical data generated during the initial site assessment investigation program will be utilized in conjunction with data obtained as part of this phase of the program in order to assess the nature and extent of contamination present at each substation. The report will include soil boring logs and groundwater monitoring well logs (where applicable), as well as depth to water measurements recorded at all accessible groundwater monitoring wells prior to sampling.

The report will also include recommendations addressing each area of concern at each substation with respect to any additional investigation activities (as required) and/or remediation based on the remedial alternatives study described under Task 5. If recommendations involve additional sample collection activities as is typical of previous D&B reports, specific descriptions of boring location, depth, number of samples and types of laboratory analyses will be provided. In addition, if groundwater investigations are warranted, details will be included which describe the well location, depth and recommended laboratory analysis.

As stated earlier, a draft/final Delineation Phase II Site Assessment Report will be prepared for each of the 17 substations. The reports will be grouped and completed in the following order:

- **Group A (completed within the first 9 months of NTP)**
  - *Babylon Yard*
  - *Far Rockaway (Inwood)*
  - *Floral Park*
  - *Hempstead*

- **<u>Group B</u> (completed within the first 12 months of NTP)**
  - *Nassau Boulevard*
  - *Little Neck*
  - *Lindenhurst*
  - *Bayside*
- **<u>Group C</u> (completed within the first 15 months of NTP)**
  - *Bellaire*
  - *St. Albans*
  - *Cedar Manor*
  - *Kew Gardens*
- **<u>Group D</u> (completed within the first 18 months of NTP)**
  - *Shea*
  - *Mineola*
  - *Valley Stream*
  - *Port Washington*
  - *Rockville Centre*

2.3.10.2 - Monthly Progress Reports

Monthly Progress Reports will be prepared and submitted to LIRR by the fifth day following completion of the month to facilitate the reports being received by the NYSDEC by the tenth of the month, as stipulated in the NYSDEC Voluntary Cleanup Agreement. Each progress report will provide details by task, including compliance with the project schedule, percent completion, accomplishments during the reporting period, work planned for next period, problems and delays encountered, suggested resolution of problems/delays and projected changes in project scope, as well as comparison of expenditures with the projects budget. Based on an 18-month project schedule, a total of 18 progress reports have been budgeted for as part of this task.

2.3.11 Task 11 - Biddable Plans and Specifications

Upon NYSDEC approval of the recommended remedial actions presented in the final report (Subtask 10), D&B will proceed with the full-scale design of the selected remedial alternatives for the 17 substations, if applicable. The scope of work and level of effort associated with this subtask assumes that the selected remedial alternative at each substation will be limited to the following:

- Limited soil removal of shallow soil not exceeding 2 feet in depth in areas exhibiting elevated levels of mercury;
- Capping (pavement) and/or use of bluestone at selected areas within and/or adjacent to the substations in order to prevent direct exposure to surficial soil; and
- The use of institutional controls such as deed restrictions.

As stated previously in Section 2.3.5, D&B will evaluate other remedial options or technologies if warranted based on the results of the site assessment, FWRIA or the human health exposure assessment.

D&B will submit three copies of the draft remedial construction plans and specifications to the LIRR for review and comment. Supporting data, documentation and design calculations as applicable shall be provided with the design documents. Following receipt of written comments from the LIRR describing the changes required to complete the design, D&B will submit to the LIRR for review three copies of the draft final plans and specifications, along with supporting data/documentation and design calculations, as applicable. We assume that the elements described above relating to the design would be "plugged in" to the LIRR boilerplate "up-front" contract language.

In addition, as part of this task, a detailed construction cost estimate will be prepared. The estimate will be prepared on a bid item basis as provided in the bid schedule in order to provide an estimate for each bid item. The estimated quantities on the bid schedule in the final contract documents will be utilized to provide a total engineering cost estimate for construction of the remedial system.

Written comments on the various submissions will be provided by the LIRR describing the changes required to consider the plans and specifications acceptable for the bid process.

As part of this task, the following activities will be performed:

- Assistance will be provided to the LIRR in conducting a pre-bid conference and site visit. Minutes of the pre-bid conference will be prepared by D&B during the conference and provided to the LIRR for distribution to bidders.

- Any required addenda to the plans and specifications will be prepared by D&B and provided to the LIRR for distribution to prospective bidders. In addition, responses will be provided to the LIRR for any written questions received. Addenda and written responses will be prepared for the LIRR in a timely manner for transmittal to prospective bidders prior to the bid due date.

- D&B will review the submittals received and make a recommendation to the LIRR as to the apparent low bidder. D&B will also carefully review the submittal of the apparent low bidder for compliance with the requirements of the contract documents. This will consist of a review of the apparent low bidder's health and safety plan, sampling and analysis plan, and QA/QC Plan.

2.3.12 Task 12 - Remediation Oversight and Remediation Oversight Report

The following provides a discussion on each of the subtasks associated with this task.

2.3.12.1 - Remediation Oversight

The scope of work and level of effort for Task 12 assumes that the selected remedial alternative at each of the 17 substations will be consistent with the alternative detailed under Task 11. As part of Task 12, D&B will provide the following for each substation remediation:

- Provide full-time oversight at the project site during remediation activities.

- Assist the LIRR in interpreting the remediation contract documents.

- Modify the contract bid documents (plans and specifications) to reflect changes made by addenda.

- Provide representation at the pre-remediation conference (including the project manager and support staff).

- Review and approve detailed remediation and shop drawings submitted by the Contractor.

- Review and approve all proposed deviations and substitutions to contract drawings.

- Review all laboratory, shop, mill, material and equipment test reports.

- Prepare supplemental sketches, if required, to reflect actual field conditions.

- Make periodic field visits "as necessary" or "as reasonably required" to observe the remediation work and confer with the LIRR and contractors on remediation progress and problems which arise during the progress of the remediation work.

- Review change orders and prepare supplemental drawings and detailed cost estimates in a timely fashion so as not to impede remediation progress.

- Review Contractor's Value Engineering Change Proposals.

- Arrange for D&B's project manager and support staff to attend update and job meetings.

- Witness and report on shop tests of major equipment.

- Provide consultation on special remediation problems by D&B specialists in specific fields of work.

- Assist the LIRR in the final inspection of the work to determine if each remediation contract has been completed in accordance with the contract documents.

- Evaluation of claims.

2.3.12.2 - Remediation Oversight Report

Upon completion of the remediation oversight detailed above, D&B will draft a Remediation Oversight Report documenting the remediation activities completed at each of the substations. The report will include a description of the remedial activities completed at each substation and, where applicable, details on the quantities of soil excavated and the areas that were capped. The report will include any endpoint sample data and copies of all waste disposal manifests.

2.3.12.3 - Underground Injection Control (UIC) Closure Oversight

A total of nine substations will require UIC closures, including:

- Bellaire
- Far Rockaway
- Floral Park
- Hempstead
- Lindenhurst
- Little Neck
- Mineola
- Port Washington
- Valley Stream

D&B will perform engineering oversight of the UIC closures at the above substations to be completed by a subcontractor under direct contract with the LIRR. The UIC closure will be completed in accordance with the UIC closure plan to be drafted by D&B as discussed under Task 1. Note that site inspections by Qualified Regulatory Agencies, including the local health departments, the NYSDEC and/or the USEPA, may add to the current total of nine sites requiring UIC closures, and/or the current total number of features requiring a UIC closure.

2.3.12.4 - Underground Injection Control (UIC) Closure Oversight Report

A report will be prepared that documents the UIC closure activities. The closure report will include a description of the drainage structures, dates of closure activities, volumes of material excavated for off-site transportation and disposal, endpoint results, final status of drainage structures (i.e., backfilled or active for continued storm water drainage) and copies of all waste disposal manifests.

2.3.13 Task 13 - NYSDEC Meetings

This task has been organized into two subtasks: Technical Meetings/Conference Calls and NYSDEC Briefing Meetings.

2.3.13.1 - Technical Meetings/Conference Calls

D&B will have monthly meetings with the LIRR to discuss the progress of the ongoing program, investigation findings and other technical issues. This task includes the development of meeting agendas, miscellaneous briefing documents and presentation graphics. D&B also recommends having a kickoff meeting between D&B and the LIRR in order to finalize the scope of work, lines of communication and schedule.

2.3.13.2 - NYSDEC Briefing Meetings

This task includes provision to provide technical support for up to four meetings with the LIRR and the NYSDEC at the NYSDEC headquarters in Albany, New York over the course of the project. The purpose of such meeting will be to discuss the progress of the program, findings and remedial options.

2.4 Project Management

Dvirka and Bartilucci Consulting Engineers (D&B) will be the prime consultant responsible for all substation site assessments. Firms that will be used as subconsultants and subcontractors for this project are summarized below:

PROJECT TEAM SUMMARY

Firm	Category	MBE/ WBE	Project Responsibility	Work Statement Participation
Dvirka and Bartilucci Consulting Engineers	Professional Consultant	---	Prime Consultant/ Engineering Services/ Overall Project Management	Tasks 1 through 13
Emilcott Associates, Inc.	Subconsultant	---	Health and Safety/Industrial Hygiene	Tasks 1, 3, 11 and 12

Firm	Category	MBE/ WBE	Project Responsibility	Work Statement Participation
Zebra Environmental, Inc.	Subcontractor	WBE	Drilling Services	Task 3
ChemTech Consulting Group, Inc.	Subcontractor	MBE	Analytical (Laboratory) Services	Task 3
Naeva Geophysics, Inc.	Subconsultant	---	Geophysical Services	Task 3
Brookside Environmental, Inc.	Subconsultant	---	Test Pit Services	Task 3

The project organization for this project, illustrating both management and project responsibility functions for the project team and key personnel, is provided in Figure 2-37.

2.5 Citizen Participation

In accordance with the NYSDEC Voluntary Cleanup Program Guide, dated May 2002, the LIRR will assist the NYSDEC in the following citizen participation activities as part of this project.

2.5.1 Investigations

The NYSDEC will send a fact sheet to persons on a mailing list before the start of field work. The fact sheet will be sent to adjacent property owners, elected officials, any relevant community groups, and local media. The NYSDEC will be responsible for developing the mailing list. The fact sheet will describe the site, provide a summary of the purpose and goals of the investigation, include the project schedule and milestones, and list sources of additional information.

2.5.2 Interim Remedial Measures (IRMs)

If a decision is made to implement an Interim Remedial Measure, the extent of citizen participation activities to be completed will depend upon the scope of the IRM as follows:

MTA Long Island Rail Road

Substation Delineation Phase II Site Assessment
Remedial Investigation/Feasibility Study

Andrew Willson (MTA)
Capital Program Management
Program Director

William Keenan (MTA)
Geologist
Capital Program Management
Program Manager

B. C. Blake (MTA)
Senior Contract Administrator
Procurement & Logistics
Contracts, Planning & Construction Section

Richard M. Walka (db)
Senior Vice President
Director - Hazardous Waste Management
Multimedia Compliance Division
Principal-in-Charge/Project Director

Thomas P. Fox, P.G. (db)
Associate/Hydrogeologist
Project Manager

Ronald Sorrentino (MTA)
Engineer-Substations

James Klees (MTA)
Assistant Engineer-Substations

Bruce D. Groves, CIH
President, Emilcott Associates, Inc.
Health and Safety Program Manager

Robbin Petrella (db)
Chemical Quality Assurance/
Quality Control Program Manager

Substation Locations

- Babylon Yard
- Far Rockaway
- Floral Park
- Hempstead
- Nassau Boulevard
- Little Neck
- Lindenhurst
- Bayside
- Bellaire
- Saint Albans
- Cedar Manor
- Kew Gardens
- Shea
- Mineola
- Valley Stream
- Port Washington
- Rockville Centre

Substation Investigation Program

- Transportation Department (Flagman)
- Communications Section
- Signal Maintenance and Construction Section
- Traction (Third Rail) Section
- Substation Section
- System Safety Department
- Capital Program Management Department

Thomas P. Fox, P.G. (db)
Associate/Hydrogeologist
Field Operations Manager

Thomas Sperry (db)
Ecologist/Wetlands Biologist

Field Team 1

Anthony Caniano (db)
Field Geologist
Field Team Leader

James Milligan (db)
Field Geologist

Field Team 2

Christopher Morris (db)
Field Geologist
Field Team Leader

Monica Sellberg (db)
Environmental Scientist

Subconsultant/ Subcontractor Services

Emilcott Associates, Inc..
Health and Safety/Industrial Hygiene Services

Zebra Environmental, Inc. (ZEBRA)
Geoprobe/Drilling Services

ChemTech Consulting Group, Inc. (CHEMTECH)
Laboratory Services

Naeva Geophysics, Inc. (NAEVA)
Geophysical Services

Feasibility Study/Interim Remedial Measures/Remedial Design

Maria D. Wright, P.E. (db)
Environmental Engineer

Thomas P. Fox, P.G. (db)
Associate/Hydrogeologist

Frank DeVita (db)
Environmental Engineer

Project Organization And Key Staff

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

FIGURE 2-37

RLA/MTA2229OR(03/31/05)

1. If the scope of the IRM could be all or most of the final remedy for the site, the citizen participation activities will be the same as for a Remedial Action Work Plan (see Section 2.5.3, below).

2. If the scope of the IRM will not cover all or most of the final remedy, the fact sheet for the investigation described in Section 2.5.1 will also describe the IRM activities. If a decision is made to complete an IRM after the investigation fact sheet has been issued, another fact sheet will be issued by the NYSDEC using the same procedures described for an investigation work plan under Section 2.5.1.

2.5.3 Remediation

Once a Remedial Action Work Plan has been approved, the NYSDEC will issue a notice of the availability of the work plan for review and comment in the NYSDEC Environmental Notice Bulletin (ENB). The notice will provide for a 30-day comment period during which written comments may be submitted to the NYSDEC.

A notice that the Remedial Action Work Plan is available for review will be provided to each municipality by the NYSDEC in which the site is located, as appropriate, including county, town and/or city government.

Section 3

3.0 GENERIC SAMPLING AND ANALYSIS PLAN

The purpose of this Generic Work Plan is to provide general information concerning the elements of the field investigations that will be performed at typical electric substation sites. Information relating to the number and locations of samples to be collected for site-specific field investigations will be provided in the Site-Specific Work Plans (see Section 5.0).

Electric substation sites typically share several characteristics related to on-site operations, waste disposal activities and constituents of concern. For the purposes of this Generic Work Plan, certain assumptions have been made with regard to a "typical" electric substation site.

Possible mercury impacts to soil and groundwater at a typical substation site are due to the operation, maintenance and deactivation of mercury containing rectifiers. In addition, polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), and Resource Conservation and Recovery Act (RCRA) metals, are other contaminants of concern due to the proximity of electric substation sites to adjacent transformer yards.

Specific electric substation sites will possess unique characteristics unlike the typical sites described above. The techniques described below may not be applicable at all sites, and other techniques not described in this Work Plan may be desirable under certain circumstances. In any event, Site-Specific Work Plans have been prepared which address the specific conditions and investigation requirements for a specific electric substation site.

The following is a description of the various field activities that may be conducted to support a Delineation Phase II Site Assessment at an electric substation site. For a detailed description of sampling and analytical procedures, refer to Section 4.0.

3.1 Surface Soil Sampling

Surface soil samples may be collected on-site at locations of known or suspected spill or disposal areas and areas of visibly stained soil or stressed vegetation to determine the nature and extent of surficial soil contamination on-site. The number of samples to be collected will be based upon the size of the area being investigated and exactly what is observed at the surface. Samples will be collected at a depth of 0 to 2 inches below ground surface using either a disposable polyethylene scoop, decontaminated stainless steel trowel or a sterile wooden tongue depressor. If the area is paved, samples will be collected 0 to 2 inches below the pavement. Detailed sampling procedures are described in Section 4.5 of this Work Plan. Site-specific sampling methods, if different from this Generic Work Plan, will be provided in the Site-Specific Work Plans. Specific sampling locations and analytical methods are also described in the Site-Specific Work Plan provided in Section 5.0.

3.2 Sediment Sampling

Sediment samples may be collected to determine if waste disposal and on-site contamination has impacted surface water bodies (creeks, streams, lakes, ponds, etc.). Sediment samples will be collected at the same locations as the surface water samples. Samples will be collected at or immediately adjacent to the point of discharge to the surface water body and/or in down stream depositional areas. Currently, sediment sampling is only planned for the Little Neck Substation.

The sediment samples will be collected 0 to 2 inches below the surface of the sediment utilizing a decontaminated long handle polyethylene scoop, if possible. Sampling locations and analytical methods for the Little Neck Substation are provided in the Site-Specific Work Plan.

3.3 Test Pit Excavation and Sampling

Test pits may be required to expose underground utilities or on-site sanitary systems that may be acting as a source of contamination or a conduit for contaminant migration. The test pits will be excavated with a backhoe with an appropriate bucket reach.

In general, the selection of samples from the test pits will be contingent upon successful identification of the structure that is being investigated. However, samples may be considered based on visual observation, such as staining, odor and PID/FID or Jerome Mercury Analyzer measurements. Samples will be obtained from the backhoe bucket immediately after retrieval utilizing a disposable polyethylene or polystyrene scoop or sterile wooden tongue depressor. Personnel will not enter the pit to collect samples.

The protocol for test pit excavation, sampling and backfill will be the following:

- Uncontaminated soil from the test pit, approximately 2 to 3 feet in depth, will be removed and placed separately;
- Deeper excavated visibly clean soil will be staged separately;
- Deeper excavated soil which indicates contamination will be segregated and placed on plastic liners and covered;
- If the water table or buried drums are encountered during test pit construction, excavation will be terminated;
- A record of excavation and sample collection will be maintained (see Section 4.8);
- The excavation will be filled in the reverse order of soil removal; and
- Final cover will use the soil initially removed and placed separately. If this is not sufficient, clean soil from the surrounding area will be placed on top of the pit.

In general, only the backhoe bucket, which will come into direct contact with impacted soil, will require decontamination. Test pit locations and analytical methods will be provided in the Site-Specific Work Plans. If necessary, an odor suppressing foam or other appropriate material will be utilized in order to minimize the migration of hazardous vapors from the excavation or stockpiled soil. Currently, test pits are only planned for the Hempstead, Nassau Boulevard, Little Neck, Bellaire and Kew Gardens Substations.

3.4 Direct Push Soil Sampling

Direct push sampling techniques can facilitate the relatively rapid collection of soil samples with minimal disturbance of the ground surface and generation of soil cuttings. Soil samples can be collected with a probe from various depths in the vicinity of the suspected contaminant source to determine the depth of the source and degree of contamination in the vadose zone. The geology of the site must be evaluated to determine if direct push (soil probe) sampling techniques are feasible. If probe sampling is not feasible at a site due to the subsurface geology, sampling will then be completed utilizing standard drilling techniques such as hollow stem augers with split spoon sampling. The probes will be installed utilizing a decontaminated screen point and sampler fitted with a disposable acetate liner. Detailed sampling procedures are provided in Section 4.0. Probe locations and analytical methods will be provided in the Site-Specific Work Plans. Probe holes will be abandoned according to procedures described in Section 3.7.

3.5 Direct Push Groundwater Screening and Sampling

Collection of groundwater samples utilizing direct push sampling techniques include utilization of a groundwater probe sampler. Direct push sampling techniques will be utilized to collect groundwater samples to define the horizontal and vertical extent of groundwater contamination on- and off-site.

The direct push sampling techniques are useful for preliminary contaminant plume delineation based on actual groundwater sampling. Drawbacks to this method include the fact that this is a one-time sample only. The geology and hydrogeology of the site must be evaluated to determine if it is amenable to direct push sampling techniques. Probe sampling is typically only applicable in unconsolidated deposits.

Groundwater probes will be installed utilizing a decontaminated screened sampler. The decontaminated probe and rods will be driven until the sampler tip is approximately 1-foot below the target sampling depth. Once that depth has been reached, the expandable drive point will be disengaged and the rods pulled back a distance of about 2 feet to expose the screened sampler. Disposable polyethylene tubing, equipped with a bottom check valve, will be used to convey groundwater to the surface for collection. Each sample, upon retrieval, will be analyzed in the field for pH, conductivity, turbidity and temperature.

Site-specific sampling locations and analytical methods are provided in the Site-Specific Work Plans. Probe holes will be sealed and abandoned according to Section 3.7.

3.6 Monitoring Well Drilling and Groundwater Monitoring

Groundwater monitoring involves periodic sampling and analysis of groundwater from monitoring wells. The effective design of monitoring wells requires careful consideration of the hydrogeology and subsurface geochemistry at the site. Information obtained from site reconnaissance, geophysical investigations or nearby existing wells can be useful in deciding appropriate monitoring well drilling, construction and development methods for the site. The design of a monitoring well should be based upon site-specific conditions and cannot be completed using a "one size fits all" method or material. The goal of monitoring well design is to construct wells that will produce depth and location-specific hydrogeologic and chemical data. Precautions must be made to ensure that well completion and development procedures minimize disturbance to the natural geologic environment and groundwater samples. Additionally, monitoring well installation techniques must minimize the potential for cross-contamination through the subsurface.

3.6.1 Drilling Methods

The selection of drilling and well completion methods for monitoring well construction will be based on site-specific conditions, including geologic materials to be penetrated, anticipated depth of drilling, potential for cross-contamination and accessibility to boring locations on the site. The selection of an appropriate drilling method for the construction of monitoring wells will be based on minimizing both the disturbance of geologic materials penetrated and the introduction of air, fluids and mud. The use of drilling mud and additives will be avoided, where possible, because the introduction of any foreign material has the potential for interfering with the chemical quality of water obtained from the monitoring wells and determination of aquifer characteristics through the use of slug tests. The following evaluations of various drilling techniques are based on these factors and the physical limits of each method.

3.6.1.1 - Hollow Stem Augers

The hollow stem auger method is among the most desirable drilling methods for the construction of monitoring wells. Hollow stem auger drill rigs are generally mobile, relatively fast and inexpensive to operate in unconsolidated materials. No drilling fluids are used and disturbance to the geologic materials penetrated is minimal. Depths of borings constructed using augers vary based upon soil types, however, borings up to 100 feet and greater are possible (maximum depth limit is about 200 feet). Clayey soils restrict the depth to which auger drilling can be accomplished. Augers typically cannot be used in bedrock, unless it is highly weathered, and the use of hollow stem auger drilling in heaving sand environments may also present difficulty.

3.6.1.2 - Cable Tool

The cable tool drilling method is relatively slow, but still offers advantages such as low cost per foot, the ability to create large diameter borings and the ability to increase permeability of bedrock. These considerations make it a useful choice for monitoring well construction in unconsolidated formations and relatively shallow consolidated formations. This method allows for the collection of formation samples and the detection of permeable zones. The installation of a steel casing as drilling progresses also provides a stable annulus for the construction of a monitoring well.

3.6.1.3 - Air Rotary

Rotary drilling methods operate on the principle of circulating either a fluid or air to remove the drill cuttings and maintain an open hole as drilling progresses. The different types of rotary drilling are named according to the type of fluid and the direction of fluid flow. Air rotary drilling forces air down the drill rods and back up the borehole to remove the drill cuttings. The use of air rotary drilling is best suited for use in hard rock formations. In soft, unconsolidated formations, a casing is driven to keep the formations from caving. In highly fractured formations, it is often difficult to maintain air circulation and casing may be required. The air from the compressor on the rig must be filtered to ensure that the oil from the compressor is not introduced into the geologic system to be monitored. The use of air rotary drilling techniques must be used with care in highly polluted or hazardous environments. Contaminated solids, water and vapors can be blown out of the hole and are difficult to contain. Protection of the drill crew and observers is correspondingly difficult.

3.6.1.4 - Air Rotary with Casing Hammer

Air rotary drilling with casing driving capability increases the utility of this type of drilling method. Typical air rotary problems associated with drilling in soft, unconsolidated and highly fractured formations are minimized. The utility of constructing monitoring wells in the casing prior to its removal also makes this type of drilling technique more appealing. Concerns about oil in the circulating air and containment of contaminant cuttings, water and vapor, must also be considered.

3.6.1.5 - Reverse Circulation Rotary

Reverse circulation rotary drilling has limited application for the construction of monitoring wells. Large quantities of fluid are circulated down the hole and pumped back to the surface through the drill stem. Mud rotary offers better control of contaminated cuttings and water removed from the borings, and does not cause exposure to vapors as in air rotary techniques. The hydrostatic pressure of the water in the borehole is used to maintain an open borehole. If permeable formations are encountered, large quantities of water will infiltrate into these formations, altering in-situ water quality. Similarly, water bearing units with differing hydrostatic heads will have the opportunity for free interchange of waters, altering the quality of water in the unit of lower hydrostatic head. Because of the large quantities of water normally required for this type of drilling, and the high potential for water to enter the formations to be sampled, this type of drilling is not typically utilized.

3.6.1.6 - Mud Rotary

Mud rotary drilling operates in the same fashion as the air rotary drilling technique, except that water and drilling mud are circulated down the drill pipe and back up the borehole to remove drill cuttings. Mud rotary drilling offers better control of contaminated cuttings and water removed from the boring and does not cause exposure to vapors as in air rotary techniques. The borehole is held open by the hydrostatic pressure of the circulating mud and the mud cake that develops on the borehole wall during the drilling process. Viscosity of the drilling mud is controlled to minimize the infiltration of the drilling fluid into porous formations penetrated by the drilling equipment. The use of drilling mud can cause groundwater chemistry or in-situ permeability to be altered by introduction of mud into the borehole. Monitoring wells installed in mud-rotary borings often require extra well development and may detect solutes attributable to the mud that cause an inaccurate assessment of groundwater chemistry. Under certain conditions, mud rotary techniques can be effective by using a continuous supply of potable water without additives. Alternatively, mud can be used to advance a boring to a depth several feet above the zone of interest, at which time mud can be replaced with potable water and the borehole continued to final depth.

Based upon the advantages and disadvantages of the various drilling methods described above, the preferred drilling methods are typically hollow stem augers for drilling in the overburden and mud rotary using potable water without additives in the bedrock. However, the final selection of the drilling method will be based on site-specific geologic and hydrostatic conditions. Alternate methods of drilling must be specified in the Site-Specific Work Plans together with the rationale for selection.

3.6.2 Subsurface Soil Sampling

Subsurface soil samples will be collected during construction of monitoring wells and soil borings. Soil borings will be advanced to delineate the extent of subsurface soil contamination on-site. The depth of the boring and sampling intervals will be determined in the Site-Specific Work Plans. However, if visual evidence of mercury contamination, such as visible mercury beads or Jerome Mercury Vapor Analyzer readings greater than 0.1 mg/m^3, is observed/detected at the planned boring termination depth, the boring will be continued until such evidence of contamination is no longer observed or detected. In addition, in such cases, an additional soil sample will be selected for mercury analysis from the last sample interval in order to determine the vertical extent of mercury at this boring location. Samples typically will be obtained continuously from the ground surface to provide detailed stratigraphic and soil quality information.

Soil samples obtained from decontaminated split spoons will be observed and logged for geologic characteristics, odors and staining, and screened with an FID or PID and a Jerome Mercury Analyzer. The data obtained from this screening will be used to select soil samples from each borehole for chemical analysis. All subsurface soil samples selected for chemical analysis will be collected from within the unsaturated zone unless contamination at the water table interface is evident, in which case, samples of soil in the saturated zone may be collected.

The number and locations of the samples to be collected, and the analytical methods to be utilized, will be provided in the Site-Specific Work Plans.

3.6.3 Overburden Monitoring Wells and Microwells/Piezometers

Monitoring well and microwell/piezometer boreholes constructed in the overburden will typically be installed using decontaminated 4 1/4-inch ID hollow stem augers. If difficulties with "running sands" are encountered which hinder soil sampling, potable water will be added to the hollow stem augers to maintain a positive hydrostatic head. Additionally, if difficulties with elevated levels of explosive or toxic gases, such as methane and hydrogen sulfide are encountered, potable water or mud may be introduced into the hollow stem augers to suppress the gas. If the depth of boring or nature of unconsolidated deposits prevent the efficient use of 4 1/4-inch ID hollow stem augers, then other methods such as those described in Section 3.6.1 may be considered. The use of alternative drilling methods, if any, will be described and justified in the Site-Specific Work Plans.

The final depth of each borehole will be below the water table at a depth that will allow 6 inches of sand pack to be placed between the screen bottom and bottom of the boring, as well as allow the screen to intersect the water table. For mid-depth or deep overburden wells, the borings must be deep enough to allow 6 inches of sand pack between well screen bottom and boring bottom, and allow the screen to intersect the zone of concern. If the boring is drilled too deep, for any reason, the borehole must be filled to a depth of 6 inches below the planned screen location with a bentonite slurry or other suitable impermeable material. At a minimum, overburden borings will be constructed for the installation of monitoring wells and piezometers that screen the water table. The actual number and depth of borings, as well as analytical sampling methods, will be determined on a site-specific basis and contained in the Site-Specific Work Plans.

Cuttings generated from the construction of the boreholes will be handled in accordance with NYSDEC TAGM No. 4032 "Disposal of Drill Cuttings" dated November 1989. In general, this TAGM allows for on-site disposal of cuttings as long as certain criteria are met.

Monitoring wells will typically be installed for the purpose of groundwater sampling. Piezometers will typically be installed when sampling is not required, but water level data is necessary. The following discussion regarding monitoring wells also pertains to piezometers. The depth of overburden monitoring wells will be determined on the basis of the geology and hydrogeology of the site and the goals of the monitoring program. In the case of overburden wells, the goal in general is to monitor the potential effects of near surface contaminants on groundwater.

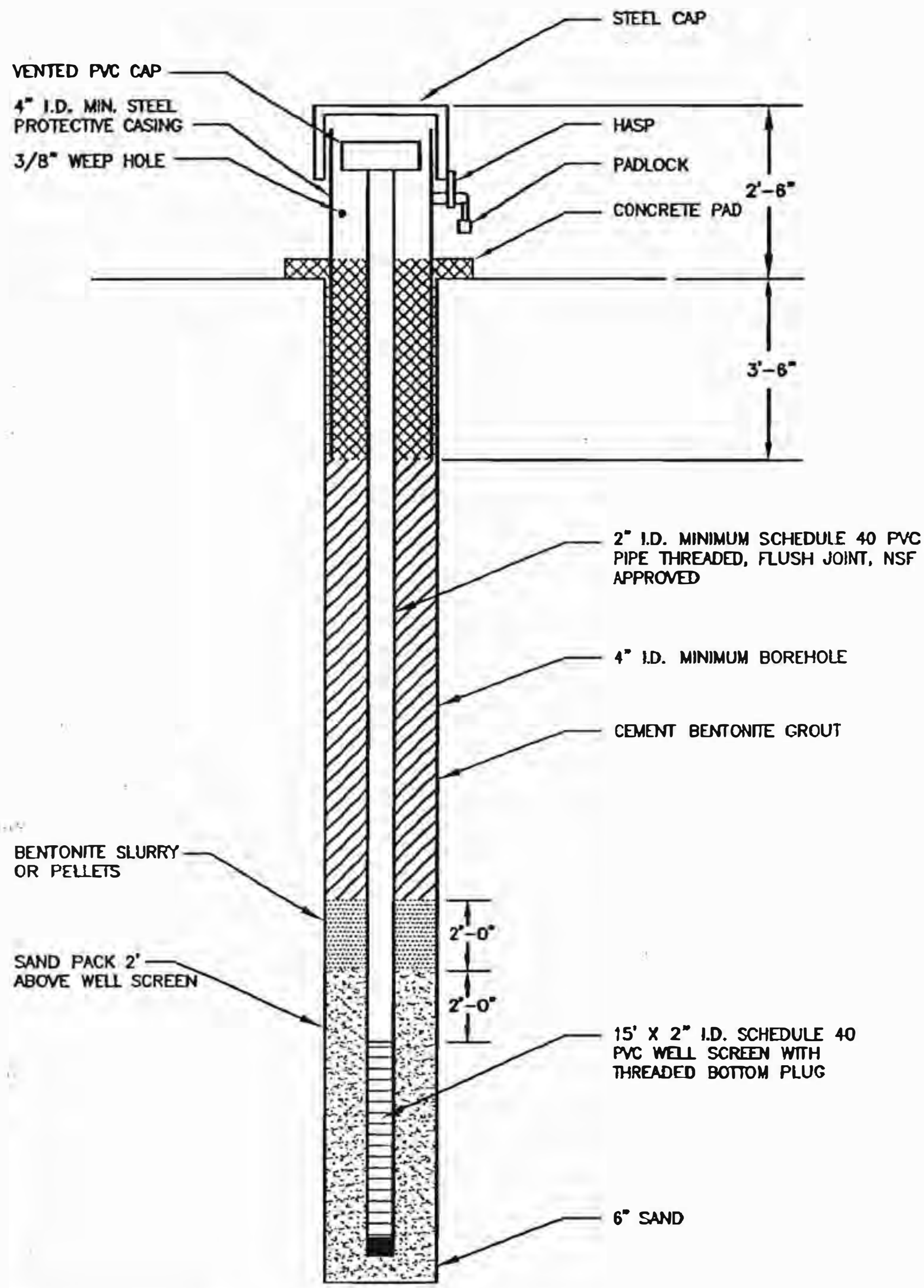
In order to properly define the movement of contaminants both vertically and horizontally, it is essential to collect depth-discreet water level data. Monitoring wells completed at the water table will provide a portion of the data needed to determine the vertical direction of groundwater movement. Water levels from several of these wells, if they are completed in the same hydrogeologic unit, will also provide information on the horizontal direction of shallow groundwater flow. If the overburden area of concern is relatively thick, then a series of mid-depth or deep monitoring wells will be required to properly assess groundwater conditions. The need for and depth of mid-depth or deep overburden wells will be provided in the Site-Specific Work Plans.

The diameter of monitoring wells should be the minimum practical size that will be compatible with the strength requirements of the well materials and allow for groundwater sampling. Small diameter monitoring wells will decrease the amount of water to be removed for well development and purging, and minimize the potential need for containment of contaminated water. Additionally, small diameter wells will minimize the potential impact on groundwater chemistry caused by disturbance during well drilling. Overburden monitoring wells will typically be constructed of decontaminated 2-inch ID, Schedule 40, 0.010-inch slot PVC well screen and threaded, flush joint PVC casing. No solvents will be utilized to construct the wells. These site-specific cases where non-aqueous phase liquids (NAPLs) are present or suspected, the use of stainless steel wire-wrap screens may be considered if the chemical is incompatible with PVC materials. In addition, when site-specific conditions dictate, different size screen openings may be utilized. Justification for the use of alternate screen material and size will be provided in the Site-Specific Work Plans.

The well screen in a monitoring well will be long enough to permit entry of water from the vertical zone to be monitored. The length of the screen will be kept to a minimum for water level data to be obtained from the well to represent information that is depth-discreet. In wells where the length of the screen is long, the resulting water level represents an average water level for the materials opposite the screen, and is sometimes insufficient to determine accurate groundwater flow characteristics. The overburden water table monitoring well screens will generally be 10 to 15 feet long. The screen will typically be installed with 5 feet above the water table in order to intercept the water table under varying seasonal groundwater elevations. The selection of screen lengths will be provided in the Site-Specific Work Plans. A generalized construction diagram for a well with a steel protective casing is shown on Figure 3-1. A generalized flush-mounted well construction diagram is shown on Figure 3-2. The type of well utilized will be based on site-specific considerations.

At the completion of borehole construction and soil sampling, the well screen and riser pipe will be lowered into the hollow stem auger and set at the desired depth. Sand pack of a grain size appropriate for the selected screen opening size and geologic conditions will be placed into the annular space to a minimum height of 2 feet above the top of the well screen using a tremie pipe or other suitable method. Generally, No. 2 morie sand will be used. During this time, the auger will be slowly removed. The well pipe will also be pulled up no more than 1/2-foot to allow sand material to fill the borehole beneath the well screen. Upon completing the placement of the sand pack, a minimum 2-foot thick bentonite pellet, chip or slurry seal will be tremied in the annular space. Bentonite pellets or bentonite chips, if used, will be hydrated with potable water and allowed to swell for a minimum of 1/2-hour before introducing the cement bentonite grout in the remaining annular space. The cement-bentonite grout will be pressure pumped into the annular space by the tremie method.

The monitoring wells will be completed with either a flush mount curb box or riser pipes. Wells completed with riser pipes will be constructed with approximately 2 1/2 feet of riser above ground surface and protected with a locking steel casing with minimum diameter of 4 inches. The protective casing will be at least 5 feet in length and secured into the borehole using concrete sand or gravel mix. The surface seal will be completed with a 3-foot diameter formed concrete pad and will be constructed to drain surface water away from the well. The protective casing will have a locking cap and weep hole, and be marked with the monitoring well identification. In cases where monitoring wells will be installed in roadways, parking lots or through floors, flush mount protective casings will be used. In such cases, a locking water tight PVC well cap will be installed inside of a curb box with bolted, water tight cover. Protective casing types will be specified in the Site-Specific Work Plans.



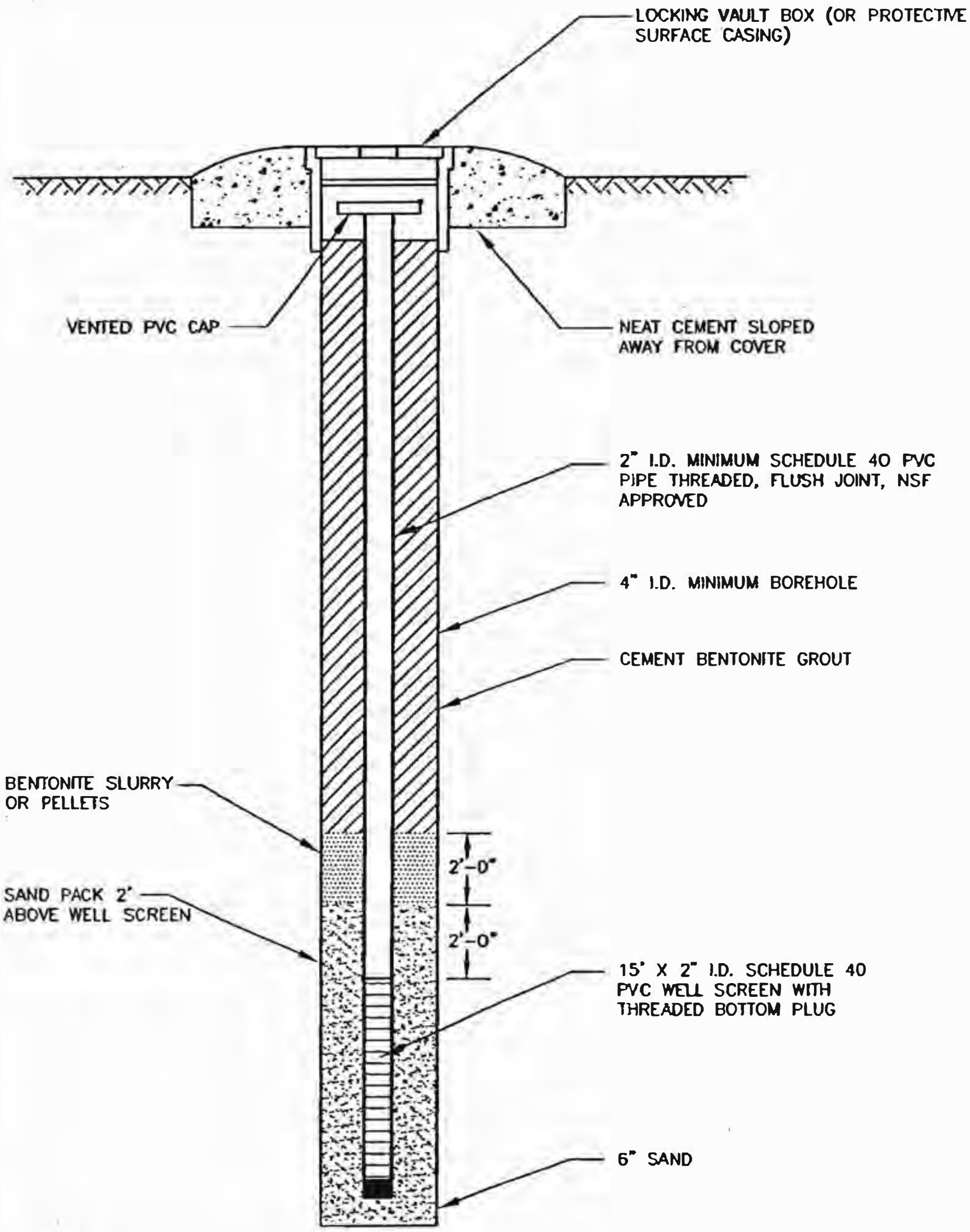
LONG ISLAND RAIL ROAD
DELINEATION PHASE 2 SITE ASSESSMENT OF 17 SUBSTATIONS

PLAN FOR CONSTRUCTION OF OVERBURDEN MONITORING WELLS

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 3-1

F:\2015\2015-8.dwg, 03/30/04 03:22:42 PM, DCortes



LONG ISLAND RAIL ROAD

DELINEATION PHASE 2 SITE ASSESSMENT OF 17 SUBSTATIONS

PLAN FOR CONSTRUCTION OF MONITORING WELLS WITH LOCKING VAULT

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 3–2

F:\2015\2015-7.dwg, 03/30/04 03:23:20 PM, DCortes

3.6.4 Borehole and Monitoring Well Logging

All borehole construction and monitoring well installation will be logged and documented by a geologist. Notes will be kept in both bound field books and on Boring Logs and Monitoring Well Construction Logs. The Boring Logs will include the depths of stratigraphic changes, description of all samples, details of drilling techniques, listing of soil samples collected for laboratory analyses and measurements made with PIDs, FIDs or Jerome Mercury Analyzer. In addition, soil will be visually inspected for staining and checked for odors. Well construction specifications will be provided in the Monitoring Well Construction Logs. The Modified Burmeister Classification System will be used to describe soil samples recovered from the borings. A Daily Field Activity Report (see Section 4.8) will be completed whenever there are drilling activities (or any other field activities) undertaken as part of the investigation.

3.6.5 Monitoring Well Development

Monitoring wells will be developed by pumping and surging for 3 hours, or until the turbidity of the groundwater achieves a reading of 50 NTUs (nephelometric turbidity units) or less. Well development will be supplemented by measurements of field parameters, including temperature, pH and specific conductance. Development will continue until the field parameters stabilize for a minimum of three consecutive readings of 10 percent variability or less. When possible, well development water will be recharged on-site. All equipment used for the development of monitoring wells will be decontaminated prior to use and between wells (see Section 4.6).

3.6.6 Groundwater Level Measurement

Groundwater level measurements, where applicable, will be obtained from any wells installed as part of the Delineation Phase II Site Assessment. Existing wells may also be utilized for groundwater level measurements. If feasible, all groundwater level measurements will be made within an eight hour period of uniform weather conditions. All groundwater level measurements will be made prior to the collection of groundwater samples. Additionally, a study of the influence of the local tidal cycles may be conducted at sites adjacent to major water bodies in order to quantify potential variations in local groundwater flow.

In addition, water levels may be obtained from surface water bodies that are suspected of influencing groundwater flow on or near the site by installing a fixed measuring point such as a staff gauge or permanent mark, on a fixed surface and measuring the depth to the surface of the water body. The measuring points will be surveyed for location and elevation.

All water and LNAPL level measurements, where appropriate, will be made using a fixed reference point at each measurement location. Down hole instruments will be decontaminated between each measurement location (see Section 4.6). The static water level will be measured to the nearest 0.01 foot. Groundwater level data will be presented in the final reports and used to construct groundwater potentiometric surface maps and to determine local horizontal flow direction, as well as vertical gradients. Where LNAPL is present, a corrected groundwater potentiometric surface elevation will be calculated in order to supplement the groundwater elevation data and provide a corrected groundwater elevation contour map, if necessary.

3.6.7 Groundwater Sampling

The depth to the water level in each well to be sampled will be measured in order to calculate the liquid bore volume necessary for purging. Depth to water will be measured with respect to a reference point established at the top of the well casing. Water level measurements will be obtained using a decontaminated electronic water level indicator.

The wells will be purged until a minimum of three to five bore volumes have been removed or until the well is dry, whichever occurs first. The number of bore volumes purged will be a function of the pH, temperature and conductivity, and will continue until stabilization of these parameters is achieved. Purge water will be recharged on-site, if possible. Refer to Section 4.11 for further discussion on containment and disposal of purge water.

Disposable polyethylene bailers with disposable nylon or polypropylene rope will be used for purging and sampling of the wells. Deep wells or wells that require large volumes of water to be removed may be purged and sampled using decontaminated, downhole pumps and decontaminated or disposable tubing. Once the well has been sufficiently purged, sampling will begin. If groundwater recovery is very slow, it may be necessary to wait several hours, or overnight, for sufficient volume to become available for the necessary sample analyses. Locations of the monitoring wells, and analytical sampling methods, will be provided in the Site-Specific Work Plans. Specific monitoring well sampling procedures are included in Section 4.0.

3.7 Probe Hole, Borehole and Well Abandonment

Direct push probe holes and soil borings which are not completed as monitoring wells will be fully sealed in a manner appropriate for the geologic conditions to prevent contaminant migration through the borehole. Sealing of the well or borehole will include the following methods: overboring or removal of the casing to the greatest extent possible followed by perforation of any casing left in place; removal of all casing and other well construction material within the upper 5 feet of the boring or within 5 feet of the proposed excavation level; sealing by pressure injection with cement bentonite grout using a tremie pipe to a depth extending the entire length of the boring to within 5 feet below the ground surface or the proposed excavation level; sealing the remaining 5 feet to ground surface with neat cement grout; and restoration of the sealed site to a safe condition. Well abandonment will follow the methods described in "Groundwater Monitoring Well Decommissioning Procedures," NYSDEC Division of Hazardous Waste Remediation, dated April 2003.

3.8 Air Screening

Ambient air monitoring will be performed throughout the field program undertaken in support of the Delineation Phase II Site Assessment. Either a flame ionization detector (i.e., Century Foxboro OVA) or a photoionization detector (i.e., Photovac MicroTip) will be utilized to detect total organic vapors. In addition, a Jerome Mercury Vapor Analyzer will be utilized to detect mercury vapors. Detailed monitoring procedures are summarized in the Health and Safety Plan (provided under separate cover).

The ambient air screening instruments will be used to determine the necessary levels of personal protective equipment (see the Health and Safety Plan), as well as to provide data on contaminant concentrations in the background ambient air and during investigative activities.

In addition, to protect the downwind community from potential airborne contaminant release, a Community Air Monitoring Plan (CAMP) requiring real-time monitoring at the downwind perimeter of each designated work zone during intrusive activities such as test pitting and hollow stem auger drilling will be established. Air monitoring will occur for particulates (i.e., dust). Continuous monitoring will occur during soil/waste excavation and handling, test pitting or trenching, and during the demolition of contaminated or potentially contaminated structures.

Specifically, particulate concentrations will be monitored in real-time at both the upwind and downwind perimeters of the Construction Work Zone (CWZ) or the Construction Exclusion Zone (CEZ). Monitoring equipment will be capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level, and will be equipped with an audible alarm to indicate exceedance of that level. Real-time monitoring will be conducted under the following conditions:

- If the downwind PM10 particulate level exceeds the upwind perimeter (background) level by 100 ug/m^3 for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed;
- Work will continue using dust suppression techniques as long as the downwind PM10 particulate level remains less than 150 ug/m^3 greater than the upwind level. If the level exceeds this value; however, work will be stopped and site work will be re-evaluated; and
- All readings will be recorded and available for State (DEC and DOH) personnel to review.

The detection of mercury vapor at concentrations exceeding the action level of 0.01 mg/m^3 within the work zone will trigger mercury vapor monitoring at the downwind perimeter of the work zone. The action levels for mercury in the CAMP are as follows:

- If mercury vapor concentrations exceed 0.01 mg/m^3 within the work zone, work will be stopped and monitoring for mercury vapor in the work zone and at the work zone downwind perimeter will be conducted separately.
- If mercury vapor concentrations fall below 0.01 mg/m^3 within the work zone, work will resume with continued mercury vapor monitoring within the work zone; and
- If mercury concentrations above 0.01 mg/m^3 persist, the source of the vapors will be identified, corrective actions will be taken to abate emissions and mercury vapor monitoring in the work zone and at the downwind work zone perimeter will be conducted separately.

3.9 Geophysical Surveys

Geophysical surveys will be conducted at the Babylon Yard, Bayside and Nassau Boulevard Substations in order to trace sanitary and storm drain piping to their discharge points. In order to complete this field task, the geophysical subcontractor, Naeva Geophysics, Inc., will run an electrical signal transmitter through the cesspool/drain line to the discharge point. The discharge point would then be traced with an instrument that can receive and track the output signal.

Vertical and horizontal control of the monitoring well/piezometer casing will allow for calculation of groundwater elevations for the development of groundwater contour maps.

Section 4

4.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN

The purpose of this Generic Quality Assurance/Quality Control (QA/QC) Plan is to describe the detailed sample collection and analytical procedures that will ensure high quality, valid data for use in the Delineation Phase II Site Assessments conducted at the 17 electric substation sites.

4.1 Data Usage

The data generated from the sampling program will be used to determine the nature, extent and source(s) of impacted soil and groundwater at the sites, prepare a public health exposure assessment, and identify, evaluate and recommend a cost-effective, environmentally sound, long-term remedial action plan. The data will also be utilized to monitor for the health and safety of workers at the site and potential receptors off site.

4.2 Sampling Program Design and Rationale

The following presents a general discussion of the sampling that may be conducted in support of the Delineation Phase II Site Assessment.

- Sediment - Sediment samples will be collected from surface water bodies to determine if surface water sediment has been impacted by on-site contamination.
- Surface Soil - Surface soil samples will be collected on site to determine the extent of impacted surface soil.
- Subsurface Soil - Subsurface soil samples will be collected on site to determine the extent of impacted subsurface soil.
- Groundwater - Groundwater samples will be obtained from monitoring wells and/or groundwater probes which will be installed as part of the Delineation Phase II Site Assessment or from monitoring wells which were installed previously at and in the vicinity of the site. Groundwater samples will be collected to characterize groundwater quality.

For a detailed discussion of the sampling program and selection of sample matrices and locations, see the Site-Specific Work Plans provided in Section 5.0.

4.3 Analytical Parameters

Surface soil and subsurface soil samples collected from the 17 substation sites will typically be analyzed for mercury. Soil samples collected as part of the United States Environmental Protection Agency (USEPA) Underground Injection Control Program (UIC) will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), Resource Conservation and Recovery Act (RCRA) metals including mercury, polychlorinated biphenyls (PCBs), and total petroleum hydrocarbons (TPHs). Soil samples which will be collected in the vicinity of transformers, and/or within the transformer yard areas, will be analyzed for TCL SVOCs, RCRA metals including mercury and PCBs. Soil samples that may be collected in areas of "potential releases" will be analyzed for mercury. In addition, sediment soil samples that may be collected will be analyzed for mercury and total organic carbon (TOC).

Groundwater samples will be analyzed for TCL VOCs, and both total and dissolved Target Analyte List (TAL) metals including mercury.

Table 4-1 presents a summary of the parameters/sample fraction together with the typical sample location, type of sample, sample matrix, type of sample container, method of sample preservation, holding time and analytical method.

4.4 Data Quality Requirements

Data quality requirements and assessments are provided in the 6/00 NYSDEC ASP, which includes the detection limit for each parameter and sample matrix. Note that quantification limits, estimated accuracy, accuracy protocol estimate precision and precision protocol are determined by the laboratory and will be in conformance with the requirements of the

Table 4-1

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Site (throughout site and areas of "potential releases")	Grab	Soil	Mercury	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for analysis	6/00 NYSDEC ASP, Method 7471a

VTSR - Verified time of sample receipt at the laboratory.

Table 4-1 (continued)

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Site (vicinity of transformers and/or within transformer yards)	Grab	Soil	SVOCs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	6/00 NYSDEC ASP, Method 8270c
	Grab	Soil	PCBs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	6/00 NYSDEC ASP, Method 8082
	Grab	Soil	RCRA Metals, Mercury	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for mercury analysis, 6 months for all other metals	6/00 NYSDEC ASP, Method 6010b/7471a

VTSR - Verified time of sample receipt at the laboratory.

Table 4-1 (continued)

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Site	Grab	Sediment	Mercury	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for analysis	6/00 NYSDEC ASP, Method 7471a
	Grab	Sediment	TOC	Glass, clear/4 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	28 days after VTSR for analysis	6/00 NYSDEC ASP, Method 9060

VTSR - Verified time of sample receipt at the laboratory.

Table 4-1 (continued)

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Soil Borings (UIC program)	Grab	Soil	VOCs	Glass, clear/2 oz./2 ICHEM 200 series or equivalent	Cool to 4°C	10 days after VTSR	6/00 NYSDEC ASP, Method 8260b
	Grab	Soil	SVOCs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	6/00 NYSDEC ASP, Method 8270c
	Grab	Soil	PCBs	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	5 days after VTSR for extraction, 40 days after extraction for analysis	6/00 NYSDEC ASP, Method 8082
	Grab	Soil	RCRA Metals, Mercury	Glass, clear/8 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	26 days after VTSR for mercury analysis, 6 months for all other metals	6/00 NYSDEC ASP, Method 6010b/7471a
	Grab	Soil	TPHs	Glass, clear/4 oz./1 ICHEM 200 series or equivalent	Cool to 4°C	14 days after VTSR for analysis	6/00 NYSDEC ASP, Method 8015b

VTSR - Verified time of sample receipt at the laboratory.

Table 4-1 (continued)

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Monitoring Wells/ Groundwater Probes	Grab	Groundwater	VOCs	Glass, clear/40 ml/3 ICHEM 300 series or equivalent	Cool to 4°C	7 days after VTSR for analysis	6/00 NYSDEC ASP, Method 8260b
	Grab	Groundwater	TAL Metals (total), Mercury	Plastic/1 L/2 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	26 days after VTSR for mercury analysis, 6 months for all others	6/00 NYSDEC ASP, Method 6010b/7470a
	Grab	Groundwater	TAL Metals (dissolved), Mercury	Plastic/1 L/2 ICHEM 300 series or equivalent	Cool to 4°C*	26 days after VTSR for mercury analysis, 6 months for all others	6/00 NYSDEC ASP, Method 6010b/7470a

*Sample will be filtered in the laboratory, then preserved.

VTSR - Verified time of sample receipt at the laboratory.

Table 4-1 (continued)

SUMMARY OF ANALYTICAL PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Container Type/Size/No.	Sample Preservation	Maximum Holding Time	Analytical Method
Site/Study Area	Trip Blank	Water	VOCs	Glass, clear/40 ml/1 ICHEM 300 series or equivalent	Cool to 4°C	7 days after VTSR for analysis	6/00 NYSDEC ASP, Method 8260b

VTSR - Verified time of sample receipt at the laboratory.

6/00 NYSDEC ASP, where applicable. Table 4-2 presents a summary of the data quality requirements.

The methods of analysis will be in accordance with SW-846 and 6/00 NYSDEC ASP. Specific analytical procedures and laboratory QA/QC descriptions are not included in this QA/QC Plan, but will be available upon request from the laboratory selected to perform the analyses. The laboratory will be New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified for organic and inorganic analyses and also be NYSDOH Contract Laboratory Protocol (CLP) certified.

4.4.1 Data Representativeness

Representative samples will be collected as follows:

- Sediment (Surface Water) - Samples will be collected in the area of the surface water samples 0 to 2 inches below the sediment surface after the surface water sample is obtained in order not to introduce sediment into the water column. Samples will be collected with a decontaminated long handle polyethylene scoop.
- Surface Soil - Samples will be collected at a depth of 0 to 2 inches using a dedicated polystyrene scoop or sterile wooden tongue depressor.
- Subsurface Soil (Hollow Stem Auger) - Samples will be collected using a decontaminated steel split spoon sampler during soil boring construction.
- Subsurface Soil (Probe) - Samples will be collected using a decontaminated screen point sampler and dedicated acetate tube liner.
- Groundwater (Probe) - Samples will be collected upon installation of the probe using dedicated polyethylene tubing equipped with a bottom check valve in order to purge the standing water and collect a representative groundwater sample.
- Groundwater (Monitoring Well) - Samples will be collected with a dedicated polyethylene bailer after the monitoring well has been purged of three to five well casing volumes until field measurements for pH, conductivity, temperature and turbidity have stabilized, or until the well is purged dry (whichever comes first) and the well has been allowed to recharge.
- Equipment Calibration - Field equipment used for air monitoring will be calibrated daily before use according to the manufacturer's procedures.

Table 4-2

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY AND COMPLETENESS

Parameter	Sample Matrix	CRDL* (ug/l)	Estimated Accuracy	Accuracy Protocol	Estimated Precision	Precision Protocol
Volatile Organics	Liquid Solid	5-10 5-10	0.87 - 2.48 ug/l	Vol. IB, Chapter 4, Method 8260b, Table 7	0.11 - 4.00 ug/l	Vol. IB, Chapter 4, Method 8260b, Table 7
Base Neutrals	Liquid Solid	10-50 330-1600	0.29 - 1.23 ug/l	Vol. IB, Chapter 4, Method 8270c, Table 7	0.13 - 1.05 ug/l	Vol. IB, Chapter 4, Method 8270c, Table 7
Acid Extractables	Liquid Solid	10-50 330-1600	0.29 - 1.23 ug/l	Vol. IB, Chapter 4, Method 8270c, Table 7	0.13 - 1.055 ug/l	Vol. IB, Chapter 4, Method 8270c, Table 7
Pesticides/PCBs	Liquid Solid	0.5-1.0 8.0-160	0.69 - 10.79 ug/l	Vol. IB, Chapter 4, Method 8082, Table 4	0.16 - 3.50 ug/l	Vol. IB, Chapter 4, Method 8082, Table 4
Metals	Liquid Solid	0.2-5000 0.2-5000	--	Vol. IA, Chapter 3, Method 6010b**, Table 4	--	Vol. IA, Chapter 3, Method 6010b**, Table 4

*Contract Required Detection Limits

**and SW-846 Methods for: Mercury 7470a - Liquid
7471a - Solid

Table 4-2 (continued)

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY AND COMPLETENESS

Matrix/Parameter	Precision (%)	Accuracy (%)
Soils		
VOCs[(a)]	See Table 4-2a	See Table 4-2a
Extractables[(a)]	See Table 4-2b	See Table 4-2b
Pesticides/PCBs	See Table 4-2c	See Table 4-2c
Metals[(b)/(c)]	± 25	75-125
Groundwater		
VOCs[(a)]	See Table 4-2a	See Table 4-2a
Extractables[(a)]	See Table 4-2b	See Table 4-2b
Pesticides/PCBs	See Table 4-2c	See Table 4-2c
Metals[(b)/(c)]	± 25%	75-125

NOTES:

(a) Accuracy will be determined as percent recovery of surrogate spike compounds and matrix spike compounds. Surrogate and matrix spike compounds for VOCs, extractables, and pesticides/PCBs are listed in Tables 4-2a, 4-2b and 4-2c, respectively. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

(b) Accuracy will be determined as percent recovery of matrix spikes when appropriate or the percent recovery of a QC sample if spiking is inappropriate. Precision will be determined as relative percent difference of matrix spike duplicate samples, or duplicate samples if spiking is inappropriate.

(c) Precision will be determined as the average percent difference for replicate samples. Accuracy will be determined as the percent recovery of matrix spike samples or laboratory control samples, as appropriate.

Source: NYSDEC ASP

Table 4-2a

DATA QUALITY REQUIREMENTS
ACCURACY REQUIREMENTS FOR VOCs

	Spike Recovery Limits (%)	
	Water	Low/Medium Soil
Surrogate Compound		
Toluene-d8	88-110	84-138
4-Bromofluorobenzene	86-115	59-113
1,2-Dichloroethane-d4	76-114	70-121
Matrix Spike Compound		
1,1-Dichloroethene	61-145	59-172
Trichloroethane	71-120	62-137
Chlorobenzene	75-130	60-133
Toluene	76-125	59-139
Benzene	76-127	66-142

Source: NYSDEC ASP

Table 4-2b

**DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS***

Surrogate Compounds	Matrix	Precision	Accuracy %
d5-Nitrobenzene	Water	≤ 20	35-114
	Solid	≤ 25	23-120
2-Fluorobiphenyl	Water	≤ 20	43-116
	Solid	≤ 25	30-115
d14-Terphenyl	Water	≤ 20	33-141
	Solid	≤ 25	18-137
d5-Phenol	Water	≤ 20	10-110
	Solid	≤ 25	24-113
2-Fluorophenol	Water	≤ 20	21-110
	Solid	≤ 25	25-121
2,4,6-Tribromophenol	Water	≤ 20	10-123
	Solid	≤ 25	19-122
2-Chlorophenol-d4 (Advisory)	Water	≤ 20	33-110
	Solid	≤ 25	20-130
1,2-Dichlorobenzene-d4 (Advisory)	Water	≤ 20	16-110
	Solid	≤ 25	20-130

Table 4-2b (continued)

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS*

	Matrix	Precision	Accuracy %
Matrix Spike Compounds			
1,2,4-Trichlorobenzene	Water	≤ 20	39-98
	Solid	≤ 25	38-107
Acenaphthene	Water	≤ 20	46-118
	Solid	≤ 25	31-137
2,4-Dinitrotoluene	Water	≤ 20	24-96
	Solid	≤ 25	28-89
Pyrene	Water	≤ 20	26-127
	Solid	≤ 25	35-142
N-Nitroso-Di-n-Propylamine	Water	≤ 20	41-116
	Solid	≤ 25	41-126
1,4-Dichlorobenzene	Water	≤ 20	36-97
	Solid	≤ 25	28-104
Pentachlorophenol	Water	≤ 20	9-103
	Solid	≤ 25	17-109
Phenol	Water	≤ 20	12-110
	Solid	≤ 25	26-90

Table 4-2b (continued)

DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS*

	Matrix	Precision	Accuracy %
Matrix Spike Compounds (continued)			
2-Chlorophenol	Water	≤ 20	27-123
	Solid	≤ 25	25-102
4-Chloro-3-methylphenol	Water	≤ 20	23-97
	Solid	≤ 25	26-103
4-Nitrophenol	Water	≤ 20	10-80
	Solid	≤ 25	11-114

*Accuracy will be determined as percent recovery of these compounds. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

Source: NYSDEC ASP

Table 4-2c

DATA QUALITY REQUIREMENTS

ADVISORY RECOVERY LIMITS
SURROGATE AND MATRIX SPIKE COMPOUNDS
FOR PESTICIDES/PCBs*

	Advisory Recovery Limits (%)	
	Water	Soil/Sediment
Surrogate Compound		
Decachlorobiphenyl	60-150	60-150
Tetrachloro-m-xylene	60-150	60-150
Matrix Spike Compound		
Lindane	56-123	46-127
Heptachlor	40-131	35-130
Aldrin	40-120	34-132
Dieldrin	52-126	31-134
Endrin	56-121	42-139
4,4'-DDT	38-127	23-134

*Samples do not have to be reanalyzed if these recovery limits are not met.

Source: NYSDEC ASP

- Equipment Decontamination - Nondedicated sampling equipment will be decontaminated prior to use at each location according to the procedures described in Section 4.

4.4.2 Data Comparability

All data will be presented in the units designated by the methods specified by a NYSDOH ELAP and CLP certified laboratory, and the 6/00 NYSDEC ASP. In addition, sample locations, collection procedures and analytical methods from earlier studies will be evaluated for comparability with current procedures/methods.

4.4.3 Data Completeness

The acceptability of 100% of the data is desired as a goal for this project. The acceptability of less than 100% complete data, meeting all laboratory QA/QC protocols/standards, will be evaluated on a case-by-case basis.

4.5 Detailed Sampling Procedures

Environmental samples will be collected as part of the Delineation Phase II Site Assessments of the 17 substations. These may include groundwater, sediment, subsurface soil, and surface soil. Sample locations may consist of monitoring wells, dry wells, sanitary systems, soil probe locations, groundwater probe locations, soil borings, and surface soils. Actual locations will be described in the Site-Specific Work Plans provided in Section 5.0.

General sampling approaches and equipment are described in this section. A summary of the Delineation Phase II Site Assessment sampling program, including sample media, depths, equipment, rationale and analytical parameters is provided in Section 5.0.

When taking soil samples, an attempt will be made to maintain sample integrity by preserving its physical form and chemical composition to as great an extent as possible. An appropriate sampling device (i.e., decontaminated or dedicated equipment) will be utilized to transfer the sample into the sample container. Every effort will be made to ensure that the sample is a proper representation of the matrix from which it was collected. The sample will be transferred into the sample bottle as quickly as possible, with no mixing, to ensure that the volatile fraction is not lost.

The materials involved in groundwater sampling are critical to the collection of high quality monitoring information, particularly where the analyses of volatile, pH sensitive or reduced chemical constituents are of interest. The materials for bailers and pump parts will be PTFE (e.g., Teflon^R) stainless steel and/or polyethylene.

There will be several steps taken after the transfer of the soil or water sample into the sample container that are necessary to properly complete collection activities. Once the sample is transferred into the appropriate container, the container will be capped and, if necessary, the outside of the container will be wiped with a clean paper towel to remove excess sampling material. The container will not be submerged in water in an effort to clean it. Rather, if necessary, a clean paper towel moistened with distilled/deionized water will be used.

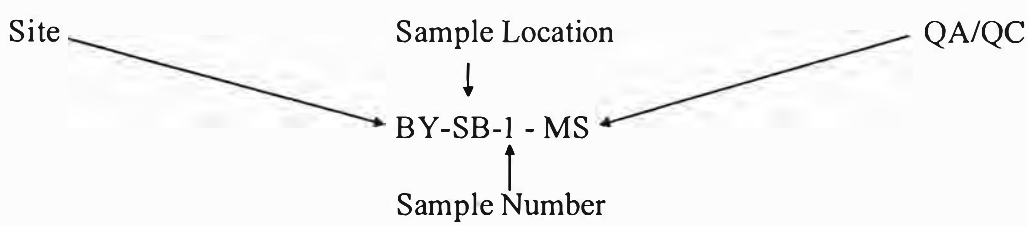
The sample container will then be properly labeled. Information such as sample number, location, collection time and sample description will be recorded in the field log book. Associated paper work (e.g., Chain of Custody forms) will then be completed and will stay with the sample. The samples will be packaged in a manner that will allow the appropriate storage temperature to be maintained during shipment to the laboratory. Samples will be delivered to the laboratory within 48 hours of collection.

4.5.1 Sample Identification

All samples collected will be labeled with a sample identification code. The code will identify the site, sample location, sample matrix and series numbers for sample locations with more than one sample. Samples will be labeled according to the following system:

- Site: – Site name (i.e., Babylon Yard "BY")
- Sample Type:
  - – Surface Water Sediment "SD"
  - – Surface Soil "SS"
  - – Soil Boring or Probe "SB"
  - – Monitoring Well "MW"
  - – Groundwater Probe "GP"
- Sample Number: – For circumstances where more than one sample of the same type and/or from the same location will be collected, a consecutive sample number will be assigned. When more than one sample is collected from a borehole in a sampling round at different depths, the depth will be indicated on the sample container and in the field log book.
- Quality Assurance/ Quality Control (QA/QC):
  - – Matrix Spike "MS"
  - – Matrix Spike Duplicate "MSD"
  - – Field Blank "FB"
  - – Trip Blank "TB"

Based upon the above sample identification procedures, an example of a sample label may be:



4.5.2 Sample Handling, Packaging and Shipping

All samples will be placed in the appropriate containers as specified in the 6/00 NYSDEC ASP. The holding time criteria identified in the ASP will be followed as specified in Table 4-1.

Prior to packaging any samples for shipment, the sample containers will be checked for proper identification and compared to the field log book for accuracy. The samples will then be wrapped with a cushioning material and placed in a cooler (or laboratory shuttle) with a sufficient amount of bagged ice or "blue ice" packs in order to keep the samples at 4°C until arrival at the laboratory.

All necessary documentation required to accompany the sample during shipment will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will then be sealed with fiber (duct) or clear packing tape, and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure laboratory receipt within 48 hours of sample collection in accordance with NYSDEC requirements. The laboratory will be notified prior to the shipment of the samples.

4.5.3 Surface Water Sediment (Pond, Lake, River, Stream)

1. Be certain that the sample location is noted on Location Sketch.
2. Unless using disposable equipment, be certain that the sampling equipment (long handle polyethylene scoop) has been decontaminated utilizing the procedures outlined in Section 4.6.
3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.
4. Wear disposable gloves and boots if it is necessary to enter the water.
5. Insert scoop slowly at 0 to 2 inches into the sediment and remove sample.
6. With a disposable polystyrene scoop or sterile wooden tongue depressor, transfer the sample into the open sample container taking care not to spill sample on the outside of the container or overfill container and replace cover on the sample container.
7. Return sample container to cooler.
8. If reusable, decontaminate the sampling equipment according to the procedures outlined in Section 4.6.
9. Place all disposable personal protective equipment and disposable sampling equipment into a DOT-approved 55-gallon drum and store in a secure area (fenced, if possible).

4.5.4 Soil (Surface)

1. Be certain that the sample location is noted on Location Sketch.
2. If a dedicated sampling device is not used, be certain that the sampling equipment has been decontaminated utilizing the procedures outlined in Section 4.6.
3. Remove laboratory precleaned sample container from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 4.8).
4. At the sample location, clear surface debris (e.g., vegetation, rocks, twigs, etc.). Collect an adequate amount of soil from a depth of 0 to 2 inches using a decontaminated or disposable scoop and/or sterile wooden tongue depressor. Transfer the sample directly into the sample container.
5. Return the sample container to the cooler.
6. If reusable, decontaminate the sampling equipment according to the procedures described in Section 4.6.
7. Place all disposable personal protective equipment and disposable sampling equipment into a DOT-approved 55-gallon drum and store in a secure area (fenced, if possible).

4.5.5 Soil (Probe)

1. Be certain that the sample location is noted on Location Sketch.
2. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form.
3. Drive the probe to the desired sampling depth.
4. Retrieve the soil probe and immediately after opening it, obtain an organic vapor measurement with a FID or PID and a mercury vapor measurement with a Jerome Mercury Analyzer.
5. Remove a sample aliquot from the soil probe using a disposable scoop or sterile wooden tongue depressor, place into the open sample container and replace the container cover.
6. Return the sample container to the cooler.

7. If reusable, decontaminate the sampling equipment according to the procedures described in Section 4.6.

8. Place all disposable personal protective equipment and disposable sampling equipment into a DOT-approved 55-gallon drum and store in a secure area (fenced, if possible).

4.5.6 Soil (Borehole, Split Spoon)

1. Be certain that the sample location is noted on Location Sketch.

2. Be certain that the sampling equipment (split spoon) has been decontaminated utilizing the procedures outlined in Section 4.6.

3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 4.8).

4. Drill into the soil to the desired depth and drive the split spoon sampler.

5. Retrieve the split spoon and immediately after opening the split spoon, obtain an organic vapor measurement with a PID or FID, a mercury vapor measurement with a Jerome Mercury Analyzer and fill out Boring Log Form (see Section 4.8).

6. Remove a sample aliquot from the split spoon using a disposable scoop or sterile wooden tongue depressor, place into the open sample container and replace the container cover.

7. Return the sample container to the cooler.

8. If reusable, decontaminate the sampling equipment according to the procedures described in Section 4.6.

9. Place all disposable personal protective equipment and disposable sampling equipment into a DOT-approved 55-gallon drum and store in a secure area (fenced, if possible).

4.5.7 Groundwater (Probe)

1. Be certain sample location is noted on Location Sketch.

2. Remove the laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 4.8).

3. Obtain a sample by using a dedicated polyethylene tubing equipped with a bottom check valve.

4. Gently pour the sample into the sample container taking care not to spill on the outside of the container or overfill container and replace cover on the sample container. Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is done by filling the vial such that there is a meniscus on top. Carefully slide the septum, Teflon side down, onto the top of the vial and cap the vial. Check for bubbles by turning the vial upside down and tapping it lightly. If bubbles appear, reopen the vial, remove the septum and add more sample (or resample). Replace the septum, recap and check for bubbles. Continue until vial is bubble-free.

5. After sample collection, obtain field measurements including pH, conductivity, temperature and turbidity.

6. If a sample is to be collected for metals analysis, the turbidity must be less than 50 NTUs. If the turbidity cannot be reduced to less than 50 NTUs, the sample will be filtered in the field or by the laboratory. Both the filtered and unfiltered portion of the sample will be analyzed.

7. Return sample containers to sample cooler.

8. Place all disposable personal protective equipment and disposal sampling equipment into a DOT-approved 55-gallon drum and store in a secure area (fenced, if possible).

4.5.8 Groundwater (Monitoring Well)

1. Measure the depth of water using a decontaminated water level indicator and compute the volume of standing water in the well.

2. Remove three to five times the volume of standing water from the well until field measurements (pH, conductivity, temperature and turbidity) stabilize, or until the well is dry, whichever occurs first. Turbidity should be less than 50 NTUs prior to collection of a sample for metals analysis.

3. Remove the laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 4.8).

4. Obtain a sample by using a disposable polyethylene bailer.

5. If the turbidity of the sample is greater than 50 NTUs, the metals portion of the sample will be filtered in the field or by the laboratory. Both the filtered and unfiltered portion of the sample will be analyzed.

6. Gently pour the sample into the sample container taking care not to spill on the outside of the container or overfill container and replace the cover on the sample container. Samples for volatile organic analyses will have no air space in the sample vial prior to sealing. This is done by filling the vial such that there is a meniscus on top. Carefully slide the septum, Teflon side down, onto the top of the vial and cap the vial. Check for bubbles by turning the vial upside down and tapping it lightly. If bubbles appear, reopen the vial, remove the septum and add more sample (or resample). Replace the septum, recap and check for bubbles. Continue until vial is bubble-free.

7. Return sample container to sample cooler.

8. Place all disposable personal protective equipment and disposable sampling equipment into a DOT-approved 55-gallon drum and store in a secure area (fenced, if possible).

4.6 Decontamination Procedures

Whenever possible, all field sampling equipment should be sterile/disposable and dedicated to a particular sampling point. In instances where this is not possible, a field cleaning/ decontamination procedure will be used in order to mitigate cross contamination between sample locations. A decontamination station/pad will be established for all field activities. This will be an area located away from the source of contamination so as not to adversely impact the decontamination procedure, but close enough to the sampling locations to keep equipment transport handling to a minimum after decontamination.

4.6.1 Field Decontamination Procedures

All nondisposable equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling location and prior to leaving the site). Different decontamination procedures are used for various types of equipment that are used to collect samples. When using field decontamination, sampling should commence in the area of the site with the lowest contamination, if known or probable, and proceed through to the areas of highest contamination.

4.6.2 Decontamination Procedure for Drilling/Probing Equipment

All equipment such as drill rigs and other mobile equipment will receive an initial cleaning prior to use at the site. The frequency of subsequent cleanings while on site will depend on how the equipment is actually used in relation to collecting environmental samples. All wash/rinse solutions will be collected and recharged on site after testing, if possible. If an appropriate location for on-site recharge is not available, the next preferable option is to discharge to a municipal sewer system. Until an appropriate discharge alternative is determined, all wash/rinse solutions will be collected and contained on site in DOT-approved 55-gallon drums.

After the initial decontamination, cleaning may be reduced to those areas that are in close proximity to materials being sampled. Drill rig/probe items such as augers, drill/probe rods and drill bits will be cleaned in between sample locations.

Drilling/probing equipment will be decontaminated in the following manner:

- Wash thoroughly with nonresidual detergent (alconox) and tap water using a brush to remove particulate matter or surface film. Pressure washing will be utilized, if necessary, to remove any oil and/or tar accumulations on the back of the rig, auger flights, drill rods, drilling head, etc. Any loose paint chips, paint flakes and rust must also be removed;
- Steam clean (212°F); and
- Once decontaminated, remove all items from the decontamination area.

Also, following the general cleaning procedures described above, all downhole/drilling items, such as split spoon samplers, Shelby tubes, rock corers, or any other item of equipment which will come in direct contact with a sample during drilling, will be decontaminated by pressure washing and/or steam cleaning.

4.6.3 Decontamination Procedure for Sampling Equipment

Teflon, PVC, polyethylene and stainless steel sampling equipment decontamination procedures will be the following:

- Wash thoroughly with nonresidual detergent (alconox) and clean potable tap water using a brush to remove particulate matter or surface film;
- Steam clean (if necessary);
- Rinse thoroughly with tap water;
- Rinse thoroughly with distilled water;
- Rinse in a well ventilated area with methanol (pesticide grade) and air dry;
- Rinse thoroughly with distilled water and air dry;
- Wrap completely in clean aluminum foil with dull side against the equipment. For small sampling items, such as scoops, decontamination will take place over a DOT-approved 55-gallon drum specifically used for this purpose;

The first step, a soap and water wash, will be performed to remove all visible particulate matter and residual oil, grease and tar. Pressure washing will be utilized followed by steam cleaning, if necessary. This step will be followed by a tap water rinse and a distilled/deionized water rinse to remove the detergent. Next, a high purity solvent rinse will be used for trace organics removal. Methanol has been chosen because it is not an analyte of concern on the Target Compound List. The solvent will be allowed to evaporate and then a final distilled/deionized water rinse will be performed. This rinse removes any residual traces of the solvent. The aluminum wrap will protect the equipment and keep it clean until it is used at another sampling location.

4.6.4 Decontamination Procedure for Well Casing and Development Equipment

Field cleaning of well casings will consist of a manual scrubbing to remove foreign material and steam cleaning, inside and out, until all traces of oil, grease and tar are removed.

This material will then be stored in such a manner so as to preserve it in this condition. Special attention to threaded joints will be necessary to remove cutting oil or weld burn residues, if necessary.

Materials and equipment that will be used for the purposes of well development will also be decontaminated by steam cleaning. An additional step will involve flushing the interior of any hose, pump, etc. with a nonphosphate detergent solution and potable water rinse prior to the development of the next well. This liquid waste will be disposed of on site, if possible after testing.

4.7 Laboratory Sample Custody Procedures

A NYSDOH ELAP and CLP certified laboratory meeting the requirements for sample custody procedures, including cleaning and handling sample containers and analytical equipment, will be used to analyze samples collected during the Delineation Phase II Site Assessment. The selected laboratory's Standard Operating Procedures will be made available upon request.

4.8 Field Management Documentation

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with the sampling plan and QA/QC Plan in an efficient and high quality manner. Field management procedures will include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if required); preparing a Location Sketch; completing Sample Information Records, Chain of Custody Forms, and Test Pit, Boring, Drilling and Well Construction Logs; maintaining a daily Field Log Book; completing Daily Equipment Calibration Logs; preparing Daily Field Activity Reports; completing Field Change Forms; and filling out a Daily Air Monitoring Form. Copies of each of these forms are provided in Appendix A. Proper completion of these forms and the field log book are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the samples were collected and handled properly.

4.8.1 Location Sketch

For each sampling point, a Location Sketch will be completed using permanent references and distances to the sampling point noted, if possible.

4.8.2 Sample Information Record

At each sampling location, a Sample Information Record Form is filled out including, but not limited to, the following information:

- Site name;
- Sample crew;
- Sample location;
- Field sample identification number;
- Date;
- Time of sample collection;
- Weather conditions;
- Temperature;
- Sample matrix;
- Method of sample collection and any factor that may affect its quality adversely;
- Well information (groundwater only);
- Field test results;
- Analysis to be performed; and
- Remarks.

4.8.3 Chain of Custody

The Chain of Custody Form will be completed and is initiated at the laboratory with container preparation and shipment to the site. The form remains with the sample at all times and bears the name of the person assuming responsibility for the samples. This person is tasked with ensuring secure and appropriate handling of the containers and samples. When the form is complete, it will indicate that there was no lapse in sample accountability.

A sample is considered to be in an individual's custody if any of the following conditions are met:

- It is in the individual's physical possession; or
- It is in the individual's view after being in his or her physical possession; or
- It is secured by the individual so that no one can tamper with it; or
- The individual puts it in a designated and identified secure area.

In general, Chain of Custody Forms are provided by the laboratory selected to perform the analytical services. At a minimum, the following information will be provided on these forms:

- Project name and address;
- Project number;
- Sample identification number;
- Date;
- Time;
- Sample location;
- Sample type;

- Analysis requested;
- Number of containers and volume taken;
- Remarks;
- Type of waste;
- Sampler(s) name(s) and signature(s); and
- Spaces for relinquished by/received by signature and date/time.

For this particular study, forms provided by the laboratory will be utilized.

The Chain of Custody Form will be filled out and signed by the person performing the sampling. The original of the form will travel with the sample and will be signed and dated each time the sample is relinquished to another party, until it reaches the laboratory or analysis is completed. The field sampler will keep one copy and a copy will be retained for the project file. The sample bottle will also be labeled with an indelible marker with a minimum of the following information:

- Sample number;
- Analysis to be performed; and
- Date of collection.

A copy of the completed form will be returned by the laboratory with the analytical results.

4.8.4 Split Samples

Whenever samples are being split with another party, a Receipt for Samples Form will be completed and signed. A copy of the Chain of Custody Form will accompany this form.

4.8.5 Field Log Book

Field log books will be bound and have consecutively numbered, water resistant pages. All pertinent information regarding the site and sampling procedures will be documented. Notations will be made in log book fashion, noting the time and date of all entries. Information recorded in this notebook will include, but not be limited to, the following:

The first page of the log will contain the following information:

- Project name and address;
- Name, address and phone number of field contact;
- Waste generator and address, if different from above;
- Type of process (if known), generating waste;
- Type of waste; and
- Suspected waste composition, including concentrations.

Daily entries will be made for the following information:

- Purpose of sampling;
- Location of sampling point;
- Number(s) and volume(s) of sample(s) taken;
- Description of sampling point and sampling methodology;
- Date and time of collection, arrival and departure;
- Collector's sample identification number(s);
- Sample distribution and method of storage and transportation;
- References, such as sketches of the sampling site or photographs of sample collection;

- Field observations, including results of field analyses (e.g., pH, temperature, specific conductance), water levels, drilling logs, and organic vapor and dust readings; and
- Signature of personnel responsible for completing log entries.

4.8.6 Daily Field Activity Report

At the end of each day of field work, the Field Operations Manager, or designee, will complete this form noting personnel on site and summarizing the work performed that day, equipment, materials and supplies used, results of field analyses, problems and resolutions. This form will be signed and subject to review.

4.8.7 Field Changes and Corrective Actions

Whenever there is a required or recommended investigation/sampling change or correction, a Field Change Form will be completed by the Field Operations Manager, and approved by a LIRR representative and the NYSDEC Project Manager, if required.

4.9 Calibration Procedures and Preventive Maintenance

The following information regarding equipment will be maintained at the project site:

1. Equipment calibration and operating procedures which will include provisions for documentation of frequency, conditions, standards and records reflecting the calibration procedures, methods of usage and repair history of the measurement system. Calibration of field equipment will be performed daily at the sampling site so that any background contamination can be taken into consideration and the instrument calibrated accordingly.
2. A schedule of preventive maintenance tasks, consistent with the instrument manufacturer's specific operation manuals, that will be carried out to minimize down time of the equipment.
3. Critical spare parts, necessary tools and manuals will be on hand to facilitate equipment maintenance and repair.

Calibration procedures and preventive maintenance, in accordance with the NYSDEC 6/00 ASP, for laboratory equipment, will be contained in the laboratory's standard operating procedures (SOP) which will be available upon request.

4.10 Performance of Field Audits

During field activities, the QA/QC officer will accompany sampling personnel into the field, in particular in the initial phase of the field program, to verify that the site sampling program is being properly conducted, and to detect and define problems so that corrective action can be taken early in the field program. All findings will be documented and provided to the Field Operations Manager.

4.11 Control and Disposal of Contaminated Material

During construction and sampling of the monitoring wells and soil borings, contaminated waste, soil and water may be generated from drill cuttings, drilling fluids, decontamination water, development water and purge water. All soil cuttings generated during the Delineation Phase II Site Assessment will be handled in a manner consistent with NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4032, Disposal of Drill Cuttings.

All water generated during the investigation, including decontamination water, drill water and purge water, will be recharged on site, if possible, following testing. The Site-Specific Work Plans will provide detailed information on the disposal of water generated during the investigation. If it is not possible to recharge water on site, the next preferred option is discharge of the water to a municipal sewer system. This will be evaluated in preparation of the Site-Specific Work Plans.

Department of Transportation approved 55-gallon drums will be used for the containment of soil cuttings and water, and for disposal of personal protective clothing and disposable sampling equipment (i.e., bailers, scoops, tongue depressors, etc.). The drums will be marked, labeled with a description of the contents and from what location they were collected. All drums will be sealed and stored on site in a secure area.

4.12 Documentation, Data Reduction and Reporting

ChemTech Consulting Group, Inc., a NYSDOH ELAP and CLP certified laboratory meeting the New York State requirements for documentation, data reduction and reporting will be used for all laboratory analysis. All data will be cataloged according to sampling locations and sample identification nomenclature that is described in Section 4.5.1 of this Work Plan. The laboratory analysis will be reported in the NYSDEC ASP Category B deliverables format.

4.13 Data Validation

As described in Section 4.12 above, summary documentation regarding data validation will be completed by the laboratory using NYSDEC forms contained in the 6/00 NYSDEC ASP and submitted with the data package.

A Data Validation Summary Report (DUSR) will be prepared in lieu of a full data validation. The analytical and usability processes will be conducted in conformance with the NYSDEC ASP dated June 2000 and NYSDEC Guidance for the Development of Data Usability Summary Reports.

The DUSR will be prepared by reviewing and evaluating the analytical data. The parameters to be evaluated in reference to compliance with analytical method protocols include all chain-of-custody forms, holding times, raw data (instrument print out data and chromatograms), calibrations, blanks, spikes, controls, surrogate recoveries, duplicates and sample data. If available, field sampling notes will also be reviewed and any quality control problems will be evaluated as to their effect on the usability of the sample data.

The DUSR will describe the samples and analysis parameters reviewed. Data deficiencies, analytical protocol deviations and quality control problems will be described and their effect on the data discussed. Re-sampling and re-analysis recommendations will be made, if necessary.

The DUSR shall be prepared by our company QA/QC officer, Ms. Robbin Petrella. Ms. Petrella meets the personnel requirements listed in the DUSR Guidance Document. A copy of her résumé is included in Appendix B.

4.14 Performance and System Audits

ChemTech Consulting Group, Inc., a NYSDOH ELAP and CLP certified laboratory which has satisfactorily completed performance audits and performance evaluation samples will be used to perform sample analyses for the Delineation Phase II Site Assessment.

4.15 Corrective Action

A NYSDOH ELAP and CLP certified laboratory will meet the requirements for corrective action protocols, including sample "clean up" to attempt to eliminate/mitigate matrix interference.

The 6/00 NYSDEC ASP protocol includes both mandatory and optional sample cleanup and extraction methods. Cleanup is required by the 6/00 NYSDEC ASP in order to meet contract required detection limits. There are several optional cleanup and extraction methods noted in the 6/00 NYSDEC ASP protocol. These include florisil column cleanup, silica gel column cleanup, acid-base partition, steam distillation and sulfuric acid cleanup for PCB analysis.

High levels of matrix interference may be present in waste, soil and sediment samples. This interference may prevent the achievement of ASP detection limits if no target compounds are found. In order to avoid unnecessary dilutions, the optional cleanup methods noted in the 6/00 NYSDEC ASP will be required to be performed by the laboratory as necessary.

4.16 Trip Blanks

The primary purpose of a trip blank is to detect other sources of contamination that might potentially influence contaminant values reported in actual samples, both quantitatively and qualitatively. The following have been identified as potential sources of contamination:

- Laboratory reagent water;
- Sample containers;
- Cross contamination in shipment;
- Ambient air or contact with analytical instrumentation during preparation and analysis at the laboratory; and
- Laboratory reagents used in analytical procedures.

A trip blank will consist of a set of 40 ml sample vials filled at the laboratory with laboratory demonstrated analyte free water. Trip blanks will be handled, transported and analyzed in the same manner as the samples acquired that day, except that the sample containers themselves are not opened in the field. Rather, these sample containers only travel with the sample cooler. The temperature of the trip blanks will be maintained at 4°C while on site and during shipment. Trip blanks will return to the laboratory with the same set of bottles they accompanied in the field.

The purpose of a trip blank is to control sample bottle preparation and blank water quality as well as sample handling. Thus, the trip blank will travel to the site with the empty sample bottles and back from the site with the collected samples in an effort to simulate sample handling conditions. Contaminated trip blanks may indicate inadequate bottle cleaning or blank water of questionable quality. Trip blanks will be implemented only when collecting water samples, including field blanks, and analyzed for volatile organic compounds only.

4.17 Method Blanks/Holding Blanks

A method blank is an aliquot of laboratory water or soil which is spiked with the same internal and surrogate compounds as the samples. The purpose of the method blank is to define and determine the level of laboratory background contamination. Frequency, procedure and maximum laboratory containment concentration limits are specified in the 6/00 NYSDEC ASP. A holding blank is an aliquot of analyte-free water that is stored with the environmental samples in order to demonstrate that the samples have not been contaminated during laboratory storage. This blank will be analyzed using the same analytical procedure as the samples.

4.18 Matrix Spikes/Matrix Spike Duplicates and Spiked Blanks

Matrix spike samples are quality control procedures, consistent with 6/00 NYSDEC ASP specifications, used by the laboratory as part of its internal Quality Assurance/Quality Control program. The matrix spikes (MS) and matrix spike duplicates (MSD) will be aliquots of a designated sample (water or soil) which are spiked with known quantities of specified compounds. These QA/QC samples will be used to evaluate the matrix effect of the sample upon the analytical methodology, as well as to determine the precision of the analytical method used. A matrix spike blank will be an aliquot of analyte-free water, prepared in the laboratory, and spiked with the same solution used to spike the MS and MSD. The matrix spike blank (MSB) will be subjected to the same analytical procedure as the MS/MSD and used to indicate the appropriateness of the spiking solution by calculating the spike compound recoveries. The procedure and frequency regarding the MS, MSD and MSB samples are defined in the 6/00 NYSDEC ASP.

4.19 Field Blank (Field Rinsate Blank)/Equipment Blank

The field blank will consist of an aliquot of analyte-free water, supplied by the laboratory, which is opened in the field and is generally poured over or through a sample collection device after it is decontaminated, collected in a sample container and returned to the laboratory as a sample for analysis. It is a check on sampling procedures and cleanliness (decontamination) of sampling devices. Generally, a field blank will be collected daily or for a "batch" of sample matrices collected in the same manner (such as water and soil/sediment) up to a maximum of 20 samples. Field blanks will be analyzed for the suite of chemicals analyzed for in the environmental samples collected in that "batch." Field blanks will not be analyzed when using dedicated or disposable (one use only) sampling equipment unless directed otherwise.

Section 5

5.0 SITE-SPECIFIC WORK PLANS

The purpose of the Site-specific Work Plans is to describe the detailed sampling and analysis to be conducted as part of the Delineation Phase II Site Assessment of the 17 electric substations. The proposed sample locations for the 17 substations are provided on Figures 5-1 through 5-17. However, it should be noted that the exact locations of the samples will be determined in the field based on field conditions, equipment access and utility clearance. Descriptions of the sampling and analysis to be conducted for each of the 17 substation sites are provided on Tables 5-1 through 5-17 and are summarized below.

5.1 Babylon Yard (V00385-1)

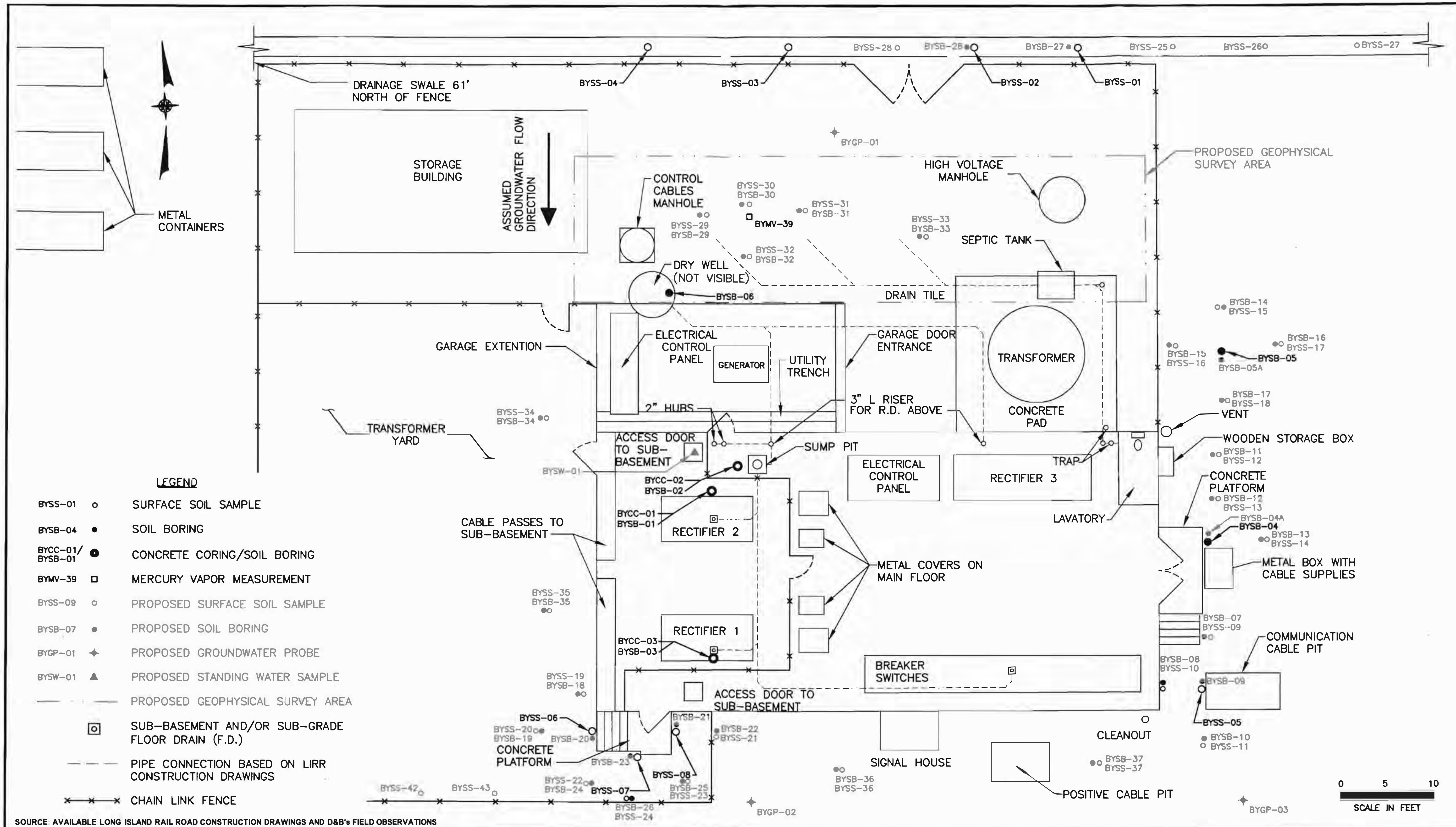
5.1.1 Surface and Subsurface Soil Sampling

1. East Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the east side of the substation in the area of previous surface soil sample/soil borings BYSS-05, BYSB-04 and BYSB-05. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Southwest Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination associated with previous surface soil samples BYSS-06, 07 and 08 located on the southwest corner of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Drainage Swale - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination in the drainage swale extending east to west approximately 60 feet north of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Miscellaneous Pits and Manholes - Sampling shall be conducted if the following pits and manholes are found to contain earthen bottoms or a drain to underlying soil: a positive cable pit located on the south side of the substation; a communications cable pit located on the east side of the substation; a high-voltage manhole and control cable manhole located off the north side of the substation; a high tension cable pit located immediately west of the transformer yard; a sump pit located within the substation; and both the positive and negative cable manholes.

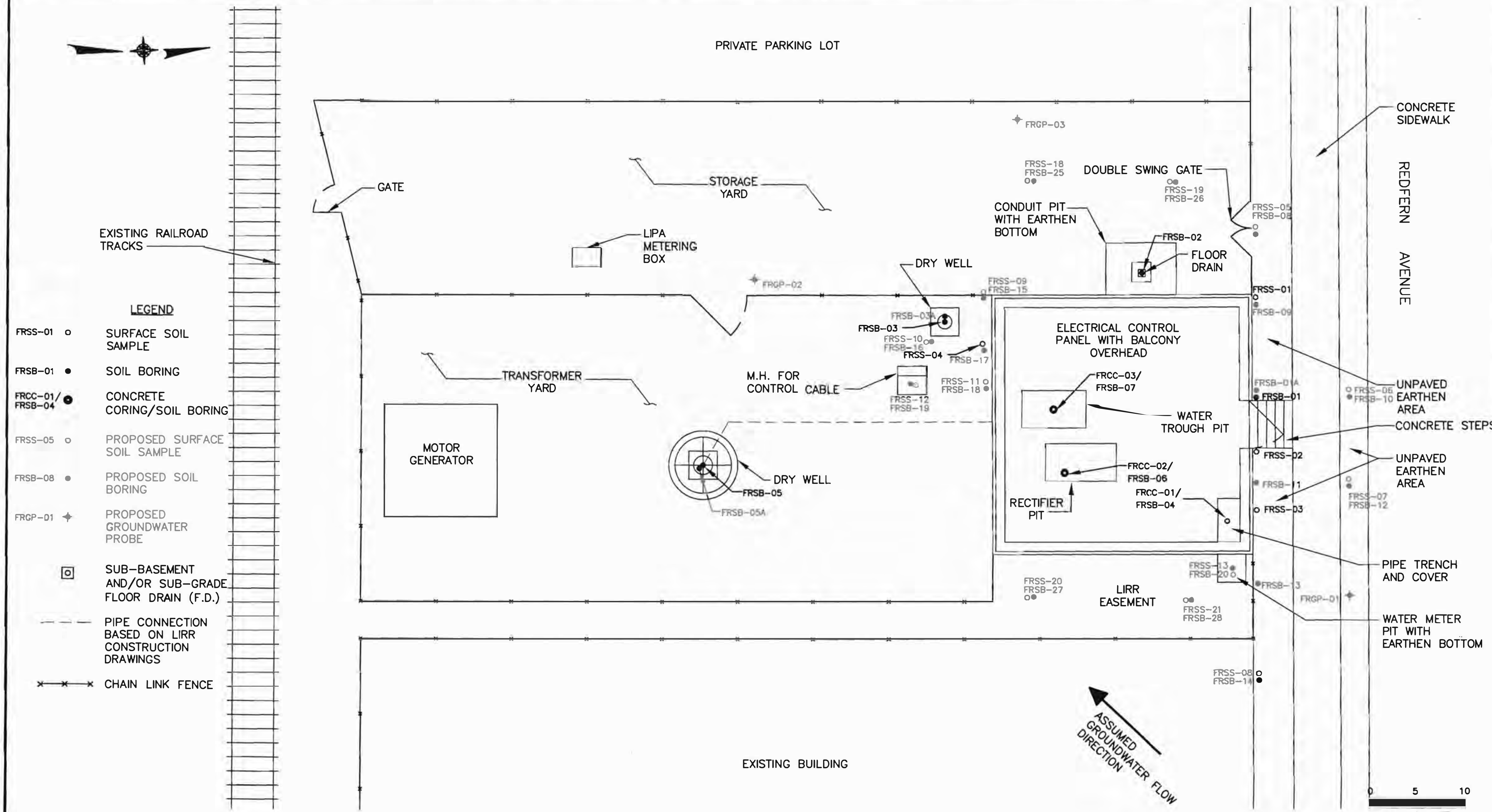


Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
BABYLON YARD SUBSTATION (V00385-1)

FIGURE 5-1



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

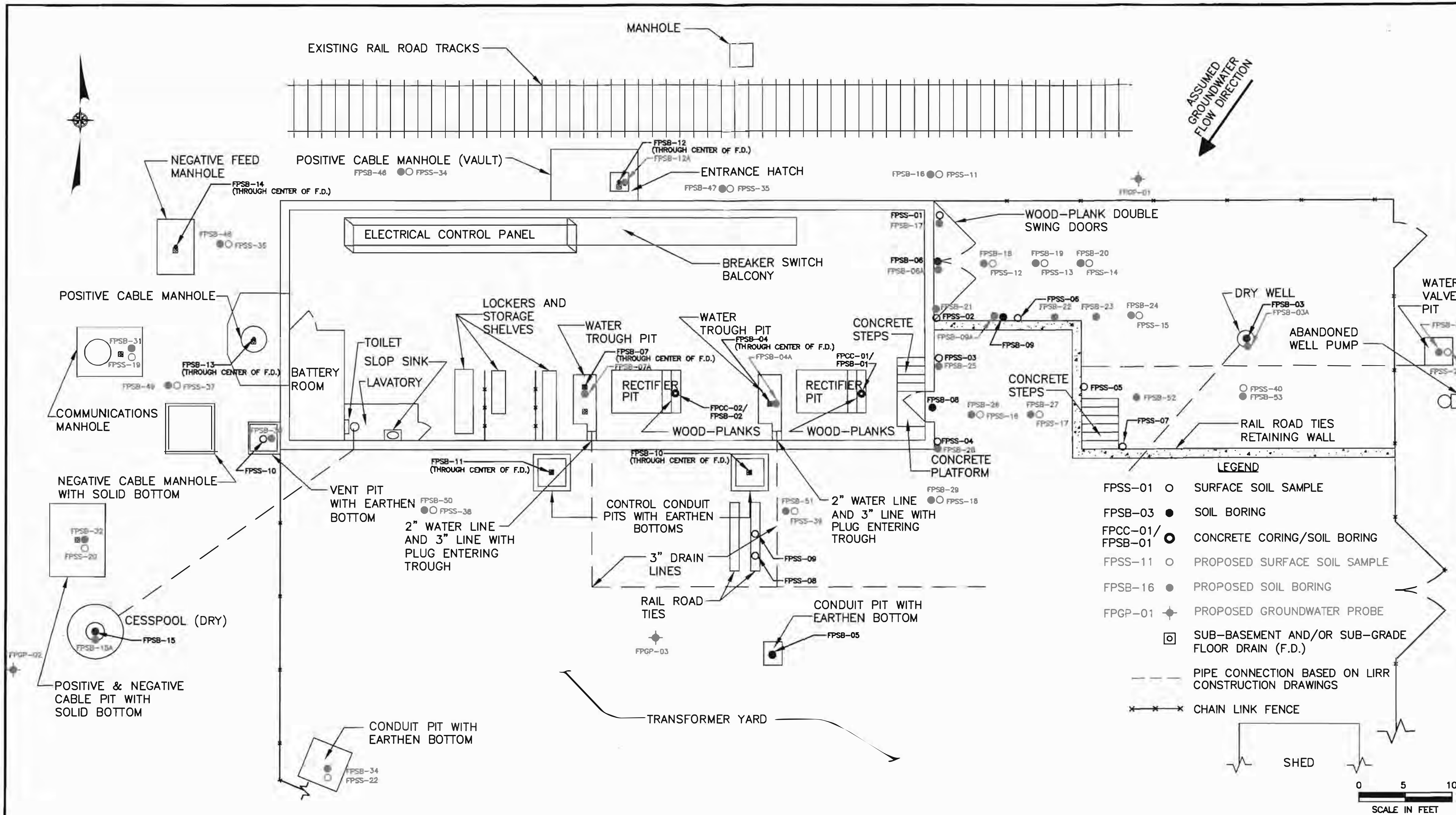
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
FAR ROCKAWAY SUBSTATION (V00391-1)

FIGURE 5-2

F:\2229\2229-3A.dwg, LOCATION, 06/16/05 10:24:14 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

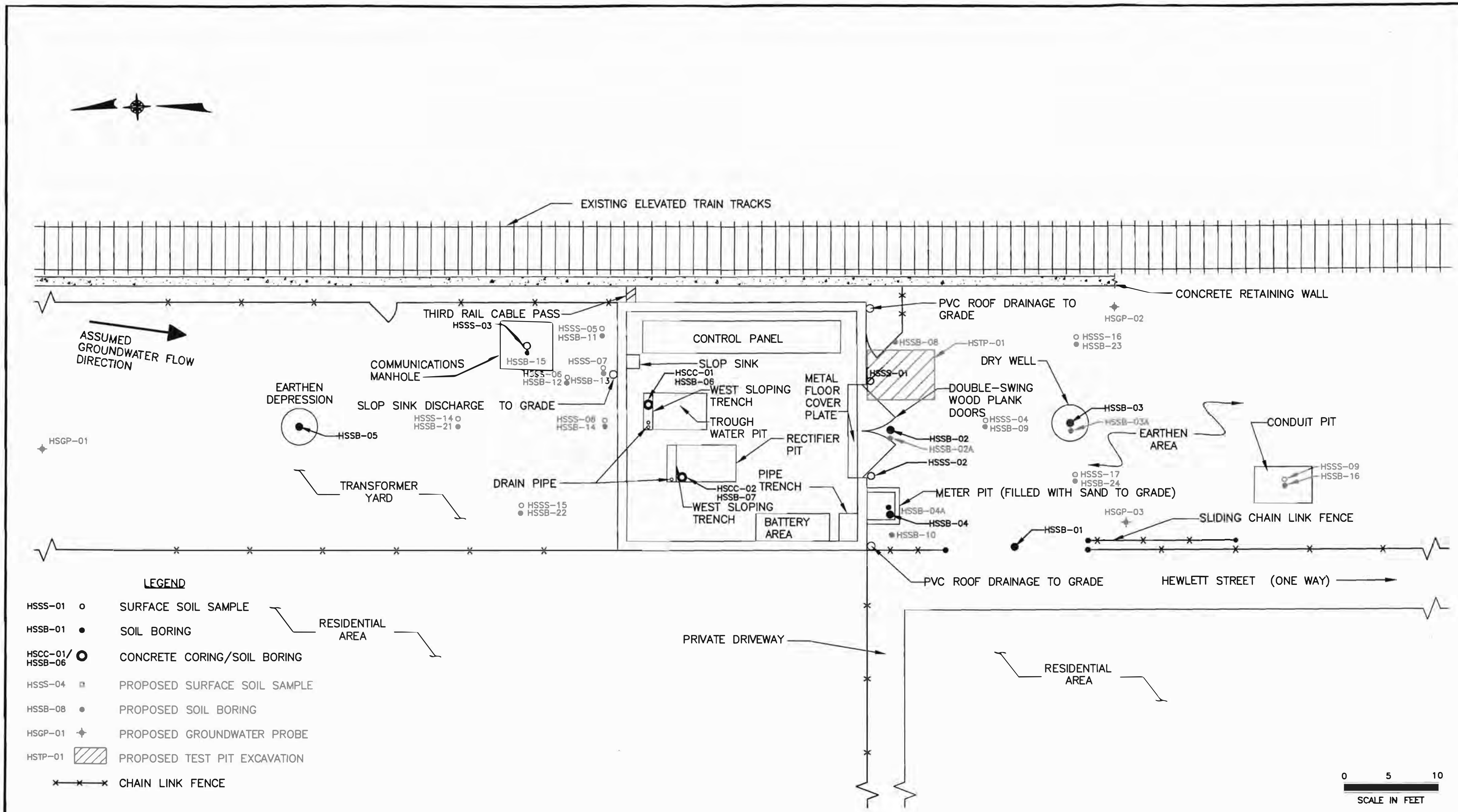
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
FLORAL PARK SUBSTATION (V00389-1)

FIGURE 5-3

F:\2229\2229-19A.dwg, LOCATION, 06/16/05 10:24:52 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

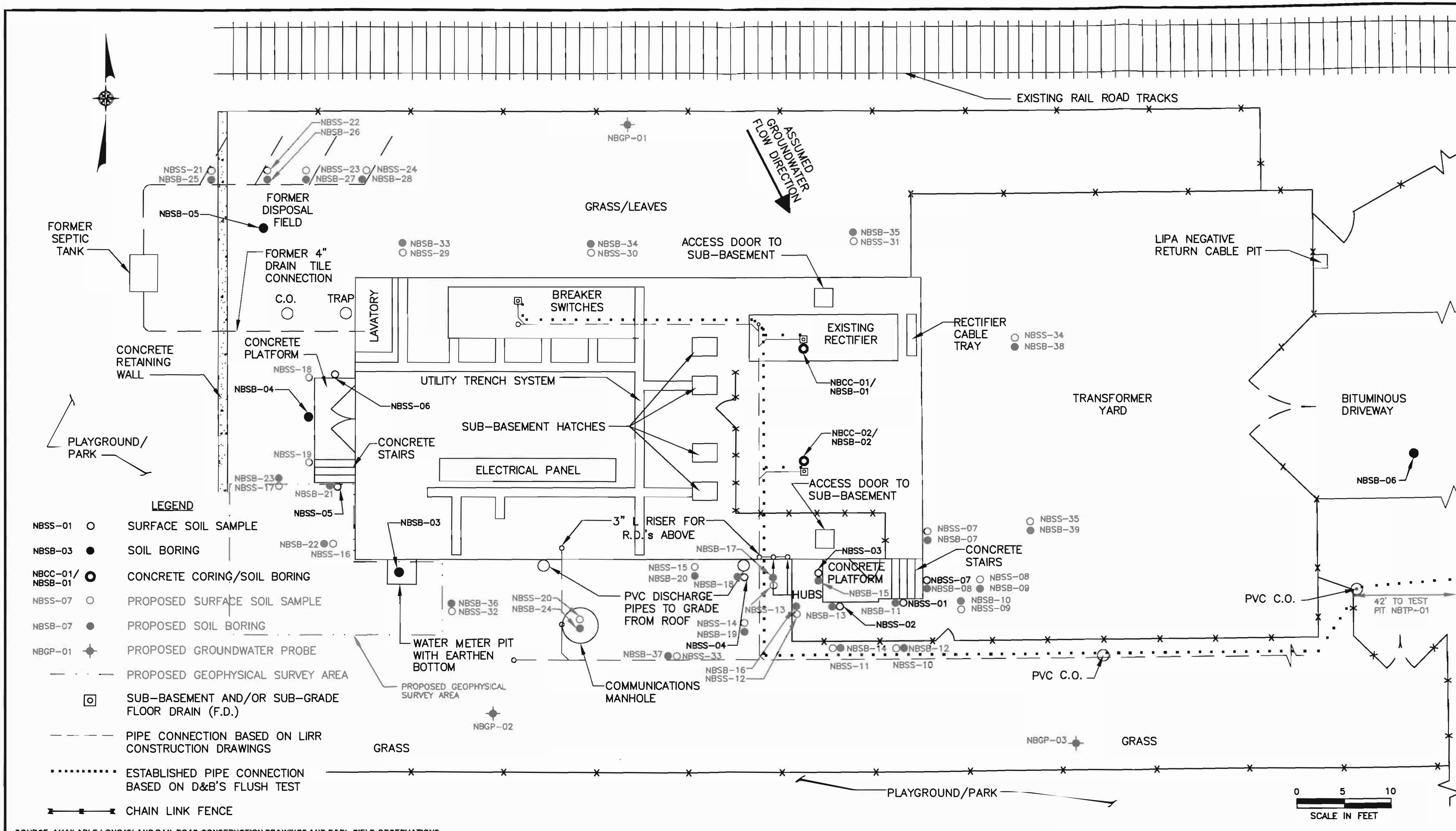
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
HEMPSTEAD SUBSTATION (V00390-1)

FIGURE 5-4

F:\2229\2229-17A.dwg, LOCATION, 06/16/05 10:25:21 AM, DCortes



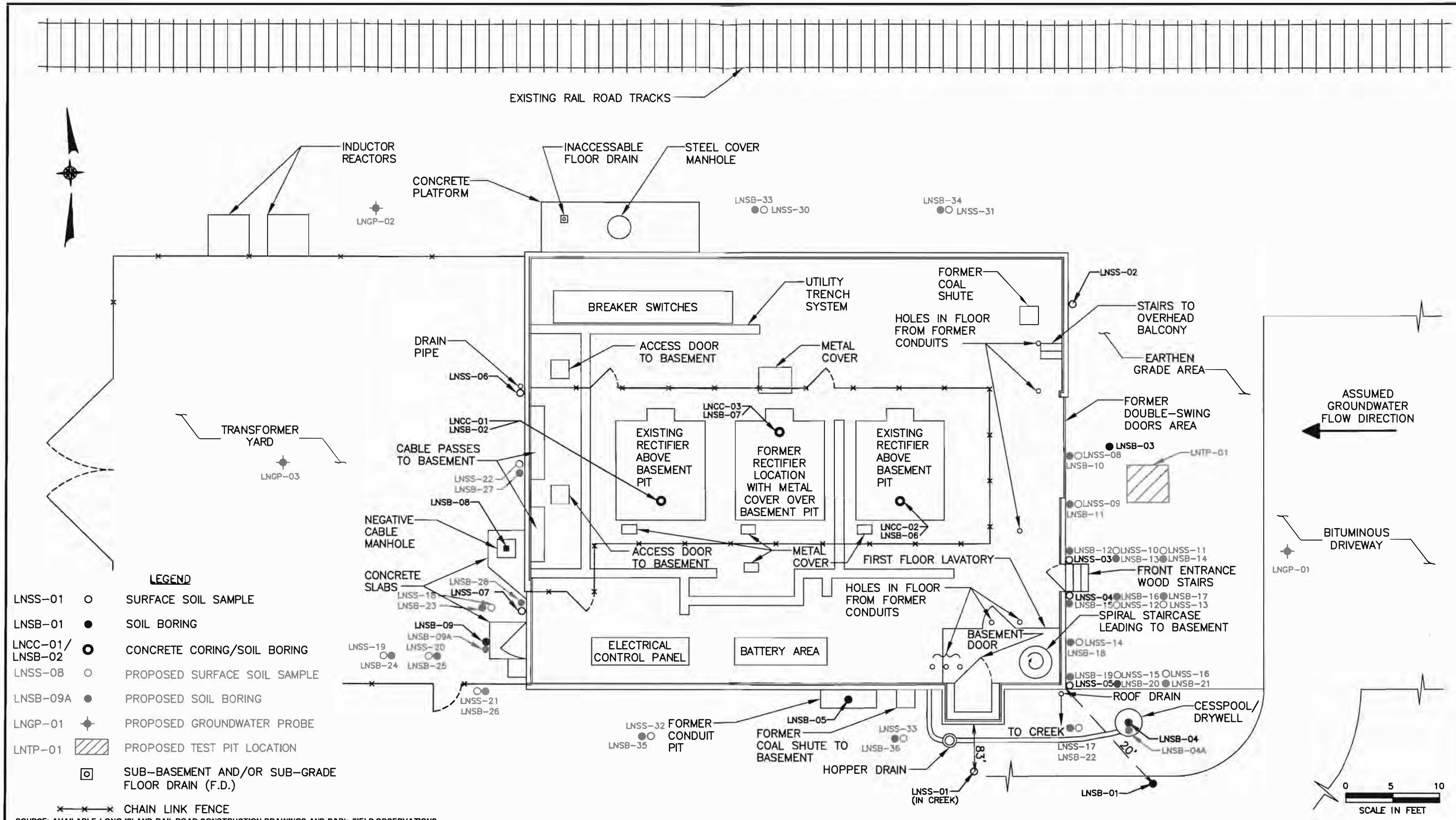
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
NASSAU BLVD. SUBSTATION (V00399-1)

FIGURE 5-5

F:\2229\2229-14A.dwg, LOCATION, 06/16/05 10:30:38 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

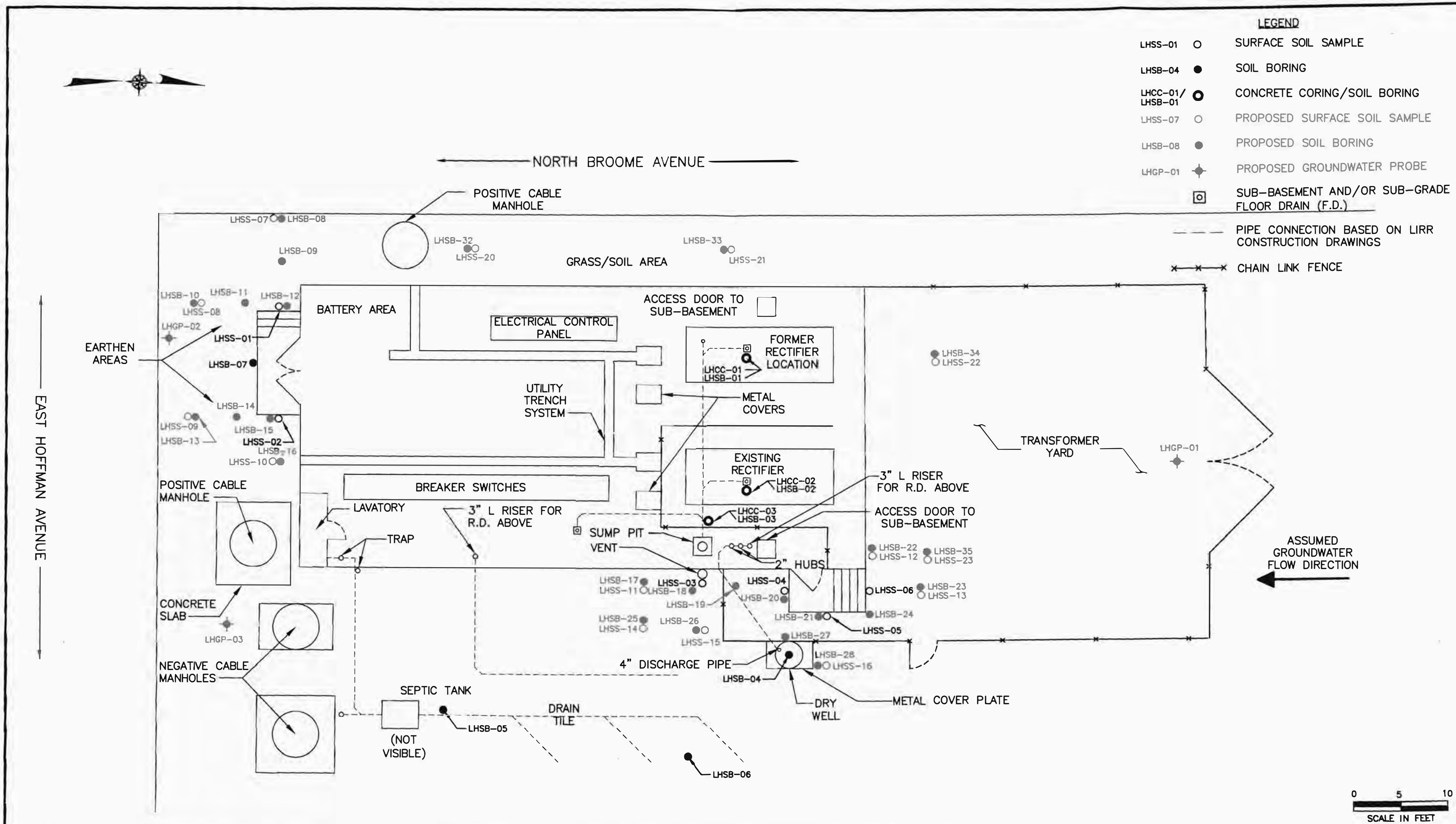
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
LITTLE NECK SUBSTATION (V00395-1)

FIGURE 5-6

F:\2229\2229-11A.dwg, LOCATION, 06/16/05 10:40:40 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

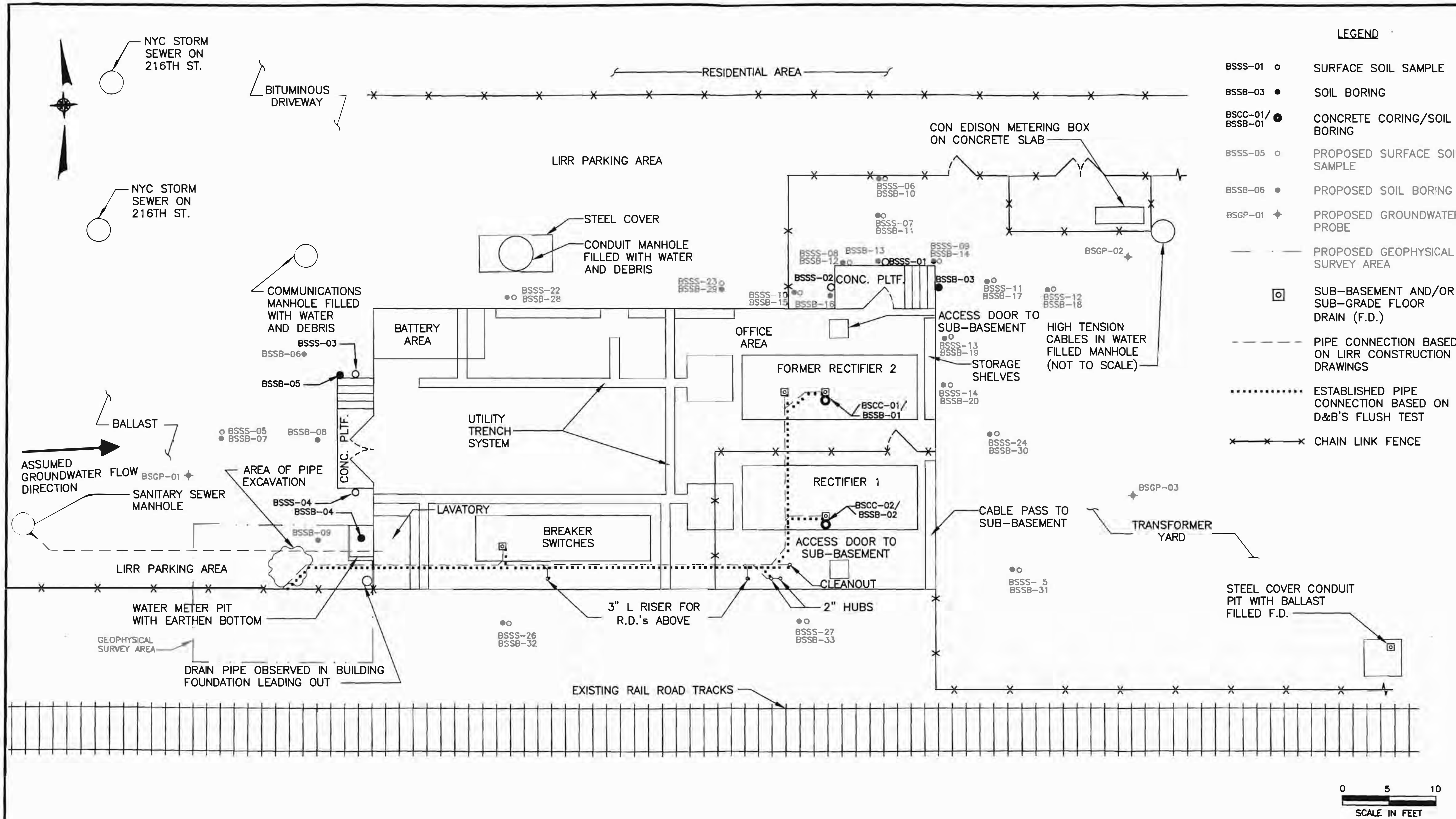
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
LINDENHURST SUBSTATION (V00394-1)

FIGURE 5-7

F:\2229\2229-10A.dwg, LOCATION, 06/16/05 10:42:10 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

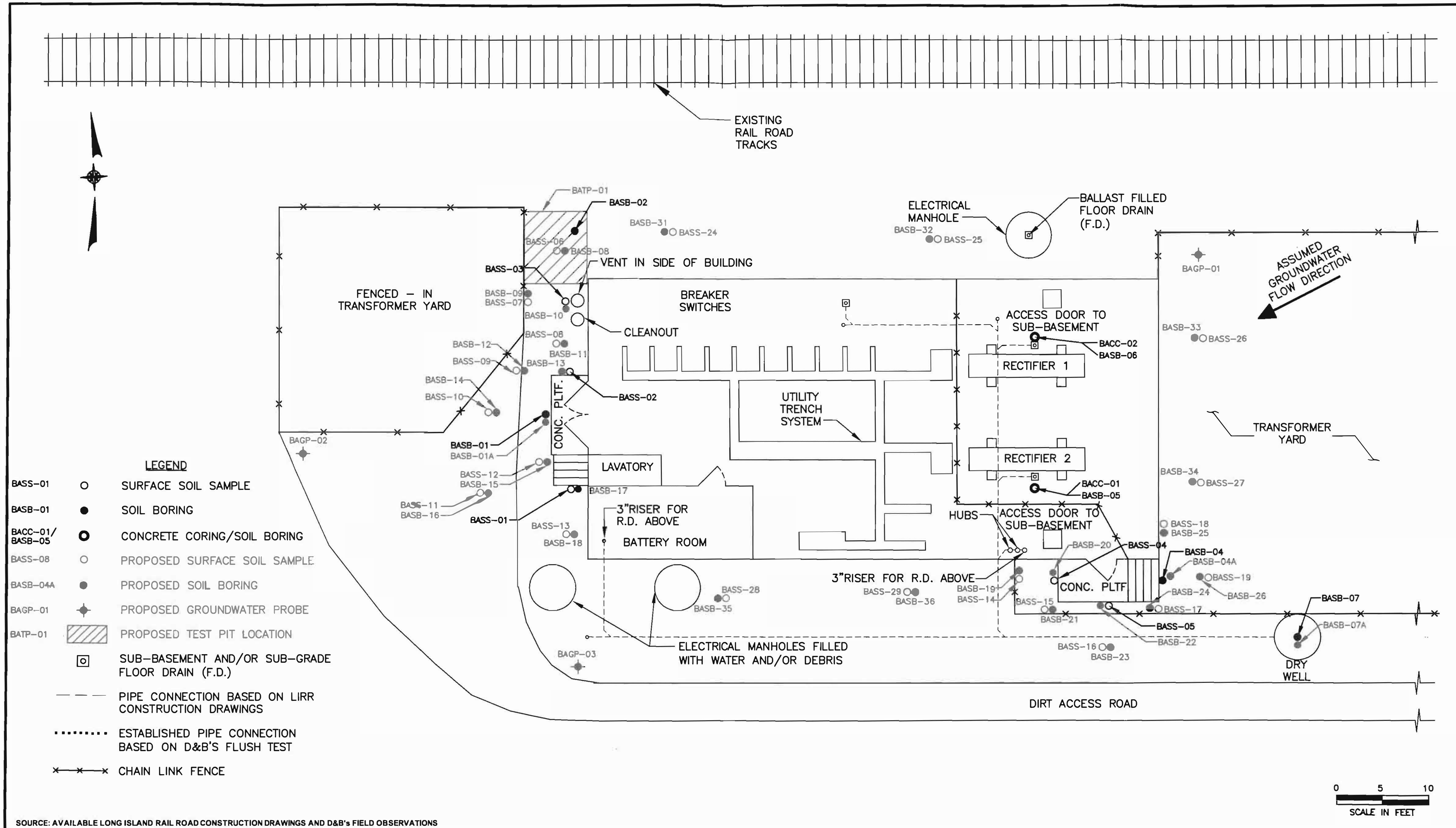
Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
BAYSIDE SUBSTATION (V00386-2)

FIGURE 5-8

F:\2229\2229-12A.dwg, LOCATION, 06/16/05 10:46:17 AM, DCortes



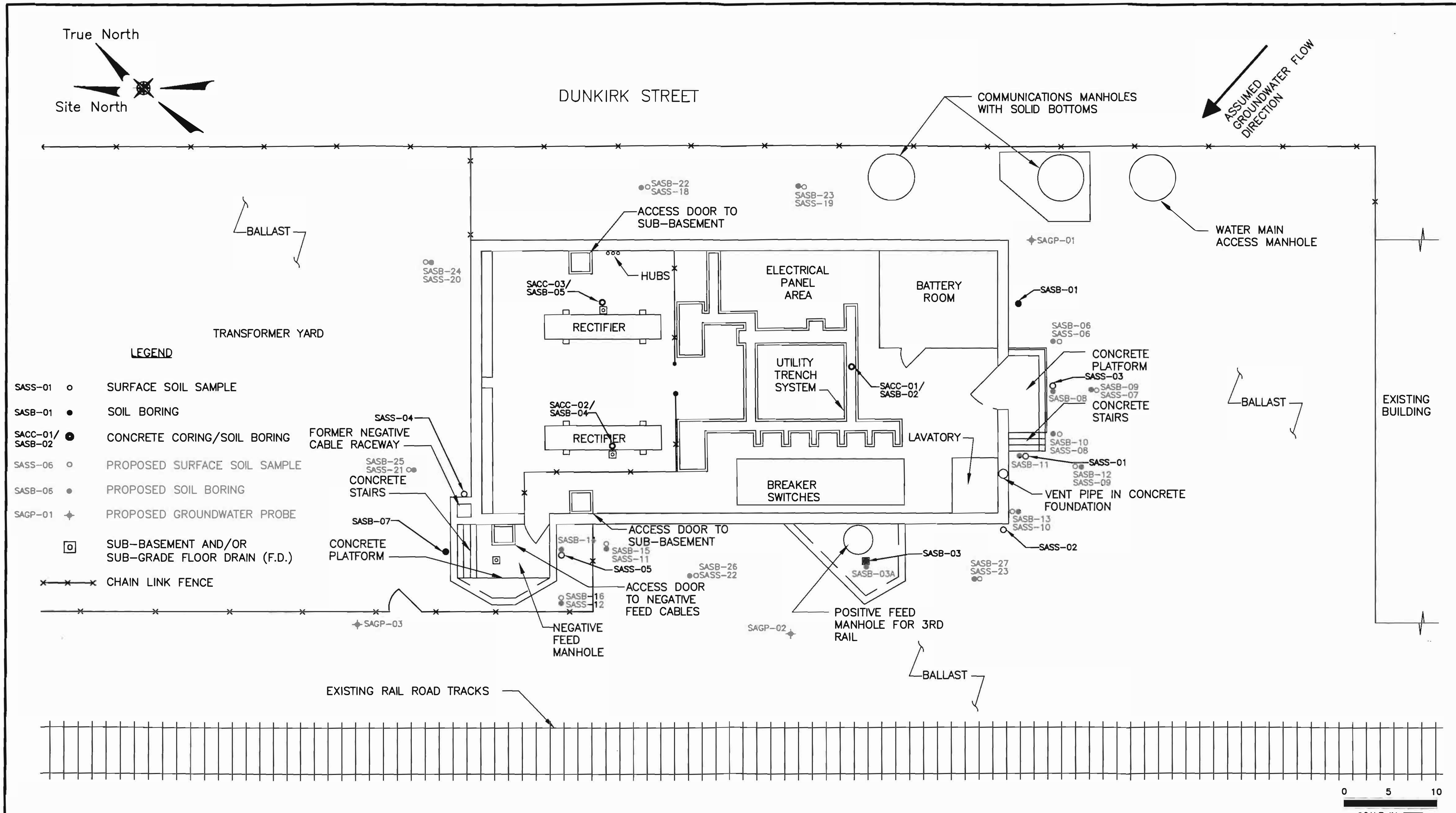
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
BELLAIRE SUBSTATION (V00387-2)

FIGURE 5-9

F:\2229\2229-16A.dwg, LOCATION, 06/16/05 10:46:55 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

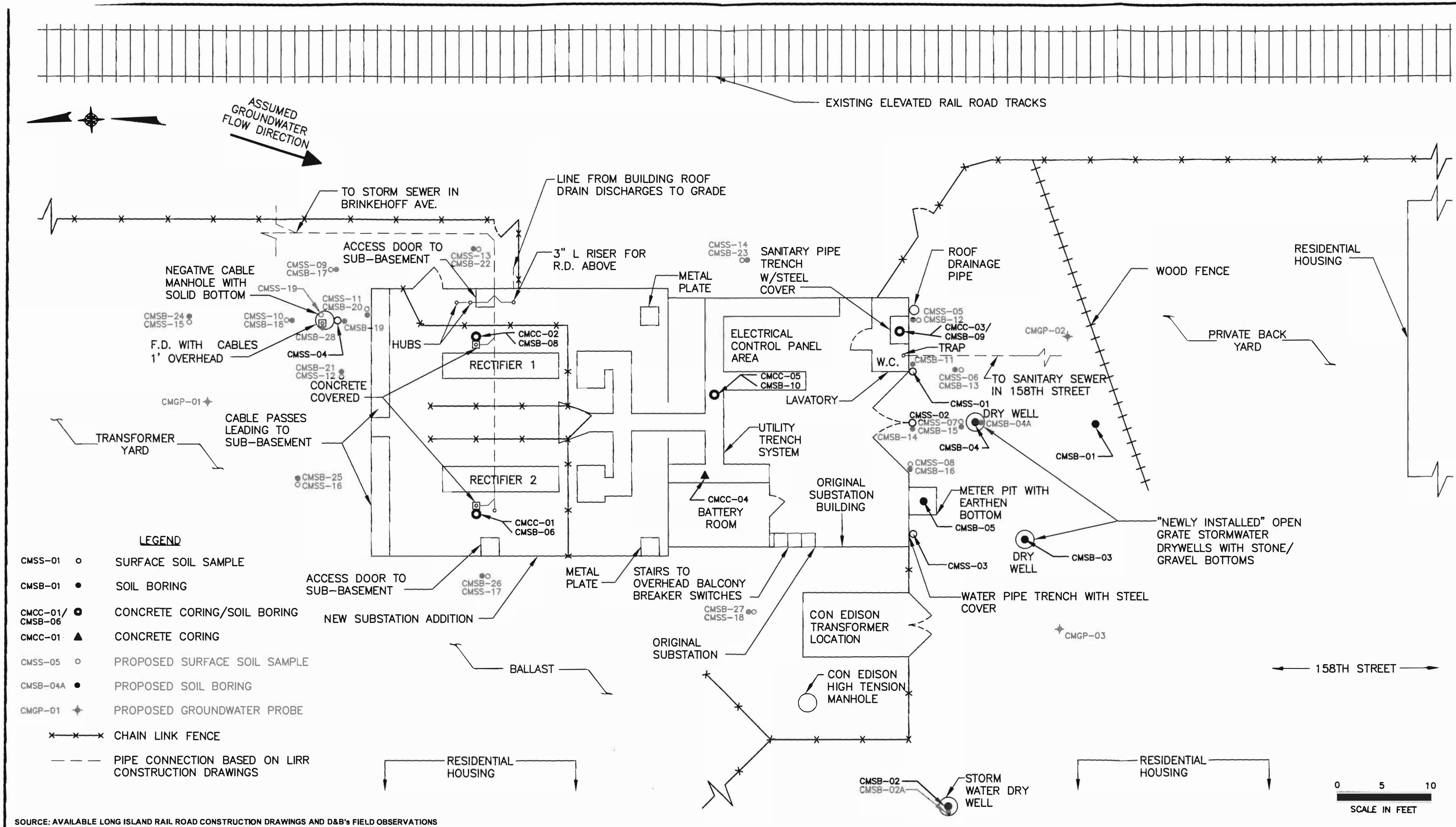
LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
ST. ALBANS SUBSTATION (V00402-2)

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

FIGURE 5-10

F:\2229\2229-7A.dwg, LOCATION, 06/16/05 11:02:39 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

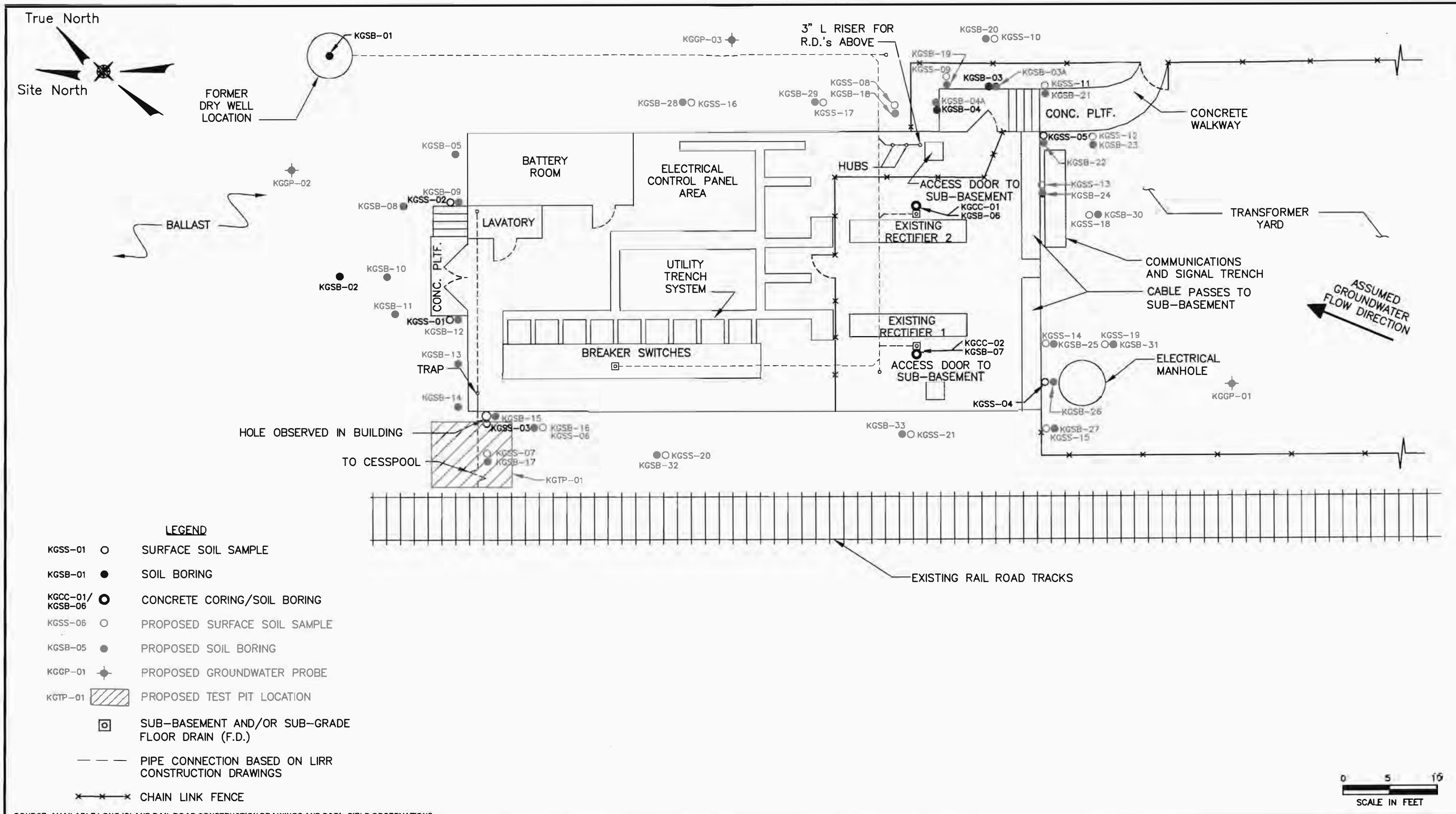
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
CEDAR MANOR SUBSTATION (V00388-2)

FIGURE 5-11

F:\2229\2229-13A.dwg, LOCATION, 06/16/05 11:04:06 AM, DCortes

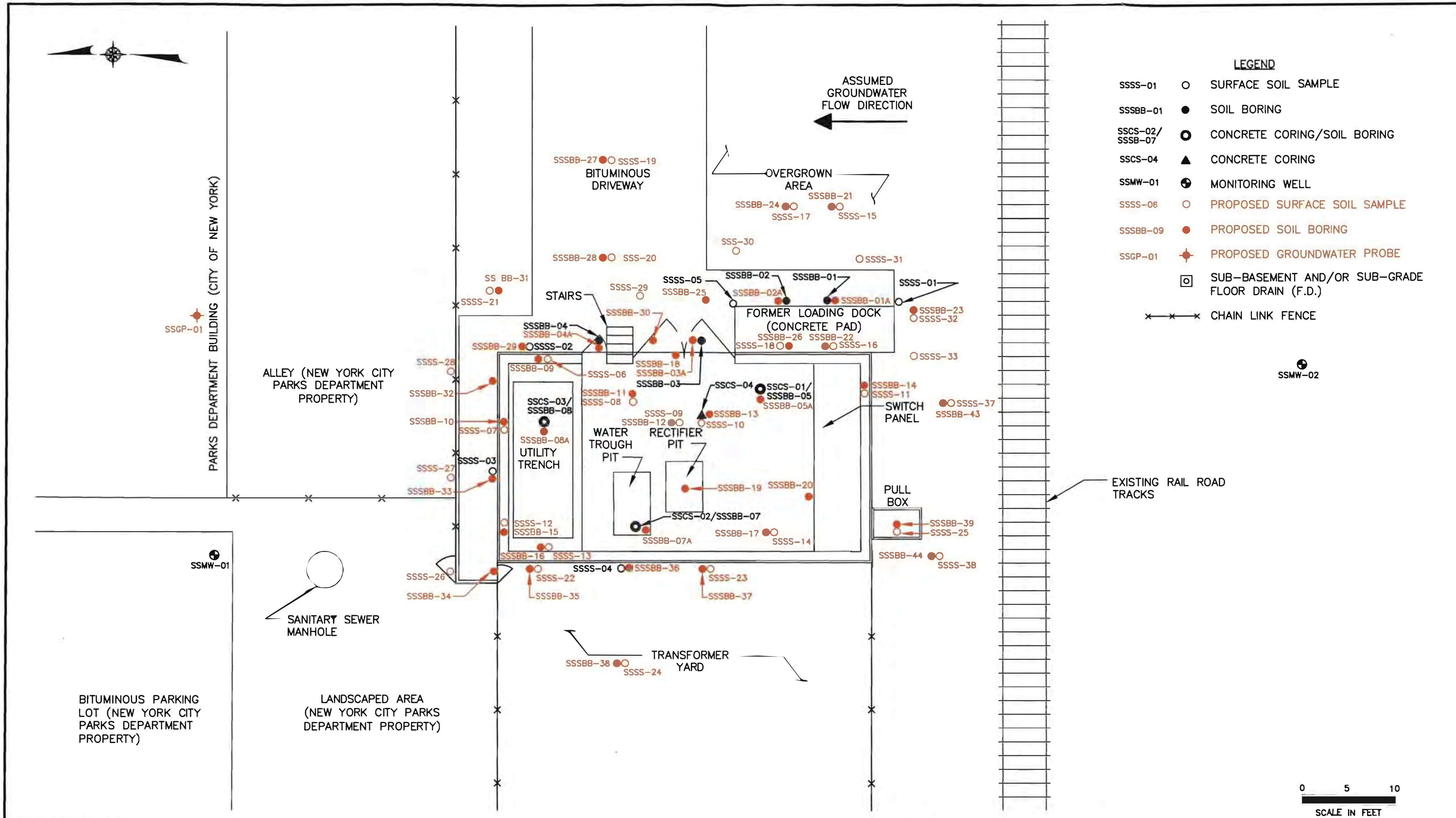


Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
KEW GARDENS SUBSTATION (V00393-2)

FIGURE 5-12



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

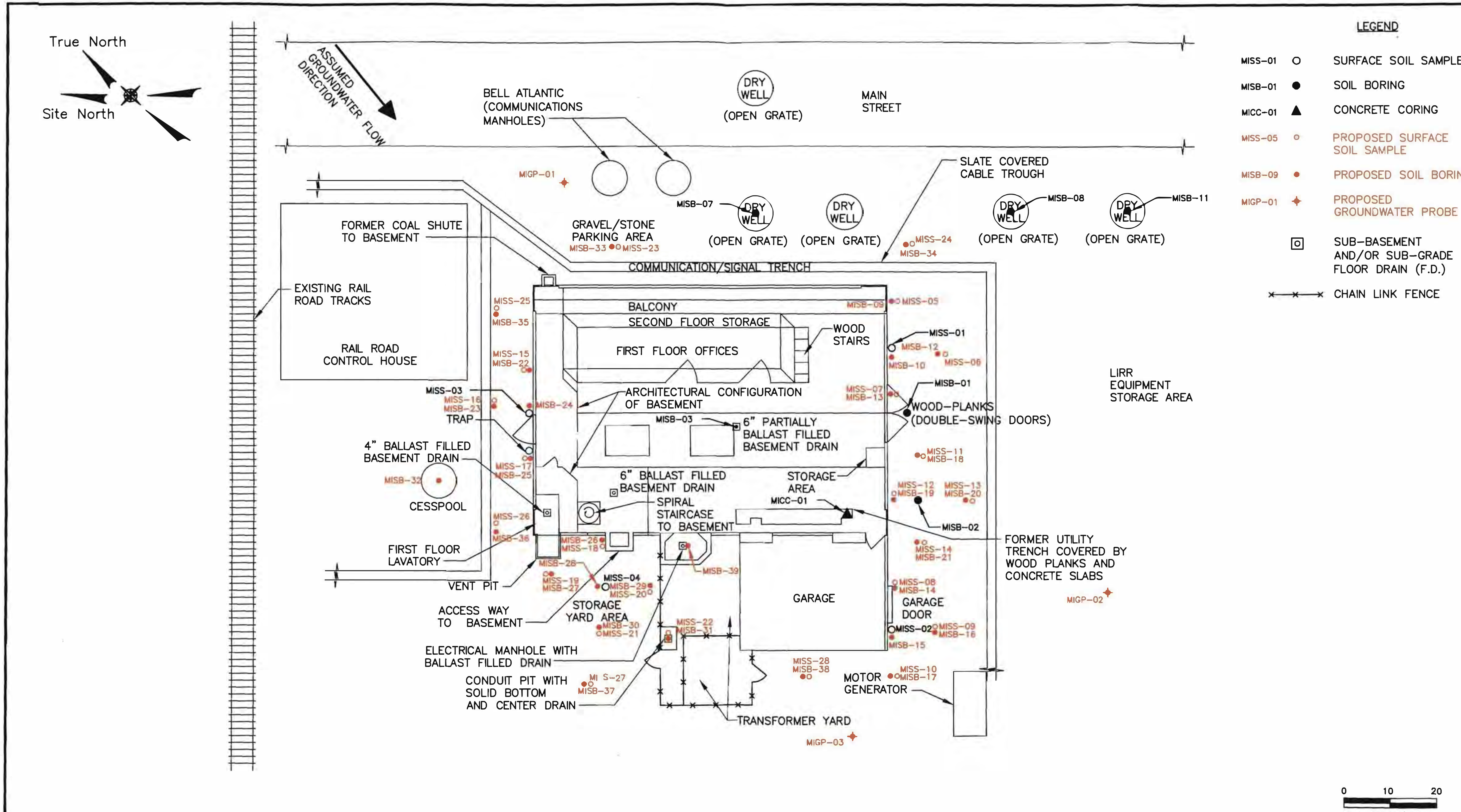
Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
SHEA SUBSTATION (V00403-2)

FIGURE 5-13

F:\2229\2229-1A.dwg, LOCATION, 06/16/05 11:05:31 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

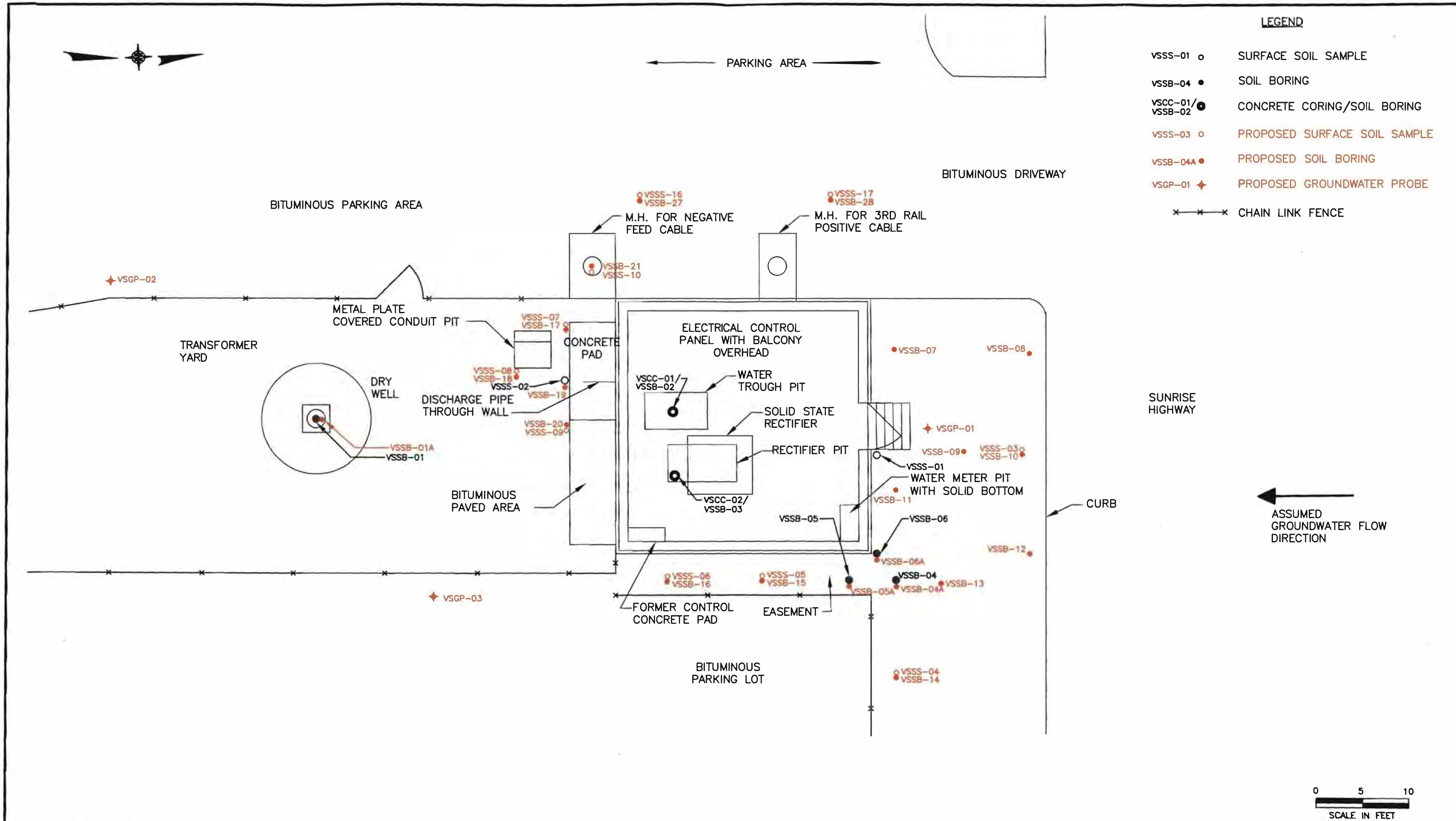
F:\2229\2229-8A.dwg, LOCATION, 06/16/05 11:12:22 AM, DCortes

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
MINEOLA SUBSTATION (V00398-1)

FIGURE 5-14



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

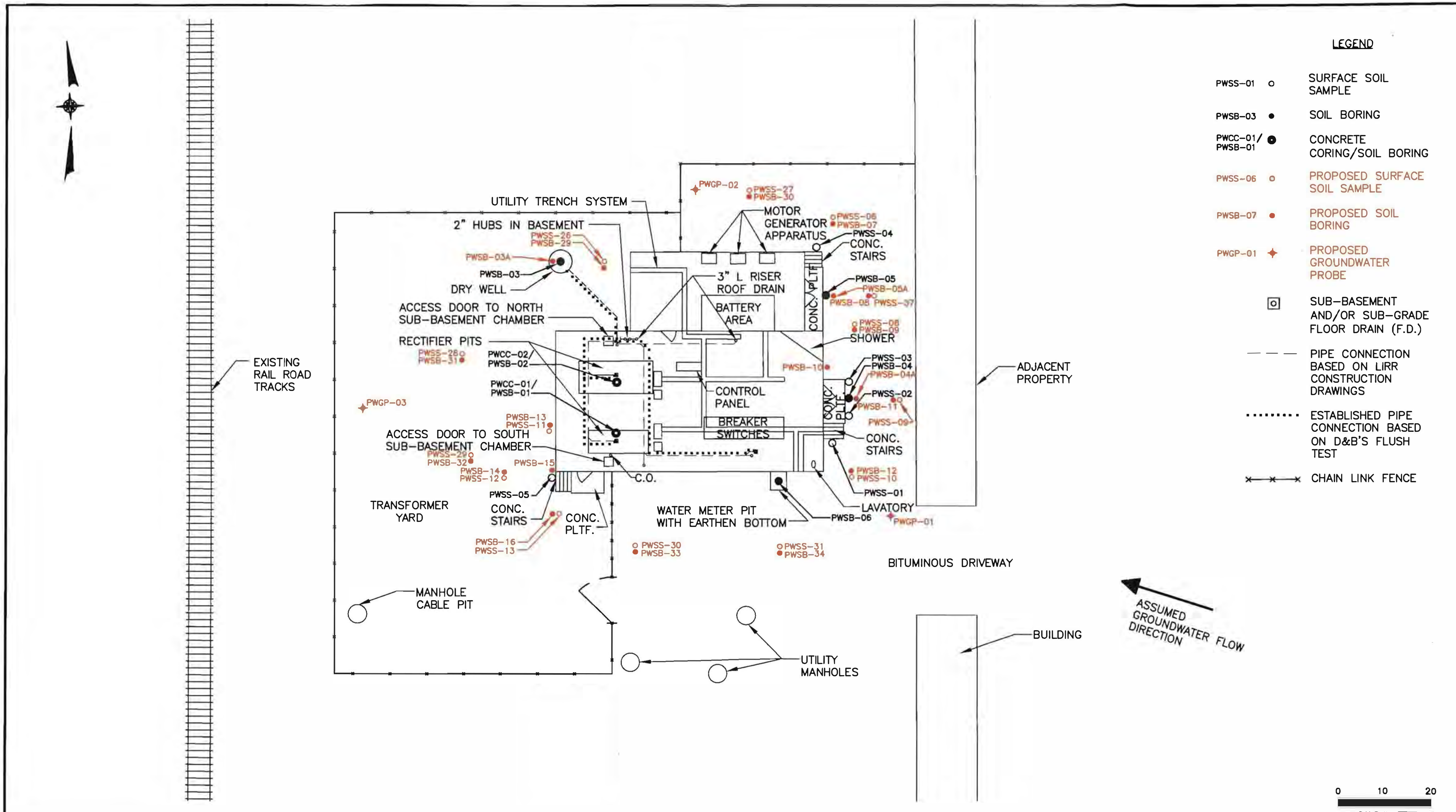
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
VALLEY STREAM SUBSTATION (V00404-1)

FIGURE 5-15

F:\2229\2229-4A.dwg, LOCATION, 06/16/05 11:13:11 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

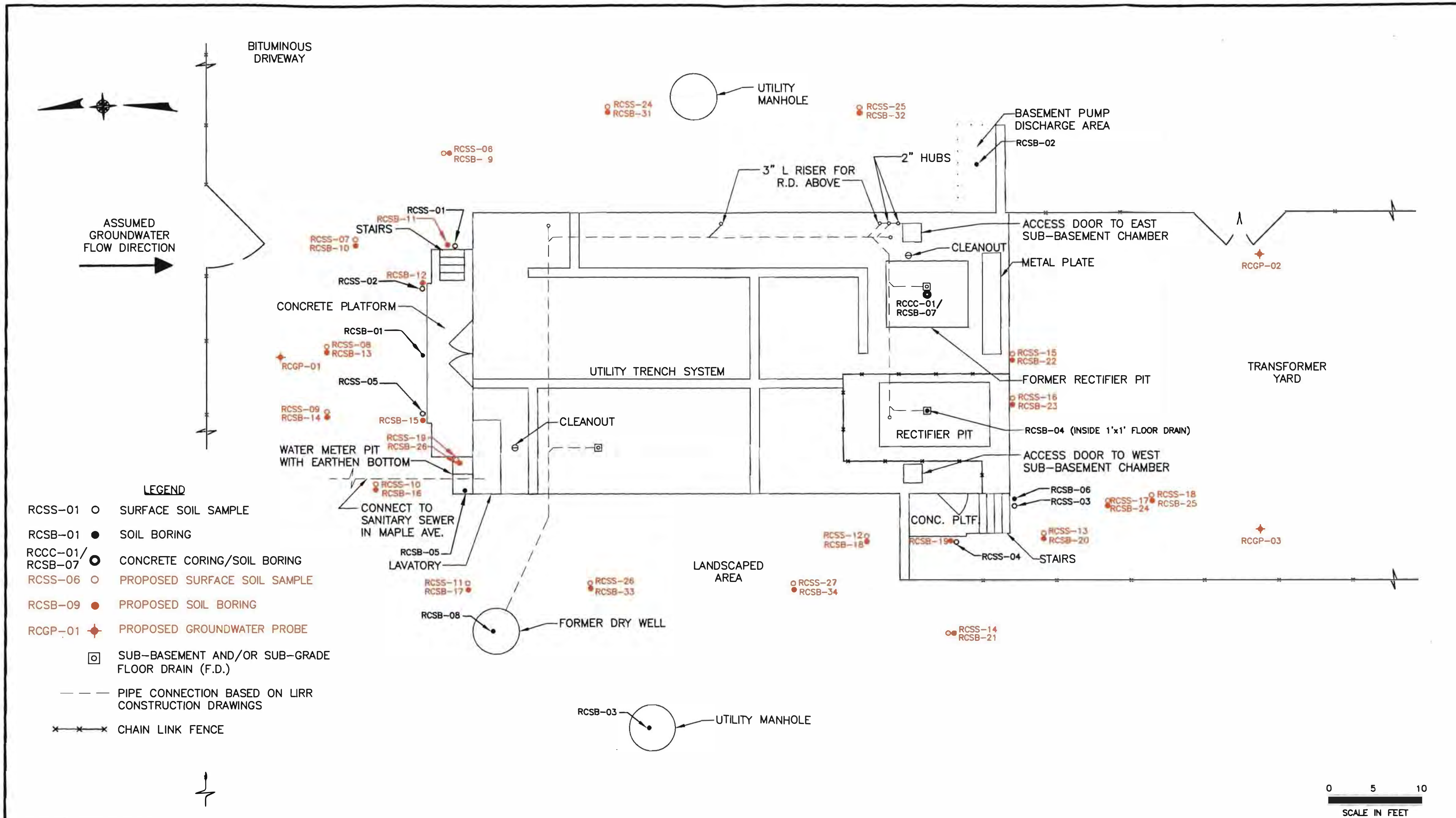
Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
PORT WASHINGTON SUBSTATION (V00400-1)

FIGURE 5-16

F:\2229\2229-18A.dwg, LOCATION, 06/16/05 11:13:58 AM, DCortes



SOURCE: AVAILABLE LONG ISLAND RAIL ROAD CONSTRUCTION DRAWINGS AND D&B's FIELD OBSERVATIONS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

LONG ISLAND RAIL ROAD
DELINEATION PHASE II SITE ASSESSMENT

SAMPLE LOCATION MAP
ROCKVILLE CENTRE SUBSTATION (V00401-1)

FIGURE 5-17

F:\2229\2229-5A.dwg, LOCATION, 06/16/05 11:14:39 AM, DCortes

TABLE 5-1
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Babylon Yard (V00385-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS No. of Probes	SOIL PROBES/BORINGS No. of Samples	SOIL PROBES/BORINGS Soil Sampling Interval	STANDING WATER SAMPLES	GROUNDWATER PROBES No. of Probes	GROUNDWATER PROBES Approximate Total Depth of Probes	Recommended Analyses Mercury	Recommended Analyses RCRA Metals	Recommended Analyses TAL Metals	Recommended Analyses PCBs	Recommended Analyses VOCs	Recommended Analyses SVOCs	Recommended Analyses USEPA UIC Constituents *	Comments
East Side of Substation	BYSB-07 through 10 BYSS-09 through 11	3	4	4	2-4' bgs Cont.				7							Delineate vertical and horizontal extent of impacted soil in the vicinity of BYSS-05.
	BYSB-04A		1	2	6-10' bgs Cont.				2							Delineate vertical extent of impacted soil at BYSB-04.
	BYSB-11 through 13 BYSS-12 through 14	3	3	12	2-10' bgs Cont.				15							Delineate vertical and horizontal extent of impacted soil in the vicinity of BYSB-04.
	BYSB-05A		1	3	0-2', 2-4' & 6-8' bgs.				3							Delineate vertical extent of impacted soil at BYSB-05.
	BYSB-14 through 17 BYSS-15 through 18	4	4	12	2-8' bgs Cont.				16							Delineate vertical and horizontal extent of impacted soil in the vicinity of BYSB-05.
Southwest Corner of Substation	BYSB-18 through 26 BYSS-19 through 24	6	9	9	2-4' bgs Cont.				15							Delineate the vertical and horizontal extent of impacted soil in the vicinity of soil probes BYSS-06, BYSS-07 and BYSS-08.
Drainage Swale	BYSB-27 & 28		2	2	2-4' bgs Cont.				2							Delineate vertical extent of impacted soil at BYSS-01 and BYSS-02 (within Drainage Swale).
	BYSS-25 through 28	4							4							Delineate the horizontal extent of impacted surface soil in the vicinity of BYSS-01 and BYSS-02.
Groundwater	BYGP-01 through 03						3	11'			6***		3			Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 5 to 7 feet below grade.
Positive Cable Pit, Communications Cable Pit, High Voltage Manhole, Control Cable Manhole, High Tension Cable Pit, Sump Pit and the Positive and Negative Cable Manholes	Contingent upon inspection	8	8	8	2-4' bpb Cont.				16							Inspect these structures to determine if they have earthen bottoms or floor drains which discharge to underlying soil. Only conduct sampling if structures are identified as discharging to underlying soil.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.				8							Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Potential Releases	BYSB-29 through 37 BYSS-29 through 37	9	9	9	2-4' bgs Cont.				18							Address potential releases not previously investigated and delineate the possible horizontal and vertical extent of impacted soil north of the substation in the vicinity of BYMW-39. Probes and surface soil samples to be located along the north, south, and west sides of the substation.
Transformers	BYSB-38 through 41 BYSS-38 through 41	4	4	8	0-4' bgs Cont.				12	12		12		12		Investigate stained areas in vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.

TABLE 5-1
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Babylon Yard (V00385-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			STANDING WATER SAMPLES	GROUNDWATER PROBES		Recommended Analyses							Comments
			No. of Probes	No. of Samples	Soil Sampling Interval		No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	USEPA UIC Constituents *	
Geophysical Survey	Contingent upon locating dry well															Conduct geophysical survey to locate dry well. If located, expose dry well with excavator and collect sediment sample. In addition, advance soil probe adjacent to dry well a total depth of 10 feet and collect up to two subsurface soil samples.
	Contingent upon locating former septic tank/tile drain															Conduct geophysical survey to locate former septic tank/tile drain. If located, expose septic tank/tile drain with excavator. Collect up to five subsurface soil samples at various locations along the tile drain using a hand auger.
Suffolk County Department of Health Services Sampling	BYSW-01					1			1	1			1	1		Investigate standing water within the basement area of the substation.
	BYSS-42 & 43	2							2	2			2	2		Investigate area adjacent to the southwest corner of the substation where standing water from basement was discharged.

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-2
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Far Rockaway (V00391-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS No. of Probes	SOIL PROBES/BORINGS No. of Samples	SOIL PROBES/BORINGS Soil Sampling Interval	GROUNDWATER PROBES No. of Probes	GROUNDWATER PROBES Approximate Total Depth of Probes	Recommended Analyses Mercury	Recommended Analyses RCRA Metals	Recommended Analyses TAL Metals	Recommended Analyses PCBs	Recommended Analyses VOCs	Recommended Analyses SVOCs	Recommended Analyses TPH	Recommended Analyses USEPA UIC Constituents *	Comments
North Side of Substation	FRSB-01A		1	2	6-10' bgs Cont.			2								Delineate vertical extent of impacted soil at FRSB-01.
	FRSB-08 through 14 FRSS-05 through 08	4	7	28	2-10' bgs Cont.			32								Delineate vertical and horizontal extent of impacted soil in the vicinity of FRSB-01.
South Side of Substation	FRSB-15 through 18 FRSS-09 through 11	3	4	4	2-4' bgs Cont.			7								Delineate vertical and horizontal extent of impacted soil along south side of substation in the vicinity of FRSS-04.
Dry Well Off Southwest Corner of Substation	FRSB-03A		1	1	6-8' bgs			1								Delineate vertical extent of impacted soil at FRSB-03 (drywell off southwest corner of substation).
Water Meter Pit and Control Cable Manhole	FRSB-19 & 20 FRSS-12 & 13	2	2	2	2-4' bpb Cont.			4								Advance one probe within the water meter pit and one probe within the control cable manhole to identify potentially impacted subsurface soil.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control	FRSB-05A		1	8	8-24' bgs Cont.										8	Delineate vertical extent of impacted soil at FRSB-05 (drywell in transformer yard).
Groundwater	FRGP-01 through 03					3	9'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 3 to 5 feet below grade.
Transformers	FRSB-21 through 24 FRSS-14 through 17	4	4	8	0-4' bgs Cont.			12	12		12		12			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	FRSB-25 through 28 FRSS-18 through 21	4	4	4	2-4' bgs Cont.			8								Address potential releases not previously investigated. Probes and surface soil samples to be located on east and west sides of the substation.

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-3
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Floral Park (V00389-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses								Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPH	USEPA UIC Constituents *	
East Side of Substation	FPSB-06A & 09A		2	4	6-10' bgs Cont.			4								Delineate vertical extent of impacted soil at FPSB-06 and FPSB-09.
	FPSB-16 through 24 FPSS-11 through 15	5	9	36	2-10' bgs Cont.			41								Delineate vertical and horizontal extent of impacted soil in the vicinity of FPSB-06 and FPSB-09.
	FPSB-25 through 29 FPSS-16 through 18	3	5	15	2-8' bgs Cont.			18								Delineate vertical and horizontal extent of impacted soil in the vicinity of FPSB-08.
	FPSB-52		1	4	0-8' bgs. Cont.			4								Delineate vertical extent of impacted soil at FPEP-08.
	FPSB-53 FPSS-40	1	1	3	2-8' bgs Cont.			4								Delineate vertical and horizontal extent of impacted soil in the vicinity of FPEP-08.
Positive Cable Manhole	FPSB-12A		1	2	16-20' bgs Cont.			2								Delineate vertical extent of impacted soil beneath floor drain in positive feed cable manhole.
Vent Pit Off Southwest Corner of Substation	FPSB-30		1	1	2-4' bpb Cont.			1								Delineate vertical extent of impacted soil beneath vent pit located off southwest corner of substation.
Communications Manhole and Positive/Negative Cable Pit	FPSB-31 & 32 FPSS-19 & 20	2	2	2	2-4' bpb Cont.			4								Delineate the vertical extent of potentially impacted soil beneath floor drains within Communications Manhole and Positive/Negative Cable Pit.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control	FPSB-15A		1	4	15.5-23.5' bgs Cont.										4	Delineate vertical extent of impacted soil within the Sanitary Cesspool. Soil probe to be advanced through cesspool immediately adjacent to FPSB-15
	FPSB-03A		1	5	13.5-23.5' bgs Cont.										5	Delineate vertical extent of impacted soil associated with dry well located east of substation. Soil boring to be advanced immediately adjacent to FPSB-03.
	FPSB-04A & 07A		2	6	6-12' bpb Cont.										6	Delineate vertical extent of impacted soil associated with floor drains located in Water Trough Pits. Soil probes to be advanced immediately adjacent to FPSB-04 and FPSB-07.
Conduit Pit and Water Valve Pit	FPSB-33 & 34 FPSS-21 & 22	2	2	4	2-6' bpb Cont.			6								Delineate potentially impacted soil beneath the Conduit Pit and Water Valve Pit.
Groundwater	FPGP-01 through 03					3	74'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 65 to 70 feet below grade.
Transformers	FPSB-35 through 45 FPSS-23 through 33	11	11	22	0-4' bgs Cont.			33	33		33		33			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	FPSB-46 through 51 FPSS-34 through 39	6	6	6	2-4' bgs Cont.			12								Address potential releases not previously investigated. Probes and surface soil samples to be located on north, south and west sides of the substation.

NOTES:
bgs: below ground surface
bpb: below pit bottom
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-4
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Hempstead (V00390-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS No. of Probes	No. of Samples	Soil Sampling Interval	GROUNDWATER PROBES No. of Probes	Approximate Total Depth of Probes	Recommended Analyses Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPH	USEPA UIC Constituents *	Comments
South Side of Substation	HSSB-08 through 10 HSSS-04	1	3	9	2-8' bgs Cont.			10								Delineate vertical and horizontal extent of impacted soil in the vicinity of HSSB-02.
	HSSB-02A		1	2	6-10' bgs Cont.			2								Delineate vertical extent of impacted soil at HSSB-02.
Meter Pit	HSSB-04A		1	3	10-16' bgs Cont.			3								Delineate vertical extent of impacted soil within Meter Pit. Advance probe immediately adjacent to HSSB-04.
Slop Sink	HSSB-11 through 14 HSSS-05 through 08	4	4	4	2-4' bgs Cont.			8								Delineate vertical and horizontal extent of impacted soil in the vicinity of the discharge point of the Slop Sink.
Communications Manhole and Conduit Pit	HSSB-15		1	1	2-4' bmb Cont.			1								Delineate vertical extent of impacted soil beneath the Communications Manhole.
	HSSB-16 HSSS-09	1	1	1	2-4' bpb Cont.			2								Delineate the vertical extent of impacted soil beneath the Conduit Pit.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control	HSSB-03A		1	5	23-33' bgs Cont.										5	Delineate the vertical extent of impacted soil beneath the dry well located 22' to the south of the substation. Advance probe adjacent to HSSB-03.
Groundwater	HSGP-01 through 03					3	34'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 25 to 30 feet below grade.
Transformers	HSSB-17 through 20 HSSS-10 through 13	4	4	8	0-4' bgs Cont.			12	12		12		12			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	HSSB-21 through 24 HSSS-14 through 17	4	4	4	2-4' bgs Cont.			8								Address potential releases not previously investigated. Probes and surface soil samples to be located on north and south sides of the substation.
Test Pit	HSTP-01		1	5	0-10' bdb Cont.			5								An exploratory excavation will be conducted to identify a historic dry well reportedly located approximately 4 feet off the southeast exterior substation wall. If dry well is located one soil boring will be installed through bottom of dry well to delineate potentially impacted soil.

NOTES:

bgs: below ground surface.
bpb: below pit bottom.
bdb: below dry well bottom.
bmb: below manhole bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-5
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Nassau Boulevard (V00399-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS: No. of Probes	SOIL PROBES/BORINGS: No. of Samples	SOIL PROBES/BORINGS: Soil Sampling Interval	GROUNDWATER PROBES: No. of Probes	GROUNDWATER PROBES: Approximate Total Depth of Probes	Recommended Analyses: Mercury	Recommended Analyses: RCRA Metals	Recommended Analyses: TAL Metals	Recommended Analyses: PCBs	Recommended Analyses: VOCs	Recommended Analyses: SVOCs	Recommended Analyses: TPH	Recommended Analyses: USEPA UIC Constituents *	Comments
Southeast Corner of Substation	NBSB-07 through 17 NBSS-07 through 13	7	11	11	2-4' bgs Cont.			18								Delineate the vertical and horizontal extent of impacted soil in the vicinity of NBSS-01, NBSS-02, NBSS-03, and NBSS-07.
South Side of Substation	NBSB-18 through 20 NBSS-14 & 15	2	3	3	2-4' bgs Cont.			5								Delineate the vertical and horizontal extent of impacted soil in the vicinity of NBSS-04.
West Side of Substation	NBSB-21 through 23 NBSS-16 & 17	2	3	3	2-4' bgs Cont.			5								Delineate the vertical and horizontal extent of impacted soil in the vicinity of NBSS-05.
	NBSS-18 & 19	2						2								Delineate horizontal extent of impacted surface soil in the vicinity of NBSB-04.
Communications Manhole	NBSB-24 NBSS-20	1	1	1	2-4' bdb Cont.			2								Delineate vertical extent of potentially impacted soil beneath Communications Manhole floor drain.
Former Disposal Field	NBSB-25 through 28 NBSS-21 through 24	4	4	4	2-4' bgs Cont.			8								Delineate the vertical and horizontal extent of impacted soil in the vicinity of NBSB-05 (Former Disposal Field).
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Groundwater	NBGP-01 through 03					3	49'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 40 to 45 feet below grade.
Transformers	NBSB-29 through 32 NBSS-25 through 28	4	4	8	0-4' bgs Cont.			12	12		12		12			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	NBSB-33 through 39 NBSS-29 through 35	7	7	7	2-4' bgs Cont.			14								Address potential releases not previously investigated. Two probes and two surface soil samples to be located along the south, and east sides of the substation. Three probes and three surface soil samples to be located along the north side of the substation
Geophysical Survey	Contingent on locating sanitary system	1	1	1	2-4' bsb Cont.			2								Conduct geophysical survey to locate sanitary system off southwest corner of substation. If a sanitary system is detected in this area, advance one soil probe below the bottom of the sanitary system to delineate vertical extent of potentially impacted soil.
Test Pit	NBTP-01															Conduct exploratory excavation to identify discharge point of floor drains located in the substation basement.

NOTES:
bgs: below ground surface.
bsb: below sanitary system bottom.
bdb: below drain bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-6
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Little Neck (V00395-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS No. of Probes	SOIL PROBES/BORINGS No. of Samples	SOIL PROBES/BORINGS Soil Sampling Interval	GROUNDWATER PROBES No. of Probes	GROUNDWATER PROBES Approximate Total Depth of Probes	Recommended Analyses: Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TOC	TPH	USEPA UIC Constituents *	Comments
East Side of Substation	LNSB-10 through 22 LNSS-08 through 17	10	13	13	2-4' bgs Cont.			23									Delineate the vertical and horizontal extent of impacted soil in the vicinity of LNSS-03, LNSS-04, and LNSS-05.
West Side of Substation	LNSB-09A		1	2	6-10' bgs Cont.			2									Delineate the vertical extent of impacted soil at LNSB-09.
	LNSB-23 through 26 LNSS-18 through 21	4	4	16	2-10' bgs Cont.			20									Delineate the vertical and horizontal extent of impacted soil in the vicinity of LNSB-09.
	LNSB-27 LNSS-22	1	1	1	2-4' bgs Cont.			2									Delineate the vertical and horizontal extent of impacted soil in the vicinity of LNSS-07.
	LNSB-28		1	3	2-8' bgs Cont.			3									Delineate the vertical extent of impacted soil at LNSS-07.
Drainage Creek	LNSS-23 through 25	3						3						3			Collect two sediment samples downgradient of LNSS-01 at 15' intervals and collect one sediment sample 15' upgradient of LNSS-01 to delineate the horizontal extent of impacted sediment in the drainage creek. Note that due to the distance of the Drainage Creek from the site, these samples are not depicted on the Sample Location Map.
Manhole along North Side of Substation	Contingent upon drain inspection	1	1	1	2-4' bdb Cont.			2									Inspect this structure to determine if it has an earthen bottom or drain which discharges to underlying soil. If this discharge is confirmed, advance a soil probe beneath the bottom to delineate the vertical extent of potentially impacted subsurface soil.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8									Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control	LNSB-04A		1	5	12-22' bgs Cont.											5	Delineate the vertical extent of impacted soil beneath the cesspool/dry well located to the east of the substation. Soil probe should be advanced immediately adjacent to LNSB-04.
Groundwater	LNGP-01 through 03					3	24'			6***		3					Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 20 feet below grade.
Transformers	LNSB-29 through 32 LNSS-26 through 29	4	4	8	0-4' bgs Cont.			12	12		12		12				Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Basement Water	LNBW-01							1									Determine if water in basement is contaminated with mercury. Note that the sample location shall be selected during the field program. As a result, it is not depicted on the Sample Location Map.
Potential Releases	LNSB-33 through 36 LNSS-30 through 33	4	4	4	2-4' bgs Cont.			8									Address potential releases not previously investigated. Probes and soil samples to be located along the north and south sides of the substation.
Test Pit	LNTP-01																Conduct exploratory excavation to further trace drain pipe which originates from the substation basement and runs long the east side of the site.

NOTES:
bgs: below ground surface.
bdb: below drain bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples
NA Not Applicable

TABLE 5-7
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Lindenhurst (V00394-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses								Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPH	USEPA UIC Constituents *	
South Side of Substation	LHSB-08 through 16 LHSS-07 through 10	4	9	9	2-4' bgs Cont.			13								Delineate the vertical and horizontal extent of impacted soil in the vicinity of LHSS-01 and LHSS-02.
Northeast Corner of Substation	LHSB-17 through 28 LHSS-11 through 16	6	12	12	2-4' bgs Cont.			18								Delineate the vertical and horizontal extent of impacted soil in the vicinity of LHSS-03, LHSS-04, LHSS-05 and LHSS-06.
Four Electric Manholes and Sump Pit	Contingent upon bottoms of structures	5	5	5	2-4' bmp Cont.			10								Inspect four Electric Manholes and Sump Pit to determine if the structures contain earthen bottoms or floor drains which discharge to underlying soil. If confirmed to discharge to underlying soil, advance one probe to delineate the vertical extent of potentially impacted soil at each location.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control		1													1	Collect endpoint soil sample from bottom of dry well in the presence of the Suffolk County Department of Health.
Groundwater	LHGP-01 through 03					3	9'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 3 to 5 feet below grade.
Transformers	LHSB-29 through 31 LHSS-17 through 19	3	3	6	0-4' bgs Cont.			9	9		9		9			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	LHSB-32 through 35 LHSS-20 through 23	4	4	4	2-4' bgs Cont.			8								Address potential releases not previously investigated. Probes and surface soil samples to be located on north and west sides of the substation.

NOTES:
bgs: below ground surface.
bmp: below manhole bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-8
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Bayside (V00386-2)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses								Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPH	USEPA UIC Constituents *	
West Side of Substation	BSSB-06 through 09 BSSS-05	1	4	4	2-4' bgs Cont.			5								Delineate the vertical and horizontal extent of impacted soil in the vicinity of the western concrete platform.
Northeast Corner of Substation	BSSB-10 through 16 BSSS-06 through 10	5	7	7	2-4' bgs Cont.			12								Delineate the vertical and horizontal extent of impacted soil in the vicinity of BSSS-01 and BSSS-02.
	BSSB-17 through 20 BSSS-11 through 14	4	4	8	2-6' bgs Cont.			12								Delineate the vertical and horizontal extent of impacted soil in the vicinity of BSSB-03.
Communications Manhole, Conduit Manhole, and High Tension Cable Manhole	Contingent on bottoms of structures	3	3	3	2-4' bpb Cont.			6								Inspect the three structures to determine if they contain earthen bottoms or floor drains which discharge to underlying soil. If confirmed to discharge to underlying soil, advance one probe to delineate the vertical extent of potentially impacted soil at each structure.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Groundwater	BSGP-01 through 03					3	74'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 70 feet below grade.
Transformers	BSSB-21 through 27 BSSS-15 through 21	7	7	14	0-4' bgs Cont.			21	21		21		21			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	BSSB-28 through 33 BSSS-22 through 27	6	6	6	2-4' bgs Cont.			12								Address potential releases not previously investigated. Probes and surface soil samples to be located along the north, south, and east sides of the substation.
Geophysical Survey																Conduct geophysical survey to further trace 3 drain pipes which originate from the substation basement..

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-9
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Bellaire (V00387-2)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses								Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPH	USEPA UIC Constituents *	
West Side of Substation	BASB-08 through 11 BASS-06 through 08	3	4	4	2-4' bgs Cont.			7								Delineate the vertical and horizontal extent of impacted soil in the vicinity of BASS-03.
West Side of Substation	BASB-12 through 18 BASS-09 through 13	5	7	28	2-10' bgs Cont.			33								Delineate the vertical and horizontal extent of impacted soil in the vicinity of BASS-02 and BASS-01 and BASB-01.
West Side of Substation	BASB-01A		1	2	6-10' bgs Cont.			2								Delineate the vertical extent of impacted soil at BASB-01. Probe to be located immediately adjacent to BASB-01.
Southeast Corner of Substation	BASB-19 through 24 BASS-14 through 17	4	6	18	2-8' bgs Cont.			22								Delineate the vertical and horizontal extent of impacted soil in the vicinity of BASS-04 and BASS-05.
Southeast Corner of Substation	BASB-04A		1	3	4-10' bgs Cont.			3								Delineate the vertical extent of impacted soil at BASB-04. Probe to be located immediately adjacent to BASB-04.
Southeast Corner of Substation	BASB-25 & 26 BASS-18 & 19	2	2	8	2-10' bgs Cont.			10								Delineate the vertical and horizontal extent of impacted soil in the vicinity of BASB-04.
Electric Manholes	Contingent upon inspection	2	2	2	2-4' bmb Cont.			4								Inspect two Electric Manholes to determine if the structures contain earthen bottoms or floor drains which discharge to underlying soil. If confirmed to discharge to underlying soil, advance one probe to delineate the vertical extent of potentially impacted soil at each manhole.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control	BASB-07A		1	5	13-23' bgs Cont.										5	Determine vertical extent of contamination associated with dry well located southeast of substation. Soil boring to be advanced immediately adjacent to BASB-07.
Transformers	BASB-27 through 30 BASS-20 through 23	4	4	8	0-4' bgs Cont.			12	12		12		12			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Groundwater	BAGP-01 through 03					3	74'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 65 to 70 feet below grade.
Potential Releases	BASB-31 through 36 BASS-24 through 29	6	6	6	2-4' bgs Cont.			12								Address potential releases not previously investigated. Probes and surface soil samples to be located on north, south and east sides of the substation.
Test Pit	BATP-01															Conduct exploratory excavation to locate Former Septic System off the northwest corner of the substation.

NOTES:
bgs: below ground surface.
bmb: below manhole bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-10
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
St. Albans (V00402-2)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses								Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPH	USEPA UIC Constituents *	
South Side of Substation	SASB-06, 08 through 13 SASS-06 through 10	5	7	7	2-4' bgs Cont.			12								Delineate the vertical and horizontal extent of impacted soil in the vicinity of SASS-03 and SASS-01.
Northwest Corner of Substation	SASB-14 through 16 SASS-11 & 12	2	3	3	2-4' bgs Cont.			5								Delineate the vertical and horizontal extent of contamination in the vicinity of SASS-05.
Positive Feed Manhole	SASB-03A		1	2	12-16' bgs Cont.			2								Delineate the vertical extent of impacted soil in Positive Feed Manhole. Advance one probe immediately adjacent to SASB-03.
Negative Feed Manhole	Contingent upon inspection	1	1	1	2-4' bdb Cont.			2								Inspect floor drain within the Negative Feed Manhole. If it is found to discharge to underlying soil, advance one probe to delineate the extent of potentially impacted soil beneath the floor drain.
Water Main Manhole	Contingent upon inspection	1	1	1	2-4' bpb Cont.			2								Inspect the Water Main Manhole to determine if it contains an earthen bottom or floor drain that discharges to underlying soil. If found to discharge to underlying soil, install one probe to delineate the extent of potentially impacted soil beneath the bottom of the structure.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Groundwater	SAGP-01 through 03					3	49'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 40 to 45 feet below grade.
Transformers	SASB-17 through 21 SASS-13 through 17	5	5	10	0-4' bgs Cont.			15	15		15		15			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	SASB-22 through 27 SASS-18 through 23	6	6	6	2-4' bgs Cont.			12								Address potential releases not previously investigated. Probes and surface soil samples to be located along the north, east and west sides of the substation.

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
bdb: below drain bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-11
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Cedar Manor (V00388-2)

			SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses							
Location	Sample Designation	SURFACE SOIL SAMPLES**	No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	USEPA UIC Constituents *	Comments
South Side of Substation	CMSB-11		1	1	2-4' bgs Cont.			1							Delineate the vertical extent of impacted soil at CMSS-01.
	CMSB-12 & 13 CMSS-05 & 06	2	2	4	2-8' bgs Cont. at CMSB-12 2-4' bgs Cont. at CMSB-13			6							Delineate the vertical and horizontal extent of impacted soil in the vicinity of CMSS-01.
	CMSB-14		1	1	2-4' bgs Cont.			1							Delineate the vertical extent of impacted soil at CMSS-02.
	CMSB-15 & 16 CMSS-07 & 08	2	2	2	2-4' bgs Cont.			4							Delineate the vertical and horizontal extent of impacted soil in the vicinity of CMSS-02.
North Side of Substation	CMSB-17 through 21 CMSS-09 through 12	4	5	5	2-4' bgs Cont.			9							Delineate the vertical and horizontal extent of impacted soil in the vicinity of CMSS-04.
Stormwater Dry Wells	CMSB-02A & 04A		2	10	10-20' bgs. Cont.			10							Delineate the vertical extent of impacted soil in two stormwater dry wells. Advance soil probes immediately adjacent to CMSB-02 and CMSB-04.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8							Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Groundwater	CMGP-01 through 03					3	14'			6***		3			Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 10 feet below grade.
Potential Releases	CMSB-22 through 27 CMSS-13 through 18	6	6	6	2-4' bgs Cont.			12							Address potential releases not previously investigated. Probes and surface soil samples to be located along the north, east, and west sides of the substation.
Negative Cable Manhole	CMSB-28 CMSS-19	1	1	1	2-4' bgs Cont.			2							Delineate the vertical extent of potentially impacted soil beneath the Negative Cable Manhole within the transformer yard.
Transformers	CMSB-29 through 31 CMSS-20 through 22	3	3	6	0-4' bgs Cont.			9	9		9		9		Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.

NOTES:
bgs: below ground surface.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-12
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Kew Gardens (V00393-2)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses							Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	USEPA UIC Constituents *	
North Side of Substation	KGSB-05, 08 through 17 KGSS-06 & 07	2	11	11	2-4' bgs Cont.			13							Delineate the vertical and horizontal extent of impacted soil in the vicinity of KGSS-02, KGSS-01, KGSS-03, and KGSB-02.
Southeast Corner of Substation	KGSB-18 through 24 KGSS-08 through 13	6	7	28	2-10' bgs Cont.			34							Delineate the vertical and horizontal extent of impacted soil in the vicinity of KGSS-05, KGSB-03, and KGSB-04.
	KGSB-03A & 04A		2	4	6-10' bgs Cont.			4							Delineate the vertical extent of impacted soil at KGSB-03 and KGSB-04.
Southwest Corner of Substation	KGSB-25 through 27 KGSS-14 & 15	2	3	3	2-4' bgs Cont.			5							Delineate the vertical and horizontal extent of impacted soil in the vicinity of KGSS-04.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8							Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Groundwater	KGGP-01 through 03					3	49'			6***		3			Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 45 feet below grade.
Potential Releases	KGSB-28 through 33 KGSS-16 through 21	6	6	6	2-4' bgs Cont.			12							Address potential releases not previously investigated. Probes and surface soil samples to be located along the south, east, and west sides of the substation.
Transformers	KGSB-34 through 39 KGSS-22 through 27	6	6	12	0-4' bgs Cont.			18	18		18		18		Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Test Pit	KGTP-01														Conduct exploratory excavation to identify former cesspool off the northwest corner of the substation..

NOTES:

bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-13
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Shea (V00403-2)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS No. of Probes	No. of Samples	Soil Sampling Interval	GROUNDWATER PROBES No. of Probes	Approximate Total Depth of Probes	Recommended Analyses Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPHs	USEPA UIC Constituents *	Comments
Substation Interior	SSSBB-05A, 07A & 08A		3	6	6-10' bgs Cont.			6								Delineate the vertical extent of impacted soil at SSSBB-07, SSSBB-05, and SSSBB-08.
	SSSBB-09 through 17 SSSS-06 through 14	9	9	36	2-10' bgs Cont.			45								Delineate the vertical and horizontal extent of impacted soil in the vicinity of SSSBB-07, SSSBB-05, SSSBB-08 and SSCS-04.
	SSSBB-18 through 20		3	15	0-10' bpb Cont.			15								Delineate the vertical extent of impacted soil beneath the rectifier pit. In addition, delineated the horizontal and vertical extent of impacted soil adjacent to the rectifier pit.
Concrete Loading Dock	SSSBB-01A		1	2	6-10' bgs Cont.			2								Delineate the vertical extent of impacted soil at SSSBB-01.
	SSSBB-21 through 23 SSSS-15 & 16	2	3	12	2-10' bgs Cont.			14								Delineate the vertical and horizontal extent of impacted soil in the vicinity of SSSBB-01.
	SSSBB-02A		1	2	4-8' bgs Cont.			2								Delineate the vertical extent of impacted soil at SSSBB-02.
	SSSBB-24 through 26 SSSS-17 & 18	2	3	9	2-8' bgs Cont.			11								Delineate the vertical and horizontal extent of impacted soil in the vicinity of SSSBB-02.
East Side of Substation	SSSBB-03A & 04A		2	4	6-10' bgs Cont.			4								Delineate the vertical extent of impacted soil at SSSBB-03 and SSSBB-04.
	SSSBB-27 through 30 SSSS-19 & 20	2	4	16	2-10' bgs Cont.			18								Delineate the vertical and horizontal extent of impacted soil in the vicinity of SSSBB-03 and SSSBB-04.
North Side of Substation	SSSBB-31 through 34 SSSS-21	1	4	12	2-8' bgs Cont.			13								Delineate the vertical and horizontal extent of impacted soil in the vicinity of SSSS-03.
West Side of Substation	SSSBB-35 through 38 SSSS-22 through 24	3	4	12	2-8' bgs Cont.			15								Delineate the vertical and horizontal extent of impacted soil in the vicinity of SSSS-04.
Pull Box South of the Substation	SSSBB-39 SSSS-25	1	1	1	2-4' bpb Cont.			2								Delineate the vertical extent of potentially impacted soil beneath the pull box.
Outer Perimeter of Excavated Area	SSSS-26 through 33	8						8								Delineate the horizontal extent of impacted soil by collecting surface soil samples along the outer perimeter of area excavated during the IRM program.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Groundwater	SSGP-01 SSMW-01 & 02					1	9'			6***		3				Determine if groundwater has been impacted at the site by advancing and sampling 1 groundwater probe, and sampling 2 monitoring wells. The depth to groundwater is estimated to be approximately 3 to 5 feet below grade.
Transformers	SSSBB-40 through 42 SSSS-34 through 36	3	3	6	0-4' bgs Cont.			9	9		9		9			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	SSSBB-43 & 44 SSSS-37 & 38	2	2	2	2-4' bgs Cont.			4								Address potential releases not previously investigated. Probes and surface soil samples to be located on the south side of the substation.

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-14
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Mineola (V00398-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses								Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPHs	USEPA UIC Constituents *	
South Side of Substation	MISB-09,10, 12 through 17 MISS-05 through 10	6	8	8	2-4' bgs Cont.			14								Delineate the vertical and horizontal extent of impacted soil in the vicinity of MISS-01 and MISS-02.
	MISB-18 through 21 MISS-11 through 14	4	4	8	2-6' bgs Cont.			12								Delineate the vertical and horizontal extent of impacted soil in the vicinity of MISB-02.
North Side of Substation	MISB-22 through 25 MISS-15 through 17	3	4	4	2-4' bgs Cont.			7								Delineate the vertical and horizontal extent of impacted soil in the vicinity of MISS-03.
West Side of Substation	MISB-26 through 30 MISS-18 through 21	4	5	5	2-4' bgs Cont.			9								Delineate the vertical and horizontal extent of impacted soil in the vicinity of MISS-04.
Conduit Pit	MISB-31 MISS-22	1	1	1	2-4' bdb Cont.			2								Delineate the vertical extent of potentially impacted soil beneath the Conduit Pit. Advance probe through floor drain.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control	MISB-32		1	5	10' below bottom of cesspool Cont.										5	Advance probe through cesspool, subsequent to clean-out.
Electric Manhole	MISB-39		1	3	0-6' below bottom of manhole Cont.			3								Delineate the vertical extent of potentially impacted soil beneath the Electric Manhole.
Groundwater	MIGP-01 through 03					3	49'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 40 to 45 feet below grade.
Potential Releases	MISB-33 through 38 MISS-23 through 28	6	6	6	2-4' bgs Cont.			12								Address potential releases not previously investigated. Probes and surface soil samples to be located on north, east and west sides of the substation.
Transformers	MISB-39 & 40 MISS-29 & 30	2	2	4	0-4' bgs Cont.			6	6		6		6			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.

NOTES:
bgs: below ground surface.
bdb: below drain bottom
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-15
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Valley Stream (V00404-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS: No. of Probes	SOIL PROBES/BORINGS: No. of Samples	SOIL PROBES/BORINGS: Soil Sampling Interval	GROUNDWATER PROBES: No. of Probes	GROUNDWATER PROBES: Approximate Total Depth of Probes	Recommended Analyses: Mercury	Recommended Analyses: RCRA Metals	Recommended Analyses: TAL Metals	Recommended Analyses: PCBs	Recommended Analyses: VOCs	Recommended Analyses: SVOCs	Recommended Analyses: USEPA UIC Constituents *	Comments
North and East Sides of the Substation	VSSB-04A, 05A & 06A		3	6	6-10' bgs Cont.			6							Delineate vertical extent of impacted soil at VSSB 04, VSSB-05 and VSSB-06.
North and East Sides of the Substation	VSSB-07 through 16 VSSS-03 through 06	4	10	40	2-10' bgs Cont.			44							Delineate vertical and horizontal extent of impacted soil in the vicinity of VSSB-05, VSSB-04, VSMV-02 and VSSS-01.
South Side of Substation	VSSB-17 through 20 VSSS-07 through 09	3	4	4	2-4' bgs			7							Delineate vertical and horizontal extent of impacted soil in the vicinity of VSSS-02.
Negative Feed Electric Manhole	VSSB-21 VSSS-10	1	1	1	2-4' bpb			2							Delineate the vertical extent of potentially impacted soil beneath the Negative Feed Electric Manhole.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8							Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control	VSSB-01A		1	5	12-22' bgs Cont.									5	Delineate the vertical extent of impacted soil beneath the dry well located within the transformer yard.
Groundwater	VSGP-01 through 03					3	9'			6***		3			Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 5 feet below grade.
Transformers	VSSB-22 through 26 VSSS-11 through 15	5	5	10	0-4' bgs Cont.			15	15		15		15		Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	VSSB-27 & 28 VSSS-16 & 17	2	2	2	2-4' bgs			4							Address potential releases not previously investigated. Probes and surface soil samples to be located on the west side of the substation.

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-16
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Port Washington (V00400-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses								Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPHs	USEPA UIC Constituents *	
East Side of Substation	PWSB-04A & 05A		2	4	6-10' bgs Cont.			4								Delineate vertical and horizontal extent of mercury impacted soil at PWSB-04 and PWSB-05.
	PWSB-07 through 12 PWSS-06 through 10	5	6	24	2-10' bgs Cont.			29								Delineate vertical and horizontal extent of mercury impacted soil in the vicinity of PWSB-04 and PWSB-05.
Southwest Corner of Substation	PWSB-13 through 16 PWSS-11 through 13	3	4	4	2-4' bgs Cont.			7								Delineate vertical and horizontal extent of mercury impacted soil at southwest corner of the substation in the vicinity of PWSS-05.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Underground Injection Control	PWSB-03A		1	5	13-23' bgs Cont.										5	Delineate vertical extent of impacted soil beneath dry well. Advance probe adjacent to PWSB-03.
Groundwater	PWGP-01 through 03					3	44'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 40 feet below grade.
Transformers	PWSB-17 through 28 PWSS-14 through 25	12	12	24	0-4' bgs Cont.			36	36		36		36			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	PWSB-29 through 34 PWSS-26 through 31	6	6	6	2-4' bgs Cont.			12								Address potential releases not previously investigated. Two probes and two surface soil samples to be located on north, south and west sides of the substation.

NOTES:
bgs: below ground surface.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

TABLE 5-17
Long Island Rail Road
DELINEATION PHASE II SITE ASSESSMENT - SEVENTEEN SUBSTATIONS
Rockville Centre (V00401-1)

Location	Sample Designation	SURFACE SOIL SAMPLES**	SOIL PROBES/BORINGS			GROUNDWATER PROBES		Recommended Analyses								Comments
			No. of Probes	No. of Samples	Soil Sampling Interval	No. of Probes	Approximate Total Depth of Probes	Mercury	RCRA Metals	TAL Metals	PCBs	VOCs	SVOCs	TPHs	USEPA UIC Constituents *	
North Side of Substation	RCSB-09 through 17 RCSS-06 through 11	6	9	18	2-6' bgs Cont.			24								Delineate vertical and horizontal extent of mercury impacted soil in the vicinity of RCSS-01, RCSB-01. RCSS-05 and RCSB-05.
Southwest Corner of Substation	RCSB-18 through 21 RCSS-12 through 14	3	4	4	2-4' bgs Cont.			7								Delineate the vertical and horizontal extent of impacted soil in the vicinity of RCSS-04.
	RCSB-22 through 25 RCSS-15 through 18	4	4	8	2-6' bgs Cont.			12								Delineate the vertical and horizontal extent of impacted soil in the vicinity of RCSB-06.
Water Meter Pit	RCSB-26 RCSS-19	1	1	1	2-4' bpb Cont.			2								Delineate the vertical extent of potentially impacted soil beneath the bottom of the Water Meter Pit.
Roof Drains	Contingent upon inspection	4	4	4	2-4' bgs Cont.			8								Inspect the substation for roof drains that terminate above ground. If such roof drains are identified, conduct sampling at all depressions under the identified roof drains, assuming four such locations.
Groundwater	RCGP-01 through 03					3	19'			6***		3				Determine if groundwater has been impacted at the site. The depth to groundwater is estimated to be approximately 15 feet below grade.
Transformers	RCSB-27 through 30 RCSS-20 through 23	4	4	8	0-4' bgs Cont.			12	12		12		12			Investigate stained areas in the vicinity of transformers. Sample locations to be identified in the field based on visual observations of staining. Note that locations are not depicted on Sample Location Map.
Potential Releases	RCSB-31 through 34 RCSS-24 through 27	4	4	4	2-4' bgs Cont.			8								Address potential releases not previously investigated. Probes and surface soil samples to be located along the east and west sides of the substation.

NOTES:
bgs: below ground surface.
bpb: below pit bottom.
Cont.: Continuous 2-foot soil sampling
* USEPA UIC Constituents include VOCs by Method 8260b, RCRA Metals including Mercury by Methods 6010b/7471a, SVOCs by Method 8270c, PCBs by Method 8082, and TPHs by Method 8015b.
** Surface soil samples to be collected at 0-2" interval.
*** Filtered and Unfiltered Samples

Provided sampling is warranted, soil probes should be advanced, and surface and subsurface soil sampling should be conducted below the bottom of each structure, as necessary, to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

6. Potential Releases - Advance 9 soil probes and collect 9 surface soil samples and 9 subsurface soil samples to detect inadvertent, nonspecific releases and delineate the possible horizontal and vertical extent of mercury-impacted soil north of the substation in the area of previous mercury vapor reading BYMV-39. Five probes shall be located on the north side of the substation, including four to investigate BYMV-39, and two probes shall be located on each of the south and west sides. Samples shall be analyzed for mercury (EPA Method 7471a).

7. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

5.1.2 Geophysical Survey

1. Dry Well - Complete a geophysical survey using ground-penetrating radar in an area north of the substation in order to locate the dry well that was formally used as a discharge point for water that was pumped from the basement area. After being located, the dry well will be exposed using an excavator, and a sediment sample will be collected for chemical analysis. In addition, one soil probe will be advanced a total of 10 feet below grade adjacent to the dry well, and up to two subsurface soil samples will be collected for chemical analysis.

2. Former Septic Tank/Tile Drain - Complete a geophysical survey using ground-penetrating radar in an area north of the substation in order to locate the former septic tank and associated tile drain. After being located, the septic tank and tile drain will be exposed using an excavator. After exposing the tile drain, up to five subsurface soil samples will be collected from the excavation for chemical analysis using a hand auger. The samples will be collected at various locations along the tile drain.

This work was discussed with the Suffolk County Department of Health Services (SCDHS) during a December 2, 2004 site meeting. As agreed upon with the SCDHS, all collected samples will be analyzed for VOCs by EPA Method 8260b, SVOCs by EPA Method 8270c and RCRA metals, including mercury by EPA Method 6010b/7471a.

5.1.3 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Babylon Yard site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.1.4 Suffolk County Department of Health Services Sampling

As per a December 2, 2004 site meeting with the SCDHS, the LIRR will expand the investigation of the Babylon Yard substation to include the sampling activities listed below.

1. Collect one sample of standing water for chemical analysis from within the basement area of the substation.
2. Collect two surface soil samples for chemical analysis from an area adjacent to the southwest corner of the substation where the standing water present in the substation basement was discharged during the December 2, 2004 site meeting.

As agreed upon with the SCDHS, all collected samples will be analyzed for VOCs by EPA Method 8260b, SVOCs by EPA Method 8270c and RCRA metals including mercury by EPA Method 6010b and 7470a/7471a.

5.2 Far Rockaway (V00391-1)

5.2.1 Surface and Subsurface Soil Sampling

1. North Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the north side of the substation in the area of previous soil boring location FRSB-01. Samples shall be analyzed for mercury by EPA Method 7471a.

2. South Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination on the south side of the substation in the area of previous surface soil sample FRSS-04. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Dry Well off Southwest Corner of Substation - Advance a soil probe for the collection and analysis of subsurface soil samples to delineate the vertical extent of mercury contamination beneath the bottom of a dry well located off the southwest corner of the substation (previous soil boring FRSB-03). Samples shall be analyzed for mercury by EPA Method 7471a. Note that, upon inspection, this feature may be deemed a UIC feature and would, therefore, fall under UIC investigation and closure procedures.

4. Miscellaneous Pits and Manholes - Advance soil probes and collect surface and subsurface soil samples to assess soil beneath the bottom of a control cable manhole located to the south of the substation within the transformer yard and a water meter pit off the northeast corner of the substation. Samples shall be analyzed for mercury by EPA Method 7471a. Note that, upon inspection, these features may be deemed UIC features and would, therefore, fall under UIC investigation and closure procedures.

5. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

6. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

7. Potential Releases - Advance four soil probes and collect four surface soil samples and four subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the east and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

8. Underground Injection Control - Advance a soil probe for the collection and analysis of soil samples to determine the vertical extent of impacted soil beneath the bottom of a dry well located south of the substation within the transformer yard. Samples shall be analyzed for USEPA UIC Constituents including TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA Metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.2.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Far Rockaway site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.3 Floral Park (V00389-1)

5.3.1 Surface and Subsurface Soil Sampling

1. East Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the east side of the substation in the area of previous soil borings FPSB-06, FPSB-08 and FPSB-09. Samples shall be analyzed for mercury by EPA Method 7471a. Advance soil probes and collect surface and subsurface soil samples in the area of previous sample FPEP-08, collected during IRM activities. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Positive Cable Manhole and Vent Pit - Advance a soil probe for the collection and analysis of subsurface soil samples to delineate the vertical extent of contamination beneath the bottom of a positive cable manhole located along the north side of the substation and a vent pit located off the southwest corner of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Communications Manhole and Positive/Negative Cable Pit - Advance a soil probe and collect surface and subsurface soil samples to assess the impact, if any, associated with the discharge to subsurface soil from floor drains within a communications manhole located approximately 15 feet off the west side of the substation and a positive/negative cable pit located approximately 20 feet off the southwest corner of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Conduit Pit and Water Valve Pit - Advance soil probes and collect surface and subsurface soil samples from beneath the bottom of a conduit pit and water valve pit with earthen bottoms. Samples shall be analyzed for mercury by EPA Method 7471a.

6. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

7. Potential Releases - Advance 6 soil probes and collect 6 surface soil samples and 6 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north, south and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

8. Underground Injection Control - Advance a soil probe for the collection and analysis of soil samples to determine the vertical extent of impacted soil associated with the substation lavatory discharges to a sanitary cesspool. Advance a soil probe for the collection and analysis of soil samples to determine the vertical extent of contamination beneath the bottom of a dry well located east of the substation. Advance two soil probes to determine the vertical extent of contamination beneath the bottom of the east and west water trough pits. Samples shall be analyzed for USEPA UIC Constituents including TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA Metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.3.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Floral Park site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.4 Hempstead (V00390-1)

5.4.1 Surface and Subsurface Soil Sampling

1. South Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the south side of the substation in the area of previous soil boring HSSB-02. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Meter Pit - Advance a soil probe and collect surface and subsurface soil samples to delineate the vertical extent of mercury contamination beneath the bottom of a meter pit located adjacent to the southwest corner of the substation (previous soil boring HSSB-04). Samples shall be analyzed for mercury by EPA Method 7471a.

3. Slop Sink - Advance soil probes and collect surface and subsurface soil samples to determine the impact, if any, from the slop sink discharge to the ground located in the transformer yard. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Communications Manhole and Conduit Pit - Advance a soil probe for the collection and analysis of soil samples to determine the vertical extent of soil contamination associated with the discharge to subsurface soil from a floor drain within a communications manhole located in the transformer yard (previous surface soil sample HSSS-03). Advance a soil probe and collect surface and subsurface soil samples to determine the impact, if any, from the discharges from a floor drain within

a conduit pit located approximately 40 feet south of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

6. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

7. Potential Releases - Advance four soil probes and collect four surface soil samples and four subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north and south sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

8. Underground Injection Control - Advance a soil probe for the collection and analysis of soil samples to determine the vertical extent of impacted soil beneath the bottom of the dry well located approximately 22 feet to the south of the substation. Samples shall be analyzed for USEPA UIC Constituents including TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA Metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.4.2 Test Pit Excavation

1. Historic Dry Well - Conduct excavation activities to locate an historic dry well located approximately 4 feet off the southeast exterior substation wall. If a dry well is located, a soil probe should be advanced and subsurface soil samples collected from beneath the bottom of the suspected dry well. Samples shall be analyzed for mercury by EPA Method 7471a.

5.4.3 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Hempstead site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures

(USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.5 Nassau Boulevard (V00399-1)

5.5.1 Surface and Subsurface Soil Sampling

1. Southeast Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the southeast corner of the substation in the area of previous surface soil samples NBSS-01, NBSS-02, NBSS-03, and NBSS-07. Samples shall be analyzed for mercury by EPA Method 7471a.

2. South Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the south side of the substation in the area of previous surface soil sample NBSS-04. Samples shall be analyzed for mercury by EPA Method 7471a.

3. West Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the west side of the substation in the area of previous surface soil sample NBSS-05. Collect surface soil samples in the area of previous soil boring NBSB-04. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Communications Manhole - Advance a soil probe and collect surface and subsurface soil samples to assess the impact, if any, associated with the direct discharge to subsurface soil from a floor drain at the bottom of a communications manhole located approximately 10 feet south of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Former Disposal Field - Advance soil probes and collect surface and subsurface soil samples in a former disposal field located northwest of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

6. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and

subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

7. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

8. Potential Releases - Advance 7 soil probes and collect 7 surface soil samples and 7 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the south and east sides of the substation. Three probes shall be located on the north side of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

5.5.2 Geophysical Survey

1. Southwest Corner of Substation - Complete a geophysical survey using ground-penetrating radar in an area off the southwest corner of the substation to determine if a sanitary system is located in this area. If a sanitary system is detected in this area, one soil probe shall be advanced through the bottom the sanitary system. Samples shall be analyzed for mercury by EPA Method 7471a; however, pending inspection, the system may require closure pursuant to the USEPA UIC regulations.

5.5.3 Test Pit Excavation

1. East Side of Substation - Excavate in the area approximately 42 feet east of the substation chain link fence to further trace a pipe originating from the substation basement and running west-to-east along the eastern side of the substation to determine the discharge point of the floor drains located in the substation basement.

5.5.4 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Nassau Boulevard site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA

Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.6 Little Neck (V00395-1)

5.6.1 Surface and Subsurface Soil Sampling

1. East Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the east side of the substation in the area of previous surface soil samples LNSS-02, LNSS-03, LNSS-04 and LNSS-05. Samples shall be analyzed for mercury by EPA Method 7471a.

2. West Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the west side of the substation in the area of previous surface soil sample/soil boring LNSS-07 and LNSB-09. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Drainage Creek - Collection of three sediment samples from the drainage creek that flows from east to west and is located approximately 80 feet south of the substation. Two sediment samples shall be collected downgradient of previous sediment sample LNSS-01 at 15-foot intervals and one sediment sample shall be collected 15 feet upgradient of previous sediment sample LNSS-01. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Manhole along North Side of Substation - Determine if manhole floor drain discharges to underlying subsurface soil. If confirmed to discharge to subsurface soil, advance a soil probe and collect surface and subsurface soil samples beneath the bottom of the manhole to assess potential impacts. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

6. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

7. Potential Releases - Advance four soil probes and collect four surface soil samples and four subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north and south sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

8. Water in Basement - Provided there is standing water in the basement of the substation, one sample shall be collected for analysis of mercury by EPA Method 7470a. The purpose of this sample is to determine whether or not mercury-impacted concrete from the rectifier pit is affecting this water.

9. Underground Injection Control - Advance a soil probe for the collection and analysis of subsurface soil samples to determine the vertical extent of impacted soil in the cesspool/dry well located to the east of the substation. Sample shall be analyzed for USEPA UIC Constituents including TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA Metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.6.2 Test Pit Excavation

1. East of Substation - Excavate in the area approximately 10 feet east of the substation to further trace a drain pipe originating from the substation basement and running along the eastern side of the substation.

5.6.3 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Little Neck site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.7 Lindenhurst (V00394-1)

5.7.1 Surface and Subsurface Soil Sampling

1. South Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil along the south side of the substation in the area of previous surface soil samples LHSS-01 and LHSS-02. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Northeast Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the northeast corner of the substation in the area of previous surface soil samples LHSS-03, LHSS-04, LHSS-05 and LHSS-06. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Electric Manholes and Sump Pit - Inspect four electric manholes and sump pit for earthen bottoms and/or drains which discharge to underlying soil. If these structures are found to drain to underlying soil, debris and/or standing water shall be removed from each structure (as necessary) and waste characterization samples collected by D&B. Transportation and disposal of the material will be managed by the LIRR. Once debris and standing water have been removed, advance soil probes and collect surface and subsurface soil samples beneath the bottom of each structure for analysis of mercury by EPA Method 7471a.

4. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

6. Potential Releases - Advance four soil probes and collect four surface soil samples and four subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

7. Underground Injection Control - Collection of one endpoint sample from the bottom of the dry well located to the northeast of the substation. Sample shall be analyzed for USEPA UIC Constituents including TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA Metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.7.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Lindenhurst site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.8 Bayside (V00386-2)

5.8.1 Surface and Subsurface Soil Sampling

1. West Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the west side of the substation in the vicinity of the western concrete platform. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Northeast Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the northeast corner of the substation within the transformer yard

(previous soil samples/borings BSSS-01, BSSS-02 and BSSB-03). Samples shall be analyzed for mercury by EPA Method 7471a.

3. Miscellaneous Pits and Manholes - A communications manhole located off the northwest corner of the substation, a conduit manhole located to the north of the substation and a high-tension cable manhole off the northeast corner of the substation should be inspected to determine if they have earthen bottoms or drain to underlying soil. If this is confirmed, soil probes should be advanced and surface and subsurface soil samples should be collected beneath the bottoms of the structures to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

6. Potential Releases - Advance 6 soil probes and collect 6 surface soil samples and 6 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north, south and east sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

5.8.2 Geophysical Survey

1. Southwest Corner of Substation - Perform a geophysical survey using ground-penetrating radar (GPR) in the area off the southwest corner of the substation between the fence line and the train tracks to further trace three drain pipes originating from the substation basement.

5.8.3 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Bayside site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler.

One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.9 Bellaire (V00387-2)

5.9.1 Surface and Subsurface Soil Sampling

1. West Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the west side of the substation in the area of previous surface soil samples/soil boring BASS-02, BASS-03, BASB-01 and BASS-01. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Southeast Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the vertical and horizontal extent of mercury contamination along the southeast corner of the substation in the area of previous soil samples/soil borings BASS-04, BASS-05 and BASB-04. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Electric Manholes - Sampling shall be conducted if the two manholes to the south of the substation are found to contain earthen bottoms or drain to underlying soil. If this is confirmed, soil probes should be advanced and surface and subsurface soil samples collected from the bottom of the manholes to assess the potential impacts the underlying soil. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note

that sample locations will be selected in the field based on site observations with regard to visible staining.

6. Potential Releases - Advance 6 soil probes and collect 6 surface soil samples and 6 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north, south and east sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

7. Underground Injection Control - Advance one soil probe from 13 to 23 feet below grade within dry well and collect five soil samples for analysis of TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.9.2 Test Pit Excavation

1. Northwest Corner of Substation - The area off the northwest corner of the substation should be excavated to locate the former substation septic system. This activity should be undertaken subsequent to any sampling, which is to be conducted in this area.

5.9.3 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Bellaire site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.10 St. Albans (V00402-2)

5.10.1 Surface and Subsurface Soil Sampling

1. South Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the south side of the substation in the area of previous surface soil samples SASS-01 and SASS-03. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Northwest Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the northwest corner of the substation in the area of previous surface soil sample SASS-05. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Positive Feed Manhole - Advance a soil probe for the collection and analysis of soil samples to determine the vertical extent of contamination beneath the bottom of the positive feed manhole located along the west side of the substation that contains a floor drain that discharges directly to subsurface soil. Probe to be located immediately adjacent to previous soil boring SASB-03. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Negative Feed Manhole - The floor drain within the negative feed manhole located adjacent to northwest corner of substation will be inspected to determine if it discharges to underlying soil. If this discharge is confirmed, one soil probe will be advanced within this manhole and surface and subsurface soil samples will be collected for analysis of mercury by EPA Method 7471a.

5. Water Main Manhole - The water main manhole, located to the south of the substation, will be inspected to determine if it has an earthen bottom or floor drain which drains to underlying soil. If this discharge is confirmed, one soil probe shall be advanced within this structure, and surface and subsurface soil samples will be collected for analysis of mercury by EPA Method 7471a.

6. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

7. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note

that sample locations will be selected in the field based on site observations with regard to visible staining.

8. Potential Releases - Advance 6 soil probes and collect 6 surface soil samples and 6 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north, east and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

5.10.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the St. Albans site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.11 Cedar Manor (V00388-2)

5.11.1 Surface and Subsurface Soil Sampling

1. South Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil on the south side of the substation in the vicinity of previous surface soil samples CMSS-01 and CMSS-02. Samples shall be analyzed for mercury by EPA Method 7471a.

2. North Side of the Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination on the north side of the substation in the vicinity of former surface soil sample CMSS-04. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Storm Water Dry Wells - Advance soil borings for the collection and analysis of soil samples to delineate the vertical extent of mercury contamination beneath the bottom of two storm water dry wells (previous soil boring locations CMSB-02 and CMSB-04) located on the south side of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Meter Pit - Soil at least 5.5 feet below grade is impacted by mercury. It should be noted that soil sample CMSB-05 (7.5'-9.5') did not exhibit any mercury exceedances. It is recommended that mercury-impacted soil be excavated to a depth of 7.5 feet below grade for proper off-site transportation and disposal.

6. Negative Cable Manhole - There is a negative cable manhole located to the north of the substation within the transformer yard that contains a floor drain that discharges directly to subsurface soil. One soil probe shall be advanced, and surface and subsurface soil samples shall be collected beneath the bottom of the manhole for analysis of mercury by EPA Method 7471a.

7. Potential Releases - Advance 6 soil probes and collect 6 surface soil samples and 6 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north, east and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

8. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

5.11.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Cedar Manor site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.12 Kew Gardens (V00393-2)

5.12.1 Surface and Subsurface Soil Sampling

1. North Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil along the north side of the substation in the area of previous surface soil samples/soil boring KGSS-01, KGSS-02, KGSS-03 and KGSB-02. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Southeast Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil along the southeast corner of the substation in the area of previous surface soil sample/soil borings KGSS-05, KGSB-03 and KGSB-04. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Southwest Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil in the area of previous surface soil sample KGSS-04. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Potential Releases - Advance 6 soil probes and collect 6 surface soil samples and 6 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the south, east and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

6. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

5.12.2 Test Pit Excavation

1. Northwest Corner of Substation - A vent consistent with a septic system is located along the northwest corner of the substation. Subsequent to sampling activities to be conducted in association with this area, it shall be excavated to locate the former cesspool.

5.12.3 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Kew Gardens site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.13 Shea (V00403-2)

5.13.1 Surface and Subsurface Soil Sampling

1. Substation Interior - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil in the substation interior in the area of previous soil borings SSSBB-05, SSSBB-07 and SSSBB-08. Advance soil probes for the collection and analysis of soil samples to determine the impact, if any, from the rectifier pit located in the substation interior. Advance a soil probe and collect surface and subsurface soil samples to determine the impact to the subsurface, if any, associated with former concrete sample SSCS-04. All samples shall be analyzed for mercury by EPA Method 7471a. Note that the Shea Substation is scheduled to be demolished. As a result, the delineation activities described above shall be performed prior to the demolition of the building.

2. Concrete Loading Dock - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination in the area of the concrete loading dock and previous soil borings SSSBB-01 and SSSBB-02. Samples shall be analyzed for mercury by EPA Method 7471a.

3. East Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the east side of the substation in the area of previous soil borings SSSBB-03 and SSSBB-04. Samples shall be analyzed for mercury by EPA Method 7471a.

4. North Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the north side of the substation in the area of previous surface soil sample SSSS-03. Samples shall be analyzed for mercury by EPA Method 7471a.

5. West Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the west side of the substation in the area of previous surface soil sample SSSS-04. Samples shall be analyzed for mercury by EPA Method 7471a.

6. Pull Box South of Substation - Advance a soil probe and collect surface and subsurface soil samples beneath the bottom of a pull box located on the south side of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

7. Former Excavation Area - Collect eight surface soil samples from the outer perimeter of the area excavated during the IRM program. Samples shall be analyzed for mercury by EPA Method 7471a.

8. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

9. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

10. Potential Releases - Advance two soil probes and collect two surface soil samples and two subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on the south side of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

5.13.2 Groundwater Sampling

One groundwater probe will be advanced at the Shea substation using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from this location using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996). In addition, groundwater samples will be collected from two existing monitoring wells. All three groundwater samples will be analyzed for TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.14 Mineola (V00398-1)

5.14.1 Surface and Subsurface Soil Sampling

1. South Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil along the south side of the substation in the area of previous surface soil samples/soil boring MISS-01, MISS-02 and MISB-02. Samples shall be analyzed for mercury by EPA Method 7471a.

2. North Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the north side of the substation in the area of previous surface soil sample MISS-03. Samples shall be analyzed for mercury by EPA Method 7471a.

3. West Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the west side of the substation in the area of previous surface soil sample MISS-04. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Conduit Pit - Advance a soil probe through the floor drain and collect surface and subsurface soil samples to delineate the vertical extent of mercury-impacted soil beneath the Conduit Pit. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

6. Electric Manhole - Advance a soil probe and collect soil samples to assess the impact, if any, associated with the direct discharge to subsurface soil from a floor drain at the bottom of an electric manhole located off the west side of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

7. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

8. Potential Releases - Advance 6 soil probes and collect 6 surface soil samples and 6 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north, east and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

9. Underground Injection Control - The cesspool located to the north of the substation that receives substation laboratory wastewater should be cleaned out. Following the cleanout, a soil probe should be advanced for the collection and analysis of subsurface soil samples to determine impacts, if any, to subsurface soil beneath the cesspool. Samples shall be analyzed for USEPA UIC Constituents including TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA Metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.14.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Mineola site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.15 Valley Stream (V00404-1)

5.15.1 Surface and Subsurface Soil Sampling

1. North and East Sides of Substation - Advance soil probes and collect surface and subsurface soil samples to determine the extent of mercury-contaminated soil along the north and east sides of the substation in the area of previous soil borings/surface soil sample/mercury vapor sample VSSB-04, VSSB-05, VSSB-06, VSSS-01 and VSMV-02. Samples shall be analyzed for mercury by EPA Method 7471a.

2. South Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination along the south side of the substation in the area of previous surface soil sample VSSS-02. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Negative Feed Electric Manhole - Advance a soil probe and collect subsurface soil samples to assess the impact, if any, associated with a negative feed electric manhole with an earthen bottom located along the west side of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

6. Potential Releases - Advance two soil probes and collect two surface soil samples and two subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on the west side of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

7. Underground Injection Control - Advance a soil probe for the collection and analysis of soil samples to determine the vertical extent of impacted soil in the dry well located to the south of the substation within the transformer yard. Samples shall be analyzed for USEPA UIC Constituents including TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA Metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.15.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Valley Stream site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.16 Port Washington (V00400-1)

5.16.1 Surface and Subsurface Soil Sampling

1. East Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil along the east side of the substation in the area of previous soil borings PWSB-04 and PWSB-05. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Southwest Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination on the southwest corner of the substation in the area of previous surface soil sample PWSS-05. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

5. Potential Releases - Advance 6 soil probes and collect 6 surface soil samples and 6 subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the north, south and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

6. Underground Injection Control - Advance a soil probe for the collection and analysis of soil samples to determine the vertical extent of impacted soil in the dry well located off the northwest corner of the substation. Samples shall be analyzed for USEPA UIC Constituents including TCL VOCs (EPA Method 8260b), TCL SVOCs (EPA Method 8270c), RCRA Metals including mercury (EPA Method 6010b/7471a), PCBs (EPA Method 8082) and TPHs (EPA Method 8015b).

5.16.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Port Washington site. The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.17 Rockville Centre (V00401-1)

5.17.1 Surface and Subsurface Soil Sampling

1. North Side of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury-impacted soil along the north side of the substation in the area of previous surface soil samples/soil borings RCSS-01, RCSB-01, RCSS-05 and RCSB-05. Samples shall be analyzed for mercury by EPA Method 7471a.

2. Southwest Corner of Substation - Advance soil probes and collect surface and subsurface soil samples to delineate the horizontal and vertical extent of mercury contamination on the southwest corner of the substation in the area of previous surface soil sample RCSS-04. Four soil probes will be collected near RCSB-06. Samples shall be analyzed for mercury by EPA Method 7471a.

3. Water Meter Pit - Advance a soil probe and collect surface and subsurface soil samples to assess the impact, if any, associated with a water meter pit with an earthen bottom located along the north side of the substation. Samples shall be analyzed for mercury by EPA Method 7471a.

4. Roof Drains – Inspect the substation for roof drains that terminate aboveground. If such roof drains are identified, sampling shall be conducted at all depressions under the identified roof drains. Soil probes should be advanced, and surface and subsurface soil sampling should be conducted to assess potential impacts to soil. Samples shall be analyzed for mercury by EPA Method 7471a.

5. Transformers - Advance soil probes and collect surface and subsurface soil samples to determine the impact from potential stained areas in the vicinity of transformers. Samples shall be analyzed for PCBs (EPA Method 8082), RCRA Metals including mercury (EPA Method 6010b/7471a) and TCL SVOCs (EPA Method 8270c). Note that sample locations will be selected in the field based on site observations with regard to visible staining.

6. Potential Releases - Advance four soil probes and collect four surface soil samples and four subsurface soil samples to detect inadvertent, nonspecific releases. Two probes shall be located on each of the east and west sides of the substation. Samples shall be analyzed for mercury (EPA Method 7471a).

5.17.2 Groundwater Sampling

One groundwater probe will be advanced upgradient and two groundwater probes will be advanced downgradient of the assumed groundwater flow direction at the Rockville Centre site.

The probes will be advanced using a hydraulic "direct push" technique and a screen point sampler. One sample will be collected from each probe using low flow sampling and purging procedures (USEPA Ground Water Currents, April 1996) for analysis of TCL VOCs by EPA Method 8260b and total and dissolved TAL metals including mercury by EPA Method 6010b/7470a.

Purge water and/or drill cuttings generated during groundwater sampling activities will be containerized in DOT-approved 55-gallon drums and later characterized by D&B. The LIRR will be responsible for transportation and disposal of purge water and drill cuttings.

5.18 Air Monitoring

Air monitoring for mercury will be conducted in the interior of each substation near the vicinity of rectifiers, on horizontal surfaces (i.e., the tops of switching equipment), near work areas and at existing utility trenches. Air monitoring will be conducted utilizing a Jerome Mercury Vapor Analyzer. In addition, elevated surfaces will be visually inspected for signs of condensed mercury. All monitoring results and observations will be documented in a project field book.

5.19 Health and Safety

D&B will be responsible for ensuring that the Health and Safety Plan (provided under a separate cover) and all work associated with this project is performed in accordance with safe working practices, including applicable Occupational Safety and Health Administration (OSHA) requirements. All site personnel will have hazardous waste operations and emergency response (HAZWOPER) training in accordance with 29 CFR 1910.120, will be certified for confined space entry (if necessary), will be trained and certified in the proper use of personal protective equipment (PPE) and will have knowledge and understanding of construction standards. Certifications regarding training and expertise will be submitted to the LIRR prior to the start of work. Prior to the start of field activities at the substations, all project personnel who will be working on LIRR property will be required to complete a track safety course administered by LIRR.

D&B will also have our Health and Safety consultant (Emilcott Associates) provide a Site Safety Officer during "intrusive" field work located within active (but de-energized) substations. As such, D&B has made provision for Emilcott Associates to be on-site during the sampling activities to be conducted within the substations. In addition, a Certified Industrial Hygienist (CIH) will also available for both office and "in-field" consultation (if necessary) throughout the field program.

5.20 Waste Disposal

D&B has made provision to contain all investigation-derived waste in DOT-approved 55-gallon drums. D&B has also included the cost to collect and analyze two waste characterization samples from each site. It has been assumed that one composite waste characterization sample will be collected from the soil and wastewater investigation derived material from each site. The LIRR will be responsible for the proper off-site transportation and disposal of the investigation derived waste.

Appendix A

APPENDIX A

FIELD FORMS

EXHIBIT 1

LOCATION SKETCH

Dvirka
and
Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Date: ____________________

LOCATION SKETCH

Project ______________________________ Sample Crew ______________________________

Sample(s) Locations(s) ____

Sample(s) and/or Well Number(s) ____

____

Location of sample points, wells, borings, etc., with reference to three permanent reference points. Measure all distances, clearly label roads, wells and permanent features.

N

EXHIBIT 2

SAMPLE INFORMATION RECORDS

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Date: ______________

SAMPLE INFORMATION RECORD

Site: ______________ Sample Crew: ______________

Sample Location/Well No. ______________

Field Sample I.D. Number ______________ Time ______________

Weather ______________ Temperature ______________

Sample Type:

Groundwater ______________ Sediment ______________

Surface Water/Stream ______________ Air ______________

Soil ______________ Other (describe, i.e. water, septage, etc.) ______________

Well Information (fill out for groundwater samples)

Depth to Water ______________ Measurement Method ______________

Depth of Well ______________ Measurement Method ______________

Volume Removed ______________ Removal Method ______________

Field Test Results

Color ______________ pH ______________ Odor ______________

Temperature (°F) ______________ Specific Conductance (umhos/cm) ______________

Other (OVA, Methane Meter, etc. ______________

____

Constituents Sampled

______________ ______________ ______________ ______________

______________ ______________ ______________ ______________

Remarks:

____

____

____

Well Casing Volumes

GAL/FT	1¼" = 0.077	2" = 0.16	3" = 0.37	4" = 0.65
	1½ =0.10	2½ " = 0.24	3½ = 0.50	6" = 1.46

DVIRKA
AND
BARTILUCCI

WATER SUPPLY SAMPLE INFORMATION RECORD

Name: ______________________________

Address: ______________________________

Telephone: ______________________________

Date and Time Sampled: ______________________________

Sample Location: ______________________________

Sample Number: ______________________________

Well Information: ______________________________

Depth and Type of Well: ______________________________

Date Constructed: ______________________________

Type of Construction and Diameter: ______________________________

Driller: ______________________________

Estimated Usage (gpm): ______________________________

Water Use(s): ______________________________

Type of Treatment Device and Location: ______________________________

Date and Location Last Sampled: ______________________________

Homeowner's Perception of Water Quality: ______________________________

Comments: (Use of bottled water, etc.) ______________________________

Sketch of Lot, Building, and Well and Septic System Location

Sketch of Water Treatment System and Sampling Locations

Photograph of Water Treatment System

EXHIBIT 3

CHAIN OF CUSTODY FORM

CHAIN OF CUSTODY RECORD

PAGE ___ OF ___ | NO ___

JOB #:

CLIENT:

PROJECT ID:

PROJECT MGR:

RUSH [ ] YES [ ] NO | DUE DATE

TESTS								GENERAL REMARKS
BOTTLE TYPE AND PRESERVATION								

BOTTLE SET #	CLIENT SAMPLE ID	DATE / TIME SAMPLED	MATRIX	LAB ID	QC Y / N	FIELD FILTERED - CIRCLE Y or N								SAMPLE REMARKS
						Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	Y / N	

MATRIX CODES

A - AIR	S - SOIL
AQ - AQUEOUS	SL - SLUDGE
C - COMPLEX	W - WIPE
D - DRUM WASTE	O - OTHER
OI - OIL	FB - FIELD BLANK
	TB - TRIP BLANK

BOTTLES PREPARED BY	DATE / TIME	BOTTLES REC'D BY	DATE / TIME
SIGNATURE		SIGNATURE	
SAMPLES COLLECTED BY	DATE / TIME	RECEIVED IN LAB BY	DATE / TIME
SIGNATURE		SIGNATURE	

REMARKS ON SAMPLE RECEIPT

[ ] BOTTLES INTACT   [ ] CUSTODY SEALS
[ ] PRESERVED   [ ] SEALS INTACT
[ ] CHILLED   [ ] SEE REMARKS

LABORATORY COPY

EXHIBIT 4

RECEIPT OF SAMPLES FORM

DVIRKA
AND
BARTILUCCI

Receipt for Samples

Project Name: ____________________ Field Log Book Reference Number: ____________________

Project Address: ____________________ Sampled By: ____________________

Project Number: ____________________ Split With: ____________________

SAMPLE NUMBERS	DATE	TIME	COMP	GRAB	SPLIT SAMPLES	LOG BOOK PAGE NO.	TAG NUMBERS	SAMPLE LOCATION	NO. OF CONTAINERS	REMARKS

Transferred by (Signature)		Received by (Signature)		Telephone
Date	Time	Title	Date	Time

EXHIBIT 5

TEST PIT LOG FORM

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Project No.: **Project Name:**		**Test Pit No.:** **Sheet of** **By:**
Contractor: **Operator:** **Equipment:**	**Geologist:** **Test Pit Method:** **Date Started:** **Date Completed:**	**Test Pit Completion Depth:** **Ground Surface Elevation:** **Test Pit Dimension(s):**

Weather Conditions:

Depth *(ft.)*	**OVA** *(ppm)*	**PID** *(ppm)*	**Description of Materials**	**Remarks**
-0-				
-1-				
-2-				
-3-				
-4-				
-5-				
-6-				
-7-				
-8-				
-9-				
-10-				

NOTES:

EXHIBIT 6

BORING LOG FORM

Dvirka and Bartilucci CONSULTING ENGINEERS A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.	Project No.: Project Name:	Boring No.: Sheet __ of __ By:
Drilling Contractor: Driller: Drill Rig: Date Started:	Geologist: Drilling Method: Drive Hammer Weight: Date Completed:	Boring Completion Depth: " Ground Surface Elevation: Boring Diameter:

Depth (ft.)	Soil Sample				Headspace Analysis			Sample Description	USCS
	No.	Type	Blows Per 6"	Rec	FID ppm	PID ppm	CH4 ppm		
-0-									
-1.5'-									
-2-									
-3-									
-4-									
-5-									
-6-									
-7-									
-8-									
-9-									
-10-									

Sample Types:
SS =
ST =
D&M =
UC = Undisturbed Core (Dennison Type)

NOTES:

EXHIBIT 7

DRILLING LOG FORM

DVIRKA
AND
BARTILUCCI

DRILLING CONTRACTOR	DRILLING LOG	BORING NUMBER
Driller	PROJECT NAME	Sheet ___ of ___
Inspector		Boring Location
Rig Type	PROJECT #	
Drilling Method	Location/Address	
Drive Hammer Weight		

GROUNDWATER OBSERVATIONS				Weather	Plot Plan
Water Level					
Time				Date/Time Start	
Date				Date/Time Finish	
Casing Depth					

Sample Depth	Sample Number	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	COMMENTS

SPT = STANDARD PENETRATION TEST

Soil Stratigraphy Summary

EXHIBIT 8

WELL CONSTRUCTION LOG FORM

Dvirka and Bartilucci Consulting Engineers

WELL CONSTRUCTION LOG

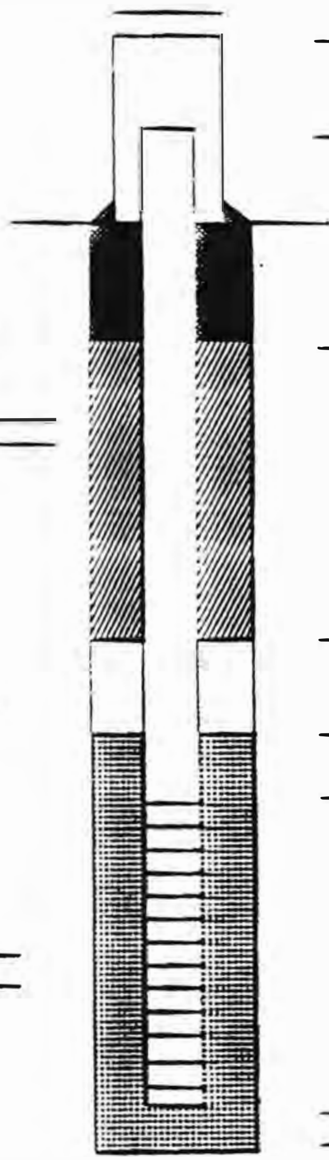
SITE ______________________ JOB NO. ____ WELL NO. ____

TOTAL DEPTH ____ SURFACE ELEV. ________ TOP RISER ELEV. ________

WATER LEVELS (DEPTH, DATE, TIME) ________ DATE INSTALLED ______

RISER	DIA	___	MATERIAL	______	LENGTH	___		
SCREEN	DIA	___	MATERIAL	______	LENGTH	___	SLOT SIZE	______
PROT CSG	DIA	___	MATERIAL	______	LENGTH	___		

SCHEMATIC



___ Prot. Csg Stickup

___ Riser Stickup

Ground Surface

Surface Seal Type ________
____

___ Bottom Surface Seal

Grout Type ________
____

___ Top Seal

Seal Type ________

___ Top Sand Pack

___ Top Screen

Sand Pack Type ________
Size ________

___ Bottom Screen

___ Total Depth of Boring

Dvirka and Bartilucci Consulting Engineers

WELL CONSTRUCTION LOG

SITE ______________________ JOB NO. ________ WELL NO. ________

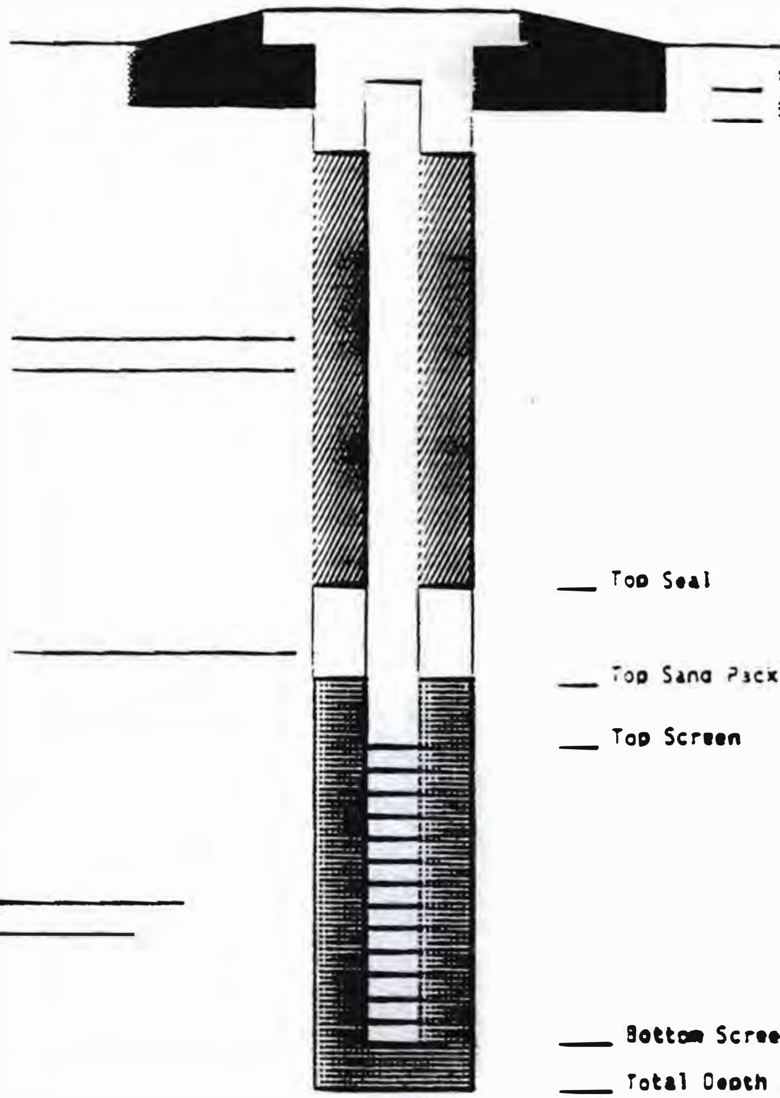
TOTAL DEPTH ________ SURFACE ELEV. ________ TOP RISER ELEV. ________

WATER LEVELS (DEPTH, DATE, TIME) ________ DATE INSTALLED ________

RISER DIA ___ MATERIAL ________ LENGTH ___

SCREEN DIA ___ MATERIAL ________ LENGTH ___ SLOT SIZE ________

SCHEMATIC



Surface Seal Type ________________

Grout Type ________________

Seal Type ________________

Sand Pack Type ________________

Size ________________

Ground Surface

___ Riser Elevation

___ Bottom Surface Seal

___ Top Seal

___ Top Sand Pack

___ Top Screen

___ Bottom Screen

___ Total Depth of Boring

EXHIBIT 9

DAILY EQUIPMENT CALIBRATION LOG FORM

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Date: ____________

DAILY EQUIPMENT CALIBRATION LOG

Project Name: ____________________

Project Number: ____________________ Calibrated by: ____________________

Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

EXHIBIT 10

DAILY FIELD ACTIVITY REPORT

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Date: ____________________

DAILY FIELD ACTIVITY REPORT

Report Number: ____________________ Project Number: ____________________

Field Log Book Page Number: ____________________

Project: ____________________

Address: ____________________

Weather: (AM) ____________________ Rainfall: (AM) __________ Inches

(PM) ____________________ (PM) __________ Inches

Temperature: (AM) ______ °F Wind Speed: (AM) ______ MPH Wind Direction: (AM) ______

(PM) ______ °F (PM) ______ MPH (PM) ______

Site Condition: ____________________

Personnel On Site:	Name	Affiliation	Arrival Time	Departure Time

Subcontractor Work Commencement: (AM) __________ (PM) __________

Subcontractor Work Completion: (AM) __________ (PM) __________

Dvirka
and
Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Date: ____________________

DAILY FIELD ACTIVITY REPORT

Work Performed by subcontractor(s) (includes equipment and labor breakdown):

Dvirka and Bartilucci
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Date: ____________________

DAILY FIELD ACTIVITY REPORT

General work performed today by D&B Engineers:

____
____
____
____
____

List specific inspection(s) performed and results (include problems and corrective actions):

____
____
____
____
____

List type and location of tests performed and results (include equipment used and monitoring results):

____
____
____
____
____

Verbal comments received from subcontractor (include construction and testing problems, and recommendations/resulting actions):

____
____
____
____
____

Prepared by: ______________________ Reviewed by: ______________________

EXHIBIT 11

FIELD CHANGE FORM

DVIRKA AND BARTILUCCI

FIELD CHANGE FORM

Project Name: ______________________________

Project Number: ______________________ Field Change Number: __________

Location: ______________________________ Date: __________

Field Activity Description: ______________________________

____

____

____

Reason for Change: ______________________________

____

____

____

Recommended Disposition: ______________________________

____

____

____

______________________________ __________

Field Operations Officer (D&B Consulting Engineers) (Signature) Date

Disposition: ______________________________

____

____

____

______________________________ __________

On-site Supervisor (NYSDEC) (Signature) Date

Distribution: Project Manager (D&B)
Project Manager (NYSDEC)
Field Operations Officer
On-site Supervisor (NYSDEC)

Others as Required: __________
____
____
____

EXHIBIT 12

FIELD AUDIT FORM

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM

Site: ______________________ Date: ______________________

Persons On-site: ______________________ QA/QC Officer Conducting Audit: ______________________

Project: ______________________

1. Is safety equipment in use (hardhats, respirators, gloves etc.): YES NO

2. Is a decontamination station, equipment and supplies on site and in working order:

Methanol	YES	NO
Alconox	YES	NO
D.I. Water	YES	NO
Scrub Brushes	YES	NO
Steam Cleaner	YES	NO

Comments: ______________________

3. Is the decontamination pad set up so water is contained: YES NO

Comments: ______________________

4. Is the site/investigation areas secured (fence, markers, etc.) or otherwise in accordance with project requirements: YES NO

Comments: ______________________

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

5. Is contaminated material properly stored and in a secure area or otherwise in accordance with project requirements: YES NO
   Are the drums of waste (water, soil, ppe) labeled properly: YES NO

   Comments: ______________________

   ____

   ____

6. Are field forms filled out properly, legibly and timely:

Field Log Book	YES	NO
Chain of Custody	YES	NO
Equipment Calibration Log	YES	NO
Daily Field Activity Report	YES	NO
Location Sketch	YES	NO
Sample Information Record	YES	NO
Equipment Usage Form	YES	NO
Boring Logs	YES	NO

   Comments: ______________________

   ____

   ____

7. Is the proper sampling and field measurement equipment, including calibration supplies on site: YES NO

   Comments: ______________________

   ____

   ____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

8. Are there adequate sample containers, including deionized water for QA/QC:

QA/QC:	Field Blanks	YES	NO
	Trip Blanks	YES	NO

Comments: ______________________________

____

____

9. Is the equipment decontaminated in accordance with project requirements:

Sampling equipment	YES	NO
Construction equipment	YES	NO

Comments: ______________________________

____

____

10. Is field measurement equipment calibrated:

Daily	YES	NO
Properly	YES	NO

Comments: ______________________________

____

____

11. Are samples collected and labeled properly: YES NO

Comments: ______________________________

____

____

OVIRKA
AND
BARTILUCCI

FIELD AUDIT FORM
(continued)

12. Are samples stored at 4°C: YES NO

Comments: ______________________________

____

____

13. Are coolers properly sealed and packed for shipment including Chain of Custody taped to underside of lid: YES NO

Comments: ______________________________

____

____

14. Is a copy of the Field Investigation Work Plan available on site: YES NO

Comments: ______________________________

____

____

15. Is a copy of each equipment manual on-site: YES NO

Comments: ______________________________

____

____

16. Is a copy of the QA/QC Plan available on site: YES NO

Comments: ______________________________

____

____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

17. Are investigation personnel familiar with the Work Plan and QA/QC Plan: YES NO

Comments: ____________________

____

____

18. Are quality control samples taken:

Trip Blanks	YES	NO
Field Blanks	YES	NO

Comments: ____________________

____

____

19. Are samples shipped in a timely and appropriate manner: YES NO

Comments: ____________________

____

____

20. Has the laboratory been contacted regarding planned shipment of samples: YES NO

Comments: ____________________

____

____

21. Certification - Based upon my audit at the above project. I hereby certify/do not certify compliance with QA/QC requirements for the project:

____________________ ____________________

Dated Signed

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM
(continued)

General Comments: ______________________________

____

____

____

EXHIBIT 13

NYSDEC SAMPLE IDENTIFICATION, PREPARATION AND ANALYSIS SUMMARY FORMS

To be included with all lab data and with each workplan

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements					
		*VOA GC/MS Method #	*BNA GC/MS Method #	*VOA GC Method #	*Pest PCBs Method #	*Metals	*Other

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOLATILE (VOA)
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd at Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
SEMIVOLATILE (BNA)
ANALYSES

Laboratory Sample ID	Matrix	Analytical Protocol	Extraction Method	Auxiliary Cleanup	Dil/Conc Factor

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
INORGANIC ANALYSES

Laboratory Sample ID	Matrix	Metals Requested	Date Rec'd at Lab	Date Analyzed

Appendix B

APPENDIX B

RÉSUMÉ OF THE D&B QA/QC OFFICER

ROBBIN A. PETRELLA

QUALITY ASSURANCE OFFICER

EDUCATION

SUNY at Buffalo, B.S. (Chemical Engineering) - 1986

PROFESSIONAL EXPERIENCE

Ms. Petrella's professional quality assurance/quality control (QA/QC) experience spans 15 years. During this time, she served as a Sample and Data Analyst for two large environmental laboratories. Ms. Petrella was responsible, as Data Review Group Leader, for supervision of data validation and QA/QC coordination between the laboratory and its clients. Her technical experience includes both the analysis and review of environmental samples using numerous protocols, including those developed by the United States Environmental Protection Agency (USEPA), New York State Department of Environmental Conservation (NYSDEC), and New Jersey Department of Environmental Protection (NJDEP).

Since joining the firm, Ms. Petrella has been responsible for preparing Quality Assurance/Quality Control Plans and Waste Analysis Plans for a number of large private sector clients. These include Chemical Waste Disposal Corporation, the International Business Machines Corporation and Northrop Grumman Corporation. She also has prepared overall QA/QC programs for Northrop Grurnman's on-site laboratories.

Ms. Petrella has prepared QA/QC Plans and data validation/usability reports for remedial investigation and feasibility studies conducted at numerous New York State Registry Sites, including those in the Towns of Cheektowaga, Schodack, and North Tonawanda, as well as the Villages of Croton-on-Hudson and Brentwood, New York. These tasks involved evaluation of the laboratory data to determine compliance with NYSDEC Analytical Services Protocols (ASP), as well as to determine the usability of the data particularly if it was not consistent with ASP requirements.

Ms. Petrella has assisted in the preparation and performance of air sampling programs for remedial investigation/feasibility studies (RI/FS) conducted at landfill/Superfund sites in Wallkill, New York and East Northport, New York. She has also performed water supply sampling for an RI/FS in Rensselaer County, New York, and a surface and subsurface water and soil sampling program as part of an RI/FS in Elmira, New York.

Ms. Petrella has acted as the QA/QC officer, and prepared and performed field audits for Superfund site investigations in Tonawanda, New York; Owego, New York; Brookhaven, New York; and Hornell, New York, and for a major railroad facility in New York City. She also has assisted in the preparation of laboratory contracts for analytical services for hazardous waste studies in Schodack, New York; Jamaica, New York; and the New York State Superfund Standby contract.

Ms. Petrella is responsible for performing laboratory audits on all laboratories having contracts with the firm as part of the New York State Superfund Program. She has been certified by the USEPA in both organic and inorganic data validation by successfully completing courses authorized by the USEPA. These certifications have also been accepted by the NYSDEC.

Ms. Petrella is responsible for the data validation of all data packages from ongoing hydrogeologic investigation and *landfill* closure investigations in Brookhaven and Hauppauge, New York. She also is responsible for validation of all data collected during field investigations for a large aerospace corporation, a major utility on Long Island, and manufactured gas plants across Long Island.

Ms. Petrella has acted as Project Manager for a standby project with the NYSDEC and a groundwater treatment project located in New Jersey.

Ms. Petrella has been instrumental in the design and implementation of the firm's GIS\Key Database system. In that role, she is responsible for the maintenance of the system and training of personnel in its use. She also is responsible for all updates to the GIS\Key program and communicates on a regular basis with the GIS\Key venders with regard to system improvements and network administration. Currently, there are seven ongoing projects that use GIS\Key, five of which are MGP sites. Ms. Petrella is responsible for entering and reporting of all chemistry data from GIS\Key.

Ms. Petrella also has conducted indoor and outdoor air sampling programs as part of MGP site field investigations. She has conducted interviews with homeowners as part of the air sampling program. She also is responsible for data validation of all the data from the air sampling programs.

Ms. Petrella is presently the Quality Assurance/Quality Control officer for the firm and responsible for reviewing all work relating to Quality Assurance/Quality Control for hazardous waste, hazardous substance, manufactured gas plant and solid waste projects undertaken by the firm. She also is responsible for preparation and maintenance of the Corporate Quality Assurance Manual, and for inventory and maintenance of the firm's field/sampling and monitoring equipment. As the QA/QC Officer, she reports directly to the Principal-in-Charge of the Environmental Remediation Division.