EAST WALL PORTION OF THE WASTEBED B/HARBOR BROOK IRM FINAL DESIGN REPORT

Geddes and Syracuse, New York

Prepared For:

Honeywell

301 Plainfield Road, Suite 330
Syracuse, New York 13212

Prepared By:

O'BRIEN & GERE ENGINEERS

5000 Brittonfield Parkway
Syracuse, New York 13221-4873
Phone: (315) 437-6100
Fax: (315) 437-7594

PARSONS

301 Plainfield Road, Suite 350
Syracuse, New York 13212
Phone: (315) 451-9560
Fax: (315) 451-9570

Geosyntec consultants

1255 Roberts Boulevard, Suite 200
Kennesaw, Georgia 30144
Phone: (678) 202-9500
Fax: (678) 202-9501

JUNE 2011

TABLE OF CONTENTS

Page

LIST OF ABBREVIATIONS iv

SECTION 1 INTRODUCTION 1-1

1.1 PURPOSE 1-1

1.2 IRM OBJECTIVES 1-1

1.3 SITE DESCRIPTION AND BACKGROUND 1-1
1.3.1 Harbor Brook 1-1
1.3.2 Lakeshore Area 1-2
1.3.3 Penn-Can Property 1-2
1.3.4 Railroad Area 1-2
1.3.5 Areas of Study 1-2

1.4 IRM OVERVIEW 1-2

1.5 INTEGRATION WITH OTHER REMEDIES 1-3

1.6 PRE-DESIGN INVESTIGATIONS 1-3

SECTION 2 DESIGN ISSUES AND CONSTRUCTION ACTIVITIES 2-1

2.1 INTRODUCTION 2-1

2.2 INCORPORATION OF PRE-DESIGN DATA 2-1

2.3 GENERAL SITE WORK 2-2
2.3.1 Notification Requirements 2-2
2.3.2 Access and Permits 2-2
2.3.3 Stormwater, Erosion, and Sediment Control 2-3
2.3.4 Site Preparation/Grading 2-3
2.3.5 Construction Water Management 2-4

2.4 BARRIER WALL 2-4
2.4.1 Design Objective 2-4
2.4.2 Barrier Wall Type 2-5
2.4.3 Barrier Wall Alignment and Depth 2-5
2.4.4 Barrier Wall Stability Evaluation 2-6
2.4.5 Barrier Wall Installation 2-6
2.4.6 Instrumentation and Monitoring 2-7

TABLE OF CONTENTS
(CONTINUED)

Page

2.4.7 Utility Penetrations and Management 2-7
2.4.8 Surface Completion 2-7

2.5 GROUNDWATER COLLECTION SYSTEM 2-7
2.5.1 Design Objective 2-7
2.5.2 Groundwater Collection Trench 2-8
2.5.3 Wick Drains 2-9
2.5.4 Collection Sumps 2-9
2.5.5 Monitoring System 2-10
2.5.6 Groundwater Conveyance System 2-10
2.5.7 Groundwater Treatment and Discharge 2-10

2.6 TEMPORARY REROUTING OF LOWER HARBOR BROOK 2-11
2.6.1 Harbor Brook Temporary Channel Section 2-11
2.6.2 Existing Culvert 2-12
2.6.3 New Culvert 2-13

2.7 EXCAVATED SOIL MANAGEMENT 2-15

2.8 HABITAT RESTORATION AND MITIGATION 2-15

2.9 CULTURAL RESOURCE SURVEY 2-15

2.10 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL 2-16

SECTION 3 PROJECT SCHEDULE 3-1

SECTION 4 REFERENCES 4-1

LIST OF TABLES

Table 2.1 Type 1B Aggregate Gradation Requirements 9
Table 2.2 Sump Level Control Functions 10
Table 2.3 Existing Culvert Data 13
Table 2.4 Proposed Culvert Data 14

TABLE OF CONTENTS
(CONTINUED)

Page

FIGURES

Figure 1.1 Site Location Map 1-5

Figure 3.1 Project Schedule 3-2

APPENDICES

APPENDIX A RESPONSE TO NYSDEC COMMENTS ON 95% DESIGN

APPENDIX B SUMMARY OF SUBSURFACE STRATIGRAPHY AND MATERIAL PROPERTIES

APPENDIX C SEEPAGE ANALYSIS

APPENDIX D GLOBAL SLOPE STABILITY ANALYSIS

APPENDIX E INTERNAL STABILITY ANALYSIS

APPENDIX F DRAFT HYDRAULIC ANALYSIS OF HARBOR BROOK

APPENDIX G DRAWINGS

APPENDIX H SPECIFICATIONS

APPENDIX I DURABILITY ANALYSIS

APPENDIX J INSTRUMENTATION AND MONITORING PLAN

APPENDIX K LIMITATIONS PACKAGE

APPENDIX L CQAP

LIST OF ABBREVIATIONS

AOS	area of study
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CPT	cone penetration tests
CRS	cultural resource survey
CQAP	Construction Quality Assurance Plan
cy	cubic yards
DNAPL	dense non-aqueous phase liquid
DSA	dredge spoils area
EE/CA	engineering evaluation/cost analysis
FRP	fiberglass reinforced pipe
gpm	gallons per minute
GAC	granular activated carbon
GWTP	groundwater treatment plant
IRM	interim remedial measure
Metro	Metropolitan Wastewater Treatment Plant
MRCE	Mueser Rutledge Consulting Engineers
NAPL	non-aqueous phase liquid
NAVD 88	North American Vertical Datum of 1988
NHP	National Heritage Program
NYCRR	New York Codes Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
OBG	O'Brien & Gere
PAF	Public Archeology Facility
PDIs	pre-design investigations
RI	remedial investigations
SEQRA	State Environmental Quality Review Act
RCCP	reinforced concrete cylinder pipe
SESCP	Stormwater, Erosion, and Sediment Control Plan
SHPO	State Historic Preservation Office
SPDES	State Pollutant Discharge Elimination System
SVOCs	semi-volatile organic compounds
SWPPP	Storm Water Pollution Prevention Plan
UEF	Upper East Flume
USGS	United States Geologic Survey
USFWS	U.S. Fish and Wildlife Service
VOCs	volatile organic compounds
WBB/HB	Wastebed B/Harbor Brook

SECTION 1

INTRODUCTION

1.1 PURPOSE

This 95% Design Report presents the proposed remediation strategies for the East Wall portion of the barrier wall and groundwater collection system of the Wastebed B/Harbor Brook (WBB/HB) Interim Remedial Measure (IRM). The East Wall is a continuation of the work being performed under the WBB/HB IRM Order on Consent (Index #D7-0008-01-09). The East Wall design is being prepared for Honeywell by a team led by Parsons and includes O'Brien & Gere Engineers (OBG) and Geosyntec Consultants (Geosyntec).

1.2 IRM OBJECTIVES

The IRM objectives, as presented in the Order on Consent, are as follows:

- Eliminate, to the extent practicable, within the scope of this IRM, the discharge of contaminated groundwater and non-aqueous phase liquid (NAPL) (and collect NAPLs, as feasible) into Harbor Brook and Onondaga Lake.
- Eliminate, to the extent practicable, within the scope of this IRM, the potential human health and ecological impacts associated with site constituents of concern.
- Eliminate, to the extent practicable, within the scope of this IRM, potential impacts to fish and wildlife resources associated with on-going discharges of contaminants of concern from the site.

1.3 SITE DESCRIPTION AND BACKGROUND

As indicated in the Order on Consent, the WBB/HB area encompasses approximately 90 acres, including Harbor Brook, the Lakeshore Area, the Penn-Can Property, and the Railroad Area, as shown on Figure 1.1. Additional areas of study (AOS) have been added at the request of the New York State Department of Environmental Conservation (NYSDEC) and include AOS#1 and AOS#2. AOS #1 is a wetland area situated east of Harbor Brook and adjacent to the Lakeshore area. AOS #2 is situated east of Harbor Brook and south of I-690 between Harbor Brook and the western dike of the Wastebeds D and E area. The following subsections briefly describe each of these areas but focus on areas that are part of the IRM scope.

1.3.1 Harbor Brook

The lower portion of Harbor Brook (Figure 1.1), which passes through the site, is classified as a Class C stream by NYSDEC. It originates southeast of Syracuse, New York, in the town of Onondaga and flows through the west side of Syracuse before discharging into the southeast corner of Onondaga Lake. Harbor Brook drains a watershed of approximately 13.2 square miles and has an average flow rate of 14.3 cubic feet per second (Blasland & Bouck, 1989). As the brook approaches the lake, it flows past Wastebeds D and E and enters the lake along the eastern end of Wastebed B.

1.3.2 Lakeshore Area

The Lakeshore Area is composed of the following four areas: Wastebed B, the East Flume, Dredge Spoils Area #1 (DSA 1) and Dredge Spoils Area #2 (DSA 2) and the I-690 Drainage Ditch. Wastebed B is approximately 3,200 ft. long (east to west) and 800 ft. wide (north to south) and is situated along the southern shore of Onondaga Lake, near the southeast corner. The Upper East Flume (UEF) defines the western extent of this area, and the eastern extent is defined by Harbor Brook near its confluence with Onondaga Lake. The southern extent of the Lakeshore Area is defined by I-690. The Lakeshore Area is generally flat with a relatively steep slope to the north in the north-central portion of the area due to the presence of a constructed berm for Wastebed B.

The I-690 Drainage Ditch was designed as a storm water drainage feature for the interstate and is maintained by the New York State Department of Transportation (NYSDOT). It parallels the westbound lanes of I-690 at the southern border of the Lakeshore Area and flows west to east and discharges directly into Harbor Brook. The substrate of the drainage ditch consists primarily of weathered Solvay waste. It appears that the ditch was constructed on portions of the upland wastebed.

1.3.3 Penn-Can Property

The area referred to as the Penn-Can property is to the south of the Lakeshore Area and south of I-690. This property was used for the production and storage of asphalt products. A shallow drainage swale runs along the southern and eastern perimeter of the property.

1.3.4 Railroad Area

The Railroad Area, owned by the CSX Corporation, Inc., is situated to the south of the Penn-Can property and is bounded to the north, south, and east by railroad tracks. The area is approximately 1,400 ft. long (east to west) and 400 ft. wide (north to south). Historical uses of this area are unknown.

1.3.5 Areas of Study

AOS #1 is a wetland area situated east of Harbor Brook and adjacent to the Lakeshore Area. This area was delineated during the Jurisdictional Wetland Survey (OBG, 2003a). AOS #2 is situated east of Harbor Brook and south of I-690 between Harbor Brook and the western dike of Wastebeds D and E.

1.4 IRM OVERVIEW

The following components will be implemented during the East Wall portion of the IRM:

- Replacement of the downstream culvert located in Harbor Brook
- Temporary re-routing of a section of lower Harbor Brook
- Installation of a barrier wall from the eastern terminus of the West Wall, to the downstream Harbor Brook culvert and extending to the eastern portion of AOS #1
- Installation of a groundwater collection system along barrier wall to achieve hydraulic control

- Grading and backfilling of portions of Wastebed B
- Site restoration

1.5 INTEGRATION WITH OTHER REMEDIES

The East Wall portion of the IRM involves portion of the Lakeshore Area, Lower Harbor Brook, and AOS #1. Other portions of the IRM either completed or in development are considered integral to the design and construction of the East Wall portion. These portions include the following remedies:

- The West Wall portion of the WBB/HB IRM
- The Upper Harbor Brook IRM
- Remediation and restoration of the area outboard of the barrier wall (West Wall and East Wall)
- Remediation of Onondaga Lake SMUs 1 and 7
- The final remedy for Wastebed B, Penn-Can Property, and the Railroad Area

Since some of these adjacent remedies are currently in the development stage, assumptions were required for purposes of developing this design report. These assumptions primarily impact the stability analyses performed in support of the East Wall design and have been included in Appendices D and E of this design report.

1.6 PRE-DESIGN INVESTIGATIONS

Extensive pre-design investigations (PDIs) were conducted in the vicinity of the East Wall to characterize the subsurface conditions, which included the WBB/HB PDI performed in 2004 that covered the entire WBB/HB site and the PDIs performed separately for the West Wall and the East Wall. A list of PDIs for the West Wall was included in the Data Package for the West Wall design (Parsons, 2009c). The following investigations have been performed specifically for the East Wall:

- Phase I East Wall PDI (2008)
- Phase I East Wall PDI – Railroad Borings (2008)
- Phase II East Wall PDI (2008)

The results from the 2004 investigation were provided in the *Draft Remedial Investigation Wastebed B/Harbor Brook Site* (OBG, 2007). The investigation results, including boring logs and raw laboratory data, from the Phase I East Wall PDI, the Phase I East Wall PDI – Railroad Borings and the Phase II East Wall PDI are provided in Appendix B. In addition, ten cone penetration tests (CPTs) were performed as part of the Phase II East Wall PDI along the East Wall alignment and within approximately 100 ft. outboard of the wall alignment. The CPT logs are also included in Appendix B.

Soil borings were advanced in SMU 7 during the Phase I Onondaga Lake PDI in 2005, the Phase II Onondaga Lake PDI in 2006, and the Phase V Onondaga Lake PDI in 2009. In addition, vibracore samples were collected from SMU 7 during the Phase I, II, III, and IV Onondaga Lake PDIs in 2005, 2006, 2007, and 2008, respectively. The vibracores were terminated at about 20 ft.

or less below the mudline. The investigation results, including boring logs and raw laboratory data, from the Phase V Onondaga Lake PDI are provided in Appendix B. Details of the other investigations were presented in data summary reports prepared by Parsons (2007, 2009a, 2009b, and 2009c).

For SMU 1, the investigations included the Phase I PDI in 2005, Phase II PDI in 2006, Phase III PDI in 2007, and the dense-non-aqueous phase liquid (DNAPL) investigation (in the lake) in 2006 and 2007. Details of these investigations were presented in data summary reports prepared by Parsons (2007a, 2007b, 2009a, and 2009b).

Figure 1.1 Site Location Map

SECTION 2

DESIGN ISSUES AND CONSTRUCTION ACTIVITIES

2.1 INTRODUCTION

The design issues and construction activities for the proposed IRM include general civil site work, Harbor Brook culvert replacement, temporary re-routing of Lower Harbor Brook, barrier wall installation, groundwater collection and conveyance system installation, sediment management, and site restoration. The anticipated methods and sequencing of the work are presented to ensure an understanding of how the IRM goals will be met.

It is anticipated that construction will begin in May 2011 and the major elements will be completed in the following order:

1. Erosion and sediment control installation
2. Clearing and grubbing
3. Installation of the temporary work platform
4. Installation of the sheet pile barrier wall near the culvert
5. Diversion of Harbor Brook, demolition of the culvert, installation of the new culvert
6. Installation of the remaining sheet piles
7. Installation of a groundwater collection system
8. Site restoration.

2.2 INCORPORATION OF PRE-DESIGN DATA

Appendix B provides a "Summary of Subsurface Stratigraphy and Material Properties" package (referred to as the Data Package). Information generated during the PDI and summarized in the Data Package was used to determine the barrier wall alignment and depth. The Data Package includes the following:

- A summary of site investigation activities conducted to date in the vicinity of the East Wall (i.e., WBB/HB and AOS #1 areas)
- Description of the subsurface stratigraphy in the vicinity of the East Wall
- Interpretation of material properties (i.e., index properties, compressibility, shear strength, and hydraulic conductivity)
- Recommended material properties for stability analyses

Pre-design data was further used to develop the following technical packages in support of the East Wall design:

- Seepage Analysis (Appendix C)
- Global Slope Stability Analysis (Appendix D)
- Internal Stability Analysis (Appendix E)

Compatibility testing was previously performed to evaluate the long-term durability of the steel, interlock sealant, and wick drains to be used in the construction of the barrier wall and groundwater collection system. The Compatibility Test Report was included in the West Wall Design Report (Parsons, 2009c). The results of the compatibility testing were used to support a Durability Analysis (provided in Appendix I).

2.3 GENERAL SITE WORK

2.3.1 Notification Requirements

Before beginning work, Dig Safely New York will be contacted to locate and mark underground utilities. Known utilities, based on historic records, are shown on Drawing C-001 (Appendix G).

2.3.2 Access and Permits

Honeywell will obtain site access agreements and easements, as required, to conduct the work. In accordance with 6 New York Codes Rules and Regulations (NYCRR) 375-1.7 (Permitting Remedial Activities) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), project-specific permit applications are not required. In addition, the remedy is a Type II action (6 NYCRR 617.5[c][29]) and is not subject to the State Environmental Quality Review Act (SEQRA). Honeywell will comply with the following requirements, as necessary:

- Federal
  - Section 404 of the Clean Water Act for work in waters of the United States (including Harbor Brook, Onondaga Lake, and federal wetlands)
  - Section 10 of the Rivers & Harbors Act of 1899 for work in Onondaga Lake
  - Statement of Procedures on Floodplain Management and Wetlands Protection
  - Executive Order No. 11988 – “Floodplain Management”
  - Executive Order No. 11990 – “Wetlands Protection”
  - Policy on Floodplains and Wetlands Assessments for CERCLA Actions, August 1985
  - National Historic Preservation Act of 1966
- State
  - Article 15 of the Environmental Conservation Law, 6 NYCRR Part 608
  - Article 24 of the Environmental Conservation Law, 6 NYCRR Part 663
  - State Pollutant Discharge Elimination System (SPDES) General Permit for Storm Water Discharges Associated with Construction Activities (including preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) and Erosion & Sediment Control Plan)
  - NYSDOT right-of-way occupancy
  - NYSDEC National Heritage Program (NHP)/U.S. Fish and Wildlife Service (USFWS) – Endangered Species Act

  - SHPO – New York State Historic Preservation Act of 1980
- Local
  - Town of Geddes and City of Syracuse building permits (e.g. plumbing, electrical)
  - Onondaga County utility easements
- Private
  - Right of Entry Permit agreements for construction site access and temporary monitoring wells (e.g. CSX)
- Construction trade permits (e.g. Dig Safe, plumbing, electrical, etc.).

2.3.3 Stormwater, Erosion, and Sediment Control

A Stormwater, Erosion, and Sediment Control Plan (SESCP) was developed for the West Wall Portion of the Wastebed B/Harbor Brook IRM and was approved by the NYSDEC. The SESCP will be modified to include the East Wall Portion of the IRM and will be submitted for review and approval to the NYSDEC prior to the start of work.

Temporary stormwater, erosion, and sediment controls may consist of silt fence, berms, and/or stormwater diversion channels to prevent significant soil or sediment erosion from the site and to minimize stormwater contact with exposed materials to the extent practicable. The remedial contractor will be required to maintain stormwater, erosion, and sediment control structures for the duration of the project, and these structures will not be removed until permanent vegetation, or an otherwise stable surface, is established in the disturbed areas.

2.3.4 Site Preparation/Grading

Site preparation will include the tasks described below.

- Installing temporary facilities: Temporary facilities, such as trailers, utilities, decontamination pad(s), and staging areas will be installed at the site, as necessary. The existing fencing will be used in conjunction with temporary fencing erected within the work areas to provide site security. The existing gravel roads will be used to access the work areas. Repairs or upgrades to existing access roads will be conducted, as required, to complete the work.
- Clearing: A majority of the site is vegetated with trees, shrubs, and grasses. Clearing activities will be conducted, as required, to perform the work. Non-salvageable woody material will be chipped, if needed, and stockpiled onsite for reuse (e.g., mulch). Salvageable woody material will be cut into manageable pieces and stockpiled onsite for general use or chipped along with the non-salvageable woody material.

Installation of a temporary work platform to provide a working surface for construction of the barrier wall, collection trench, and necessary utilities. The work platform essentially provides construction road stabilization to prevent erosion of the work area soils. The work platform consists of a 24-inch layer of gravel over the existing land surface. A geotextile fabric will be placed beneath the gravel bedding. The platform will be removed following construction of the final site remedial work and the area will be restored with topsoil and vegetation. In general, the top of the sheet pile wall will be installed to match existing grade, and therefore significant excavation or backfill work is not required. The installation of the trench portion of the

groundwater collection system will generate approximately 2,000 cubic yards (cy) of material. The Harbor Brook and culvert diversion work is anticipated to generate approximately 6,000 cy of material and an equal amount of imported fill material will be required. Imported backfill material to be used for the collection trench and the brook will be required to demonstrate that it meets the allowable constituent requirements of NYSDEC DER-10. The material generated from the Harbor Brook excavation will be managed in accordance with Section 2.7.

The majority of the site work to install the barrier wall, collection trench, culvert and channel is within the 100-yr flood boundary (EL 372), however there is no permanent encroachment upon the regulatory floodway. Temporary fill material including the work platform, decon pad, equipment pads and site lay down areas placed over existing grade will be removed following completion of the site remedy and no permanent fill material will be installed above the existing elevation. Construction of the new Harbor Brook section requires approximately 2,500 cy of excavation along the 450-ft. realigned section. An equal amount of fill material will be placed in the existing Harbor Brook channel section to be closed. Since fill above the existing grade is temporary and the amount of required cut and fill volume within the flood boundary are equal, and the final surface elevations will not create an adverse increase in the 100-yr. flood elevation.

2.3.5 Construction Water Management

It is anticipated that groundwater will collect in the excavation areas during construction because of the shallow water table and proximity of Onondaga Lake. Accumulated groundwater and stormwater will be pumped from excavation and bermed areas into a tank(s) for temporary storage. Construction water will either be pumped to the existing Willis/Semet Groundwater Treatment Plant (GWTP) for treatment, or transported offsite to a commercial treatment facility for disposal. If necessary, construction water will be pretreated prior to transfer.

During construction, groundwater or surface water that comes in contact with excavated material including NAPL soils will be treated as construction water. The subcontractor will perform visual inspection of water pumped from diversions for oil sheen or changes in turbidity as well as real-time turbidity monitoring as a minimum. Parsons will coordinate the final water quality monitoring plan with the NYSDEC before commencement of the excavation of lower Harbor Brook and the culvert installation. The contractor's work plan will be prepared to modify pumping procedures if the water quality threshold values are exceeded.

2.4 BARRIER WALL

2.4.1 Design Objective

The primary purpose of the IRM is to contain contaminants in the shallow and intermediate groundwater regimes within the site. As the groundwater collection system is anticipated to be highly effective at containing impacted groundwater, a design objective of the barrier wall is therefore to contain impacted soils and NAPL behind the wall. The barrier wall also functions in reverse, preventing lake water from entering the site. Excluding lake water significantly reduces the amount of water collected for treatment and discharge, particularly during times of high lake levels. The barrier wall will be buried, thus maintaining shoreline access as currently exists.

Based on compatibility test results, exposure to subsurface conditions should have minimal impacts on the integrity of the barrier wall. However, the hydraulic barrier is intended to function for the life of the remediation, and therefore conservative measures to prevent corrosion, including application of a protective coating and a cathodic protection system, have been included in the barrier wall design.

2.4.2 Barrier Wall Type

The barrier wall will conform to the requirements shown on Drawing C-016 (Appendix G). Sheet piles will be hot-rolled steel sections AZ19-700 and will be provided in standard double piles with the center interlock full length seal welded. Coal tar epoxy coating will be applied in the shop to both sides of the steel sheets, as specified on Drawing C-016 (Appendix G). A sealant (Swellseal WA, Gungrade Polyurethane Waterstop, manufactured by De Neef Construction Chemicals, Inc.) will be applied to the open sheet pile joints in the field using the wet cure method. Compatibility test results indicate exposure to subsurface conditions should not impact the effectiveness of the sealant used for sealing sheet pile joints.

2.4.3 Barrier Wall Alignment and Depth

The alignment of the barrier wall is shown on Drawing C-001 (Appendix G). The proposed barrier alignment extends from the existing West Wall termination to the mouth of Lower Harbor Brook at the downstream culvert and terminates in the eastern portion of AOS #1 between the lake and the railroad. The total length of the proposed barrier alignment is approximately 1,600 ft. The following objectives were considered in determining the barrier wall alignment:

- Maximizing the volume of NAPL and impacted material captured behind the barrier wall and preventing, to the extent practicable, the migration of contaminated groundwater and NAPL into Onondaga Lake
- Providing groundwater control along the Onondaga Lake shoreline adjacent to SMU 1 and SMU 7.
- Maximizing area outboard of the barrier wall for habitat restoration and wetland mitigation
- Ensuring the barrier wall is properly keyed into a confining unit

An Engineering Evaluation/Cost Analysis (EE/CA) (OBG, 2010) has been developed to evaluate alternative response actions for the East Wall alignment. The EE/CA also discusses the hydraulic control of groundwater and NAPL discharge into Upper Harbor Brook; and the temporary relocation of Lower Harbor Brook, which will be required as part of the East Wall construction.

The barrier wall will be installed with a top elevation ranging from 365.0 to 369.5 ft. North American Vertical Datum of 1988 (NAVD 88), and a bottom elevation that generally corresponds to a minimum of 3 ft. into the silt and clay confining layer**.** At sections labeled 2C, 3A 3B, 3C 3D and 3E are up to 6 ft. into the silt and clay layer. Cross sections along the barrier wall are provided on Drawings C-007 through C-010 and cross sections perpendicular to the barrier wall alignment are provided on Drawings C-011 through C-014 (Appendix G).

2.4.4 Barrier Wall Stability Evaluation

Geosyntec performed evaluation of barrier wall stability that included both a global stability analysis and an internal stability analysis. The global stability analysis results are presented in Appendix D. The internal stability analysis results are presented in Appendix E. The design of the East Wall incorporates the results of both of these packages.

The global stability analyses provided in Appendix D evaluate the stability of the proposed East Wall (i) before the outboard excavation/dredging starts (i.e., the pre-dredging condition); and (ii) after the outboard excavation/dredging and the inboard area are capped (i.e., the post-capping condition). The results indicate that the design achieves appropriate factors of safety for both cases. In addition, the stability of the railroad was evaluated for the existing condition and the condition with a cap.

The global stability evaluation associated with the removal of outboard area materials (including removal depths and allowable sequential removal dimensions) will be provided in a subsequent submittal addressing the outboard area remedial design. Preliminary global stability evaluations under this condition have been conducted by Geosyntec, and the results have been discussed with NYSDEC. Due to the unknowns associated with the existing railroad's construction, it has been determined that the removal of materials adjacent to and outboard of the East Wall will require sequential excavation or dredging to satisfy global stability requirements.

Since the wall will be buried before outboard excavation/dredging starts and after capping is completed, internal analyses were required only for the interim case during outboard excavation/dredging. Although the details associated with remediation of the outboard area materials have not yet been defined, a removal depth was assumed for purposes of the internal stability analyses that are presented in Appendix E. The results indicate that the design achieves the appropriate factors of safety for internal stability.

The current wall design will not prohibit deeper excavation within the Outboard Area if deeper removal is required to achieve post capping habitat elevation goals. Sequential excavation will be required within approximately 100 ft. of the wall in order to mitigate potential risks associated with railroad stability and achieve anticipated removal depths. If deeper removal is required, the size of the allowable open excavation area within this footprint will be reduced.

2.4.5 Barrier Wall Installation

Installation of the barrier wall will generally involve the following steps:

1. Installation of the temporary work platform.
2. All rocks and other debris which might prevent driving of sheet piles will be removed. Pre-trenching may be conducted along the alignment, if necessary.
3. Installation of sheet pile using an impact or vibratory hammer.

Installation of the sheeting is expected to progress relatively rapidly. Sheeting installation will be performed under full time inspection to confirm sheet lengths and interlock integrity.

2.4.6 Instrumentation and Monitoring

Monitoring of the East Wall and nearby structures (i.e., the existing CSX railroad and pipelines) will be required before, during, and after wall installation and dredging/excavation in front of the wall. A Geotechnical Instrumentation and Monitoring Plan for the East Wall area is provided in Appendix J and includes a description of the instrumentation program (i.e., instrument types and installation procedures), the monitoring program during different phases of the project, data management and analysis, contingency plans, and instrumentation maintenance. In addition, a Limitations Package summarizing the assumptions during design and the restrictions during construction is provided in Appendix K.

2.4.7 Utility Penetrations and Management

The project site contains both buried and overhead utilities, as shown on Drawing C-001 (Appendix G). There are no known utilities that will require penetration of the barrier wall. Prior to construction, the contractor is required to contact Dig Safely New York to locate and mark underground utilities.

2.4.8 Surface Completion

The elevation of the top of the barrier wall ranges from 365.0 to 369.5 ft. NAVD 88. A safety berm is required along the wall at sections where the top of wall is above the existing grade. The purpose of the safety berm is to mitigate risk to site workers, end users, and wildlife present at the site. The safety berm will consist of granular material and will span both the inboard and outboard portions of the wall.

2.5 GROUNDWATER COLLECTION SYSTEM

A groundwater collection system will be constructed in conjunction with the sheet pile barrier wall system to eliminate, to the extent practicable, within the scope of the IRM, the discharge of contaminated groundwater to Onondaga Lake. The groundwater collection system will be composed of the following elements:

- Groundwater collection trench
- Wick drains
- Collection sumps
- Monitoring system

2.5.1 Design Objective

The groundwater collection system is designed to establish and maintain an inward gradient from the lake via collection of groundwater in the shallow and intermediate units. Based on discussions with NYSDEC, deep groundwater collection has not been included in the WBB/HB IRM design. Deep groundwater is currently being evaluated under the Feasibility Study for the WBB/HB site.

The inward gradient will be maintained during normal operation of the system. In the event that a flood condition exists with lake levels exceeding the top of barrier wall elevation, pumping from the collection system will be suspended until lake levels have receded to an elevation below the top of the barrier wall.

The collection system design flow rate is based on the results of the Honeywell Groundwater Flow Model Version 2.0 prepared for the site by O'Brien & Gere, which is included in the *West Wall Final Design Report* (Parsons, 2009c). Calculated flow rates for the overall Wastebed B/Harbor Brook IRM (including both the proposed East Wall and the existing West Wall portions) is 27 gallons per minute (gpm) (24 gpm from the shallow fill unit and 3 gpm from the intermediate marl unit). The anticipated contribution from the East Wall collection trench portion is 7 gpm. The collection system has been conservatively designed to achieve a maximum capacity of approximately 65 gpm to allow for some variance in the model predictions.

Groundwater will gravity flow from the collection trench into the collection sump. The sump will be equipped with a submersible pump controlled by a float system which will transfer groundwater from the sump to the lakeshore pump station. From the lakeshore pump station, groundwater will be conveyed to the Willis-Semet GWTP. Piezometers equipped with pressure transducers will be installed immediately downgradient of the trench to verify that the collection system is maintaining an inward hydraulic gradient.

As discussed in *the Draft Remedial Investigation (RI) Report* (OBG, 2007), the results of the RI (including NAPL recovery tests) indicate that the coal tar-like NAPL encountered at WBB/HB is not present in pools and is not currently migrating. Furthermore, only small quantities of NAPL (<1-Liter) were collected when the system was stressed via high rate pumping. Although the data suggest it is unlikely, the current components of the Willis-Semet GWTP are capable of addressing the limited NAPL that may enter the trench.

Given the immobility of the NAPL at WBB/HB and the anticipated limited effectiveness of recovery methods, NAPL collection has not been included in the IRM design. The presence of NAPL at WBB/HB is being addressed as part of the WBB/HB Feasibility Study.

A detailed description of each component of the groundwater collection system and its operation are provided below.

2.5.2 Groundwater Collection Trench

A shallow collection trench will be constructed inboard of the sheet pile barrier wall as shown on Drawing C-001 (Appendix G). The collection trench will collect groundwater from the shallow and intermediate hydrogeologic units. The trench system includes a 6-inch diameter 0.015-inch slotted fiberglass reinforced plastic (FRP) collector pipe with an invert of 358.00 ft. (NAVD 88).

Excavation of the collection trench will be completed using conventional construction methods. Trench protection measures, such as trench boxes, will be used to stabilize the trench excavation. Material removed from the trench excavation will be stockpiled and managed in accordance with Section 2.7. Once the trench has been excavated to the required depth, a 1-ft. lift (minimum) of No.1 and No.2 blended stone (ASTM No.57) will be placed in the bottom of the trench to provide a flat, stable working surface during construction activities. After placing the working surface, an 8-inch lift of Type 1B coarse aggregate (see gradation requirements in Table 2.1 below) will be placed prior to installation of the 6-inch diameter 0.015-inch slotted FRP collector pipe. The balance of the excavation will then be backfilled to the design grades indicated on the drawings.

TABLE 2.1 – TYPE 1B AGGREGATE GRADATION REQUIREMENTS

	Percent Passing By Weight	
Sieve Size	**Minimum**	**Maximum**
6.3 mm (1/4”)	100	
3.2 mm (1/8”)	90	100
180 μm (#80)	0	15
75 μm (#200)	0	1.0

The collection trench will be equipped with cleanouts to afford access to the pipe using conventional cleaning equipment. Cleanouts will be installed at the upgradient end of the collection pipe and every 100 ft. along the length of the trench.

2.5.3 Wick Drains

Prefabricated wick drains will be installed along the groundwater collection trench alignment at 3 ft. horizontal spacing. The wick drains will terminate in the top of the silt and clay layer. The purpose of the wick drains is to facilitate vertical movement of deeper groundwater to the collection trench resulting in an inward gradient across the hydraulic barrier over the depth of the wick drains without the need for a deep collection trench.

AmerDrain 607 wick drains were selected based on the results of an evaluation of several types of wick drains conducted in support of the Willis/Semet IRM. These wick drains were also evaluated as part of the compatibility testing done in support of this design. The compatibility test results (Parsons, 2009c) indicate some clogging and reduction in flow is likely through the wick drains following exposure to subsurface conditions (i.e., Solvay waste and NAPL-impacted soil). However, this design has considered the reduced flow rates encountered during the testing and incorporates adequate wick drains to achieve the minimum flow rate required. In the event that post-IRM monitoring indicates that the required groundwater collection flow rates are not being achieved (i.e., insufficient drawdown of the groundwater table behind the wall), the need to replace or add wick drains will be evaluated as well as alternative collection methods (e.g., wells).

2.5.4 Collection Sumps

One collection sump (CS-7) will be installed along the alignment of the proposed barrier wall as shown on Drawing C-026 (Appendix G). Groundwater along the East Wall will be conveyed by either the existing collection sump CS-6 or the new collection sump CS-7, which will be installed for the East Wall project. The sump will consist of an epoxy-coated 4-ft. diameter pre-cast manhole equipped with a submersible effluent pump. Water will be discharged from the manhole into a 3-inch diameter FRP force main, which will convey the water to the lakeshore pump station. The pumps will be controlled by a float system with floats set at the elevations indicated on the drawings, and will perform the functions as summarized on Table 2.2 below.

TABLE 2.2 - SUMP LEVEL CONTROL FUNCTIONS

Float ID	Function
Pump On	Turns on pump at the set water level
Pump Off	Turns pump off after sump has been pumped down to the set water level
Low-Level Alarm	Sends a signal to the control system indicating a low level in the collection sump
High-Level Alarm	Sends a signal to the control system indicating a high level in the collection sump

Note: Float elevation set points are provided on the drawings in Appendix G.

The sumps will operate independent of one another to allow for maintenance activities to be completed as needed. The existing Operations and Maintenance (O&M) plan for the Willis/Semet GWTP will be updated to include the WBB/HB groundwater collection systems (including the East and West Wall systems). Alarms will be addressed in accordance with the procedures to be outlined in the O&M Plan.

2.5.5 Monitoring System

The monitoring system will consist of a series of piezometers equipped with pressure transducers that will be installed immediately downgradient of the trench and at 500-ft. spacing along the alignment of the trench. The piezometers will extend to the top of the silt/clay layer. The monitoring system will be used to verify that the collection system is maintaining an inward hydraulic gradient from the lake. Comparative lake level measurements will be obtained from the United States Geologic Survey (USGS) surface water gage (USGS 04240495) located on the north shore of Onondaga Lake at Onondaga Park Marina basin, 200 ft. southwest of Onondaga Lake Parkway, and 1.9 miles upstream from the outlet of the lake. Piezometer locations are shown on drawing C-026 and a detail is shown on C-029 in Appendix G.

2.5.6 Groundwater Conveyance System

Groundwater recovered by the shallow and intermediate groundwater collection system will gravity flow through the 6-inch FRP collection pipe into the collection sump. The eastern end of the collection pipe will be connected to collection sump CS-6, which will be installed as part of the West Wall portion of the IRM. Discharge pumps located in the collection sumps are designed to transfer water to the lakeshore pumping station through a 4-inch diameter single-walled FRP pipeline. The groundwater conveyance system controls will include an alarm circuit linked to the water level in the lakeshore pump station that will stop the transfer of groundwater in the event of a high water condition in the pump station.

2.5.7 Groundwater Treatment and Discharge

The existing lakeshore pump station transfers groundwater to the GWTP. The GWTP is currently operating using a treatment train consisting of influent equalization, pH adjustment, metals precipitation, filtration, volatile organic compounds (VOCs) removal via air stripping, granular activated carbon (GAC) for semi-volatile organic compounds (SVOCs) removal, treated water neutralization, off-gas management, and chemical storage/feed systems. This system was

designated the Phase 1 Treatment Train and was sized for a maximum capacity of 150 gpm. The treated effluent currently discharges via Outfall 15A in accordance with a NYSDEC-approved effluent permit. Phase 2 expansion of the GWTP is currently in progress. Phase 2 will increase the capacity from 150 gpm to 375 gpm and will primarily discharge to the Onondaga County Metropolitan Wastewater Treatment Plant (Metro) meeting approved effluent limits. The option to allow discharge to Outfall 15A under wet weather conditions will remain.

2.6 TEMPORARY REROUTING OF LOWER HARBOR BROOK

The installation of the East Wall sheet piles requires the temporary rerouting of a portion of Lower Harbor Brook. The work includes creation of a new section of the brook, backfill of an existing section, and demolition and replacement of the downstream culvert. The section of Harbor Brook to be removed is located approximately 300 ft. upstream from the lake and is approximately 700 ft. long including the culvert. The existing 100-ft. long concrete box culvert is located upstream from the section of the Brook targeted for realignment. The existing channel section will be backfilled with structural fill material specified for stabilization of the wall and the area will be restored with topsoil, seeding and mulch to establish permanent vegetation.

2.6.1 Harbor Brook Temporary Channel Section

The rerouted section of Lower Harbor Brook Channel is considered temporary as the final restoration of Lower Harbor Brook will be completed following final design and remediation of the WBB/HB Site and Outboard Area in accordance with the lakewide plan for habitat restoration (Parsons, 2009b). The goals of the design of the Harbor Brook section are to: (1) create a stabilized channel having equal hydraulic capacity as the existing channel, and to (2) limit exposure of contaminated material to Harbor Brook during the temporary conditions.

The existing Lower Harbor Brook channel is generally a non-geometric cross-section. Sedimentation and growth of invasive wetland plant species have been documented along the channel bottom in the downstream portion. The average dimensions consist of a top width of approximately 55 ft., a bottom width of approximately 24 ft., a height of approximately 4 ft. and average side slopes of 2:1 (H:V). A survey drawing and sections of the existing channel are shown in the design drawings in Appendix G.

The soil boring logs for the East Wall area of the proposed channel show that the upper soil layer consists of black, soft, wet silt with some vegetation, as well as fill material consisting of grayish black, wet, loose fine and coarse gravel, with little sand. Soils in the upper 5-ft. layer have N values between <1 to 2 and “no recovery” was reported in some logs. Groundwater was reported between 2 to 4 ft. beneath the ground surface. Due to the soft and wet soil conditions in the upper layer, it is assumed that a 5-ft. deep channel design with relatively steep side slopes would require a significant layer of rip rap bedding for stabilization. A configuration with more gentle side slopes was chosen for the design. Gentle side slopes allow the use of more organic and smaller grain soils for the channel bottom material.

The rerouted section of the Lower Harbor Brook channel will have a top width of 48 to 55 ft., a bottom width of 24 ft., and an average height of 4 ft. The channel side slopes will be between 2:1 and 4:1 (H:V) and a 5-ft. wide bench is provided to enhance wetland development in several segments along the brook. The proposed channel centerline alignment is designed to minimize disturbance of wetland areas by choosing a direct route through the wall section and

tying back into the existing Harbor Brook at a location downstream from the proposed wall. The temporary channel will be periodically inspected for noticeable signs of erosion of the channel materials. Eroded areas will be repaired, as necessary. A drawing and sections of the proposed temporary channel are shown in the design drawings in Appendix G.

Anchor QEA completed a hydraulic analysis of the proposed lower Harbor Brook channel and reaches. One of the objectives of the analysis was to calculate stable particle and stone sizes for post-construction conditions given different flow events and based on the model-predicted flow velocities and bed shear stresses. In general, maximum velocities within lower Harbor Brook for the 1, 2, 5 10, 50, 100-yr return interval storms for the segment downstream from Culvert #1's range from 2.01 fps to 2.52 fps. The estimated stable particle sizes for the channel bed substrate able to resist erosion range from a minimum D50 of 0.237 and a maximum D50 of 0.483. The bed thickness was calculated to be 2 times the D50. Based on the results of the recent hydraulic analysis and the objective of erosion protection, the channel bed material currently proposed is a 6-inch layer of granular fill material consisting of a 50/50 mixture of sand and aggregate. The aggregate will be Type 1 conforming to NYSDOT Specification 703.02 Table 703-04. The Draft Hydraulic Analysis of Harbor Brook (Anchor QEA, 2010) is provided in Appendix F. An updated version of the Hydraulic Analysis of Harbor Brook memorandum will be submitted with the *Final Design of Upper Harbor Brook IRM* by OBG.

2.6.2 Existing Culvert

As stated above, demolition and replacement of the downstream culvert is required in order to install the East Wall. The existing culvert is approximately 600 ft. upstream from Onondaga Lake and is the lowest downstream culvert in Harbor Brook. A gravel access road and two utilities cross over the culvert. The parallel utilities are installed above-grade over a structural support and include a 36-inch reinforced concrete cylinder pipe (RCCP) sanitary force main and a 12-inch abandoned sanitary pipeline. The structural support is a steel beam and truss structure and is supported on concrete footings. As-built drawings for the force main indicate that the concrete footings are not directly bearing on the concrete culvert. Visual inspection of the existing culvert shows that the structure is severely deteriorated and has several areas of exposed steel reinforcing. The force main is in service and was installed approximately 30 years ago. A 24-inch leachate force main crosses over Harbor Brook directly upstream from the existing culvert outside of the limit of work.

Considering the condition and operational constraints associated with the 36-inch sanitary force main, it was determined that the removal and replacement of any portion of the pipeline will be costly and time constrictive. Therefore, it is most desirable to relocate the culvert without disturbing the force main. It is proposed for the new culvert to be placed within the width of the above-grade portion of the existing utilities. In plan, the new culvert inlet location is identical to the existing culvert inlet and the alignment is curved to the east. The new culvert will outlet to an open channel prior to crossing the proposed East Wall.

The following considerations were used to develop the design for the new culvert:

- Based on the HEC-RAS modeling completed by AnchorQEA for the Draft Hydraulic Analysis of Harbor Brook (Appendix F), the proposed culvert has been sized to provide equal or greater hydraulic capacity than the existing culvert.

- The proposed new culvert is located so as not to require removal or replacement of the sanitary force main. Mueser Rutledge Consulting Engineers (MRCE) has completed an engineering evaluation of the structural supports. As part of this work, MRCE has described the required isolation of the pipeline structure during construction and has provided recommendations for real-time vibration monitoring of the force main during demolition/construction of the culvert as well as installation of the wall. The results of this evaluation will be included in the Final Design Report.
- During demolition of the existing culvert and construction of the new culvert, Harbor Brook will be temporarily diverted around the work area.
- Segmented precast reinforced concrete was chosen for construction in order to minimize installation time.
- The existing culvert will be demolished in place and disposed offsite.
- The barrier wall will be completed in the area of the new channel penetration prior to installing the proposed culvert.

Data for the existing culvert were provided by O'Brien and Gere, and the culvert was also field-measured by Parsons. A significant amount of sediment was noted inside the culvert and an accurate depth measurement was not possible at the time of the field investigation. Given the height measurement and assuming a depth of sediment of one foot, the inside height is assumed to be approximately 6.5 ft. The general dimensions of the existing culvert are provided in Table 2.3 below.

TABLE 2.3 – EXISTING CULVERT DATA

Inside Width (ft)	~19
Inside Height (ft)	~6.5
Length (ft)	93
Wall Thickness (in)	N/A
Invert at Inlet	361.36
Invert at Outlet	360.59
Slope (ft/ft)	0.010
Approximate Capacity (cfs)	2388
Type	Concrete

Capacities of the existing and proposed culverts shown in Tables 2.3 and 2.4 on the following page were determined using Manning's equation for open channel flow and using a roughness coefficient of 0.018.

2.6.3 New Culvert

In order to locate the new culvert so as not to require modifications of the 36-inch sanitary force main, the alignment of the new culvert is partially located under the above-grade section of the force main. Prior to replacement of the culvert, the force main will require a new structural support system isolated from the culvert and structural monitoring prior to and during

construction, but will not require reconfiguration, new piping, or other modifications that would disrupt service.

The dimensions of the proposed culvert are based on the observed dimensions of the existing culvert. It is planned for the proposed culvert to be 88.9 ft. long along the centerline and consist of a precast concrete box culvert section at the furthest upstream portion and a precast concrete open channel section downstream from the box culvert. The culvert will be capable of meeting HS-25 loading and will be watertight. Backfill over the culvert will consist of a 1-ft. thick layer of granular material with 6 inches of topsoil at the surface in most areas. Backfill over the area of the culvert under the road will be composed of a 1.5- to 2-ft. layer of gravel material with a maximum grain size of 4 inches.

The new culvert will include the following sections:

- (1) 20 ft. (width) x 6.5 ft. (height) x 6 ft. (depth) - Rectangular Culvert Section
- (11) 20 ft. (width) x 6.5 ft. (height) x 6 ft.-10 in. (outside depth) - Angled Culvert Sections
- (3) 20 ft. (width) x 6.5 ft. (height) x 6 ft. (depth) - Rectangular Channel Sections
- (2) Precast end sections “wing walls” at upstream and downstream ends

The angled sections are sized with a 6 ft.–10 in. depth on the outside of the curve and 4 ft.–10½ in. depth on the inside of the curve. Each section will have precast push-on gaskets and watertight joints.

The dimensions of the proposed culvert are summarized in Table 2.4 below.

TABLE 2.4 – PROPOSED CULVERT DATA

Inside Width (ft.)	20
Inside Height (ft.)	6.5
Length (ft.)	88.9
Wall/Base Thickness (in.)	12
Deck Thickness (in.)	14
Curve (deg)	56
Invert at Inlet	361.36
Invert at Outlet	360.65
Slope (ft./ft.)	0.011
Capacity (cfs)	2808
Type	Precast Reinforced Concrete
Weight Box Culvert (lbs/sf)	440
Weight Channel (lbs/sf)	265

A plan and details for the proposed culvert are shown in the design drawings provided in Appendix G. A hydraulic analysis of the proposed culvert shows that the predicted water surface elevations of the proposed geometry including the culvert and the lower Harbor Brook channel are either the same or lower than existing conditions. Therefore, no increased

head loss through the culvert is anticipated. The Draft Hydraulic Analysis of Harbor Brook (Anchor QEA, 2010) is provided in Appendix F. The existing culvert location is shown in the design drawings provided in Appendix G. General construction sequence of the culvert and channel section including installation of the temporary pump diversion of Harbor Brook around the work area excavation is shown in Drawing C-023, Appendix G.

2.7 EXCAVATED SOIL MANAGEMENT

Approximately 10,000 cy of soil will be generated from excavating the groundwater collection trench and the Harbor Brook and culvert diversion activities. This material will be stockpiled on site and stabilized (with vegetation) to minimize contact with stormwater and runoff when not in use and following completion of the project. The stockpile cover, as well as any sediment and erosion control measures will be maintained until final disposition of these materials is addressed as part of the final Wastebed B/Harbor Brook site remedy selection. In the event that grossly contaminated soil (e.g., NAPL saturated soils) is encountered during the excavation/site grading activities, this material will be staged separately on site. A plan for the temporary staging, characterization, and disposal of this material will be developed by Honeywell in consultation with the NYSDEC.

2.8 HABITAT RESTORATION AND MITIGATION

The IRM work will disturb wetland and non-wetland areas both inland and outboard of the barrier wall. Areas disturbed by the IRM project will be temporarily restored by conventional methods such as grading, seeding, and applying mulch, with final restoration to be completed following final design and remediation of the WBB/HB Site and Outboard Area in accordance with the *Lakewide Plan for Habitat Restoration* (Parsons, 2009b). The installation of the East Wall affects an area of approximately 1.77 acres total, including 0.31 acres in Wetland Area W1 located between the East Wall and existing Lower Harbor Brook and 1.46 acres located directly inboard of the wall in Wetland Area W1 between wall station 9+00 and the eastern terminus of the wall. Mitigation of wetlands affected by construction of the barrier walls will be addressed in the Wastebeds 1-8 IRM design by O'Brien and Gere. Remediation including dredging, capping and restoration of the area outboard of the West Wall and East Wall are being addressed as part of the outboard area IRM.

2.9 CULTURAL RESOURCE SURVEY

A Phase 1A (Pratt and Pratt, 2004) Cultural Resource Survey (CRS) for the site was performed to assess the potential for or presence of cultural resources at the site. A second Phase 1A Cultural Resources Survey (CRS) was conducted by the Public Archeology Facility (PAF) at SUNY Binghamton in response to NYSDEC comments on the Pratt & Pratt Phase 1A CRS. A Revised Phase 1A CRS Report was issued in October of 2004 (Hohman, 2004). The revised report concluded that there was low potential for prehistoric and historic resources and a Phase 1B CRS was recommended only in the area of the former Geddes Pier. The revised CRS Report was approved by NYSDEC in September of 2007. The recommendations were incorporated into the Draft Phase 1B Work Plans for the lake and associated uplands sites, (including the area of the former Geddes Pier) that were submitted to NYSDEC in October of 2008 (Hohman, 2008; Parsons and LCMM, 2008). The work plans were revised to incorporate comments received from NYSDEC in May of 2009. *The Upland Work Plan* (PAF, 2009) was approved on March 5,

2010 and *The Underwater Work Plan* (LCMM, 2010) was approved on April 15, 2010. Phase 1B field work is currently being conducted on the upland sites (including Harbor brook) and underwater.

2.10 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

A Construction Quality Assurance Plan (CQAP) is provided as Appendix L.

SECTION 3

PROJECT SCHEDULE

Figure 3.1 provides a preliminary schedule for the construction of the East Wall portion of the WBB/HB IRM. A more detailed schedule will be developed following the procurement and selection of a remedial contractor.

Figure 3.1 Project Schedule

SECTION 4

REFERENCES

Blasland & Bouck. 1989. Hydrogeologic Assessment of the Allied Waste Beds in the Syracuse Area, Solvay, New York. Blasland, Bouck & Lee, Syracuse, New York.

Hohman, Christopher D. 2004. Cultural Resource Management Report: Phase 1A Cultural Resource Assessment. Public Archaeology Facility, Binghamton University: Binghamton, New York. Prepared for Parsons (and Honeywell).

Hohman, Christopher D. 2008. Cultural Resource Management Report, Phase IB Archeological Work Plan, Onondaga Lake Project, Upland and Shoreline Area, Settling Basins 12-15, Geddes Brook IRM, Ninemile Creek RI/FS, and Harbor Brook IRM, Towns of Camillus and Geddes, Onondaga County, New York, MCDs 06701 and 06707. November 17, 2008.

NYSDEC. 2003. Order on Consent Index No. D7-0008-01-09 (Wastebed B/Harbor Brook IRM). December 2003.

O'Brien & Gere (OBG). 2003a. Jurisdictional Wetland Delineation Report, Harbor Brook Site. Geddes and Syracuse, New York. December 2003.

OBG. 2003b. Final Work Plan East Flume Interim Remedial Measure. Syracuse, NY.

OBG. 2007. Draft Remedial Investigation, Wastebed B/Harbor Brook Site, Geddes and Syracuse, New York. November 2007.

OBG. 2010. Engineering Evaluation/Cost Analysis Report for the Wastebed B/Harbor Brook IRM. April 2010.

Parsons. 2007a. Onondaga Lake Pre-Design Investigation Phase I Data Summary Report. May 2007.

Parsons. 2007b. Draft Willis-Semet Interim Remedial Measure Causeway DNAPL Investigation. December 2007.

Parsons. 2008. Draft Onondaga Lake Pre-Design Investigation Phase II Data Summary Report. September 2008.

Parsons. 2009a. Draft Onondaga Lake Pre-Design Investigation Phase III Data Summary Report. February 2009.

Parsons, 2009b. Draft *Onondaga Lake Remediation Design Elements for Habitat Restoration*. December 2009.

Parsons. 2009c. West Wall Portion of the Wastebed B/Harbor Brook IRM Final Design Report. November 2009.

Parsons and Lake Champlain Maritime Museum (LCMM). 2008. Underwater and Shoreline Archaeological Resources Phase 1B Work Plan for the Onondaga Lake Bottom, Subsite of the Onondaga Lake Superfund Site, Onondaga County, New York. July 24, 2008.

Pratt and Pratt. 2004. Phase 1A Cultural Resources Survey, Onondaga Lake LCP Bridge Street Site and Related Wastebeds, Village of Solvay, Town of Geddes, Town of Camillus, Onondaga County, New York. August 2004.

Public Archaeology Facility (PAF), 2009. Cultural Resource Management Report Phase 1B Archaeological Work Plan, Onondaga Lake Project, Upland and Shoreline Area, Wastebed 13, Geddes Brook IRM, Tributary of Geddes Brook Ninemile Creek RI/FS, Shoreline Survey and Wastebed B/Harbor Brook IRM, Towns of Camillus and Geddes, New York, Public Archeology Facility, Binghamton University, Binghamton, New York

APPENDIX A

RESPONSE TO NYSDEC COMMENTS ON 95% DESIGN

APPENDIX B

SUMMARY OF SUBSURFACE STRATIGRAPHY AND MATERIAL PROPERTIES

APPENDIX C

SEEPAGE ANALYSIS

APPENDIX D

GLOBAL SLOPE STABILITY ANALYSIS

APPENDIX E

INTERNAL STABILITY ANALYSIS

APPENDIX F

DRAFT HYDRAULIC ANALYSIS OF HARBOR BROOK

APPENDIX G

DRAWINGS

- 444184-100-G-001 COVER SHEET
- 444184-100-C-001 GENERAL SITE PLAN
- 444184-100-C-002 EROSION AND SEDIMENT CONTROL PLAN
- 444184-100-C-003 DETAIL SITE PLAN - I
- 444184-100-C-004 DETAIL SITE PLAN - II
- 444184-100-C-005 DETAIL SITE PLAN - III
- 444184-100-C-006 DETAIL SITE PLAN - IV
- 444184-100-C-007 CROSS SECTION ALONG WALL ALIGNMENT - I
- 444184-100-C-008 CROSS SECTION ALONG WALL ALIGNMENT - II
- 444184-100-C-009 CROSS SECTION ALONG WALL ALIGNMENT - III
- 444184-100-C-010 CROSS SECTION ALONG WALL ALIGNMENT – IV
- 444184-100-C-011 CROSS SECTION PERPENDICULAR WALL ALIGNMENT – I
- 444184-100-C-012 CROSS SECTION PERPENDICULAR WALL ALIGNMENT – II
- 444184-100-C-013 CROSS SECTION PERPENDICULAR WALL ALIGNMENT – III
- 444184-100-C-014 CROSS SECTION PERPENDICULAR WALL ALIGNMENT – IV
- 444184-100-C-015 SHEET PILE DETAILS
- 444184-100-C-016 SHEET PILE WALL CONSTRUCTION SPECIFICATIONS
- 444184-100-C-017 GEOTECHNICAL INSTRUMENTATION PLAN
- 444184-100-C-018 INSTRUMENTATION INSTALLATION GUIDANCE AND INSTRUMENTATION DETAILS – I
- 444184-100-C-019 INSTRUMENTATION DETAILS - II
- 444184-100-C-019A CULVERT AND SHEET PILE WALL PENETRATION DETAILS
- 444184-100-C-020 EXISTING SITE CONDITIONS
- 444184-100-C-021 PROPOSED CULVERT PLAN AND SECTIONS
- 444184-100-C-022 EXISTING HARBOR BROOK ALIGNMENT AND SECTIONS
- 444184-100-C-023 HARBOR BROOK DIVERSION PLAN
- 444184-100-C-024 HARBOR BROOK ALIGNMENT AND SECTIONS
- 444184-100-C-025 CULVERT PLAN AND DETAILS
- 444184-100-C-026 COLLECTION SYSTEM ALIGNMENT
- 444184-100-C-027 TYPICAL COLLECTION SUMP PLAN AND DETAILS
- 444184-100-C-028 COLLECTION SYSTEM DETAILS
- 444184-100-C-029 MISCELLANEOUS DETAILS
- 444184-100-C-030 STOCKPILE LOCATION PLAN
- 444184-100-E-001 GROUNDWATER PUMP STATION CONTROL ROOM LAYOUT & WIRING DIAGRAMS
- 444184-100-E-002 PIEZOMETER SYSTEM SCHEMATIC AND COLLECTION SUMP WIRING DIAGRAM
- 444184-100-E-003 ELECTRICAL SITE PLAN AND DETAILS

APPENDIX H

SPECIFICATIONS

- 01066 Decontamination
- 01100 Remediation Construction Requirements
- 01500 Temporary Facilities and Controls
- 01620 Safety, Health & Emergency Response
- 01720 Surveying
- 02015 Piezometer Installation
- 02070 Selective Demolition
- 02140 Construction Water Management
- 02219 Material Excavation, Staging and Disposal
- 02222 Excavation
- 02223 Backfilling
- 02226 Wick Drain Installation
- 02990 Finish Grading, Topsoil and Seeding
- 11300 Magnetic Flow Meter
- 15060 Piping and Pipe Fittings
- 16010 General Electrical Requirements
- 16120 Raceways, Boxes, and Cabinets
- 16130 Wires and Cables
- 16452 Grounding
- 16710 Piezometer Monitoring System
- 16720 Description of Operation

APPENDIX I

DURABILITY ANALYSIS

APPENDIX J

INSTRUMENTATION AND MONITORING PLAN

APPENDIX K

LIMITATIONS PACKAGE

APPENDIX L

CQAP

FIGURE 1.1

LEGEND

- HARBOR BROOK SITE
- DREDGE SPOIL AREA
- ADDITIONAL AREA OF STUDY
- WASTEBEDS

HONEYWELL
WASTEBED B/
HARBOR BROOK SITE
GEDDES AND SYRACUSE, NY

SITE PLAN

N
W E
S

0 225 450 900
Feet

Note: Original base map information obtained from O'Brien & Gere Remedial Investigation Report (November 2007), Figure 2.

PARSONS

301 Plainfield Road, Suite 350, Syracuse, NY 13212 315-451-9560

(Q:\GIS\Harbor_Brook_RI\Figure_2\SITE_PLAN.mxd)1/10/2008 -- 1:13:03 PM

Figure 3.1

Anticipated Project Schedule
Wastebed B/Harbor Brook Site
East Wall Portion of IRM

	Anticipated Duration (Working Days)	Anticipated Start - Finish
Activity		
Procurement of Steel for East Wall	**45**	**September 2010 - November 2010**
Procurement for Construction	**60**	**March 2011 - May 2011**
Steel Fabrication/Delivery	**100**	**February 2011 - June 2011**
Field Mobilization	**10**	**July 2011**
Temporary Reroute of Lower Harbor Brook (Bypass)	**30**	**July 2011 - August 2011**
Barrier Wall/Collection System Construction	**80**	**July 2011 - October 2011**

Note: Schedule for field work associated with East Wall/groundwater collection system construction is dependent on access to CSX property.

Response to March 7, 2011 NYSDEC Comments on the East Wall Portion of the Wastebed B/Harbor Brook IRM Draft East Wall 95% Design Report

General Comments

G.1 General. The final design should incorporate measures in accordance with EPA Region 2's Clean and Green policy[1] and NYSDEC's Division of Environmental Remediation Program Policy *Green Remediation* (DER-31)[2] during the construction and operation of the remedy, including but not limited to reducing idling of construction vehicles, use of renewable energy and/or purchase of renewable energy credits, and use of ultra-low sulfur diesel fuel.

Comment noted. Honeywell is currently evaluating measures that may be applicable during IRM construction and operation. These measures will be identified in the Contractor's Work Plan.

G.2 General. Summary text or a graphic should be added in the final design to illustrate the sequence of construction for all major activities.

The following text will be added to Section 2.1 of the design report:

"It is anticipated that construction will begin in May 2011 and the major elements will be completed in the following order:

1. ***Erosion and sediment control installation***
2. ***Clearing and grubbing***
3. ***Installation of the work platform***
4. ***Installation of the sheet pile barrier wall near the culvert***
5. ***Diversion of Harbor Brook, demolition of the culvert, installation of the new culvert***
6. ***Installation of the remaining sheet piles***
7. ***Installation of a groundwater collection system***
8. ***Site restoration."***

G.3 General. Is any regrading necessary or will a work bench be needed to install the wall? If so, then locations and details will need to be shown on the appropriate drawings.

Regrading is not required to install the wall or collection trench. The work platform required to install the wall will consist of a 24" gravel layer placed over the existing surface along the wall alignment. The work platform will be a maximum of 60' wide and will be place either inboard or outboard of the wall depending on the site conditions. The platform will be removed

---

[1] See http://epa.gov/region2/superfund/green_remediation

[2] See http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

following construction of the final site remedial work and the area will be restored with topsoil and vegetation. Drawing C-002 has been revised to show the work platform location and details.

G.4 General. A monitoring plan is needed that includes monitoring, repair, and/or maintenance of the temporary Harbor Brook channel structure and function.

As discussed with NYSDEC on February 8, 2011, the temporary channel will be periodically inspected for noticeable signs of erosion of the channel materials. Eroded areas will be repaired, as necessary. Given the temporary nature of the structure, a detailed monitoring plan will not be prepared. Relevant text has been added to Section 2.6.1 of the design report.

G.5 General. A presentation of all limitations on the design and construction of the East Wall inboard and outboard of the wall should be included in the final design. Although some of these limitations are discussed in various appendices and drawings, a concise summary of all limitations should be presented in a section of the report or as a separate appendix.

A summary of limitations both inboard and outboard of the barrier wall has been provided to the DEC for review and will be included in the final design package.

<u>Specific Comments</u>

1. Page 2-3, Paragraph 4, Section 2.3.4. It should be noted in the text that the imported fill material will need to meet the requirements of NYSDEC's DER-10 and the allowable constituent levels for imported fill or soil included in Appendix 5 of DER-10.

   The text has been revised accordingly.

2. Page 2-3, Section 2.3.5. As shown in the draft Wastebed B/Harbor Brook RI, pooled NAPL exists near the surface of the sediments in Lower Harbor Brook. The final design will need to include NAPL control measures (see comment 22 below) and water quality monitoring (e.g., turbidity) during all phases of construction, including but not limited to, pump arounds and the filling in of Lower Harbor Brook and the excavation of the temporary channel.

   During construction, groundwater or surface water that comes in contact with excavated material including NAPL soils will be treated as construction water. Parsons current plan is to perform visual inspection of water pumped from diversions for oil sheen or changes in turbidity as well as real-time turbidity monitoring as a minimum. Parsons will coordinate the final water quality monitoring plan with the DEC before commencement of the excavation of lower Harbor Brook and the culvert installation. The contractor's work plan will address modification of the pumping procedures if the water quality threshold values are exceeded.

3. Page 2-5, Paragraph 1, Section 2.4.3. It is stated that the bottom elevation of the barrier wall corresponds to a minimum of 3 feet into the silt and clay confining layer. Although this is correct, it should be noted here that in select sections (2C, 3A, 3B, 3C, 3D, and 3E), the depth will be a minimum of 6 feet into the confining layer to provide for additional resistance as recommended by Geosyntec in Appendix D. Please revise.

The text has been revised accordingly.

4. Page 2-5, Paragraph 5, Section 2.4.4. The statement "maximum removal depths were assumed for…" should be changed to "a removal depth was assumed for…" in the final design report. In addition, the following text from Parsons' October 6, 2010 email to NYSDEC and in response to comment 6 on the Global Stability appendix should be added to this section: "The current wall design will not prohibit deeper excavation within the Outboard Area if deeper removal is required to achieve post capping habitat elevation goals. Sequential excavation will be required within approximately 100 feet of the wall in order to mitigate potential risks associated with railroad stability and achieve anticipated removal depths. If deeper removal is required, the size of the allowable open excavation area within this footprint will be reduced."

   The text has been revised accordingly.

5. Page 2-5, Paragraphs 4 and 5, Section 2.4.4. The text discusses the need for sequential excavations to satisfy global stability requirements. It should also be noted here in the text that Geosyntec indicated that the assumed elevation of 358.5 feet could not be met near the barrier wall and recommended that tiered excavations be conducted along Sections 2A (to 363.3 feet) and 2B (to 361.8 feet) for a distance of approximately 80 feet from the wall to satisfy internal stability requirements (see Figures 14, 15, and 21 in Appendix E). Also, regarding the comment above, please clarify if the sequential excavations can be used along these two sections within 80 feet from the wall to allow for potential deeper excavations.

   Along these two sections, the allowable excavation depths are controlled by internal wall stability. Sequential excavation can be used to address global stability and/or deflections but not internal stability. Therefore, depending on the required excavation depth in these sections, a tiered excavation may be required. Section 2.4.4 has been revised to include discussion on excavation requirements.

6. Page 2-7, Paragraph 1, Section 2.5.1. The text here references the West Wall Final Design for the groundwater model which was used to estimate a groundwater collection flow rate of 7 gallons per minute (gpm) for the collection trench along the East Wall portion of the Wastebed B/Harbor Brook site. Although a total collection flow rate of 27 gpm is noted in Appendix K of the West Wall report, the estimated contribution of 7 gpm from the East Wall portion of the IRM is not presented in that appendix. Also, as those estimates were based on Version 2.0 of the regional groundwater model and Version 3.01 is the version that was conditionally approved by NYSDEC, it should be stated whether the estimated flow rates are different using Version 3.01.

   The collection system design flow rate is based on the estimated flow rates of the Honeywell Ground Water Flow Model Version 2.0 by OBG. The model results are presented in the Final Design Wastebed B Ground Water Modeling Evaluation, which was included as Appendix K of the West Wall design report. Calculated flow rates for the overall Wastebed B/Harbor Brook IRM (including both East and West Wall portions) is 27 gallons per minute (gpm) (24 gpm from the shallow fill unit and 3 gpm from the intermediate marl unit). The anticipated contribution from the West Wall collection trench alone is 20 gpm. In 2010, SSPA and OBG simulated the collection system with Honeywell Model Version 3.01. The results of the revised model show that the estimated total flow to the drain is 20 gpm for both portions of the wall. The collection system has been conservatively designed to achieve a maximum capacity of approximately 65 gpm to allow for some variance in the model predictions. Section 2.5.1 has been revised to state that the collection

trench design is based on the Version 2.0 model results.

7. Page 2-8, Paragraph 4, Section 2.5.4. It is stated that one new collection sump (CS-7) will be installed for the East Wall IRM. It should be noted, if correct, that groundwater along the East Wall west of Harbor Brook would be conveyed to the existing sump at the eastern end of the West Wall (CS-6).

   Groundwater along the East Wall will be conveyed by either the existing collection sump CS-6 or the new collection sump CS-7, which will be installed for the East Wall project. Section 2.5.4 has been revised accordingly.

8. Page 2-10, Section 2.6. Page 2-10, Section 2.6. This section needs to state that the period of time between the construction of the temporary Harbor Brook channel and the restoration of the final Harbor Brook channel will be minimized to the extent possible.

   The NYSDEC is concerned with the amount of time that would exist between the construction of the temporary Harbor Brook channel (2011) and the restoration of the final Harbor Brook channel (which appears to be proposed as 2014/2015 according to Figure 8.2 of the January 2011 Draft Onondaga Lake Capping, Dredging and Habitat Intermediate Design report). This issue needs to be discussed by NYSDEC and Honeywell in the immediate future and a detailed schedule, for the restoration of the final Harbor Brook channel and for the sequencing for the excavation and restoration of the Outboard Area, will need to be approved by NYSDEC as part of the design of the Outboard Area.

   Comment noted.

9. Page 2-10, Paragraph 2, Section 2.6. This last sentence in this paragraph states that the "existing" Harbor Brook channel will be restored to a "naturalized condition". As proposed the channel will not be in a naturalized condition. Please revise.

   Section 2.6 has been revised as requested.

10. Page 2-10, Paragraph 3, Section 2.6.1. The paragraph describes the temporary channel as "an opportunity to create an improvement over the current channel" implying that the temporary channel accomplishes this goal. However, the temporary channel does not provide an improved condition to the stream. This statement will need to be removed.

    Section 2.6.1 has been revised as requested.

11. Page 2-10, Section 2.6.1. The text discusses placement of a 3-inch layer of granular fill material following limited excavation for the temporary Lower Harbor Brook channel. There is no discussion of the need for placement of isolation cap material beneath the granular fill. According to the response to NYSDEC's September 24, 2010 comment 8 (in Appendix A of this East Wall report), the temporary Lower Harbor Brook channel would be in place for about two years. Although the concentrations of contaminants are less in the soils below a depth of 1 meter in the area of the new temporary channel as compared to the sediments in the existing channel, some of the data still exceed NYSDEC sediment criteria. Installation of a sand cap is recommended prior to placement of the granular fill to minimize mixing during placement of the granular fill and for contaminant isolation during the 2-year period.

Response to March 7, 2011 NYSDEC Comments on the East Wall Portion of the Wastebed B/Harbor Brook IRM Draft East Wall 95% Design Report

As discussed with Tracy Smith of NYSDEC on April 13, 2011, the design has been revised to include a 6-inch thick layer of sand and gravel within the temporary Harbor Brook Channel.

12. Page 2-11, Paragraph 1, Section 2.6.1. The depth and cross-sectional area of the temporary channel will need to be similar to the existing channel. If the depth and/or cross-section are different then this should be noted in the design and it should be confirmed that no effects on the discharge of Harbor Brook will occur.

    The depth, cross sectional area and slope of the temporary Harbor Brook channel section are equal or greater to the existing channel's dimensions. Anchor QEA's hydraulic evaluation demonstrated that the predicted water surface elevation in the proposed culvert is either the same or lower than the existing conditions. In other words, both the existing and proposed culvert and channel have equal or greater hydraulic capacity as the existing system.

13. Page 2-12, Paragraph 1, Bullet 3, Section 2.6.2. A reference should be noted here to Drawing C-023 for the temporary diversion of Harbor Brook around the work area during demolition of the existing culvert and construction of the new culvert. The contractor work plan will need to include the items identified in the Notes on Drawing C-023.

    Comment noted. A reference to Drawing C-023 has been added as requested.

14. Page 2-13, Paragraph 3, Section 2.6.3. The text states that "the final hydraulic design of the proposed culvert and channel is not yet determined." This section should further state when and how the final hydraulic design will be determined and how this may change the culvert and channel details provided in the document.

    The referenced text has been removed.

15. Page 2-15, Paragraph 1, Section 2.8. This section states that the total wetland expected to be affected is 2.3 acres which is the same acreage expected before the alignment of the wall was modified (as discussed in my September 9, 2010 email to Megan Miller of Parsons). Please provide a specific figure of the expected wall alignment in relation to the wetland delineation in the area and provide an accurate as possible calculation for the expected impacted acreage of wetland for the lakeshore area of the Wastebed B/Harbor Brook site. It should be stated that the impacted acreage of wetland will be mitigated at a 2:1 ratio outboard of the wall and at the Wastebeds 1-8 mitigation wetland.

    The 2.3 acres stated in the December 2010 draft 95% design submittal is not accurate. These areas have been recalculated and are shown on attached Figure RTC-15.

    Based on the original wall alignment (June 2010), the portion of wetland W1 that would have been affected was 1.11 acres. The current wall alignment affects an additional 0.35 acres over the original wall alignment. Mitigation of wetlands affected by construction of the barrier wall is covered under the Wastebeds 1-8 IRM design by O'Brien and Gere. Section 2.8 has been revised to more accurately quantify area of wetlands affected.

16. Figure 3.1. The finish date in the "Procurement for Construction" row should be changed from January 2010 to 2011.

The schedule has been revised accordingly.

17. Appendix F, Page 4, Paragraph 2 (continued on page 5). It is stated that the location of Lower Harbor Brook and Culvert #1 were modified to align with the Onondaga Lake remedy. It should be noted that the Lower Harbor Brook channel that was modeled is the temporary channel for the Wastebed B/Harbor Brook IRM and the final channel, to be designed as part of the Onondaga Lake restoration and Outboard Area remedy, may have a different alignment.

    Anchor QEA will submit a revised version of the Hydraulic Analysis of Harbor Brook memorandum with the Final Design. The text will be revised as suggested in the final version.

18. Appendix F, Page 9. Model simulations were conducted for typical (median) flow conditions and various return-interval flow events up to a 100-year event. Although this is acceptable for the temporary channel, low-flow conditions (water level of 362.0 feet) should also be modeled for the permanent channel in a future report as was done for Lower Ninemile Creek to ensure that the final bathymetry in Lower Harbor Brook meets the minimum water depth requirements during summer low-flow periods to satisfy habitat restoration design goals for the area.

    The permanent channel is being designed as part of a separate IRM program, and it will be modeled once the design of the permanent channel is completed and approved.

19. Appendix F, Page 14, Paragraph 1 and Figure 6. The text discusses and the figure presents a comparison of predicted water surface elevations during the 100-year flow event based on existing and proposed conditions. In Figure 6, the bed elevation profile line shown is existing conditions. The bed elevation profile line that was used to model future conditions should also be shown. It should be confirmed that the model for proposed conditions was based on the sections for the new temporary channel as shown on Drawing C-024.

    The current model does include the channel geometry shown on Drawing C-024. Anchor QEA will submit a revised version of the Hydraulic Analysis of Harbor Brook memorandum with the Final Design. The figure will be revised to include both existing and proposed bed elevation in the final version of the memorandum.

20. Appendix F, Page 17, Paragraph 3, Sentence 4 (continued on page 18), Summary. It is indicated that coarse gravels should be used as channel bed substrate to resist erosion (under the 100-year event) in each reach of Harbor Brook and the drainage ditches. However, based on the results presented, this does not appear to be correct for the Wastebed D/E Drainage Ditch, Railroad Drainage Ditch #1, and Railroad Drainage Ditch #2. Also, since an isolation cap is not a component of the remedy in the upstream ditches and in the various reaches of Harbor Brook, a discussion of stable particle sizes for the 1-year, 5-year, and 10-year events should also be presented in this summary.

    Work in the Wastebed D/E Drainage Ditch, Railroad Drainage Ditch #1, and Railroad Drainage Ditch #2 will occur as part of the Upper Harbor Brook remediation project designed by O'Brien & Gere (OBG). OBG selected substrate materials for the ditches to have larger particle sizes than the minimum stable particle sizes that were determined by HEC RAS model calculations performed by Anchor QEA. These minimum stable particle sizes are calculated based upon 0% scour at maximum water velocity. OBG selected the design materials to provide a higher factor of safety than the 10% inherent in the modeling, to resist erosion under the maximum velocity calculated,

and to ensure placement of the materials at the correct locations during restoration. The channel bed substrate particle sizes provided in the design of the brook and ditches are based on locally available imported materials. It is anticipated that the void space within the gravel will fill in with sediment over time resulting in a channel lining with a more well-graded composition. Parsons has taken a parallel approach for the design of the temporary Lower Harbor Brook channel lining. A summary of the stable particle sizes for the various ditches and Harbor Brook for the 1-year, 5-year, and 10-year events will be added in the summary as suggested. Anchor QEA will submit a revised version of the Hydraulic Analysis of Harbor Brook memorandum with the Upper Harbor Brook Final Design Report (OBG).

21. Appendix G, Drawing C-001. In Note 6, the reference to Drawing C-030 appears to be incorrect. Please revise.

    Drawing C-030 has been revised to show the survey benchmark established by Thew Associates.

22. Appendix G, Drawing C-002. Silt/turbidity curtains and absorbent booms should be used in Lower Harbor Brook to minimize impacts on the lake. In addition, the vegetation clearing outboard of the wall appears excessive (80-110 ft). The notes (on Drawing C-016) indicate that the cleared areas will be grubbed with no provision made for preserving root mass where only clear sight lines are needed. Also, removed trees and shrubs inboard of the wall will need to be replaced.

    Per discussion with Ellen Hahn (DEC) on April 27, 2011, a turbidly curtain is not preferred for the location. Drawing C-002 has been revised to show a reduced clearing area. The current area of disturbance is less than 5 acres. The majority of the work platform area shown in Drawing C-002 is a low quality wetland covered with phragmites and other weed grasses. For most of the work platform area, the gravel bed will be placed directly over the phagmites and clearing of woods is not required. It is estimated that a total of 2 acres of clearing will be required within the temporary work platform Drawing C-002 and an additional 2 acres of clearing will be required in the Stockpile Area shown on C-030. Grubbing will only be required if needed for installation of the barrier wall and collection trench. Final site restoration including replacement of vegetation and trees will be included in the final site restoration plan for the Outboard Area IRM

23. Appendix G, Drawing C-004. Note 3 does not specify the distance that vehicles are not allowed inboard of the wall. Note 8 does not specify the distance stockpiles are allowed inboard of the wall. Please revise.

    Vehicles and stockpiles are not allowed inboard of the wall between the wall (Section 2) and railroad during the outboard excavation/dredging. Note 3 and Note 8 on Drawing C-004 have been revised accordingly. Also, see response to Comment 24 for additional information regarding vehicle access.

24. Appendix G, Drawings C-005 and C-006. Note 2 states that vehicles are not allowed between the tracks and wall during outboard area excavation. Is there a limit on the vehicle size? Does this include CSX truck traffic and/or other vehicles? Please provide additional information/clarification.

    During outboard area excavation/dredging, special vehicle access to the area between the tracks and the wall will be provided on a case-by-case basis. Discussion with CSX regarding their needs and limitations is currently in progress.

25. Appendix G, Drawing C-007. Note 3 should specify use of engineered fill for existing Harbor Brook, as is indicated on Drawing C-024.

    The note has been revised accordingly.

26. Appendix G, Drawing C-019A. In Note 4, does "excavated natural material" come from an off-site source or does this refer to soil excavated on-site as part of this work? Please clarify.

    Note 4 on Drawing C-019A will be revised to specify use of engineered fill for backfilling the trench excavated for culvert installation.

27. Appendix G, Drawing C-022. The bathymetry survey used for the bottom elevations of the brook in these sections should be specified.

    Bathymetry of the existing Harbor Brook was generated using transect data collected by R. M. Rybinski, L.S. in April 2010. Drawing C-022 has been revised to include the reference.

28. Appendix G, Drawing C-023. Note 2 under Phase 2 indicates that the design storm flow for the diversion pumps are to be presented in the contractor's work plan. This design flow will need to be specified in the final design report.

    The subcontractor is required to provide diversion pumping up to maximum capacity of 17 cfs (7,600 gpm). Drawing C-023, Note 2 has been revised accordingly.

29. Appendix G, Drawing C-023, Phase 3. It is indicated on page 2-12 that a significant amount of sediment was found inside the culvert. The handling of sediments during culvert demolition will need to be discussed.

    Excavated sediment and fill material generated from the culvert demolition will be stockpiled onsite in accordance with Drawing C-030. Material with high water content will be segregated within the stockpile area until it can be more easily handled.

30. Appendix G, Drawings C-023, C-024 and C-026. The details regarding the backfilling of Harbor Brook need to be more specific regarding the purpose of the backfilling, the final elevation for the backfill, the substrate to be used for the backfilling (as discussed above, a specification for "engineered fill" will need to be provided), and the final condition after backfilling (e.g., plantings/vegetation). If filling in the old channel is needed for stability this should be noted.

    The backfill of Harbor Brook is required in accordance with the design of the wall, see Drawing C-007, note 3. The channel will be backfilled up to the existing grade elevation in accordance with Specifications for Earthwork Section 2.05. Backfill material will consist of Engineered Fill in accordance with Section 2.5 of the specification and the upper 6" of the backfill will be covered with topsoil and seeding in accordance with Specification 02990.

31. Appendix G, Drawing C-024. The "rip-rap outlet protection detail" on this drawing is confusing and needs revision. Clarification is needed regarding the text that states "minimum depth of riprap = maximum depth of flow (downstream normal depth or discharge depth whichever is greater)." In addition, Section A includes "fill" over the end of the culvert but it appears from the design that this

section of the new culvert should be open with no top, please revise.

Drawing C-024, Detail 1: The note that called out "minimum depth of riprap….." has been removed. The riprap layer will be 18" thick as shown.

Drawing C-024, Section A: The new culvert discharges to an open channel concrete section. The section detail has been revised as suggested.

32. Appendix G, Drawing C-026. The groundwater collection trench does not extend along the eastern-most approximately 100 foot section of the wall. Please clarify.

    It was determined that extending the groundwater collection trench to the match the barrier wall termination would not be constructible due to limited site access within the property line. Termination of the trench approximately 100 feet short of the barrier wall will not impact the ability of the collection system and wall to maintain hydraulic control as intended.

33. Appendix G, Drawing E-003. The alignment of the wall is not consistent with other drawings. Please revise.

    Drawing E-003 has been revised to show the correct wall alignment.

34. Appendix H, Specification 02990, pg. 4 of 9. This section describes seeding regimes based on "upland areas", "wet/dry areas" and "wetland areas". These descriptions are rather ambiguous and it is not clear how they would be applied. A figure should be provided showing the expected locations for the application of these seed mixtures after remediation. Additionally a cover crop should be added to the application. Replacement of woody vegetation (*e.g.,* planting of live stakes) should be added in areas inboard of the wall and outside the footprint of the Wastebed B/Harbor Brook site.

    References to "upland", "wet/dry", and "wetland" are a carry-over from a previous version of the specification. The temporary Harbor Brook channel will be lined with a granular material to protect the underlying soils from erosion and seeding of the channel is not planned. Disturbed areas above the channel high water elevation will be restored with topsoil, seeding and mulch per section 2.05B of Specification 02990. Final site restoration including replacement of vegetation and trees will be included in the final site restoration plan for the Outboard Area IRM.

35. Appendix J, Page 3, Section 2.2, Instrumentation Plan. The geotechnical instrumentation focuses on measurement of lateral subsurface displacement using inclinometers to provide data relative to potential instability during excavation activities. However, because railroads are concerned about rail movement, it may be prudent to also survey and monitor top of rail coordinates and elevations to supplement the inclinometer data (with CSX concurrence).

    Top of rail coordinates and elevations will be surveyed if displacements measured by inclinometers exceed the threshold value defined by the Design Engineer (Geosyntec). As indicated in the response to Comment 37, this threshold value will be provided in the final design. Access to CSX properties shall be obtained prior to the survey. In addition, measures will be taken to protect workers' safety during the survey, as the rails are actively used.

36. Appendix J, Page 7, Section 3.2, Baseline Monitoring. It is indicated that two inclinometers and six

piezometers have previously been installed near the CSX tracks. The locations and details of these instruments should be included.

As-built locations and details of these instruments will be provided as an attachment to Appendix J. Instruments SI-20 - PZ19 and SI-22 – PZ 21 have been installed to date.

37. Appendix J, Page 8, Sections 3.4, 3.5, and 3.6, Monitoring. It is indicated that monitoring data will be reviewed by the Design Engineer to assess the impact of construction operations (sheetpile wall installation, trench excavation, and outboard dredging/excavation). However, no criteria are provided to define warning points indicating when work should be halted and/or when contingency plans should be implemented. These will need to be included in the final design.

    Criteria will be included in the final design based on the pre-construction monitoring data and the stability analysis results.

38. Appendix J, General. Discussion should be included regarding how frequently the monitoring data will be transmitted to NYSDEC and in what format they will be presented.

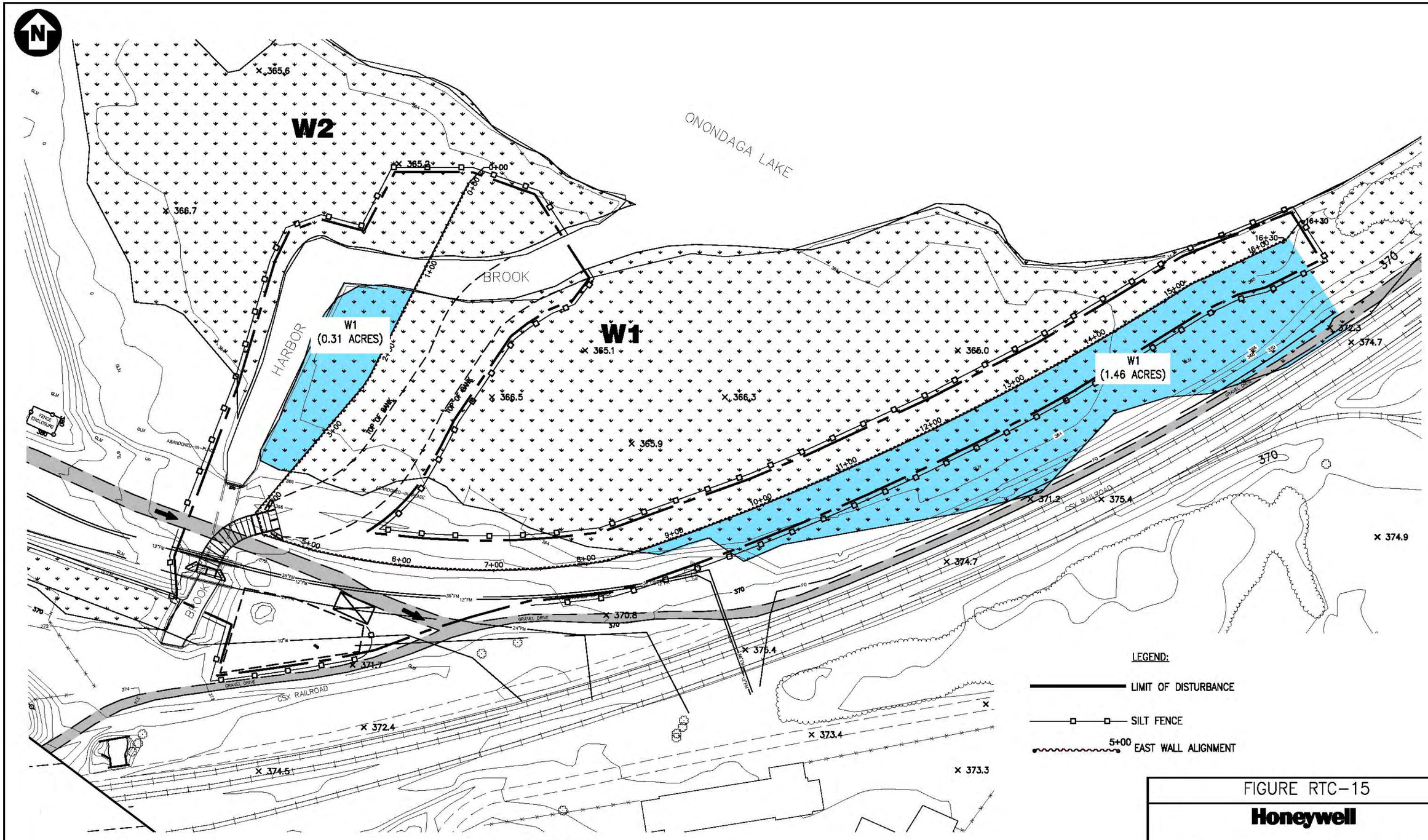
    During construction activities (i.e., sheet pile wall installation, trench installation, outboard area dredging/excavation), the applicable monitoring data will be reviewed daily by the Design Engineer. In the event of an exceedance of the criteria established in the final design, the NYSDEC will be notified and the data will be provided. This discussion will be added to Appendix J in the final design.

39. Appendix K, Page 3, Section 1.6. The last sentence discusses three collection sumps whereas the design appears to include one new collection sump. Please clarify or revise.

    The text has been revised.

40. Appendix K, Page 7, Section 3.1.1, Other Agencies. The Town of Camillus should be removed as a party of interest for this CQAP. Also, CSX should be added and the second sentence revised accordingly.

    The text has been revised as suggested.



PLAN

SCALE: 1" = 100'-0"

100 50 0 100 200

SCALE: 1"=100'

FIGURE RTC-15

Honeywell

EAST WALL AFFECTED INBOARD WETLAND AREAS

PARSONS

301 PLAINFIELD ROAD • SUITE 350 • SYRACUSE, NY 13212 • 315/451-9560
OFFICES IN PRINCIPAL CITIES

FILE NAME: P:\HONEYWELL -SYR\444184 WASTE BED B - HARBOR BROOK\10 TECH\10.1 CAD\FIGURES\444184SK001.DWG
PLOT DATE: 5/12/2011 9:11 AM PLOTTED BY: RUSSO, JILL

Response to May 10, 2011 NYSDEC Comments on the Response to NYSDEC Comments March 7, 2011 East Wall Portion of the Wastebed B/Harbor Brook IRM Draft East Wall 95% Design Report

Specific Comments

1. Comment G.5 (RTC 3-7-11). The Limitations Package (see comments below) should be included as an appendix in the final design.

The Limitations Package will be included as Appendix K in the final design package.

2. Comment 11 (RTC 3-7-11). The response refers to revising the design to include a 6-inch thick layer of sand and gravel within the temporary channel rather than 3 inches. However, the text on page 2-12 (last paragraph of Section 2.6.1) still states 3 inches. The text should be changed to be consistent with the response.

The text in Section 2.6.1 has been revised.

3. Page 2-14. The section number should be changed from 2.6.4 back to 2.6.3.

The section number has been revised.

4. Comment 15 (RTC 3-7-11). As per the last sentence of the comment, the text here should state that wetland mitigation for these impacts will take place at the Wastebeds 1 through 8 site.

Section 2.8 has been revised to state that wetland mitigation for these impacts will take place at Wastebeds 1 through 8 by OBG.

5. Comment 15 and Figure RTC- 15 (RTC 3-7-11). On page 2-1, Section 2.8, the revised text refers to 0.31 acres in Wetland Area W2. However, this area as shown on the figure is part of Wetland W1 east and south of Harbor Brook. In addition, the wetland area behind the wall along stations 0+00 to 1+00 in Wetland W2 west and north of Harbor Brook should also be included as part of the East Wall impact area if it is not already included with the West Wall impact area. Also, if the remedy results in the loss of wetlands in an area immediately outboard of the wall, then that area should be estimated and included in the impact area.

The area shown on the Figure RTC-15 that totals 0.31 acres is actually part of Wetland Area W1. The wetland area behind the wall between station 0+00 and 1+00 is included in the West Wall impact area. The remedy will impact the wetland immediately outboard of the wall however; the outboard area mitigation is addressed under the Outboard area IRM.

6. Comments 17 through 20 (RTC 3-7-11). Although the responses to these comments on Appendix F are acceptable, the revised version of Appendix F was not provided for review.

The Hydraulic Analysis of Harbor Brook (Appendix F), will be revised by Anchor QEA and will be submitted with the final design.

7. Comment No. 38 (RTC 3-7-11). It is indicated that monitoring data will be provided to NYSDEC only in the event of an exceedance of the criteria to be established in final design. Monitoring data should be provided to NYSDEC on a periodic basis (i.e., weekly), regardless of whether an exceedance has occurred. A weekly summary of the data similar to what is being done for SCA air monitoring (see

attached) would be acceptable. In addition, the NYSDEC shall be notified immediately in the event of an exceedance, with submission of data within 48 hours of the exceedance.

Consistent with the geotechnical instrumentation monitoring at the SCA, we will add the following language to Appendix J:

"The Design Engineer will monitor relevant data on a daily basis during construction activities (i.e., sheet pile wall installation, trench installation, outboard area dredging/excavation). In general, this will include inclinometers, piezometers, and vibration monitors that are in the vicinity of the construction activities occurring on a given day. If unexpected conditions are identified at any time, the construction team and the NYSDEC will be notified within 24 hours; otherwise, verbal updates will be provided on a weekly basis. The raw data will be provided to the NYSDEC on a monthly basis."

Comments on Limitations Package:

1. Page 3, Paragraph 1 and Page 4, Paragraph 4. It is indicated that monitoring data will be compared to threshold values by Geosyntec. For completeness, the threshold values should be included in this document. Update the Limitations Package, as necessary, to include the threshold values, when they are finalized.

The threshold values will be included in the Limitations Package in the final design.

2. Page 3, Paragraph 3. It is indicated that monitoring data will be compared to threshold values by Geosyntec. For completeness, the threshold values should be included in this document. Update the Limitations Package, as necessary, to include the threshold values, when they are finalized.

The threshold values will be included in the Limitations Package in the final design.

3. Page 4, Paragraph 1. It is indicated that the design of sequential excavation/dredging in the East Wall outboard area will be included in a later submittal. The Limitations package should be updated, if necessary, at completion of this design task.

The Limitations Package will be updated if necessary once the sequential excavation/dredging outboard of the East Wall has been designed.

Response to May 16, 2011 additional NYSDEC Comments on the East Wall Portion of the Wastebed B/Harbor Brook IRM Geotechnical Instrumentation and Monitoring Plan

Comment 35. The document indicates that railroad track elevations will be monitored if the inclinometers indicate "any incremental movement." This is somewhat vague, and it would be preferable to assign a specific threshold value. (Page 11, Bullet 3, Section 4)

Top of rail coordinates and elevations will be surveyed if displacements measured by inclinometers installed near the toe of the railroad embankment indicate any additional movement greater than 0.1 inch during trench excavation and outboard dredging/excavation (i.e., movement in addition to that measured by the inclinometers during the baseline monitoring before the trench excavation and outboard dredging/excavation activities start). Access to CSX properties shall be obtained prior to the survey. In addition, measures shall be taken to protect workers' safety during the survey, as the rails are actively used. The text in the Plan will be revised accordingly.

Comment 36. A Pre-Construction Instrumentation and Monitoring Summary Report has been included as Attachment C. Although this report provides the boring logs and baseline data for the piezometers, inclinometers, and seismographs, an evaluation/interpretation is not included. It is stated in Section 3.3 that the data evaluations will be performed during the remedial design process and included in future design submittals. The future design submittals should be specified. If this data is to be used to establish criteria or action levels for initiating contingencies for the East Wall work (including trenches) and/or dredging along the shoreline of the lake in this area, the data evaluations/interpretations will need to be provided as soon as possible.

The criteria (i.e., threshold values for ground vibration and lateral movement of inclinometers) were established based on industrial standards and typical values generally acceptable in geotechnical engineering practice. The baseline data were reviewed in the process of establishing the criteria and compared to the established threshold values.

The monitoring data will be reviewed during sheet pile wall installation, trench excavation, and outboard area dredging/excavation. As described in the response to Comment 38 below, the NYSDEC will be updated regularly as to the results of this monitoring.

Comment 37. See # 35 above.

See response to Comment 35.

Comment 38. Data should be provided to NYSDEC on a regular basis, not only when a threshold value is exceeded. (Page 10, Section 3.8). See also comment #7 of the comments emailed to Megan Miller on May 10, 2011.

The Design Engineer will monitor relevant data on a daily basis during construction activities (i.e., sheet pile wall installation, trench installation, outboard area dredging/excavation). In general, this will include inclinometers, piezometers, and vibration monitors that are in the vicinity of the construction activities occurring on a given day. If unexpected conditions are identified at any time, the construction team and the NYSDEC will be notified within 24 hours; otherwise, verbal updates will be provided on a weekly basis. The raw data will be provided to the NYSDEC on a monthly basis. The text in the Plan will be revised accordingly.

Honeywell

Prepared for

Honeywell
301 Plainfield Road, Suite 330
Syracuse, NY 13212

GEOTECHNICAL INSTRUMENTATION AND MONITORING PLAN

ONONDAGA LAKE EAST WALL PORTION OF THE WASTEBED B/HARBOR BROOK IRM FINAL DESIGN SUBMITTAL

Syracuse and Geddes, New York

Prepared by

PARSONS

301 Plainfield Road, Suite 350
Syracuse, NY 13212

Geosyntec consultants

engineers | scientists | innovators

1255 Roberts Boulevard, Suite 200
Kennesaw, Georgia 30144

Project Number GJ4387

May 2011

STATE OF NEW YORK · JOHN F. BEECH · No. 066133 · LICENSED PROFESSIONAL ENGINEER

Geosyntec consultants

TABLE OF CONTENTS

1. INTRODUCTION 1
   - 1.1 Project Background 1
   - 1.2 Purpose of Instrumentation and Monitoring Program 1
   - 1.3 Plan Organization 2

2. INSTRUMENTATION PROGRAM 3
   - 2.1 Introduction 3
   - 2.2 Instrumentation Plan 3
   - 2.3 Pre-Installation Acceptance Tests 3
   - 2.4 Instrumentation Installation 4
   - 2.5 Post-Installation Acceptance Tests 5
   - 2.6 Documentation 5
   - 2.7 Care and Handling 6

3. MONITORING PROGRAM 7
   - 3.1 Introduction 7
   - 3.2 Baseline Monitoring 7
   - 3.3 Surveying of Instrument Locations 8
   - 3.4 Monitoring during Sheetpile Wall Installation 8
   - 3.5 Monitoring during Trench Excavation 8
   - 3.6 Monitoring during Outboard Dredging/Excavation 8
     - 3.6.1 Measurement of Porewater Pressure 8
     - 3.6.2 Measurement of Lateral Movement 9
     - 3.6.3 Surveying 9
   - 3.7 Post-Capping Monitoring 10
   - 3.8 Data Management and Analysis 10

4. CONTINGENCY PLAN 11
   - 4.1 During Sheetpile Wall Installation 11
   - 4.3 During Trench Excavation and Outboard Dredging/Excavation 12

5. INSTRUMENTATION INSPECTION AND MAINTENANCE 13

REFERENCES 14

TABLE OF CONTENTS (Continued)

LIST OF ATTACHMENTS

Attachment A – Installation of Inclinometer Casings
Attachment B – Installation of Vibrating Wire Piezometers
Attachment C – Pre-Construction Instrumentation and Monitoring Summary Report

1. INTRODUCTION

1.1 Project Background

Onondaga Lake is a 4.6 square mile (3,000 acre) lake located in Central New York State immediately northwest of the City of Syracuse. Honeywell is currently working on a sediment removal and lake remediation project to restore the lake. Parsons and Geosyntec Consultants are members of the Design Team assisting Honeywell in this effort. As specified in the Record of Decision (ROD) (NYSDEC and USEPA, 2005), a major component of the selected lake remedy includes: "*Construction/operation of a hydraulic control system along the SMU 7 shoreline to maintain cap effectiveness. In addition, the remedy for SMUs 1 and 2 will rely upon the proper operation of the hydraulic control system, which is being designed under IRMs presently underway at the Semet Residue Ponds, Willis Avenue, and Wastebed B/Harbor Brook subsites to control the migration of contamination to the lake via groundwater from the adjacent upland areas.*"

The hydraulic control system of the proposed Interim Remedial Measure (IRM) for the Wastebed B/Harbor Brook (WB-B/HB) subsite consists of a hydraulic barrier wall and a groundwater collection system. The East Wall is a portion of the hydraulic barrier wall of the proposed WB-B/HB IRM and will be constructed with steel sheetpiles. The East Wall alignment extends continuously from the termination of the West Wall portion of the WB-B/HB IRM to its termination along the SMU 7 shoreline. The primary function of the East Wall is to form a hydraulic barrier to the migration of contaminated groundwater. However, the material outboard (i.e., on the lakeside) of the East Wall will be excavated or dredged as part of the remediation of Onondaga Lake and WB-B/HB. Therefore, the wall is also designed to achieve an adequate factor of safety during outboard excavation or dredging and after backfilling/capping.

1.2 Purpose of Instrumentation and Monitoring Program

To monitor performance of the East Wall and nearby structures (i.e., the existing CSX railroad and pipelines) during and after remediation activities, geotechnical instrumentation will be installed and monitored. More specifically, the purpose of geotechnical instrumentation and monitoring is to obtain data for the Design Team to: (i) evaluate whether or not the sheetpile wall is performing as expected with respect to lateral deformations; (ii) evaluate whether or not the surrounding area, including the

CSX railroad and pipelines, is performing as expected with regards to lateral deformations and porewater pressure dissipation during sheetpile wall installation, groundwater collection trench construction, and outboard dredging/excavation; and (iii) if necessary, implement timely remedial action (i.e., the contingency plan in Section 4) if monitoring data is not within the acceptable ranges. To assist in the instrumentation installation and monitoring activities, this Geotechnical Instrumentation and Monitoring Plan (referred to as the Plan) was prepared to: (i) describe the proposed instrumentation to be installed in the East Wall area; (ii) recommend procedures for instrument installation; (iii) identify requirements of instrument operation, data collection, and instrument maintenance; (iv) provide recommendations on data management and analysis; and (v) provide a contingency plan to be followed if monitoring data are not within acceptable ranges.

1.3 Plan Organization

The remainder of the Plan is organized as follows:

- Section 2 provides a description of the instrumentation program. It includes a summary of the proposed instrumentation to be installed in the East Wall area, the requirements for testing and calibration of instrument components, the recommended procedures of instrument installation, and the requirements for documentation.

- Section 3 provides a description of the monitoring program. It includes the requirements for baseline monitoring prior to the groundwater collection trench excavation, requirements for collecting reliable data during monitoring, requirements for post-capping monitoring, and recommendations regarding data management and analysis.

- Section 4 describes the contingency plan. It includes the recommended response actions for monitoring results that are not within acceptable ranges.

- Section 5 describes the instrumentation maintenance. It includes the requirements for maintenance of the instrumentation and monitoring systems.

2. INSTRUMENTATION PROGRAM

2.1 Introduction

Instrumentation will be installed in the East Wall area and field monitoring data will be collected and evaluated. The parameters to be monitored include: (i) lateral movement of the sheetpile wall; (ii) potential lateral ground movement near the CSX railroad and pipelines; (iii) porewater pressures in the subsurface soils in the vicinity of the sheetpile wall, CSX railroad, and pipelines; and (iv) ground vibrations.

2.2 Instrumentation Plan

A plan view of the proposed instrumentation locations is shown on Drawing 444184-100-C-017 titled "*Geotechnical Instrumentation Plan*," as presented in the design drawing set titled "Onondaga Lake WB-B/HB IRM East Wall Final Design Drawings" dated April 2011 and prepared by Geosyntec. The following instruments are planned to be installed:

- Twenty-four inclinometers will be installed in the ground or attached to the sheetpiles. The inclinometers will be used to evaluate the amount of lateral movement of the ground and sheetpiles.

- Ten sets of nested vibrating wire piezometers will be installed in the ground. Each set of nested piezometers will consist of three piezometers at various depths. The piezometers will be used to monitor porewater pressures in the subsurface soils.

In addition, two sets of seismographs will be installed at locations near the pipelines to monitor the ground vibration due to sheetpile driving.

2.3 Pre-Installation Acceptance Tests

Personnel responsible for installation of the instrumentation should perform pre-installation acceptance tests to ensure that the instruments and readout units are functioning properly. The U.S. Army Corps of Engineers' manual [USACE, 1995] provides a summary of items to be checked as part of pre-installation acceptance tests. According to the manual, pre-installation acceptance tests should include, but not be limited to, the following:

- examine factory calibration data to verify completeness (factory calibration and documentation should be specified);
- examine manufacturer's quality assurance inspection check list to verify completeness (quality assurance procedures and documentation should be specified);
- check cable length on slope inclinometers and piezometers, and tag numbers on each instrument and cable;
- check, by comparing with procurement documents, that the model, dimensions, materials, product performance criteria, etc. are correct;
- bend cable back and forth at point of connection to the instrument while monitoring the readout unit to verify connection integrity;
- check water pressure or humidity test components (if appropriate) for the service entity to identify leaks;
- verify that instrument reading as required compares favorably with factory reading;
- perform resistance and insulation testing, in accordance with criteria provided by the instrument manufacturer;
- verify that all components fit together in the correct configuration;
- check all components for signs of damage in transit; and
- check that quantities received correspond to quantities ordered.

2.4 Instrumentation Installation

Reliable installation of geotechnical instrumentation is a critical initial step in the instrumentation program. Each instrument has specific installation details that must be followed. General installation procedures for inclinometer casings and vibrating wire piezometers are presented in Attachments A and B of this Plan, respectively. Installation guides for inclinometer sensors (e.g., Shape Acceleration Arrays or portable

inclinometer probes) will be provided by the manufacturer and are not included in this plan.

2.5 Post-Installation Acceptance Tests

Personnel responsible for installation of the geotechnical instrumentation must demonstrate that the instrument was correctly installed and is functioning properly. A minimum of three readings should be obtained from each instrument over a short span of time (e.g., 1 hour) to demonstrate that the instrument reading can be repeated. The installation may have an effect on the parameter that is to be measured; therefore, the instrument should be allowed to stabilize (e.g., a minimum of 24 hours for piezometers) and the acceptance test repeated.

2.6 Documentation

An Installation Report should be prepared after completion of the installation of all instruments. The report should include a minimum of the following items [USACE, 1995]:

- description of instruments, readout units, and other related equipment;
- plan(s) to show as-built locations of installed instruments;
- information of subsurface stratigraphy from borings;
- instrument calibration and maintenance procedures;
- instrumentation and automation documentation from manufacturers, including calibration data and warranty information;
- pre-installation acceptance test results;
- record of instrument installation;
- post-installation acceptance test results; and
- names, addresses, and phone numbers of maintenance and repair sources.

The Installation Report should be maintained on file at the project site.

2.7 Care and Handling

All instruments should be handled carefully in accordance with manufactures' instructions to ensure satisfactory performance. Cables and tubes should be protected from nicking, bending, and kinking. Instruments should be protected with a protective housing that is provided with a vented locking cap. Protective housings should be grouted into place not only to secure the cap but also to prevent surface water from flowing into the instrument. Locations of instruments, cables, and tubes should be clearly identified. Care should be taken by contractors during the East Wall construction to prevent damage to the system by excavation, if any, and construction traffic.

3. MONITORING PROGRAM

3.1 Introduction

The stability of the East Wall and surrounding area, including the CSX railroad and pipelines, will be monitored during the groundwater collection trench construction, the outboard dredging/excavation, and for a limited period of time after capping, as determined by the Design Engineer based on monitoring results. The stability of the pipelines will be monitored during the sheetpile wall installation too. Geotechnical data collected from the instruments include porewater pressures and horizontal displacements. This section addresses the procedures and requirements for monitoring.

3.2 Baseline Monitoring

Baseline values will be established from the instruments installed in the East Wall area prior to the groundwater collection trench excavation. The baseline monitoring of piezometers and inclinometers will be performed weekly for four weeks. It will start approximately one month (or earlier) before the groundwater collection trench excavation commences to allow time for the Design Engineer to evaluate the baseline data. A second round of baseline monitoring may be required prior to the outboard dredging/excavation, as determined by the Design Engineer based on the schedule of outboard dredging/excavation.

A pre-construction monitoring program has been established for the existing CSX railroad. Two inclinometers and six piezometers near the CSX railroad were installed in advance to monitor the performance of the CSX railroad under the existing condition. Ground vibration due to train loading was monitored using seismographs as part of the pre-construction railroad monitoring. Data collected from the pre-construction railroad monitoring program were used as a baseline and reviewed in the process of establishing an acceptable range of values for measurements taken during sheetpile wall installation and outboard dredging/excavation. A pre-construction instrumentation and monitoring summary report is provided in Attachment C. Section 4 provides a discussion of actions that will need to be taken if the measurements are not within that acceptable range.

3.3 Surveying of Instrument Locations

After the installation of instruments is complete, the location (i.e., northing and easting) and the top elevation of each instrument will be surveyed. An as-built drawing will be prepared to include the field locations and elevations of the installed instruments.

3.4 Monitoring during Sheetpile Wall Installation

Ground surface vibration due to sheetpile driving will be monitored using seismographs during the sheetpile wall installation. Two sets of seismographs will be installed at locations near the pipelines that are in the vicinity of the working phase of the sheetpile wall. The monitoring will be performed continuously during the period of sheetpile driving. In addition, locations of the pipelines will be surveyed daily during the sheetpile installation. The ground vibration monitoring data and the survey results will be evaluated by the Design Engineer to assess the impact of sheetpile driving on the structural integrity of the pipelines. Based on the monitoring results, the Design Engineer may adjust the frequencies of the vibration monitoring and surveying.

3.5 Monitoring during Trench Excavation

Piezometers and inclinometers installed in the vicinity of the working phase of the trench excavation will be monitored until the trench section is backfilled. In addition, the top of the sheetpile wall near the working phase of the trench excavation will be surveyed daily during trench excavation. The piezometer and inclinometer data and the survey results will be evaluated by the Design Engineer to assess the impact of trench excavation on the stability of the sheetpile wall, CSX railroad, and pipelines. Based on the monitoring results, the Design Engineer may request modification to the trench excavation procedures, if necessary.

3.6 Monitoring during Outboard Dredging/Excavation

3.6.1 Measurement of Porewater Pressure

Piezometers will be used to monitor the porewater pressures in the subsurface soils in the vicinity of the sheetpile wall, CSX railroad, and pipelines and to confirm the dissipation of excess porewater pressures that are developed as a result of excavation or railroad traffic loading during outboard dredging/excavation. Information from the piezometers will be collected automatically using remote monitoring techniques.

3.6.2 Measurement of Lateral Movement

Inclinometers will be used to monitor the lateral movement of the sheetpile wall and potential ground movement near the existing CSX railroad and pipelines. Readings will be taken either automatically using in-place inclinometer sensors and a datalogger or manually using a portable inclinometer probe and a portable readout. In-place inclinometer sensors will be installed at selected locations of the sheetpile wall or near the CSX railroad as determined by the Design Engineer. As discussed previously, two of the inclinometers were installed in advance as part of the pre-construction railroad monitoring program.

The in-place inclinometer sensors will provide continuous, real-time data that can be used to evaluate the performance of the sheetpile wall and the CSX railroad during the outboard dredging/excavation. For other inclinometers without in-place inclinometer sensors, the lateral movement will be measured manually by a portable inclinometer probe twice a week during outboard dredging/excavation. The Design Engineer may adjust the monitoring frequency based on the observed readings. It is recommended that the same probe and control cable be used for each survey for consistency, and the manufacturer's procedures for data validation be explicitly followed.

3.6.3 Surveying

During the outboard dredging/excavation, locations and top elevations of the inclinometer casings attached to the sheetpile wall and installed near the CSX railroad and pipelines will be surveyed twice a week. In addition, monitoring points will be established at every 30 ft along the top of the sheetpile wall. If the monitoring point is within 5 ft of an inclinometer casing attached to the wall, the point can be ignored. The coordinates (i.e., northings and eastings) and elevations of monitoring points will be surveyed twice a week during the outboard dredging/excavation. The length of wall where the monitoring points should be surveyed during the outboard dredging/excavation will be determined by the Design Engineer based on field observations. Additional monitoring points, if needed as determined by the Design Engineer, will be established near the CSX railroad and will be surveyed twice a week during the outboard dredging/excavation. The survey results, together with the data from the inclinometers attached to the sheetpile wall and installed near the CSX railroad and pipelines, will be used to determine the lateral movement of the wall and potential ground movement near the CSX railroad and pipelines.

3.7 Post-Capping Monitoring

Based on the assessment of porewater pressure measurements during the outboard dredging/excavation, selected piezometers will be used to monitor porewater pressures for a period of up to one year after the East Wall area is backfilled with a cap, as determined by the Design Engineer. Interpretation of the observed readings may justify early termination of the monitoring. Remote monitoring techniques, as discussed previously, will be used for collecting information from the piezometers. It is further anticipated that monitoring of the seven inclinometers near the CSX railroad will continue for up to one year after capping. For the remaining inclinometers, monitoring will continue at selected locations as determined by the Design Engineer. Measurements will be taken monthly during the first two months after capping and every two months for the next four months. The Design Engineer may increase the frequency of monitoring or extend the period of monitoring based on the actual readings as they relate to the stability of the sheetpile wall, the CSX railroad, and the pipelines.

3.8 Data Management and Analysis

Management of data consists of data collection, reduction and processing, and presentation. The instrumentation manufacturers provide tools (i.e., hardware and software) to automatically retrieve the data from a data logger or a portable readout, interpret the data, and plot the data graphically as a function of time. The Design Engineer will monitor relevant data on a daily basis during construction activities (i.e., sheet pile wall installation, trench installation, outboard area dredging/excavation). In general, this will include inclinometers, piezometers, and vibration monitors that are in the vicinity of the construction activities occurring on a given day. Based on the evaluation, the Design Engineer may request more frequent measurements or additional instruments. If unexpected conditions are identified at any time (i.e., instrument measurements are not within the range of acceptable values as defined in Section 4), the construction team and the NYSDEC will be notified within 24 hours; otherwise, verbal updates will be provided on a weekly basis. The raw data will be provided to the NYSDEC on a monthly basis and summarized in the weekly meeting minutes. The verbal updates during the weekly meetings will include information on instrument status (i.e., proper functioning) and inclinometer movement.

4. CONTINGENCY PLAN

The following criteria will be used to assess whether a contingency plan needs to be implemented.

- If the measured peak particle velocity of the ground near the existing pipelines is greater than 0.5 inch/sec, the contingency plan described in Section 4.1 will be implemented.

- If the measured deflection at the top of the sheetpile wall exceeds 3 inches, the frequency of the monitoring and surveying will be increased as determined by the Design Engineer. If the measured deflection at the top of the sheetpile wall exceeds 5 inches, the contingency plan described in Section 4.2 will be implemented.

- If the inclinometers installed near the toe of the railroad embankment indicate any additional movement greater than 0.1 inch during trench excavation and outboard dredging/excavation (i.e., movement in addition to that measured by the inclinometers during the baseline monitoring before the trench excavation and outboard dredging/excavation activities start), the contingency plan described in Section 4.2 will be implemented, and the railroad tracks will be surveyed at a frequency as determined by the Design Engineer. Access to CSX properties shall be obtained prior to the survey. In addition, measures shall be taken to protect workers' safety during the survey, as the rails are actively used.

4.1 During Sheetpile Wall Installation

The contingency plan for the pipelines during sheetpile wall installation includes the following steps:

- suspend the sheetpile driving;

- visually inspect the pipelines for any signs of displacement;

- modify the sheetpile driving procedure to reduce the vibration and strengthen the pipeline support; and

- if damage to the pipelines (e.g., cracks and leaks) is noticed, follow the emergency procedures in the Project Safety Plan and contact the County (i.e., the pipeline owner).

4.2 During Trench Excavation and Outboard Dredging/Excavation

The contingency plan during the trench excavation and outboard dredging/excavation includes the following steps:

- suspend outboard dredging/excavation or trench excavation and backfill the excavated area to the design grade;
- visually inspect the ground for any signs of cracks or bulges in the vicinity of the sheetpile wall, CSX railroad, and pipelines;
- ensure that all monitoring equipment is working properly and replace components if they are found to be defective;
- increase the frequency of readings to monitor and provide data to further evaluate the situation; and
- should excessive movement rate continue after the outboard area or trench has been backfilled, implement additional measures (e.g., construction of a toe-buttress soil berm), as needed.

The selected solution to address the potential stability problem will be executed with concurrence of Honeywell, the NYSDEC, and the Design Engineer.

5. INSTRUMENTATION INSPECTION AND MAINTENANCE

Regular inspection and maintenance should be performed to ensure that the instrumentation systems remain in a satisfactory operating condition during their service lives. The maintenance should be performed in accordance with the manufacturer's procedures. General requirements for the maintenance of the major components of the instrumentation system are discussed below:

- *Portable readout units*: Portable readout units should be protected from mishandling. The units should be kept clean and dry and checked routinely for damage. Batteries should be replaced as needed. In addition, the units should be recalibrated regularly following the manufacturer's instructions or returned to the manufacture for calibration, adjustment, and/or repair.

- *Retrievable components*: Retrievable components, including in-place inclinometer sensors, wires, tubes, cables, data loggers, data controllers, and communications systems should be protected from rodents, vandals, and transient voltage surges. All plugs, caps, and covers should be maintained in good condition.

- *Embedded components*: Embedded components are normally inaccessible and maintenance is not possible. Embedded components that are accessible, such as inclinometer casings, can be inspected by downhole video cameras to determine if maintenance is required, on an as-needed basis.

Any maintenance, recalibration, or replacement should be documented and reported to the Design Engineer. Follow-up checks should be made to verify the effectiveness of maintenance.

REFERENCES

New York State Department of Environmental Conservation (NYSDEC) and United States Environmental Protection Agency (USEPA) Region 2. 2005. *Record of Decision*. *Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site*. July 2005.

U.S. Army Corps of Engineers (USACE). "*Instrumentation of Embankment Dams and Levees*", Engineering Manual 1110-2-1908, Washington DC, 30 June 1995.

Geosyntec consultants

Attachment A
Installation of Inclinometer Casings

The installation procedure for inclinometer casings should be in accordance with the specific manufacturer's instructions. Since the piezometers will be installed with the inclinometer casing, the procedure should also be in accordance with Attachment B. The installation procedure generally includes the following steps:

1. Stake out specified installation locations, which can be performed using a hand-held GPS unit. It should be noted that the as-built locations of the installed inclinometer casings should be obtained by a licensed surveyor. Surveying activities should be completed in accordance with the appropriate New York State rules and regulations.

2. Double case borings by installing a 7-inch flush joint outer casing using either spin and wash or drive and flush methods to approximately 5 ft into the Silt and Clay layer (i.e., 50 to 60 ft) to protect the deep zone from any potential impacts from the shallow zone. Install casing and seal with bentonite prior to commencement of drilling through the casing. Following outer casing installation, install a 6-inch casing through the outer casing to terminal depth (approximately 90 ft). During drilling, perform standard penetration test (SPT) sampling at 5-ft intervals to characterize the subsurface soils, if no existing borings are located within 20 ft of the borehole. Log and classify samples in the field.

3. Place a threaded cap on the bottom of the lowest section of inclinometer casing pipe to keep the inside of the casing dry and to keep sand from clogging the casing.

4. Place a pipe clamp on the top of the casing, and manually lower this first section inside of the borehole. Install another pipe clamp on top of the second section of casing. Attach this casing to the top of the casing in the borehole. Remove the lower pipe clamp, and slowly lower the casing. This procedure of clamping and incrementally adding and lowering the rigid inclinometer casing inside the borehole continues until the casing rests on the bottom of the borehole. Tape piezometers to the inclinometer casing with the filter end up at the appropriate depths, as discussed in Attachment B.

5. Backfill the borehole with grout specified by the manufacturer. Take measures to counter buoyancy during grouting and allow the grout to set.

6. Install a plug on the top section of inclinometer casing to keep foreign materials and water out of the casing.

Attachment B
Installation of Vibrating Wire Piezometers

Piezometers will be installed by the grout-in method using boreholes. The grout-in method provides a way to install multiple piezometers in one borehole together with an inclinometer casing. The installation procedures should be in accordance with the specific manufacturer's instructions, but generally applicable guidelines are as follows:

1. Stake out specified installation locations, which can be performed using a hand-held GPS unit. It should be noted that the as-built locations of the installed piezometers should be obtained by a licensed surveyor. Surveying activities should be completed in accordance with the appropriate New York State rules and regulations.

2. Double case borings by installing a 7-inch flush joint outer casing using either spin and wash or drive and flush methods to approximately 5 ft into the Silt and Clay layer (i.e., 50 to 60 ft) to protect the deep zone from any potential impacts from the shallow zone. Install outer casing and seal it with bentonite prior to commencement of drilling through the casing. Following outer casing installation, install a 6-inch casing through the outer casing to terminal depth (approximately 90 ft). During drilling, perform SPT sampling at 5-ft intervals to characterize the subsurface soils, if no existing borings are located within 20 ft of the borehole. Log and classify samples in the field. Flush the borehole with water or biodegradable drilling mud.

3. Obtain pore pressure and thermistor zero readings prior to installation.

4. Saturate the filter stone with water, in accordance with manufacturer's recommendations.

5. Check pore pressure transducer calibration with the piezometer set in a bucket of water. Obtain readings for at least two different water levels.

6. Tie the piezometer to its own signal cable and lower it, with filter-end up, into the borehole to the design elevation. If the piezometer is installed with an inclinometer casing, tape the piezometer to the casing with filter end up at the appropriate elevation. See the design drawings for elevations for each of the piezometers.

7. Nested piezometers at various depths can be installed in one borehole or separate boreholes. If multiple piezometers are installed in the same borehole, lower the deeper piezometers first. Handle the piezometers carefully.

8. Backfill the borehole with grout specified by the manufacture. Mix cement with water first, and then add the bentonite. Adjust the amount of bentonite to produce a grout with the consistency of heavy cream. If the grout is too thin, the solids and the water will separate. If the grout is too thick, it will be difficult to pump.

9. Readings taken immediately after installation will be high, but will decrease as the grout cures. Datum readings can be taken hours to days after installation, depending on the permeability of the soil.

10. Terminate the installation as specified by the manufacturer. It is important to terminate the cable above ground level in a waterproof enclosure or with a waterproof connector. Protect the installation from construction traffic and mark the location with a stake.

Attachment C
Pre-Construction Instrumentation and Monitoring Summary Report

WASTEBED B/HARBOR BROOK EAST WALL SITE ONONDAGA COUNTY, NY (SITE # D7-0008-01-09) PRE-CONSTRUCTION INSTRUMENTATION AND MONITORING SUMMARY REPORT

Prepared For:

Honeywell

301 Plainfield Road, Suite 330
Syracuse, New York 13212

Prepared By:

Parsons

301 Plainfield Road, Suite 350
Syracuse, New York 13212
Phone: (315) 451-9560
Fax: (315) 451-9570

Geosyntec consultants

1255 Roberts Boulevard, Suite 200
Kennesaw, Georgia 30144
Phone: (678) 202-9500
Fax: (678) 202-9501

APRIL 2011

SECTION 1

INTRODUCTION

This Summary Report describes the installation and monitoring of pre-construction geotechnical instrumentation at the Wastebed B/Harbor Brook East Wall Site (Site # D7-0008-01-09). The information obtained from this instrumentation will be used to support future remedial efforts at the site. Additional geotechnical instrumentation will be installed at the Site, as outlined in the final design documents.

Monitoring of the East Wall and nearby structures (i.e., the existing CSX railroad and pipelines) will be required during and after proposed remediation activities in the area. The pre-construction instrumentation installation and monitoring were conducted to establish baseline values under existing conditions. Data collected during barrier wall and outboard area construction activities will be compared to threshold criteria that are established from baseline monitoring. The scope of pre-construction geotechnical instrumentation installation work included the following:

- Advancing two borings to approximately 90 feet (ft.) in the Area of Study #1 (AOS #1) adjacent to the CSX railroad tracks at the southeast corner of Onondaga Lake.
- Installing an inclinometer casing with three vibrating wire piezometers attached to the outside of the casing at each boring location.
- Conducting baseline monitoring of inclinometers and vibrating wire piezometers under existing conditions.
- Conducting baseline vibration monitoring using seismographs under existing conditions.

Investigation activities were conducted in accordance with the Standard Operating Procedures (SOPs) provided in Appendix A of the *Onondaga Lake Pre-Design Investigation: Phase I Work Plan* (Parsons, 2005), Appendix A of the *Wastebed B/Harbor Brook IRM Work Plan Addendum Phase I East Wall Pre-Design Investigation (Phase I East Wall PDI)* (Parsons, 2008a), and the *Wastebed B/Harbor Brook East Wall Site Pre-Construction Instrumentation and Monitoring Plan* (Parsons, 2010).

SECTION 2

INSTRUMENT INSTALLATON

2.1 BOREHOLE DRILLING AND SAMPLING

Borings were advanced using a track-mounted drill rig at two locations (SI-20/PZ-19 and SI-22/PZ-21, as shown in Figure 1) to a depth of approximately 90 ft. These locations were staked using a hand-held GPS unit. The as-built locations of the piezometers/inclinometers shown on Figure 1 were obtained by using a GPS unit. To protect the deep zone from any potential impacts from the shallow zone, the borings were drilled using two casing strings. A 6-inch flush joint outer casing was installed approximately 5 ft into the silt and clay unit (i.e., approximately 60 ft below the ground surface) and sealed against the silt and clay before drilling continued through the casing. The drive and flush method was used at SI-20/PZ-19, and the spin and wash method was used at SI-22/PZ-21. Following outer casing installation, a 5-inch casing was advanced through the outer casing to a terminal depth of 90 feet. Standard Penetration Testing (SPT) was performed continuously in accordance with ASTM D1586 using a stainless steel split spoon sampler. Sample headspace was screened using a photoionization detector (PID), and the sample lithology was documented. Soil/sediment samples were physically described using the Unified Soil Classification System (USCS). Boring logs are presented in Appendix A of this report.

2.2 INCLINOMETER AND VIBRATING WIRE PIEZOMETER INSTALLATION

After each boring was completed, fiberglass inclinometer casing with vibrating wire piezometers (Geokon Model 4500) attached to the casing were installed per the manufacturer's instructions. Piezometers were installed by the grout-in method, which provides a way to install multiple piezometers in one borehole together with an inclinometer casing. The general installation procedure is as follows:

1. After drilling was complete, the borehole was flushed with water.
2. Prior to the installation of vibrating wire piezometers, pore pressure and thermistor zero readings were measured. The filter stone of the vibrating wire piezometers was saturated with water. The pore pressure transducer calibration was checked with the piezometer set in a bucket of water. Readings for at least two different water levels were measured.
3. A cap was placed on the bottom of the lowest section of inclinometer casing pipe and riveted in place to keep the inside of the casing dry and to keep sand from clogging the casing.
4. A pipe clamp was placed near the top of the casing. The casing section was manually lowered inside of the borehole. The next section of casing was attached to the top of the casing already in the borehole. The connection was sealed using putty tape provided by the inclinometer casing manufacturer. The putty tape was covered with black plastic tape, and then covered with duct tape. The pipe clamp was removed and the casing was slowly lowered into the hole. This procedure of clamping and

incrementally adding and lowering the rigid inclinometer casing inside the borehole continued until the casing rested on the bottom of the borehole. Piezometers were installed at the specified depths below ground (i.e., 20 ft, 45 ft, and 70 ft) during the installation of the inclinometer casing. The piezometers were taped to the casing with the filter-end up. The piezometer cables were attached to the casing with plastic tape at 5-ft intervals to keep the cables organized.

5. Piezometer readings were measured prior to grouting. The boreholes were backfilled with grout containing Portland cement, bentonite, and water, as specified by the manufacturer. The cement was mixed with water before the bentonite was added. The grout mix was adjusted as needed to produce a grout with the consistency of heavy cream. The inner casing was filled with clean water and the casing was held in place using the drill rig to counter buoyancy during grouting and until the grout set. Piezometer readings were taken during the grouting process.
6. Piezometer readings were taken again immediately after installation. Additional readings were taken the day after installation.
7. Prior to the installation of the inclinometer (Measurand SAA), a 1-in electrical PVC conduit was installed within the inclinometer casing. The conduit sections were connected using PVC primer and cement. A cap was attached to the bottom end to make the conduit watertight.
8. The inclinometer was installed within the 1-in electrical PVC conduit. Care was taken not to bend the inclinometer more than 45 degrees while inserting it into the conduit. Once inserted, the inclinometer was twisted back and forth 90 degrees while moving it up and down 12 inches. This motion was done to bring the inclinometer joints back into a torsion-free state.
9. The inclinometer was aligned so that the “x” marked at the top of the inclinometer was directly facing the railroad tracks. Once aligned, the inclinometer was lightly compressed to lock it in place. Rubber tape was wrapped around the top of the electrical PVC conduit and secured with a hose clamp to create a watertight seal.
10. The piezometer and inclinometer installations were completed at the surface with a PVC fitting with removable cover that had a large opening at the top to allow access for the inclinometer tools and an elbow and smaller tubing to accommodate the piezometer cables. The cables from each instrument were then run through a series of PVC pipes to a waterproof enclosure adjacent to SI-20/PZ-19. The enclosure was used to house the datalogger and a solar powered battery.

2.3 HEALTH AND SAFETY

Parsons’ Project Safety Plan (Parsons 2008b, updated April 2010) was used for this field work. Site subcontractors were required to submit a Subcontractor Safety Plan (SSP) prior to the start of field activities. Copies of the PSP, JSAs, and SSPs were maintained at the work area.

2.4 INVESTIGATION DERIVED WASTES

Excess sample material and water were containerized for subsequent characterization and disposal in accordance with SOP 1, Honeywell Contractor Handling Requirements for Investigation Derived Waste (IDW), in the *Wastebed B/Harbor Brook IRM Work Plan*

Addendum Phase I East Wall PDI (Parsons, 2008a). IDW was containerized and transported to a Honeywell program accumulation point prior to demobilization from the site.

SECTION 3

BASELINE MONITORING AND REPORTING

3.1 BASELINE MONITORING OF VIBRATING WIRE PIEZOMETERS AND IN-PLACE INCLINOMETERS

Baseline monitoring of the vibrating wire piezometers and inclinometers was performed for a period of five months after instrument installation. The vibrating wire piezometers and in-place inclinometers (Measurand SAAs) provide continuous monitoring data. These data are recorded using a data logger and are downloaded to a laptop weekly. Inclinometer data was initially recorded by the data logger every 30 seconds. After 5 weeks of 1 reading per 30 seconds, the datalogger was reprogrammed to take inclinometer readings every 10 minutes. Piezometer data was recorded by the data logger every 1 minute. The vibrating wire piezometer data (from January 2, 2011 to April 19, 2011) and in-place inclinometer data (from to October 28, 2010 to April 19, 2011) are provided in Appendix B and Appendix C, respectively.

The following observations were made on the data collected from the pre-construction monitoring program:

1. The piezometers and inclinometers are functioning properly.
2. The groundwater table varies from approximately El. 363 ft to 365.5 ft, as measured by the piezometers installed at 20 ft below ground surface (bgs). The equivalent water elevations measured by the piezometers installed at 45 and 70 ft bgs are typically 1 ft and 5 ft, respectively, higher than the measured groundwater table, indicating upward seepage through the Silt and Clay and the Marl layers. Fluctuation of the measured water elevation is likely due to the change in the lake water level.
3. The measured maximum horizontal ground movement as of April 19, 2011 is about 0.3 inch at depth of about 60 ft at the location of SI-20 as well as at depth about 10 ft at the location of SI-22. Since the curves for the measured ground movement become flat for both inclinometers after this initial measured ground movement, the movement is likely due to the voids in the sand and/or compaction of the sand backfilled between the 1-in PVC pipe for the inclinometer and the 2.75-in outer fiberglass casing.

3.2 VIBRATION MONITORING

Seismographs were installed at the site to measure ground surface vibration due to train loading. The monitoring was performed after completion of the installation of the inclinometers and piezometers and after the piezometer readings stabilized. The monitoring was conducted on December 2, 3, 4, and 13, 2010. Four Instantel® Minimate Plus™ seismographs were installed north of the railroad, starting with the nearest one approximately 35-ft north of the railroad, adjacent to SI-20/PZ-19, and then every 20-ft north thereafter (Figure 1). These data are provided in Appendix D. The seismographs were functioning properly. The general trend shows that the peak particle velocity (PPV) magnitude recorded by the seismograph decreases as the distance from the rail tracks increases.

3.3 REPORTING

The results of this instrumentation and monitoring program will be used to support the Wastebed B/Harbor Brook East Wall design and the Onondaga Lake remedial design. This letter report summarizes the data, including boring logs and data collected during monitoring. As necessary, evaluations of the data will be performed during the remedial design process and will be provided as part of future design submittals.

SECTION 4

REFERENCES

Parsons, 2005. *Onondaga Lake Pre-Design Investigation: Phase I Work Plan.* Prepared for Honeywell, Morristown, NJ. Syracuse, NY. September 2005.

Parsons, 2008a. *Wastebed B/Harbor Brook IRM Work Plan Addendum Phase I East Wall Pre-Design Investigation.* Prepared for Honeywell. February 2008.

Parsons, 2008b. *Wastebed B/Harbor Brook IRM Work Plan Addendum Phase I East Wall Pre-Design Investigation: Appendix B Project Safety Plan.* Prepared for Honeywell. February 2008. Updated April 2010.

Parsons 2010**.** *Wastebed B/Harbor Brook East Wall Site Onondaga County, NY (Site #D7-0008-01-09) Pre-Construction Instrumentation and Monitoring Work Plan.* Honeywell, Syracuse, NY. September 2010.

GEOSYNTEC CONSULTANTS

COMPUTATION COVER SHEET

Client: Honeywell **Project:** WB-B/HB IRM East Wall Final Design **Project/Proposal #:** GJ4387 **Task #:** 37

TITLE OF COMPUTATIONS **LIMITATIONS ON WB-B/HB IRM EAST WALL DESIGN AND CONSTRUCTION**

COMPUTATIONS BY:

Signature _____ 5/17/2011 DATE

Printed Name and Title: Ming Zhu, Project Engineer

ASSUMPTIONS AND PROCEDURES CHECKED BY:
(Peer Reviewer)

Signature _____ 17 May 2011 DATE

Printed Name and Title: Jay Beech, Principal

COMPUTATIONS CHECKED BY:

Signature _____ 5/17/2011 DATE

Printed Name and Title: Ming Zhu, Project Engineer

COMPUTATIONS BACKCHECKED BY:
(Originator)

Signature _____ 5/17/2011 DATE

Printed Name and Title: Ming Zhu, Project Engineer

APPROVED BY:
(PM or Designate)

Signature _____ 17 May 2011 DATE

Printed Name and Title: Jay Beech, Principal

STATE OF NEW YORK · JOHN J. BEECH · LICENSED PROFESSIONAL ENGINEER · 066337

APPROVAL NOTES: _____

REVISIONS (Number and initial all revisions)

NO.	SHEET	DATE	BY	CHECKED BY	APPROVAL

Written by:	Ming Zhu	Date:	04/14/2011	Reviewed by:	Jay Beech	Date:	04/18/2011
Client:	Honeywell	Project:	WB-B/HB IRM East Wall Final Design	Project/ Proposal No.:	GJ4387	Task No.:	37

LIMITATIONS ON WB-B/HB IRM EAST WALL DESIGN AND CONSTRUCTION

INTRODUCTION

This document was prepared to:

(i) summarize the major assumptions that were used in the engineering design for the East Wall, which is a portion of the proposed Interim Remedial Measure (IRM) for the Wastebed B/Harbor Brook (WB-B/HB) Site in Syracuse and Geddes, New York;

(ii) present the restrictions during sheet pile wall and trench installation; and

(iii) present the restrictions during outboard area dredging/excavation.

ASSUMPTIONS IN DESIGN

Interpretation of Subsurface Profiles

The subsurface profiles used in the wall design were interpreted from borings drilled at the site, as follows:

- The elevations of subsurface layer boundaries at the boring locations were obtained from information provided in the boring logs;
- The elevations of subsurface layer boundaries in areas between borings were interpreted using interpolation and extrapolation techniques; therefore, they represent the engineering estimate of the actual boundary elevations; and
- The elevations of deep subsurface layer boundaries were estimated using interpolation and extrapolation techniques and limited deep borings in the area; therefore, they may not represent the actual subsurface profiles.

Factors of Safety

For purposes of global wall stability analyses, the target FSs were selected as 1.3 and 1.5, respectively, for the interim and final conditions. In addition, the target FSs were increased

slightly to account for the effect of seepage on global wall stability, as explained in the calculation packages titled "*Seepage Analysis*" and "*Global Slope Stability Analysis*".

The proposed East Wall was considered as a temporary retaining structure because the excavation outboard of the wall will be backfilled after the lake remediation is complete. Therefore, for purposes of internal wall stability analyses, a factor of safety (FS) of 1.25 for a temporary retaining structure was applied in these analyses to reduce the calculated passive earth pressures, as explained in the calculation package titled "*Internal Stability Analysis*".

Groundwater Collection Trench

The design calculations assumed that the groundwater collection trench will be constructed behind the wall after the sheet pile wall is installed and before the dredging operations in front of the wall start. For purposes of wall stability analyses, it was assumed that the groundwater table behind the wall will have been effectively lowered by the collection trench to the design elevation (362.5 ft above mean sea level [AMSL]) when the dredging operations start. The monitoring data collected from piezometers to be installed in the vicinity of the proposed wall and drainage trench will be reviewed by Geosyntec to verify the assumed groundwater level in the wall design.

Capping Sequence

As discussed previously, the site will be capped after the lake remediation activities are complete. The wall stability analyses were performed based on the assumption that the outboard area (lake side) will be capped first, followed by the land side. Therefore, capping on the land side of the wall will not start until capping on the lake side has been completed.

Cap Configurations

Assumed cap configurations (see Figure 1) were used in the global wall stability analyses, as the final cap design was not available when the analyses were performed. After the final cap design becomes available, Geosyntec will review the cap configuration and determine if additional global wall stability analyses are needed.

RESTRICTIONS DURING SHEET PILE WALL AND TRENCH INSTALLATION

Sheetpile Wall Installation

Ground surface vibration due to sheetpile driving and culvert demolition will be monitored for the existing pipeline (i.e., the 36-inch RCCP sanitary force main) in accordance with the Geotechnical Instrumentation and Monitoring Plan (GIMP). The monitoring data will be evaluated by Geosyntec. If the measured peak particle velocity of the ground near the existing pipeline is greater than 0.5 inch/sec as specified in the GIMP, the contingency plan described in the GIMP will be implemented and NYSDEC will be notified.

Trench Installation

Soil conditions and the proximity of the CSX tracks will limit trench work as follows:

- No open trenching permitted.
- Shoring or trench boxes are to extend to grade (no sloping of side walls).
- Gaps between shoring or trench boxes and trench side walls are to be backfilled by end of work day.
- Trench is to be backfilled, as the trench box or shoring is removed, to grade.

The trench excavation will be monitored in accordance with the GIMP. The monitoring data will be evaluated by Geosyntec. As specified in the GIMP, if the inclinometers installed near the toe of the railroad embankment indicate any additional movement greater than 0.1 inch during trench excavation (i.e., movement in addition to that measured by the inclinometers during the baseline monitoring before the trench excavation starts), the contingency plan described in the GIMP will be implemented, and the railroad tracks will be surveyed at a frequency as determined by Geosyntec. Access to CSX properties shall be obtained prior to the survey. In addition, measures shall be taken to protect workers' safety during the survey, as the rails are actively used. NYSDEC will be notified if exceedances are identified.

RESTRICTIONS DURING OUTBOARD AREA EXCAVATION/DREDGING

Excavation/Dredging Depths

Since only preliminary habitat design concepts were available when the East Wall was

designed, an excavation/dredging depth to elevation 358.5 ft was assumed for the purpose of wall stability analyses. The internal stability analysis results indicate that, for Cross Sections 2A and 2B, a tiered excavation will be required to achieve this anticipated excavation/dredging depth, as shown in Figure 2. Locations of Cross Sections 2A and 2B are shown in Figure 3.

Evaluation of the global wall stability during the outboard area dredging/excavation was not included in the East Wall Final Design. Due to the proximity of the CSX tracks, sequential excavation/dredging will be performed to remove the outboard area material within 100 ft of the wall. Design of the sequential excavation/dredging in the East Wall outboard area will be included in a later submittal as part of the outboard area design.

Loading from Construction Equipment and Stockpiles

In Section 1, no vehicles will be allowed within 10 ft of the wall location from the time the excavation and dredging outboard of the wall commences to the time backfilling is completed. No stockpiles of construction or excavation material will be allowed within 200 ft of the wall location in Section 1 from the time the excavation and dredging outboard of the wall commences to the time backfilling is completed. Since the wall stability analyses in Section 1 were performed using an assumed truck loading and stockpile loading, the actual construction equipment and stockpile configurations will be reviewed by Geosyntec to determine if additional wall stability analyses are needed.

In Sections 2 and 3, no vehicles or stockpiles of construction or excavation material will be allowed inboard of the wall between the wall and railroad from the time the excavation and dredging outboard of the wall commences to the time backfilling is completed. During outboard area excavation/dredging, special vehicle access to the area between the tracks and the wall will be provided on a case-by-case basis.

Monitoring during Outboard Dredging/Excavation

The sheetpile wall, CSX railroad, and pipeline will be monitored by surveying and geotechnical instruments including inclinometers and piezometers during outboard dredging/excavation in accordance with the GIMP. The monitoring data will be evaluated by Geosyntec. The following criteria are specified in the GIMP:

- If the measured deflection at the top of the sheetpile wall exceeds 3 inches, the

frequency of the monitoring and surveying will be increased as determined by Geosyntec. If the measured deflection at the top of the sheetpile wall exceeds 5 inches, the contingency plan described in the GIMP will be implemented; and

- If the inclinometers installed near the toe of the railroad embankment indicate any additional movement greater than 0.1 inch during outboard dredging/excavation (i.e., movement in addition to that measured by the inclinometers during the baseline monitoring before the outboard dredging/excavation starts), the contingency plan described in the GIMP will be implemented, and the railroad tracks will be surveyed at a frequency as determined by Geosyntec. Access to CSX properties shall be obtained prior to the survey. In addition, measures shall be taken to protect workers' safety during the survey, as the rails are actively used.

NYSDEC will be notified if exceedances are identified.

Figures

Written by: **Ming Zhu** Date: **04/14/2011** Reviewed by: **Jay Beech** Date: **04/18/2011**

Client: **Honeywell** Project: **WB-B/HB IRM East Wall Final Design** Project/ Proposal No.: **GJ4387** Task No.: **37**

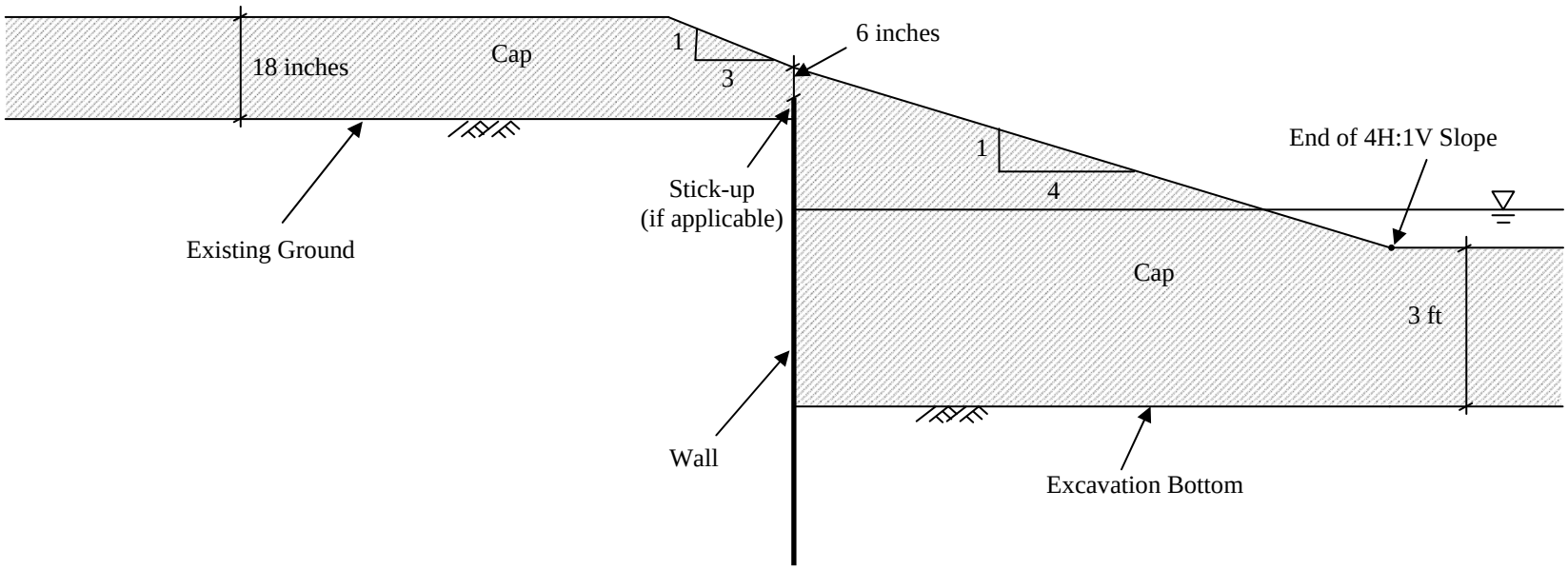


Figure 1a. Configuration of Cap at Wall Location

Notes:

[1]. Configuration of cap (i.e., thickness) was developed based on preliminary cap design concepts provided by Parsons.

[2]. The minimum elevation at top of wall was assumed at 365 ft based on information provided by Parsons. In cross sections where the original ground surface elevation at the wall location is below 365 ft, there will be a wall stickup and the 3H:1V transition slope may not apply.

Written by: **Ming Zhu** Date: **04/14/2011** Reviewed by: **Jay Beech** Date: **04/18/2011**

Client: **Honeywell** Project: **WB-B/HB IRM East Wall Final Design** Project/ Proposal No.: **GJ4387** Task No.: **37**

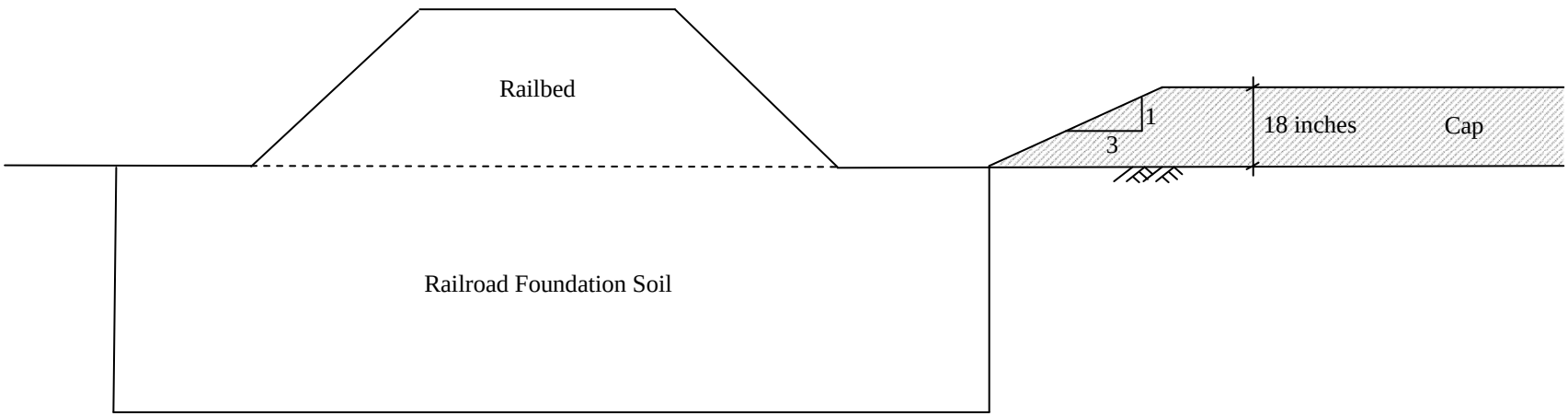
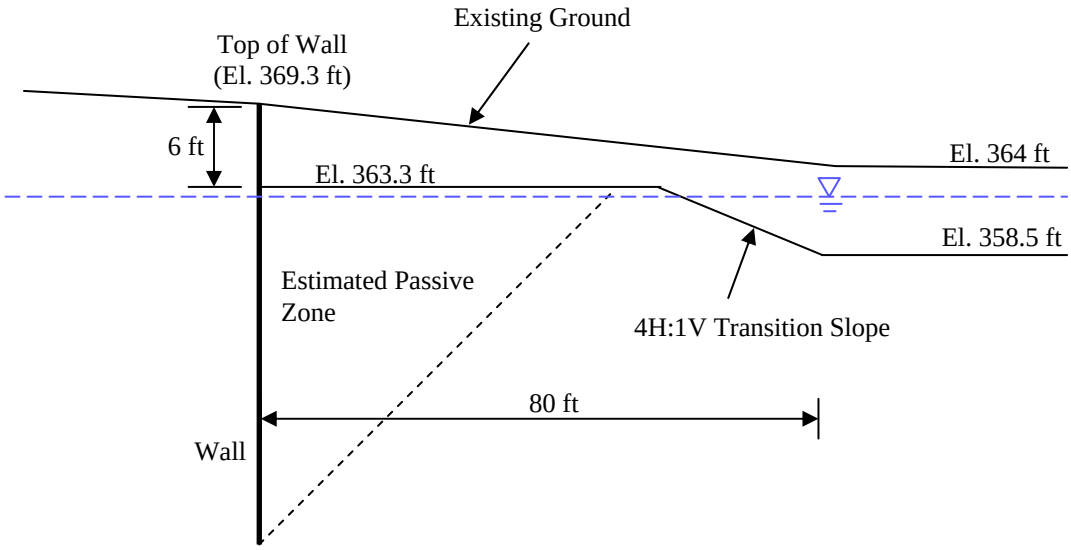
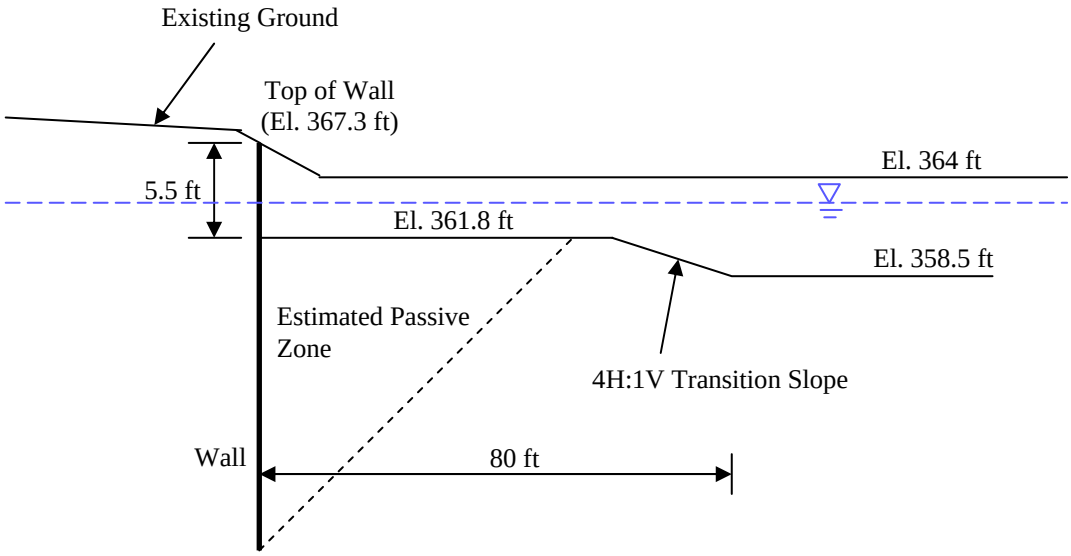


Figure 1b. Configuration of Cap near Railroad

Note:
Configuration of cap (i.e., thickness) was developed based on preliminary cap design concepts provided by Parsons.



(a) Cross Section 2A



(b) Cross Section 2B

Figure 2. Configuration of Tiered Excavation/Dredging (Not to Scale)

Written by: **Ming Zhu** Date: **04/14/2011** Reviewed by: **Jay Beech** Date: **04/18/2011**

Client: **Honeywell** Project: **WB-B/HB IRM East Wall Final Design** Project/ Proposal No.: **GJ4387** Task No.: **37**

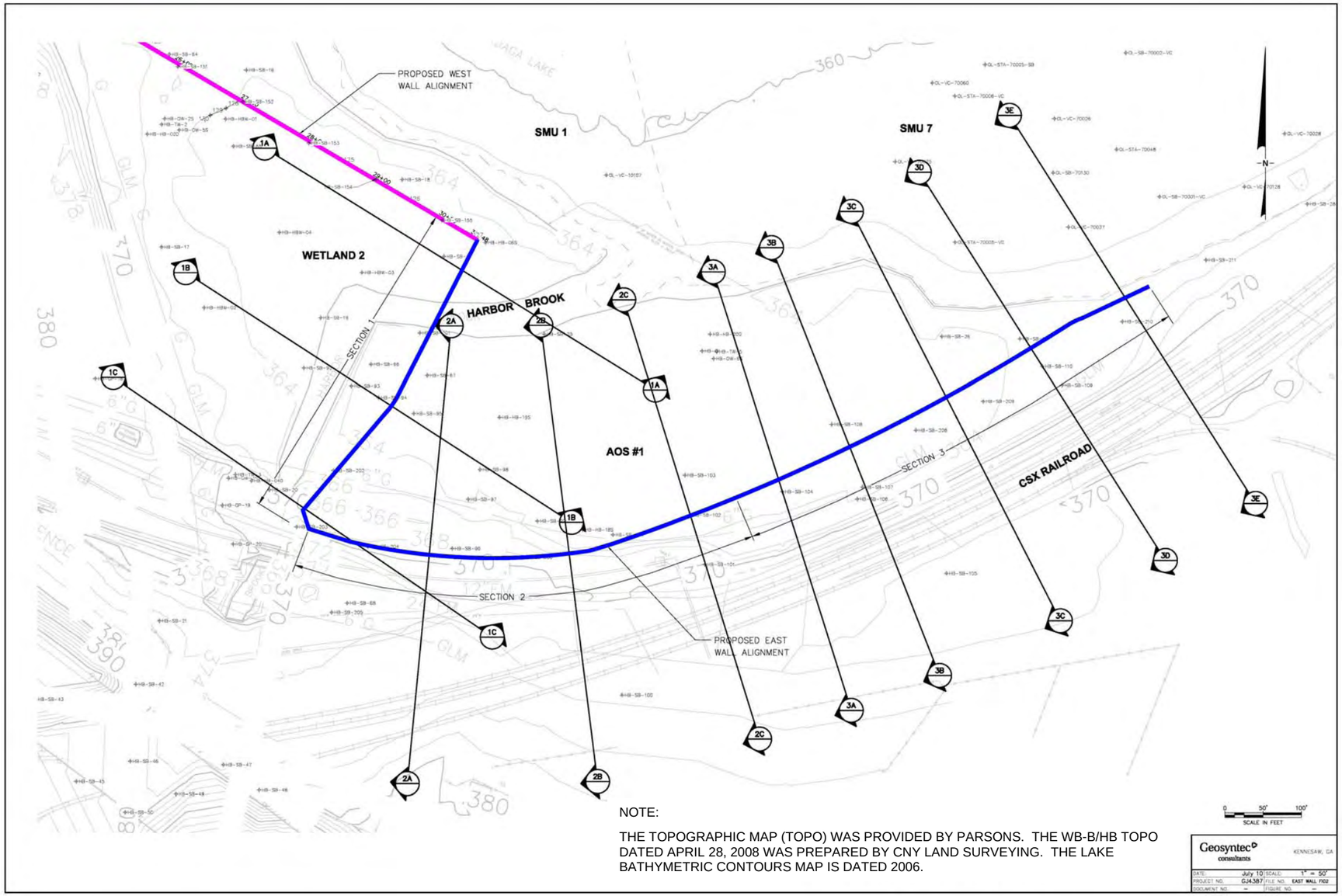


Figure 3. Proposed Alignment of East Wall and Locations of Analyzed Cross Sections

CONSTRUCTION QUALITY ASSURANCE PLAN

EAST WALL PORTION OF THE WASTEBED B/ HARBOR BROOK IRM

Syracuse, New York

Prepared for

Honeywell

301 Plainfield Road, Suite 330
Syracuse, NY 13212

Prepared by

PARSONS

301 Plainfield Road, Suite 350
Syracuse, NY 13212

Geosyntec consultants

1255 Roberts Boulevard, Suite 200
Kennesaw, Georgia 30144

MAY 2011

TABLE OF CONTENTS

Page

LIST OF ACRONYMS iv

SECTION 1 INTRODUCTION 1-1

1.1 PURPOSE 1-1

1.2 BACKGROUND 1-1

1.3 REPORT ORGANIZATION 1-2

1.4 SITE LOCATION AND DESCRIPTION 1-2

1.5 HYDRAULIC BARRIER WALL 1-2

1.6 GROUNDWATER COLLECTION SYSTEM 1-3

1.7 MONITORING SYSTEMS 1-3

1.8 CULVERT REPLACEMENT 1-3

1.9 HARBOR BROOK DIVERSION 1-4

SECTON 2 DEFINITIONS AND USE OF TERMS 2-1

2.1 DEFINITIONS RELATING TO CQA 2-1

2.2 REFERENCES TO STANDARD 2-2

2.3 UNITS 2-2

2.4 QUALITY CONTROL 2-2

SECTION 3 PROJECT MANAGEMENT 3-1

3.1 ROLES AND RESPONSIBILITIES 3-1

3.1.1 Agencies 3-1

TABLE OF CONTENTS
(CONTINUED)

Page

3.1.2 Honeywell 3-1
3.1.3 Parsons Project Manager 3-1
3.1.4 Parsons Construction Manager 3-3
3.1.4.1 Design Engineer 3-4
3.1.4.2 Certifying Engineer 3-4
3.1.5 CQA Manager 3-4
3.1.6 CQA Engineer 3-5

3.2 CHAIN OF COMMAND AND COMMUNICATION 3-5

3.3 MEETINGS 3-6
3.3.1 Construction Kickoff Meeting 3-6
3.3.2 Progress Meetings 3-6
3.3.3 Deficiency Meetings 3-6
3.3.4 Construction Wrap-up Meeting 3-7
3.3.5 Documentation 3-7

SECTION 4 CONSTRUCTION OVERSIGHT 4-1

4.1 INSPECTIONS 4-1
4.1.1 Routine Work Inspections 4-1
4.1.2 Pre-Final and Final Inspections 4-1

4.3 TECHNICAL SUBMITTAL REVIEW 4-2

4.4 DOCUMENTATION 4-2
4.4.1 Field Log Book 4-2
4.4.2 Daily Construction Reports 4-2
4.4.2 Weekly Construction Reports 4-3
4.4.3 Nonconformance Identification and Reporting 4-4
4.4.4 Photographic Documentation 4-5
4.4.5 Monthly Progress Report 4-5
4.4.6 Construction Certification Report and Record Drawings 4-5
4.4.7 Field Change Form 4-6

SECTION 5 REFERENCES 5-1

TABLE OF CONTENTS
(CONTINUED)

LIST OF TABLES

Table 3.1 Key Contact List 3-8

LIST OF FIGURES

Figure 3-1 Project Organization 3-2

LIST OF ATTACHMENTS

ATTACHMENT A CQA TESTING AND MONITORING PROCEDURES

ATTACHMENT B SAMPLE FORMS

ATTACHMENT C FIELD CHANGE FORMS

LIST OF ACRONYMS

AOS	areas of study
ASTM	American Society for Testing and Materials
CHASP	Construction Health and Safety Plan
CE	Certifying Engineer
CM	Parsons Construction Manager
CQA	Construction Quality Assurance
CQAP	Construction Quality Assurance Plan
CQC	Construction Quality Control
FRP	fiberglass reinforced plastic
IRM	Internal Remedial Measure
MQA	Manufacturing Quality Assurance
MQC	Manufacturing Quality Control
NAPL	non-aqueous phase liquid
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
PM	Parsons Project Manager
QA/QC	Quality Assurance/Quality Control
RAC	Remedial Action Contractor
ROD	Record of Decision
SHSO	Site Health and Safety Officer
USEPA	United States Environmental Protection Agency
WBB/HB	Wastebed B/Harbor Brook

SECTION 1

INTRODUCTION

1.1 PURPOSE

This Construction Quality Assurance Plan (CQAP) presents the procedures and protocols to ensure that the construction of the East Wall Portion of the Wastebed B/Harbor Brook IRM is executed in accordance with the approved design. This CQAP has been prepared on behalf of Honeywell International Inc. (Honeywell) and is based on construction specifications set forth by Honeywell and Parsons as well as Geosyntec Consultants who are the design engineer of record for the East Wall barrier wall.

1.2 BACKGROUND

The ongoing remediation of Wastebed B is being performed by Honeywell in compliance with the Waste bed B/ Harbor Brook IRM Order on Consent (Index #D7-0008-01-09) as directed by the New York State Department of Environmental Conservation (NYSDEC).

The IRM objectives, as presented in the Order on Consent, are as follows:

- Eliminate, to the extent practicable, within the scope of this IRM, the discharge of contaminated groundwater and non-aqueous phase liquid (NAPL) (and collect NAPLs, as feasible) into Harbor Brook and Onondaga Lake.
- Eliminate, to the extent practicable, within the scope of this Internal Remedial Measure (IRM), the potential human health and ecological impacts associated with site constituents of concern.
- Eliminate, to the extent practicable, within the scope of this IRM, potential impacts to fish and wildlife resources associated with on-going discharges of Contaminants of Concern from the site.

The East Wall Portion of the Wastebed B/Harbor Brook IRM or “East Wall” remedial construction includes a steel sheet pile barrier wall and groundwater collection system designed to meet the objectives of the IRM. The primary purpose of the IRM is to contain contaminants in the shallow and intermediate groundwater regimes within the site. As the groundwater collection system is anticipated to be highly effective at containment of impacted groundwater, a design objective of the barrier wall is therefore to contain impacted soils behind the wall. The East Wall barrier wall extends from the eastern terminus of the West Wall through Lower Harbor Brook and continues along perpendicular to Honeywell’s property line in between the lake and the CSX railroad line. The barrier wall has a horizontal length of 1634 ft. Sheet pile lengths vary between 45.5 and 77.0 ft. and will extend from the surface to a minimum of 3 ft. below the top of the underlying clay layer.

The East Wall Portion of the Wastebed B/Harbor Brook IRM (Final Design) Report (Parsons and Geosyntec, 2010) presents the design of the Barrier Wall and Collection Trench.

1.3 REPORT ORGANIZATION

This CQAP is organized into five sections and three attachments. The remedial action objectives, and site location and description are presented in Section 1. The definitions relative to the Quality Management System are defined in Section 2. Project management, including roles and responsibilities of the project team, chain of command, communication, and meetings is presented in Section 3. Construction oversight tasks, which will ensure construction quality, such as inspections, Quality Assurance/Quality Control (QA/QC) testing, and documentation are presented as Section 4. References are included in Section 5.

Attachment A contains Construction Quality Assurance (CQA) testing and monitoring procedures. Sample copies of construction documentation forms are provided in Attachment B. An example Field Change Form is presented as Attachment C.

1.4 SITE LOCATION AND DESCRIPTION

The Wastebed B/Harbor Brook (WBB/HB) area encompasses approximately 90-acres, which includes Harbor Brook, the Lakeshore Area, the Penn-Can Property, and the Railroad Area. Additional areas of study (AOS) have been added at the request of NYSDEC and include AOS#1 and AOS#2. AOS #1 is a wetland area situated east of Harbor Brook and adjacent to the Lakeshore area. AOS #2 is situated east of Harbor Brook and south of I-690 between Harbor Brook and the western dike of the Wastebeds D and E area.

The East Wall portion of the IRM site covers an area of 5.5 acres extending from the eastern end of the West Wall, across lower Harbor Brook and approximately 1000 ft. to the east along the property boundary.

The existing site surfaces are primary low-quality wetlands populated with vegetation such as Phragmites and other weed grasses, and a small number of trees. The site also includes a portion of lower Harbor Brook.

1.5 HYDRAULIC BARRIER WALL

The barrier wall will be constructed of hot-rolled steel sections AZ19-700 as standard double piles with the center interlock full length seal welded. Coal tar epoxy coating will be factory applied both sides of the steel sheets. The coating will extend from the top of the piles to the maximum potential outboard excavation depth (13 ft.). Sealant will be field-applied to the open sheet pile joints using the wet cure method. The top elevation of the wall ranges from 365.0 to 369.5 (NAVD 88), and the bottom elevation that generally corresponds to a minimum of 3 ft. into the silt and clay confining layer.

1.6 GROUNDWATER COLLECTION SYSTEM

The purpose of the groundwater collection system is to maintain an inward gradient from the lake via collection of groundwater in the shallow and intermediate units. In general, the collection trench runs parallel to the wall alignment approximately 10 ft. inboard. The trench includes a 6-in. diameter 0.015-in. slotted fiberglass reinforced plastic (FRP) collector pipe with a pipe invert of 358.0 (NAVD 88). Excavation of the collection trench will be completed using conventional construction methods. Trench protection measures such as trench boxes will be used to stabilize the trench excavation. Material removed from the trench excavation will be managed and stockpiled onsite. Excavated material may require dewatering onsite. Trench backfill will consist of New York State Department of Transportation (NYSDOT) Type 1, 1B and 2 coarse aggregates. Prefabricated wick drains will be installed along the groundwater collection trench alignment at 3 ft. horizontal spacing. The collection system construction also includes installation of one concrete collection sump and valve vault (CS-7) that contain a submersible pump, required hardware, and wiring.

1.7 MONITORING SYSTEMS

The barrier wall construction includes geotechnical and structural monitoring systems to measure potential movement in the sheet piles or surrounding soils. The monitoring system for the East Wall consists of thirteen instrument clusters. Each cluster consists of an inclinometer and piezometer and associated data collection instrumentation equipment.

An additional seven inline piezometers will be installed to measure groundwater as part of the monitor the performance of the groundwater collection system. These piezometers are located immediately downgradient to the collection trench at a spacing of approximately 500 ft. apart.

1.8 CULVERT REPLACEMENT

To install the proposed East Wall requires realignment of a portion of lower Harbor Brook including replacement of the existing culvert. The culvert, known as Culvert #1, is located approximately 600 ft. upstream from Onondaga Lake and is the furthest downstream structure that conveys the Brook. The existing culvert is constructed of concrete and is severely deteriorated. A gravel site access road and the above-grade sections of two buried utilities cross over the culvert. The above-grade utilities include a 36 in. RCCP sanitary force main and an adjoining parallel 12 in. abandoned gas line. Both of these utilities are supported by a shared steel truss structure on concrete footings.

In order to efficiently convey flow across the barrier wall, the proposed culvert contains both straight segments and a 56-degree curve. The culvert discharges to a 24 ft. long concrete open channel prior to crossing the wall. For ease of installation and to minimize the construction time the proposed culvert is constructed of segmented precast reinforced concrete segments. The downstream channel is also segmented concrete. The culvert and channel will be designed and certified by a precast manufacturer.

During installation of the new culvert, Harbor Brook will be temporarily diverted around the work area. Prior to installation of the new culvert, the existing culvert will be demolished in place and disposed offsite. The barrier wall will be completed in the area of the new channel penetration prior to installing the proposed culvert.

1.9 HARBOR BROOK DIVERSION

The installation of the barrier wall along the alignment requires permanent diversion of a 500 ft. portion of lower Harbor Brook. The section of Harbor Brook to be removed is located approximately 250 ft. upstream from the lake. The work consists of temporary stream diversion, excavation, backfill and slope stabilization. The objective of the channel design is to create a stabilized channel having equal or greater hydraulic capacity as the existing channel and to limit erosion of the existing channel subgrade. The completed channel will be lined with fine gravel underlain with geotextile filter fabric.

SECTON 2

DEFINITIONS AND USE OF TERMS

2.1 DEFINITIONS RELATING TO CQA

Generally, construction quality assurance and construction quality control are defined as follows:

- *Construction Quality Assurance (CQA)* - The planned and systematic means and actions that provides the permitting agency and Honeywell adequate confidence that materials and/or services meet contractual and regulatory requirements and will perform satisfactorily in service.
- *Construction Quality Control (CQC)* - Planned system of inspections and testing taken by the contractor to monitor and control the characteristics of an item or service in relation to contractual and regulatory requirements.

In the context of this document:

- CQA refers to means and actions employed by the engineer to assess conformity of the various components of the East Wall construction with the requirements of the drawings, specifications, and work plans.
- CQC refers to those actions taken by the contractor to determine compliance of the materials and workmanship of the East Wall construction with the requirements of the drawings, specifications, and work plans.

Generally, manufacturing quality assurance and manufacturing quality control are defined as follows:

- *Manufacturing Quality Control (MQC)* - A planned system of inspections that is used to directly monitor and control the manufacture of a material which is factory originated. MQC is normally performed by the manufacturer of geosynthetic materials and is necessary to ensure minimum (or maximum) specified values in the manufactured product. MQC refers to measures taken by the manufacturer to determine compliance with the requirements for materials and workmanship as stated in certification documents and contract specifications.
- *Manufacturing Quality Assurance (MQA)* - A planned system of activities that provides assurance that the materials were constructed as specified in the certification documents and contract specifications. MQA includes manufacturing facility inspections, verifications, audits and evaluation of the raw materials (resins and additives) and geosynthetic products to assess the quality of the manufactured materials. MQA refers to measures taken by the MQA organization to determine if the

manufacturer is in compliance with the product certification and contract specifications for the project.

Roles and responsibilities of the East Wall Construction Team relating to the CQA/CQC tasks are described in the next section.

2.2 REFERENCES TO STANDARD

The CQAP references to test procedures indicate that they pertain to the latest editions of the American Society for Testing and Materials (ASTM).

2.3 UNITS

In this CQAP, all parameters, properties, and dimensions are expressed in English units, unless specified otherwise. If the geomembrane manufacturer, fabricator, or installer provides SI units, a conversion to English units shall be provided. During construction, the contractor submittals, including site takeoffs, field data collection and as-built data shall be provided in English units.

2.4 QUALITY CONTROL

Sheet Piles – Honeywell will procure and deliver sheet piles to the site prior to the construction. Honeywell is responsible for insuring that MQC is performed for the sheetpiles delivered to the site. The Remedial Action Contractor (RAC) is responsible for performing QC of the installation of the barrier wall and its components

Culvert – Honeywell will procure and deliver precast concrete sections for the Harbor Brook culvert to the site prior to the construction. Honeywell is responsible for insuring that MQC is performed for the concrete delivered to the site. The RAC is responsible for performing any required QC of the installation of the culvert.

Collection Trench/Earthwork – The RAC will be responsible for procurement of all other materials and is responsible for insuring that MQC is performed for all materials delivered to the site including soil and gravel, pipe, wick drains, and all mechanical and electrical components. The contractor is responsible for QC of materials used in construction. The RAC will insure that MQC is performed for all materials installed on the site, as well as perform all required onsite QC testing. The RAC will submit results of QC testing, installation logs and data to Honeywell with the daily reports.

SECTION 3

PROJECT MANAGEMENT

3.1 ROLES AND RESPONSIBILITIES

Construction of the barrier wall and collection system is a consorted effort between NYSDEC and Honeywell. Each entity plays a key role and has responsibilities necessary to execute the project in accordance with the Record of Decision (ROD), Consent Decree, Final Design, and Contract Documents. An established chain of command is essential for communication and decisive decision making. Roles and responsibilities of the team members and agencies are described below. Key contact information is presented in Table 3.1. A project organization is provided in Figure 3.1.

3.1.1 Agencies

NYSDEC: The NYSDEC is the lead agency for the construction. The NYSDEC will designate a Project Manager for the construction. The NYSDEC's Project Manager participates in progress meetings, conducts site inspections, and provides regulatory approval for components of the remedy. The NYSDEC's Project Manager both conducts and participates in public meetings, as necessary, and is the point of contact for public questions and concerns.

OTHER AGENCIES: The United States Environmental Protection Agency (USEPA), Onondaga County, and CSX are parties of interest to the project.

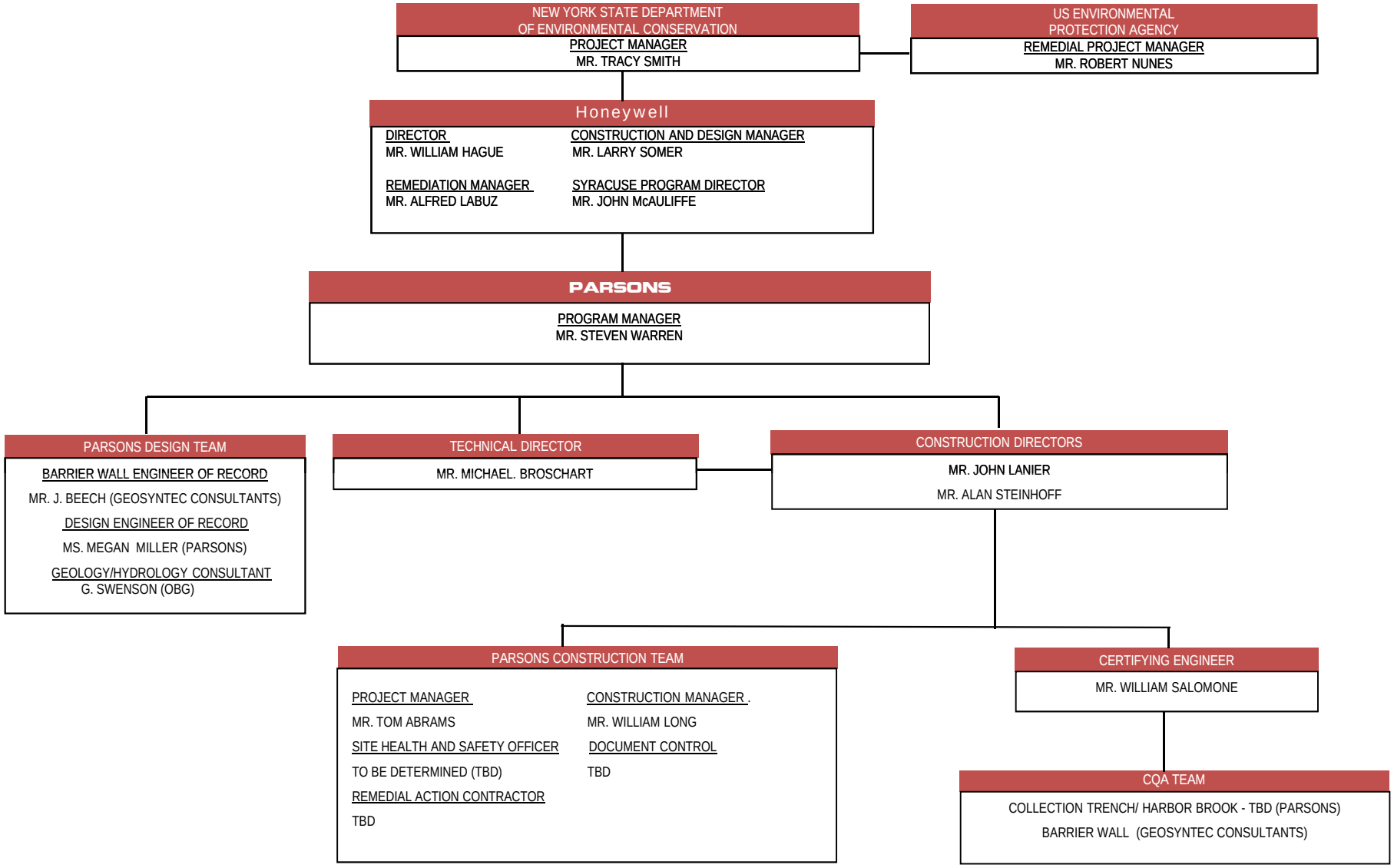
3.1.2 Honeywell

Honeywell, as the Owner, is ultimately responsible for implementing the construction in accordance with the Order on Consent (NYSDEC Index # D7-0008-01-09). Mr. John McAuliffe is Honeywell's Project Manager and direct contact with the NYSDEC. Honeywell's Project Manager attends public meetings and specific construction meetings, and reviews documents prior to submission to the NYSDEC.

3.1.3 Parsons Project Manager

Parsons Project Manager (PM) serves as Honeywell's onsite representative. The PM is responsible for ensuring that construction is completed in accordance with the Contract Documents and approved Final Design. The PM will interface directly with Honeywell, NYSDEC, the Construction Manager, the Project Engineer, and the CQA Engineer as necessary.

Figure 3.1
EAST WALL PORTION OF THE WASTEBED B/HARBOR BROOK IRM
PROJECT ORGANIZATION



The PM has the following specific duties:

- Provide centralized leadership for project activities
- Interpret and plan the overall work effort
- Communicate directly with the Construction Manager, CQA Engineer, and Project Engineer for project needs
- Ensure that QA/QC activities are conducted
- Define personnel and equipment requirements and secure resource commitments
- Orchestrate and participate in meetings as required
- Maintain overall project safety standards

3.1.4 Parsons Construction Manager

Parsons Construction Manager (CM) is responsible for completion of the construction work. The CM's project team will consist of, at a minimum, construction personnel and/or, subcontractors, and a Site Health and Safety Officer (SHSO).

The CM has the following specific duties:

- Communicate directly with the PM for project needs
- Implement onsite construction activities and direct the work crew and onsite construction personnel on daily operations
- Prepare for and attend meetings as required
- Procure, contract with, and monitor subcontractors and suppliers as needed
- Establish work budgets and schedules with milestones
- Assure that documentation is submitted to the Project Engineer as required in the Contract Documents
- Monitor the financial status of the project, negotiate change orders, and submit pay applications
- Maintain construction quality and safety standards

The full-time onsite SHSO is responsible for implementation of the Construction Health and Safety Plan (CHASP). The SHSO has the following specific duties:

- Ensure that site personnel possess necessary training and medical surveillance
- Conduct daily safety meetings with the workers
- Establish work zones and relocating zones as necessary

- Determine personnel protective equipment requirements for specific work tasks and order any changes based on work area monitoring data
- Ensure work is performed in compliance with the HASP and applicable regulations
- Implement air monitoring program and report data
- Perform routine safety inspections
- Report and investigate accidents or incidents

The CM is responsible for obtaining a surveyor to determine the lines and grades required to control the work during the construction. The project surveyor shall be a licensed Professional Land Surveyor in the state of New York, who will sign and seal survey record drawings.

3.1.4.1 Design Engineer

The Design Engineer will provide engineering support as needed and review construction submittals that require engineering interpretation. The Design Engineer will be a New York State licensed Professional Engineer. The Design Engineer is also responsible for the instrumentation (i.e., piezometers, settlement cells, settlement profilers, and inclinometers) associated with the barrier wall. If modifications to the approved Final Design are necessary, approval by the Design Engineer is required.

The Design Engineer for the East Wall and associated geotechnical/structural monitoring systems is Dr. Jay Beech, P.E. of Geosyntec Consultants (Geosyntec). Parsons is the Design Engineer for the collection system.

3.1.4.2 Certifying Engineer

The Certifying Engineer (CE) is responsible for certifying that the construction is performed in accordance with the design. The CE will be a New York State licensed Professional Engineer. The CE will have an independent line of reporting, separate from the CM. The CE will conduct routine inspections, and communicate with the PM, the CM, and the Project Engineer on a day-to-day basis. The CE, or representatives, should be onsite full-time during construction. Daily reporting will include a daily summary report, field logs, photographic documentation, and, if necessary, reports of problem identification and corrective measures taken.

3.1.5 CQA Manager

The CQA Manager is responsible monitoring that the construction, installation, and QC performed by the contractor is completed in accordance with the design. The CQA is responsible for observing the QC, and documenting daily construction work, monitoring the compliance of delivered materials, and confirming that workmanship is in accordance with the requirements of the drawings and specifications as well as conducting CQA testing (or working with independent testing subcontractor).

The CQA Manager serves as an onsite representative of the Certifying Engineer. The CQA Manager or the CQA Managers representative will be onsite full-time during construction and will perform the following:

- Observe and document the construction activities
- Observe and review the CQC procedures and documentation as provided by CM
- Completing QA activities as described in the specifications including, monitoring, and documenting daily construction work, monitoring the compliance of materials, and confirming that workmanship is in accordance with the requirements of the Drawings and Specifications
- Perform onsite and offsite QA testing and documentation of materials as required
- Perform additional QA testing, if required by the CE and/or Honeywell
- Conduct routine inspections, document the work, and communicate with the PM, the CM, and the CE on a day-to-day basis
- Complete a daily summary report, field logs, photographic documentation, and, if necessary, reports of problem identification and corrective measures taken
- Maintain record drawings (redlines) tracking approved design changes or field changes

3.1.6 CQA Engineer

As the design engineer of record for the barrier wall, Geosyntec Consultants will appoint a CQA Engineer to be onsite full time during the installation of the barrier wall and instrumentation. Geosyntec's CQA Engineer will document that the sheet pile wall is constructed in accordance with the design and QC procedures and will act as a liaison between the CM or CE and the design engineer of record. The CQA Engineer will identify and report any potential issues related to the construction of the wall with the CM and the CE.

3.2 CHAIN OF COMMAND AND COMMUNICATION

The NYSDEC is the lead agency for the IRM. Parsons and its subcontractors will prepare a Construction Work Plan prior to the start of construction for approval by the NYSDEC. Construction cannot commence until the East Wall Construction Work Plan is approved by the NYSDEC.

Once approved and the work starts, Honeywell ultimately controls the work in terms of its contractors, the project schedule, sequencing, and means and methods as long as the work is conducted in accordance with the approved design.

The chain of command onsite starts with the PM. Issues or concerns from the NYSDEC will be channeled through the PM. During construction, the PM will be in direct communication with the NYSDEC and Honeywell's Project Manager. To minimize confusion and

miscommunication, NYSDEC, other agencies, and the media will not communicate directly with PARSONS or subcontractors.

NYSDEC, Honeywell, the PM, or any other project personnel may immediately stop work if a condition is observed that threatens the safety of an onsite worker. However, if the work is being conducted safely and in accordance with the approved Final Design and Contract Documents, only the PM and Honeywell have authority to stop work. NYSDEC or other agencies can communicate directly with the PM regarding a specific issue. If it is agreed by the agencies and the PM that work must be stopped to rectify the issue, the PM is to communicate directly with the CM.

Design Engineer - Modifications to the Final Design, if required, must not be made without written approval of the Design Engineer. The Design Engineer will notify the CE of all design modifications, and the CE will document the correspondence and the modifications.

The CQA Manager and CQA Engineer reports to the CE and is considered CE's field representative during construction. The CQA team will notify both the CM and the CE of any and all potential construction or design issues or proposed changes.

The CE will have an independent line of reporting, separate from the CM.

3.3 MEETINGS

3.3.1 Construction Kickoff Meeting

Following approval of the Final Design, PM is to conduct a Construction Kickoff Meeting scheduled for the Project Team. Meeting attendees include Representatives from NYSDEC, Honeywell, the CQA Engineer, Project Engineer, the Design Engineer, and the CM. At a minimum, the meeting agenda includes the planned construction activities, construction means and methods, site safety, roles and responsibilities, and should include a site walk.

3.3.2 Progress Meetings

The PM is to conduct progress meetings on a weekly basis to discuss the prior week's completed work and the next week's anticipated work. The NYSDEC representative, the PM, the CM, the CE and the CQA Manager will participate, at a minimum. The agency's issues will be raised and addressed during the meeting. One weekly meeting will be substituted by a monthly meeting for which a larger audience of Honeywell and agency personnel will be invited to participate. A brief project summary will be provided at the monthly meeting.

3.3.3 Deficiency Meetings

A special meeting will be held when and if a problem or deficiency is present or likely to occur. The meeting will be attended by the PM, the CM, the Subcontractor, the Owner's Site Representative, and other parties as appropriate. If the problem requires a design modification, the CE should either be present at, consulted prior to, or notified immediately upon conclusion of

this meeting. The purpose of the work deficiency meeting is to define and resolve the problem or work deficiency as follows:

- Define and discuss the problem or deficiency
- Review alternative solutions
- Select a suitable solution agreeable to all parties
- Implement an action plan to resolve the problem or deficiency

The Owner's Site Representative will appoint one attendee to record the discussions and decisions of the meeting. The meeting record will be documented in the form of meeting minutes and copies will be distributed to all affected parties. A copy of the minutes will be retained in facility records.

3.3.4 Construction Wrap-up Meeting

Following substantial completion of the East Wall construction, the project team will conduct a Wrap-up Meeting to discuss the final punch list, site operation, maintenance, monitoring, and project completion issues. The Construction Certification Report punch list also will be addressed at this meeting.

3.3.5 Documentation

The PM is responsible for insuring that minutes are documented and distrusted for all meetings. Meeting minutes will be entered electronically using Primavera® Contract Manager system which is accessed through the following web address:

https://pworkscm.parsons.com/exponline/logon.jsp

TABLE 3.1

KEY CONTACT LIST

NEW YORK STATE DEC

Project Manager
Mr. Tracy Smith, Project Manager
NYS Dept. of Environmental Conservation
625 Broadway
Albany, New York 12233-7015
Phone: (518) 402-9676
Fax: (518) 402-9773
Email: txsmith@gw.dec.state.ny.us

U.S. ENVIRONMENTAL PROTECTION AGENCY

Remedial Project Manager
Mr. Robert Nunes
U.S. Environmental Protection Agency, Region II
290 Broadway, 20th Floor
New York, New York 10007-1866
Phone: (212) 637-4254

HONEYWELL, INC.

Director of Remedial Design & Construction
John McAuliffe
Honeywell Inc.
301 Plainfield Road, Suite 330
Syracuse, New York 13212
Phone: (315) 552-9782
Fax: (315) 552-9780
Email: John.McAuliffe@honeywell.com

Project Manager
Al Labuz
Honeywell Inc.
301 Plainfield Road, Suite 330
Syracuse, New York 13212
Phone: (315) 552-9781
Fax: (315) 552-9780
Email: al.labuz@honeywell.com

TABLE 3.1

KEY CONTACT LIST (CONT.)

PARSONS

Project Manager
Alan Steinhoff
Parsons
301 Plainfield Road, Suite 350
Syracuse, New York 13212
Phone: (315) 451-9560
Fax: (315) 451-9570
Email: alan.steinhoff@parsons.com

GEOSYNTEC

Design Engineer
Jay Beech, P.E.
Geosyntec
1255 Roberts Boulevard, Suite 200
Kennesaw, Georgia 30144
Phone: (678) 202-9500
Email: JBeech@Geosyntec.com

SECTION 4

CONSTRUCTION OVERSIGHT

4.1 INSPECTIONS

Members of the project team will conduct site inspections at various stages of the construction to ensure consistent quality is maintained. The CE, or representatives, will conduct inspections of representative work areas on a daily basis. NYSDEC and the other agencies are free to conduct inspections during any work hour period. Inspections by the CQA Engineer, Project Engineer, and regulatory agencies are intended to augment, not replace, the Contractor's inspections required by the Contract Documents and good practice.

4.1.1 Routine Work Inspections

The CM will conduct routine inspections of specific work elements, including:

- earthwork
- sheet pile installation
- Groundwater collection system construction
- Stream diversion
- Culvert replacement
- Piezometer installation

In addition to these specific work elements, the CM will periodically inspect the overall site condition. Overall site condition items include field trailer, parking lot, access roads, soil erosion and sediment control measures, security fence/gate(s), and survey markings.

4.1.2 Pre-Final and Final Inspections

Following notification of substantial completion by the CM, the PM, CQA Engineer, the Project Engineer, and the NYSDEC inspector will conduct a pre-final inspection of the site. A final written work punchlist will be prepared by the PM and the NYSDEC inspector for submittal to the CM. The final punch list will enable the CM to understand the project completion expectations and schedule work activities, including demobilization. Once punch list items have been addressed by the CM and approved by the PM in writing, the NYSDEC inspector will conduct a final inspection. Upon written NYSDEC approval, construction activities will be considered completed and the Subcontractor will demobilize from the site.

4.3 TECHNICAL SUBMITTAL REVIEW

The CM is required to prepare a schedule of submittals and meet the submittal requirements as stated in the Design Specifications. Construction submittals will be reviewed by the Project Engineer. Submittals requiring engineering interpretation will be reviewed by the Design Engineer. Submittals required by the Consent Decree such as the Certification Report will be reviewed by the agencies.

4.4 DOCUMENTATION

4.4.1 Field Log Book

The CQA Manager and CM will maintain daily field log books for the project. Construction activities will be documented with the following details at a minimum: dates, times, weather conditions, personnel onsite, equipment used, materials used, visitors, health and safety issues, work activities completed, delays, and other construction related issues.

4.4.2 Daily Construction Reports

The CM is responsible for preparing Daily Construction Reports and submitting the reports to the Honeywell Design and Construction Manager and the Honeywell Remediation Manager on a daily basis.

The Daily Construction Report is the official record of daily production, safety, subcontractor and work hours, and, the regulatory, and quality activities of the project. Daily Construction Reports are the official record of work performance and compliance with project plans, drawings, and specifications. The report serves to determine status of the construction work by Parsons and Honeywell Management. The content and distribution procedures of Daily Construction Reports should follow the guidance provided in the Honeywell RES Management System Standard # RES-CP-DC-03.

The Site Health and Safety Manager will provide information to the CM covering the health and safety activities portions of the Daily Report. The CQA Manager will provide information to the CM covering the CQC activities, and CQA/CQC issues, if necessary.

The project team members on the Daily Construction Report distribution should note any discrepancies in the daily report to the CM. The Honeywell CM will review reports and ensure the project is being executed in accordance with the approved design and within budget and schedule.

Daily reports will be entered electronically using Primavera® Contract Manager system which is accessed through the following web address:

https://pworkscm.parsons.com/exponline/logon.jsp

Distribution of the report should be agreed to in advance by the Honeywell CM, Alliance Construction Manager and, optionally, the Honeywell Remediation Manager and Alliance

Project Manager. Posting of the report to the Honeywell e-Portal will be the responsibility of the Parsons CM. In the absence of the CM, the Parsons PM will be responsible for posting the report to ePortal.

4.4.2 Weekly Construction Reports

The CM will prepare a Weekly Construction Report in accordance with the latest version of Honeywell RES Management System Standard # RES-CP-DC-04. The Weekly Construction Report should be issued typically on a Tuesday following the week of completed construction activities. The content of the Weekly Construction Report shall, in general, follow the following outline:

- Site Resources Summary
- Health and Safety
  - Highlights
  - Inspections and Audits
  - Incidents and Near Misses
  - Infraction Notices
  - Pending Actions
- Administrative Items
  - Updated Actions/Task List
  - Minutes from Last Week
  - Submittals (Pending and Reviewed)
  - Contract Items
  - Revised Baseline Schedule (Critical Path)
- Schedule/Site Activities Review
  - Three-Week Construction Schedule
  - Contract #1 Work Accomplished
  - Contract #2 Work Accomplished
  - Scheduled Activities for Current Week
- Construction Change Orders (CCO)
- Discussion Items
  - Old Business
  - New Business

- Equipment & Materials
  - Equipment and Materials Delivered
  - Equipment and Materials Removed
  - Transportation/Disposal and Materials Summary
- Communications/Community and Regulatory Agency Relations
- Addenda to Previous Weekly Report
- Attachments
  - Three Week Schedule
  - Site Photos (six to ten typical)
  - Weekly Materials Receipt Table
  - Air Monitoring Summary
  - Other

The PM and the CM shall discuss and agree to the distribution of the report before construction begins. The CM is responsible for posting of the report on Honeywell's ePortal. In the absence of a CM, the PM shall be responsible for posting the report to e-Portal. Weekly reports will be entered electronically using Primavera ® Contract Manager. A sample Weekly Construction Report is provided in Attachment B.

4.4.3 Nonconformance Identification and Reporting

A nonconformance is defined as a material or workmanship that does not meet the specified requirements. Nonconformance identification and corrective measures reports should be cross-referenced to specific summary reports, logs, or test data sheets where the nonconformance was identified. The reports will include the following information as applicable:

- A unique identifying sheet number for cross-referencing and document control
- Detailed description of the problem
- Location of the problem
- Probable cause
- How and when the problem was located
- Estimation of how long problem has existed
- Suggested corrective measure
- Documentation of correction
- Suggested methods to prevent similar problems

- Signature of the appropriate CQA Field Monitor and concurrence by the CQA Site Manager

In some cases, not all of the above information will be available or obtainable. However, when available, such efforts to document nonconformances could help to avoid similar nonconformances in the future. The CQA Site Manager will distribute copies of the report to the PM, CM and the CE (CE) for further action.

4.4.4 Photographic Documentation

The CQA Engineer will be responsible for obtaining photographic documentation of the construction activities, materials installation methods, and testing procedures. Photographs will serve as a pictorial record of work progress, problems, and corrective measures. Photographic reporting data sheets should be utilized to organize and document photographs taken during construction. Such data sheets could be cross-referenced or appended to summary reports, CQA monitoring logs, or test data sheets and/or problem identification and corrective measures reports.

4.4.5 Monthly Progress Report

The CM will prepare a monthly status report and submit it to the Project Engineer. Information to be included in the monthly status report is detailed in the specifications of the design.

Per the Consent Decree, Honeywell will prepare and submit a monthly progress report to the NYSDEC. The Monthly Progress Report will summarize work activities and other issues pertinent to the construction completion. The PM will assist Honeywell to fulfill this requirement.

4.4.6 Construction Certification Report and Record Drawings

A Construction Certification Report will be prepared and submitted to the NYSDEC 90 days following the completion of the IRM. The CE will certify that the construction was performed in accordance with the approved Final Design and approved field changes. The Construction Certification Report will include a description of the completed construction work activities, approved design changes to the Final Design, Record Drawings, a project photo log, sampling/analysis summary table, waste manifests, material trip tickets and/or summary table, and other pertinent information.

Record Drawings will be prepared based on the Design Drawings, Contractor markups on the drawings conducted throughout the construction, and construction survey information conducted during and after the construction. The Record Drawings will be signed/sealed by the CE.

4.4.7 Field Change Form

Design, specification, and/or drawing changes may be required during the construction. All design, specification and/or drawing changes must be made with the written approval of the Design Engineer, the CE and if deemed significant, by Honeywell and the NYSDEC. Changes may be made in the form of a Change Order or a Field Order. Change Orders entail additions, deletions, or revisions to the work that modify the contract price and/or schedule. Field Orders entail minor revisions to the work that do not involve adjustments to the contract price and/or schedule. Documentation of the design, specification, and/or drawing changes will be maintained on-site by the CQA Manager.

Attachment C presents an example Field Change Form that includes a description and reason for the field change, date, and signatures. Material substitutions (i.e., “or equals”) are not considered a field change and will be approved by the CE as part of the technical submittal review process.

SECTION 5

REFERENCES

Honeywell, 2010, RES Management System Standard Level 2 Standard, Construction Phase, Daily Construction Reports Preparation, Standard # RES-CP-DC-03, Revision 0, Dated April 20, 2010.

Honeywell, 2010, RES Management System Standard Level 2 Standard, Construction Phase, Weekly Construction Reports Preparation, Standard # RES-CP-DC-04, Revision 02, Dated February 5, 2010.

United States District Court, Northern District of New York. 2007. State of New York and Denise M. Sheehan against Honeywell International, Inc. Consent Decree Between the State of New York and Honeywell International, Inc. Senior Judge Scullin. Dated October 11, 2006. File January 4, 2007.

ATTACHMENT A

CQA TESTING AND MONITORING PROCEDURES

EARTHWORK

1. Construction Monitoring

During installation of the various soil components, the CQA Manager will observe and document the Contractor's earthwork activities for the following:

- changes in the soil consistency;
- the thickness of lifts as loosely placed and as compacted;
- soil conditioning prior to placement including general observations;
- moisture distribution, clod size, etc.;
- the action of the compaction and heavy hauling equipment on the construction surface (padfoot penetration, pumping, cracking, etc.);
- the number of passes used to compact each lift;
- desiccation cracks or the presence of ponded water; and
- final lift or layer thickness.

2. Conformance Testing

The CQA Manager will monitor QC testing of soil materials installed by the contractor in accordance with the design. The CQA Manager will perform QA Conformance testing to verify that materials and testing is in accordance with the design. Conformance tests will be performed in accordance with the current ASTM or other applicable test procedures indicated in Table A-1 found in Attachment A.

3. Performance Testing

During construction, the CQA Manager will observe the soil components of the construction to verify that they are installed in accordance with the requirements of the Drawings, Specifications, and CQAP. The CQA Manager will also evaluate the procedures, methods, and equipment used by the Contractor to install the various soil components.

Performance tests will be performed in accordance with the current ASTM or other applicable test procedures indicated in Table A-2 found in Attachment A. The frequency of performance tests will conform to the minimum frequencies presented in Table A-2. The frequency of testing may be increased at the discretion of the CQA Engineer or if variability of the materials is observed. Sampling locations will be selected by the CQA Engineer. If necessary, the location of routine in-place density tests will be determined using a non-biased sampling approach.

Low Permeability Soil - The contractor shall perform Quality Control laboratory testing to determine an Acceptable Permeability Zone (APZ) for each low permeability layer soil material. The APZ is a range of dry densities and moisture contents within which the compacted soil has been demonstrated to meet the hydraulic conductivity requirements. This testing shall be performed by the contractor at the frequency specified in the specifications. The contractor will submit the laboratory data to the Project Engineer. The Project Engineer shall route the submittal to the Design Engineer for approval at which time it will be forwarded to the CQA Engineer by the Project Engineer. The CQA Engineer shall perform the performance testing described above to ensure that the soil is placed and compacted in the appropriate APZ for that material.

3. Deficiencies

If a defect is discovered in the soils construction, the CQA Engineer will immediately determine the extent and nature of the defect. The failing area will be reworked at the Contractor's cost. Retests will be performed by the CQA personnel to verify that the deficiency has been corrected before additional work is performed by the Contractor in the area of the deficiency.

Table A-1
MINIMUM EARTHWORK CONFORMANCE TESTING REQUIREMENTS

TEST NAME/ TEST METHOD	ENGINEERED FILL[1],[2]	LOW PERMEABLILITY SOIL LINER[1],[2]	GRAVEL DRAINAGE TRENCH[1],[2]	PROTECTIVE SOIL LAYER[1],[2]	TOPSOIL[1],[2]
SPECIFICATION SECTION	Specifications for Earthwork DWG 444184-100-C-016	02223	02223	02223	02223
Particle Size Analysis/ASTM D 422 for soils, ASTM C 136 for aggregate	1 test per five QC tests	1 test per five QC tests	1 test per five QC tests	1 test per five QC tests	1 test per five QC tests
Atterberg Limits/ASTM D 4318	1 test per five QC tests	1 test per five QC tests	N/A	1 test per five QC tests	N/A
Moisture Content/ASTM D 2216 or ASTM D 4643	1 test per five QC tests	1 test per five QC tests	N/A	1 test per five QC tests	N/A
Organic Content/ASTM D 2974	N/A	1 test per five QC tests	N/A	1 test per five QC tests	1 test per five QC tests
Soil Classification/ ASTM D 2487	1 test per five QC tests	1 test per five QC tests	1 test per five QC tests	1 test per five QC tests	1 test per five QC tests
Standard Proctor/ASTM D 698	1 test per five QC tests	1 test per five QC tests	N/A	1 test per five QC tests	N/A
Hydraulic Conductivity/ASTM D 5084	N/A	1 test per five QC sample	1 test per five QC tests	N/A	N/A
Interface Direct Shear/ASTM D 5321	N/A	1 test per five QC tests	N/A	1 test per five QC tests	N/A
pH/ASTM D 4972	N/A	N/A	N/A	N/A	1 test per five QC tests

Notes:

1. Perform a minimum of 1 test per borrow source to verify that the material meets the NYSDEC requirements for clean fill.
2. The CQA Engineer shall perform the tests per the frequency in the table or a minimum of 1 test per source, whichever is more frequent.
3. N/A = Not Applicable

Table A-2
MINIMUM EARTHWORK PERFORMANCE TESTING REQUIREMENTS

TEST NAME/ TEST METHOD	**ENGINEERED FILL**	**LOW PERMEABILITY SOIL LINER** Initial Phase	**LOW PERMEABILITY SOIL LINER** Full-Scale Phase	**GRAVEL DRAINAGE TRENCH**	**PROTECTIVE SOIL LAYER**	**VEGETATIVE SOIL LAYER**
SPECIFICATION SECTION	Specifications for Earthwork DWG 444184-100-C-016	02223	02223	02223	02223	02223
In-situ Moisture/ ASTM D 3017	5 tests per acre	9 tests per acre	9 tests per acre	N/A	5 tests per acre	N/A
In-situ Density/ ASTM D 2922	5 tests per acre	9 tests per acre	9 tests per acre	N/A	5 tests per acre	N/A
Drive Cylinder/ASTM D 2937	1 test per 25in-situ moisture density tests	1 test per 25in-situ moisture density tests	1 test per 25in-situ moisture density tests	N/A	1 test per 25in-situ moisture density tests	N/A
Hydraulic Conductivity/ASTM D 5084	N/A	1 test per acre	NA	N/A	N/A	N/A

Note:
N/A = Not Applicable

ATTACHMENT B

SAMPLE FORMS

Property Consultants

1214 JFK Blvd.
Suite 850
Philadelphia, PA 19000

Phone: 215-555-2091

DAILY REPORT
No. 00007

COMPANY: ACME General Contractors **DATE:** 8/16/2008
REPORT PERIOD: Daily **DAY:** Monday
PROJECT: School Addition-Automotive Center **JOB:** JBAA450

WEATHER:

CONDITION DURATION: More than 50% of workday

PERIOD 1:		PERIOD 2:	PERIOD 3:
DURATION:		DURATION:	DURATION:
TEMP:	77	TEMP:	TEMP:
PRECIPITATION:	Drizzle	PRECIPITATION:	PRECIPITATION:
SKY:	Clear	SKY:	SKY:
WIND:	None	WIND:	WIND:
TIME PERIOD:		TIME PERIOD:	TIME PERIOD:
IMPACT:		IMPACT:	IMPACT:

ACTIVITY

COMPANY: ACME General Contractors **DATE:** 8/16/2008
REPORT PERIOD: Daily **DAY:** Monday
PROJECT: School Addition-Automotive Center **JOB:** JBAA450

TEMPERATURE:77 **PRECIPITATION:**Drizzle **SKY:**Clear **WIND:**None

ACTIVITY

Standard Paving continued mass excavation with 3/4 CY track mounted back-hoe and a smaller track hoe with mounted bucket.

SCHEDULE

Activity ID	Title	ES	A	EF	A	PCT	OD	RD	TF	FF
DM00300000	Sitework	8/11/2008	x	9/12/2008	☐	15.00	20	17	-9	0
DM00500000	Footing Excavation	8/11/2008	x	9/12/2008	☐	15.00	20	17	-9	0

EQUIPMENT

Description	Source	Units	Type	Work Area	Remarks
D6 Bulldozer	STDPAV	1	Caterpillar	ALL	
PC200 Hoe	STDPAV	1	3/4 CY Hoe	B	

FIELD FORCE LABOR

Category	Source	Supv.	Frmn.	Jrny.	Appr.	Work Area	Remarks
Site Prep	STDPAV	1	2	1	4	B	
	Totals:	1	2	1	4		

MATERIALS DELIVERED

Time	Material Name	Quantity	Location	Ticket No	Description	Remarks
	24PIPE	15.000		12435		

Property Consultants
1214 JFK Blvd.
Suite 850
Philadelphia, PA 19000

Phone: 215-555-2091

DAILY REPORT
No. 00007

Certified By: Property Consultants

Date: 11/19/2009

Signed: _____
Mary Shuttleworth

Primavera ®

Parsons
301 Plainfield Road
Suite 350
Syracuse, NY 13212

MEETING AGENDA
No. MA-05

PROJECT TITLE: Willis Groundwater Collection Trench **MEETING DATE:** 10/6/2009
LOCATION: Willis Site Trailer **SUBJECT:** Weekly Meeting Agenda

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
Y	AL	Al Labuz	Honeywell
Y	ANS	Al Steinhoff	Parsons
Y	DD	Dan Douglas	Parsons
Y	DDS	David D Steele	Parsons
N	DX	Doreen	Peak Environmental, LLC
Y	JXD	John Dillon	Peak Environmental, LLC
N	JHL	John H Lanier	Parsons
Y	JXH	John Hobbs	Parsons
Y	MEO	Marcus E O'Rourke, Jr.	Peak Environmental, LLC
Y	MJW	Matthew J Warren	Parsons
Y	MBB	Michael B Broschart	Parsons
Y	RJA	Rebecca J Absolom	Parsons
N	RXM	Richard Mustico	NYS Depart. of Environ. Conservation
N	SAW	Stephen A Warren	Parsons
N	SJM	Steve J Miller	Parsons
Y	SXT	Steven Thompson	Peak Environmental, LLC
N	TAC	Tamara A Cooper	Parsons
Y	TOR	Timothy O'Rourke	Peak Environmental, LLC
N	TXR	Tonya X Ridgway	Peak Environmental, LLC
Y	WXS	William Simpson	Peak Environmental, LLC

ITEM	DESCRIPTION	STATUS	STARTED	CLOSED	DUE	BIC
00001	Safety a) Safety Moment b) Safety review c) 2 week JSA look ahead	OPN	9/22/2009			
00002	Schedule / 2-Week Look Ahead	OPN				
00003	Light Weight Fill placement (LWF) a) LWF receiving b) Testing of LWF	OPN	9/15/2009			
00004	Pump station installation	OPN	9/15/2009			
00005	Collection system installation	OPN	9/15/2009			

Parsons
301 Plainfield Road
Suite 350
Syracuse, NY 13212

MEETING AGENDA
No. MA-05

ITEM	DESCRIPTION	STATUS	STARTED	CLOSED	DUE	BIC
00006	Site access and security. a) PDI dock requirements and coordination b) Labor status update	OPN	9/15/2009			
00007	Submittal log review and update. a. QC phase 1 meetings - 2 week look ahead	OPN	9/15/2009			
00008	Administrative Items a) Change order sump relocation	OPN	9/21/2009			

Design Group

1215 Ventnor Avenue

Philadelphia, PA 19000

Phone: (215) 555-0444
Fax: (215) 555-0445

MEETING MINUTES
No. 00002

PROJECT TITLE: Office Building

MEETING DATE: 4/7/2008

LOCATION: 8th Floor Conference

SUBJECT: Design Progress

DID ATTEND	INITIALS	ATTENDEE NAME	COMPANY NAME
Y	BW	Bill Watts	Electrical Engineering Department
Y	CA	Chris Atkinson	The Design Group
Y	LS	Larry Writer	Specifications Department
Y	LT	Lester Trumbull	Architectural Department
Y	MS	Mathew Strong	Structural Engineering Department
Y	SG	Sally Gears	Mechanical Engineering Department
Y	SB	Stoney Brookes	Civil Engineering Department

ITEM	STATUS	STARTED	DUE	CLOSED	BALL IN COURT
00001	AOK	4/7/2008			
Chris assigned specific activities to be accomplished by each department and reported on each meeting. One person from each department will attend the meetings and notify others in the department. Meeting minutes will be distributed to all involved in the design including A-1.					
00002	NEW	4/7/2008			DESIGN CA
For each meeting each department will give an account of progress on their part of the design and how many man hours have been spent. Chris will accumulate these numbers and total them to find out total hours spent for the design.					
00003	AOK	4/7/2008			
Chris reviewed the building design and the results of the project kickoff meeting for those who did not attend.					
00004	AOK	4/7/2008			
Chris explained that the design will now include a fitness and health facility. This will affect mostly the Architectural, Mechanical and Electrical departments.					
00005	AOK	4/7/2008			
To promote design coordination Chris explained that Expedition will be used on the network. The project is set up and passwords and access rights be will given. He encouraged the use of the InBasket and the Telephone log to keep the process moving.					

Design Group
1215 Ventnor Avenue
Philadelphia, PA 19000
Phone: (215) 555-0444
Fax: (215) 555-0445

MEETING MINUTES
No. 00002

ITEM	STATUS	STARTED	DUE	CLOSED	BALL IN COURT
00006	AOK	4/7/2008			

Accoording to the P3 schedule the Schematic Design submission is due September 29, 1997.

Prepared By: The Design Group

Signed: _____ **Dated:** 11/19/2009
Chris Atkinson

Primavera ©

REQUEST FOR INFORMATION

Project: Wastebed B/Harbor Brook IRM	**Date:** mm/dd/yy
From: Vendor Name Address Phone Contact	**RFI No.**
To:	**Ref:**
Subject:	

Est. Work Impacted:	
Est. Schedule Impact:	
Est. Cost Impact:	
Request Response By:	

Drawing Reference:	
Specification Reference:	

REQUEST:

PROPOSED SOLUTION:

ANSWER:

Signed:	Date:
Printed:	

Honeywell

HEALTH, SAFETY, ENVIRONMENTAL AND REMEDIATION
WEEKLY CONSTRUCTION REPORT
Honeywell RES Project: Project Name
Site No.: Site Number

Date

Address

I. SITE RESOURCES SUMMARY

Team	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Team (Ex: Health & Safety)							
TOTAL WORKDAYS							
TOTAL MANHOURS							

II. HEALTH AND SAFETY

A Highlights

- Insert Text

B Inspections and Audits

- Insert Text

C Incidents and Near Misses

Contractor	Date of Incident	Incident / Near Miss

D Infraction Notices

Contractor	Date of Incident	Infraction

E Pending Actions

III. ADMINISTRATIVE ITEMS

A Updated Actions/ Task List – see attached.

B Minutes from Last Week

- Insert Text

C Submittals

Pending	
Reviewed	

D Contract Items

- Insert Text

E Revised Baseline Schedule

- Insert Text

IV. SCHEDULE / SITE ACTIVITIES REVIEW

A Three-Week Schedule - see attached.

B Contract #1 – Work Accomplished

- Insert Text

C Contract #2 – Work Accomplished

- Insert Text

D Scheduled Activities for Current Week

V. CONSTRUCTION CHANGE ORDERS

CCO NO.	JUSTIFICATION	SCHEDULE IMPACT	COST IMPACT	CHANGE CODE	VALUE	STATUS

Change Code: **(1) Scope Change, (2) Design Error/Omission, (3) Vendor Defect, (4) Vendor Deliveries, (5) Overtime, (6) Weather, (7) Site Conditions**

Status: **Pending, Submitted, Approved, Rejected**

VI. DISCUSSION ITEMS

A Old Business

- Insert Text

B New Business

- Insert Text

VII. EQUIPMENT AND MATERIALS

Equipment Delivered	Equipment Removed
•	•
Materials Delivered *	**Materials Removed**
•	•

*** MATERIALS RECEIVED -** see attached Weekly Materials Receipt Table.

Transportation and Disposal and Materials Summary

TRANSPORTER	TRUCK TYPE	DESTINATION	TSDF	MATERIAL	TRUCK LOADS	AVG T/ TRUCK	TONS SHIPPED

VIII. COMMUNICATIONS / COMMUNITY AND REGULATORY AGENCY RELATIONS

- Insert Text

IX. ADDENDA TO PREVIOUS WEEKLY REPORT

- Insert Text

X. ATTACHMENTS

A Three-Week Schedule

B Site Photos

C Weekly Materials Receipt Table

D Air Monitoring Summary

E Other Items

Submitted By: Name
Title

Honeywell

HEALTH, SAFETY, ENVIRONMENTAL AND REMEDIATION
WEEKLY CONSTRUCTION REPORT
Honeywell RES Project SA7 Field Operations
Site No. 35037

April 9-15, 2007
Study Area 7, 60 Kellogg Street
Jersey City, NJ

SAMPLE

I. SITE RESOURCES SUMMARY

Team	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Health & Safety (H&S)	5	5	5	5	5	0	0
Engineering (QA / QC)	2	2	2	3	3	0	0
Construction Management (CM)	11	10	11	9	11	0	0
Security	6	6	6	6	6	3	3
Subcontractors	32	32	33	31	31	3	9
T & D / Subcontractors	31	31	31	31	36	0	0
Other	4	2	4	2	2	1	1
TOTAL WORKDAYS	91	88	92	87	94	7	13
TOTAL MANHOURS							3,776

II. HEALTH AND SAFETY

A Highlights

- Conducted inspections of site activities.
- Operated four mobile monitors around excavation and perimeter air monitoring system.
- Staffed Exclusion Zone and Safety Office.
- Conducted personal air sampling on CM team members in EZ.
- No excursions above the Action Level (584 ug/m^3) over any 30-minute average for fixed perimeter air monitors.
- No excursions above the Action Level (1,000 ug/m^3) over any 15-minute average for mobile perimeter air monitors.

B Inspections and Audits

- No issues noted

C Incidents and Near Misses

Contractor	Date of Incident	Incident / Near Miss
None week of 4/9/07		

D Infraction Notices

Contractor	Date of Incident	Infraction
None week of 4/9/07		

E Pending Actions

- None

III. ADMINISTRATIVE ITEMS

A Updated Actions / Task List – see attached.

B Minutes from Last Week

- No comments / changes to minutes from last week's call.

C Submittals

Pending	002: Water Treatment Area. Electronic submittal received 4/20/07, awaiting hard copy.
	003: Containment Area. Electronic submittal received 4/20/07, awaiting hard copy.
Reviewed	001: Trailer Layout. Response on 4/18/07. Reviewed
	004: Backfill Sieve Analysis. Response on 4/18/07. Resubmit; need to identify a more coarse material per backfill specification (MP 31 79 00).
	005: Site Security and Access. Response on 4/18/07. Reviewed; request a drawing identifying proposed location of silt fence, which was included in Submittal 002.

D Contract Items

- None to report.

E Revised Baseline Schedule

- Contractor submitted revised baseline schedule to CM on 4/20/07. CM forwarded the schedule to FDEP on 4/23/07 after review.

IV. SCHEDULE / SITE ACTIVITIES REVIEW

A Three-Week Schedule - see attached.

B Contract 1 – Work Accomplished:

- WWTP operational data – see attached.
- The DMR composite sampling was completed with no incident.
- Installation of the last new Modutank interconnection, a 6" valved assembly linking the bottoms of Modutanks 3 and 5.
- As a preliminary trial to refine logistics for a proposed future stormwater hexavalent chromium discharge sampling/testing profile, 17 samples of untreated spillway water were collected at

SAMPLE

time intervals on April12, 2007 during a rain event. All results were well within compliance values for hexavalent chromium and pH and no treatment was required.

- Discharge of meadow mat tannin water to the PVSC to date is 1,832,748 gallons (63.6%) of the 2,880,000 gallon yearly limit, and 118,400 gallons (49.3%) of the monthly projected volume of 240,000 gallons.

C Contract 2 – Work Accomplished:

- Completed welding hooks to the sheet piles to hold the wire mesh for overhead protection along the area of spalling on the north SCB wall. Fastened six – 2' x 8' steel sheets to the SCB wall using the shot Hilti fasteners, and filled behind two sheets with cement mortar.
- Completed the installation of 9 lengths of 8" modified underdrain piping in the southern perimeter pool area in an east/west direction from Sta. S4+50 to S5+60.
- Removed sediment from Modutanks 2, 3 and 5, and transferred the sediment to TP-3.
- Emptied drums of drill cuttings into the excavation.
- Unloaded liners..
- Consolidated Fence repaired the fence post, fabric, and windscreen along Route 440 that was damaged by a vehicular accident.

D Contract 6 – Excavation & Backfill

- Weekly Summary - see attached Excavation & Backfill Progression Chart.
- 3-Week schedule – see attached.

LABORATORY RESULTS FOR WEEK ENDING 04/15/07

BOTTOM CONFIRMATION SAMPLES	HEX CHROME mg/kg	P/F	COMMENTS	RESAMPLE NO.
C20	ND	P	2nd confirmation sampling event	115-CF-C20C1

- Contractor excavated in grids A20 and A21 (partial); scraped in grids B20 and C20 (2nd complete scraping); and sampled in grids B20 and C20 (2nd confirmation sample).
- Placed Type B backfill in 1' lifts from grid lines A11-A15 to grid lines C11-C15, and in grids A16, A17, A18 and A19, and compacted with the vibratory roller; Placed Type B backfill in two 18" lifts for bridging lift in grid C20 and compacted with the dozer; Stockpiled Type B backfill along the western edge of grid C19.
- Placed two 1' lifts of Type B backfill over Type A backfill for the southern perimeter pool area from Sta. S0+50 to S1+60.
- Stockpiled Type A backfill along the northern SCB wall perimeter pool area from Sta. S18+40 to S18+00.
- Cut back Type A backfill along the southern perimeter to final grade from Sta. S0+50 to S1+95 and compacted with the pad foot roller.
- Finished plumbing well points for supplemental header H-9A. The entire header is now pumping to the WWTP.

SAMPLE

- Installed 4-1/2 sections of 8” underdrain piping in the backfill from Sta. S5+05 to S5+60 in an east/west direction, and 10 lengths in a north/south direction from Sta. E6+75 to E5+50 at Sta. S5+60.
- Installed a temporary 36” diameter underdrainage sump in the Type B backfill at Sta. S5+60.
- Removed six well points on supplemental header H-7A to allow for advancing excavation and the truck route.
- Brought two wells (casings) back up to final grade.
- Staged pumps to remove stormwater and facilitate sheet flow during heavy rain events.
- Addressed SWPPP action items including the repair/reattachment of wind screen on the north perimeter fence; cleaning of sediment from the stormwater catch basins on the east side of 80 Kellogg Street; and removed the sediment from the bowling alley parking lot and Kellogg Street using a sweeper truck.
- Laboratories conducted compaction testing of the Type A and Type B backfill.

E Contract 7 – Waste Management / Disposal

- See Transportation / Disposal and Materials Summary

V. CONSTRUCTION CHANGE ORDERS

CCO NO.	JUSTIFICATION	SCHEDULE IMPACT	COST IMPACT	CHANGE CODE	VALUE	STATUS
None						

Change Code: **(1) Scope Change, (2) Design Error/Omission, (3) Vendor Defect, (4) Vendor Deliveries, (5) Overtime, (6) Weather, (7) Site Conditions**

Status: **Pending, Submitted, Approved, Rejected**

VI. DISCUSSION ITEMS

A Old Business

- None.

B New Business

- None.

VII. EQUIPMENT AND MATERIALS

Equipment Delivered	**Equipment Removed**
• None	• Contractor – 1 - 22,000 gallon fractionation tank
Materials Delivered *	**Materials Removed**
• None	• None

*** MATERIALS RECEIVED -** see attached Weekly Materials Receipt Table.

SAMPLE

Transportation / Disposal and Materials Summary

TRANSPORTER	TRUCK TYPE	DESTINATION	TSDF	MATERIAL	TRUCK LOADS	AVG T/ TRUCK	TONS SHIPPED
Contractor	Tri-axle Dump Truck	PA Transload	TSDF Facility	Excavated COPR	289	25.03	7232.71
Contractor	Tri-Axle Dump Truck	TSDF	TSDF Facility	WWTP Filter Cake	1	21.81	21.81

VIII. COMMUNICATIONS / COMMUNITY AND REGULATORY AGENCY RELATIONS

- None to report at this time.

IX. ADDENDUM(S) TO PREVIOUS MEETING MINUTES

- None to report at this time.

X. ATTACHMENTS

A Photo Documentation

B Three-Week Contractor Schedule

C WWTP Summary Table

D Excavation and Backfill Progression Chart

E Weekly Materials Receipt Table

Submitted By: NAME
TITLE

SAMPLE

ATTACHMENT C

FIELD CHANGE FORM

FIELD CHANGE FORM #___

East Portion-Wastebed B/Harbor Brook
Geddes and Syracuse, NY

Project Number:	Date:
Construction Manager:	
Remedial Action Contractor:	

Reason for Field Change:

During threading and driving of sheetpiles, it was noted that factory applied dry sealant was irregular. The dry cured sealant evidenced damage upon threading in a significant proportion of cases. This sealant damage required extensive repair during driving which slowed production and is not preferable from a quality control standpoint.

Summary of Changes:

It was determined that the solution to create a sufficient seal was to remove the shop applied-dry cure sealant and replace with Deneef Swell seal WA sealant using the wet cure method to all sheets in the field. The method was discussed with representatives from Deneef who noted that the proposed method was acceptable.

Approved Changes to the Final Design:

The following modifications to the Final Design are approved by the Design Engineer of Record:

1. Section 2.03D "Sealant" of the Construction Specification on sheet 21 of the approved design drawings is modified to read:

"Sealant shall be applied in the field using the wet method."

This issue and the proposed change was discussed at the weekly site meeting and coordinated with the NYSDEC project manager (Tracy Smith).

Discussion:

The contractor will remove the shop applied dry cure sealant and replace with Deneef Swell seal WA sealant using the wet cure method. This sealant will be applied to the sheets in general accordance with the manufacturer's instructions. This process has been ongoing since 7/22/10.

The following surface preparation method is acceptable in conjunction with the wet applied method:

1) Remove existing dry cure swell seal using mechanical means.
2) Remove loose dirt or debris in the interlock using compressed air. A small amount of dry cure sealant remaining well adhered to the sheet is acceptable.
3) The surface preparation and installation of the 3/8" wet bead in the female knuckle will occur on the ground and will be available for inspection by the engineer's representative.
4) The allowable working time with the wet method will remain 8 hours (i.e. all sheets shall be driven to grade by the end of the day.)

APPROVALS:

Design Engineer of Record Representative	
Name:	
Signature:	Date: 9/2/10

Construction Manager Representative
Name:

SAMPLE

Signature:	Date: 9/2/10

Certifying Engineer of Record	
Name: William Salomone (Parsons)	
Signature:	Date: 8/31/10

cc: Al Labuz - Honeywell
Tracy Smith – NYS DEC
Alan Steinhoff – Parsons
Matt Warren - Parsons
Megan Miller – Parsons
Michael Broschart - Parsons
William Salomone - Parsons
Rebecca Absolom – Parsons

SAMPLE