FINAL

WILLIS AVENUE/SEMET TAR BED IRM
TIE BACK WALL/ENGINEERED FLOODPLAIN

INTERIM REMDIAL MEASURE
WORK PLAN

Prepared For:

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DECEMBER 2011

CERTIFICATION

I, William A. Salomone, certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measure Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with DER Technical Guidance for Site Investigation and Remediation (DER-10).

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ACRONYMS

CCA	chromate copper arsenate
CIP	cast-in-place
DGA	dense graded aggregate
DMP	deflection monitoring points
DNAPL	dense non-aqueous phase liquid
DS	design sections
Ft.	feet
HDPE	high density polyethylene
IRMWP	Interim Remedial Measure Work Plan
LWF	light weight fill
NYSDEC	New York State Department of Environmental Conservation
PCF	pounds per cubic foot
PSI	pounds per square inch
RWF	regular weight fill

SECTION 1

INTRODUCTION

This Interim Remedial Measure Work Plan (IRMWP) has been prepared for activities being completed as part of the Willis Ave./Semet Tar Beds Sites IRM (Willis/Semet IRM). The IRMWP includes plans, methodologies and schedule for implementation of the Willis Tie Back Wall and Engineered Floodplain portions of the Willis/Semet IRM.

This IRMWP is organized into five sections and three appendices, as described below:

Section 1 – Introduction

Section 2 – Project Organization

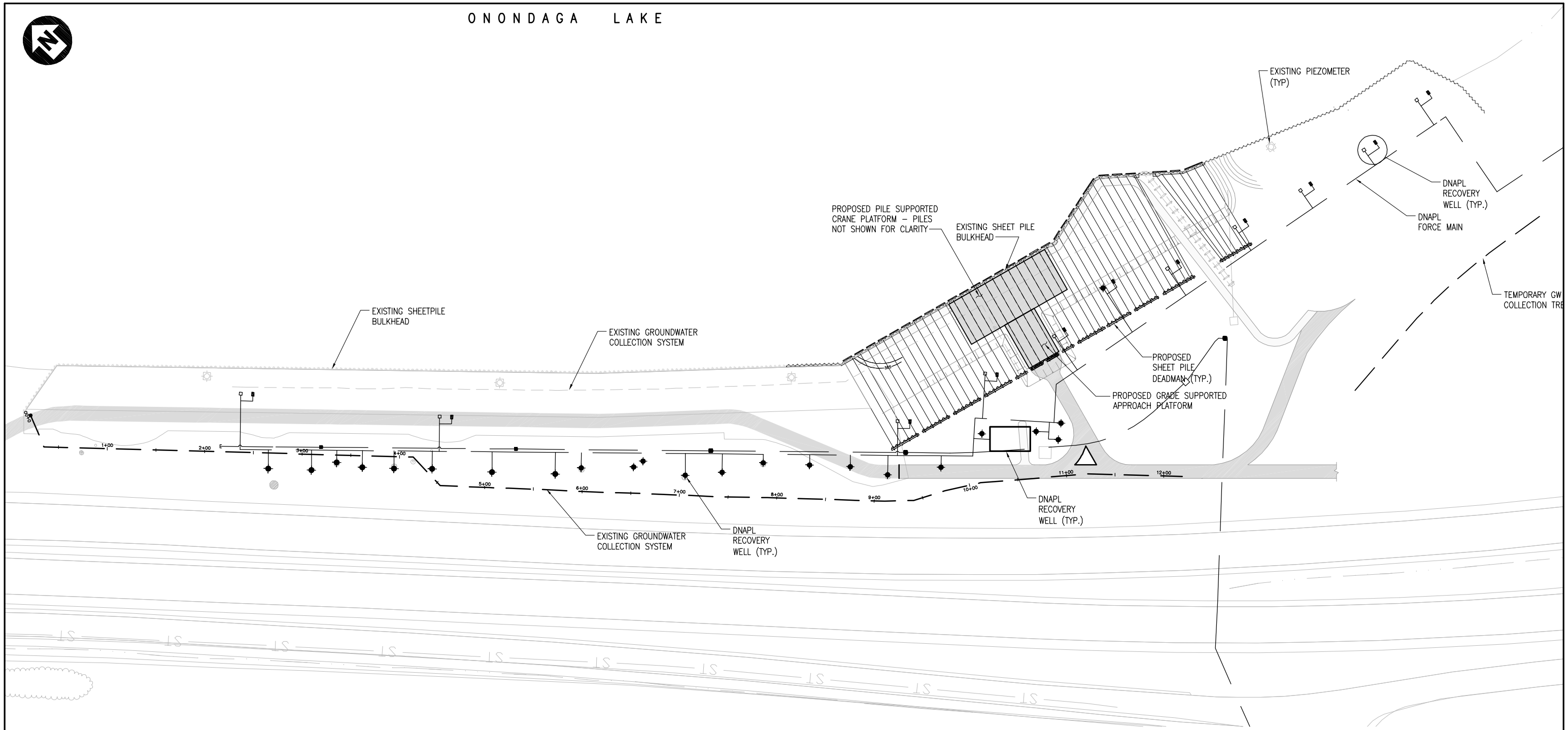
Section 3 – Remedial Activities

Section 4 - Schedule

Appendix A – Contract Drawings

The scope of work for this project includes the installation of a 60-mil HDPE liner and reinforcing grid system over portions of the site subject to inundation during periods of high lake levels and the construction of a tie-back anchoring system to provide geotechnical support for areas of the existing barrier wall that will be used during support of the Onondaga Lake dredging operations. The liner system will maintain separation of surface and groundwater, allowing surface water to discharge directly to Onondaga Lake while minimizing infiltration into the site and reducing the volume of groundwater requiring collection and treatment. The anchoring system will provide the required geotechnical support for the existing barrier wall through the use of anchor tendons that will connect to the existing sheeting via a concrete wale and will terminate at a row of segmented sheet piling approximately 100 feet (ft.) to the south of the barrier wall. Both the liner and anchoring systems have been designed to function without interference with the existing groundwater and dense non-aqueous phase liquid (DNAPL) collection systems on the site. A site map depicting the layout of the anchor system as it relates to the existing site systems is provided as Figure 1.1.

A detailed site description and history is available in the *IRM Work Plan for the Willis Ave./Semet Tar Beds Sites IRM* (Parsons, 2003).



LEGEND:

- DNAPL RECOVERY WELL
- 2011 DNAPL RECOVERY WELL
- PIEZOMETER
- CS-2 • COLLECTION SUMP
- CO-3 • CLEANOUT
- TS-2 • TRANSITION SUMP

100 50 0 100 200

SCALE: 1"=100'

FIGURE 1.1

Honeywell WASTEBED B/HARBOR BROOK SITE

SITE MAP

PARSONS
301 PLAINFIELD ROAD, SUITE 350, SYRACUSE, NY 13212 * 315-451-9560

Preliminary Draft – Privileged and Confidential
Not Intended for Public Review

FILE NAME: P:\HONEYWELL –SYR\446742 WILLIS TIE BACK DESIGN\10 TECHNICAL CATEGORIES\CAD FILES\FIGURES\TIE-BACK IRM WORK PLAN\446742-FIG 2-2.DWG
PLOT DATE: 11/7/2011 1:47 PM PLOTTED BY: RUSSO, JILL

SECTION 2

PROJECT ORGANIZATION

The purpose of this section is to provide an understanding of the overall project organization and the function and responsibility of various team members to ensure efficient project execution. The key team members and their responsibilities are provided below.

2.1 NYSDEC

NYSDEC is the lead regulatory agency for the Willis/Semet IRM. Mr. Richard Mustico, P.E. has been designated by NYSDEC as the Project Manager.

2.2 HONEYWELL

Honeywell is responsible for the implementation of this project. Honeywell has designated Mr. Steve Miller, P.E. as the Remediation Manager and primary contact for this project.

Honeywell has retained Parsons as its primary design and construction contractor on this project. Mueser Rutledge Consulting Engineers has been retained as the geotechnical designer as a subcontractor to Parsons.

2.3 PARSONS

Parsons will serve as the prime contractor for both design and construction. Parsons will manage the design, schedule and execution of the project. The responsibilities of the key Parsons' personnel are described below:

2.3.1 Project Manager

Mr. Tom Abrams will be the Project Manager for this project. Mr. Abrams will be responsible to Honeywell and Parsons Management to ensure the project objectives are met. Mr. Abrams will be responsible for managing subcontractors, maintaining the project schedule, managing the project budget, and ensuring the work is performed in accordance with the design. He will also be the primary point-of-contact for Honeywell on all technical, schedule, and contractual issues.

2.3.2 Design Manager

Mr. Michael Broschart will be the design manager for this project. Mr. Broschart will be responsible for managing all design issues that arise during construction and communicating/resolving these issues with Honeywell and NYSDEC.

2.3.4 Certifying Engineer

Mr. William Salomone, P.E. will be the certifying engineer for this project. Mr. Salomone will be responsible for: (1) ensuring that the construction is completed in accordance with the

approved design, (2) ensuring that field changes are approved and documented , and (3) preparing a Construction Completion Report for submittal to the NYSDEC in accordance with DER 10.

2.3.5 Site Health and Safety Officer

The Site Health and Safety Officer for this project will be Mr. Dale Dolph. Mr. Dolph will ensure that Project Safety Plan is properly prepared and implemented and that all Parsons and subcontractor site personnel are trained according to the site-specific health and safety requirements. Mr. Dolph will conduct periodic health and safety audits of the project and will implement corrective actions in the event that unsafe practices are identified.

2.4 MUESER RUTLEDGE CONSULTING ENGINEERS

Mueser Rutledge Consulting Engineers (MRCE) prepared the detailed design for the project and will provide construction quality assurance services throughout construction. The responsibilities of the key MRCE personnel are described below:

2.4.1 Engineer of Record

Mr. Peter Deming, P.E. is the Engineer-of-Record for the design and will be responsible for the review and approval of any proposed modifications to the design during the construction phase.

2.4.2 Construction Quality Assurance

A MRCE representative will act as the Construction Quality Assurance (CQA) engineer who will be responsible for overseeing construction activities, assisting the Certifying Engineer with ensuring that project is constructed in accordance with the design, and documenting any field changes.

SECTION 3

REMEDIAL ACTIVITIES

3.1 STORMWATER/EROSION AND SEDIMENT CONTROLS

The remedial activities to be conducted at the site will require that stormwater controls, erosion prevention measures, and sediment control measures be implemented. Temporary storm water/erosion and sediment controls will consist of silt fencing to prevent soil or sediment erosion. Stormwater from up gradient locations will be routed away from exposed materials or excavation areas. Stormwater contact with exposed material will be minimized to the extent practicable.

3.2 SITE PREPARATION

Prior to the start of work at the site, Dig Safely New York and other sources will be contacted to identify and mark existing utilities. Stormwater and erosion control structures, as described above, will be erected prior to the start of work at the site.

3.3 ENGINEERED FLOODPLAIN

An "engineered floodplain" is being constructed behind the design section (DS)-1 and DS-2 portions of the Willis barrier wall. The purpose of the floodplain is to prevent communication between surface water and groundwater during periods of high lake levels, and to allow clean surface water to be shed to Onondaga Lake from the site. The floodplain is designed to function in conjunction with the upland landscaping design described in the *Willis Semet IRM Restoration Work Plan* (Parsons, 2011) to minimize surface water infiltration on the site. The project includes the following components:

1. Waler system
2. Reinforcement Grid
3. HDPE membrane system
4. Site Grading/Landscaping

The methods of construction and details of the project for the engineered floodplain are presented below and on the Contract Drawings. The engineered floodplain drawings are designated as Contract A in Appendix A.

3.3.1 Waler System

A reinforced cast-in-place (CIP) concrete wale system will be installed along the inboard face of the existing sheet piling in DS-1 and DS-2, as indicated on the Contract Drawings, to provide a connection point for the liner and reinforcing grid systems described below. The waler

will be formed and cast with Portland Cement Type II air-entrained concrete with a minimum 28-day compressive strength of 4,000 pounds per square inch (PSI). All concrete work will conform to ACI 306 – Cold Weather Concreting. The wale will include 1.5-inch diameter weep holes, evenly spaced every 10 ft. along DS-1 and DS-2 above the liner connection point to allow surface water to discharge to the lake.

3.3.2 Reinforcing Grid

A reinforcing grid of welded wire fabric, or approved equal, will be cast into the concrete wale and will extend 45 ft. inboard of the wale to provide lateral support to the existing barrier wall in DS-1 and DS-2. The inboard edge of the reinforcing grid will be cast into a concrete anchorage block to increase anchor capacity and to provide a visual indicator if the loading on the grid exceeds the expected load. The grid is designed to provide support during the dredging outboard of the wall. Once the dredging/capping operations are complete, the wall will receive adequate lateral support from the earthen materials placed on the outboard side of the wall placed to establish a naturalized shoreline. Following installation of the reinforcing grid, light weight fill (LWF) will be installed to the design grades, as indicated on the Contract Drawings.

3.3.3 HDPE Membrane System

A 60 mil high density polyethylene (HDPE) membrane will be installed above the reinforcing grid and inboard of the barrier wall over a 7 ounce/sy non-woven separation geotextile to the limits indicated on the Contract Drawings. A drainage net will be installed immediately over the HDPE membrane to enhance drainage of surface water towards the lake. The drainage net will consist of US Fabric US 160 GN Geonet, or approved equal, and will provide a minimum transmissivity of $1x\ 10^{-3}\ m^2/sec$.

The HDPE membrane and all geotextiles will have a minimum overlap of 18 inches at seams and the geonet will have a minimum overlap of 6 inches. The HDPE membrane will be attached to the concrete wale using a termination bar, or batten, and will be sealed to the wale with a bituthene strip on the bottom and a liquid membrane seal at the top, as shown on the Contract Drawings. All penetrations (e.g. well casings, manholes, etc.) of the liner will be sealed using HDPE boots to minimize potential infiltration of surface water.

Following installation of the drainage net, regular weight fill will be installed to the design grades and the surface will be finished with topsoil or dense graded aggregate (DGA) fill, as indicated on the Contract Drawings.

3.3.4 Site Grading/Landscaping

Site grading/landscaping will include the placement of regular weight fill (RWF) and DGA to the grades shown on the Contract Drawings. The intent of the grading design is to provide a sufficient slope to maintain positive drainage of surface water towards the lake while affording site access by way of a 15 ft. wide access road 40 ft. inboard of the barrier wall and a 8 ft. wide walkway at the water's edge. The access road and walkway will be constructed of compacted

DGA with subgrades constructed from compacted RWF-1 or RWF-2, as indicated on the Contract Drawings. Following placement/compaction of RWF, 6 inches of topsoil will be placed on the slope and seeded in accordance with Table 3.1.

A temporary 30-inch diameter corrugated metal pipe sleeve will be installed beneath the access road on the eastern end of DS-2 to provide a conduit for the dredge slurry pipeline.

TABLE 3.1
LOW LAWN SEED MIX

Species	Common name	Pounds per acre
Agropyron smithii	Western Wheat Grass	10
Agropyron trachycaulum	Slender Wheat Grass	10
Agrostis hyemalis	ticklegrass	10
Lolium perenne	rye	10
Bromus kalmii	prairie brome	10
Koeleria cristata	June Grass	5
Stipa viridula	Green Needle Grass	5
Hordeum jubatum	Squirrel-tail Grass	1
Muhlenbergia mexicana	Leafy Satin Grass	1
Muhlenbergia racemosa	Upland Wild Timothy	1
Juncus tenuis	Path Rush	0.1
Total pounds per acre		63.1

3.4 TIE BACK CONSTRUCTION

A permanent tie-back anchorage system will be constructed in the DS-3 portion of the existing Willis barrier wall. The purpose of the anchorage system is to mitigate deflection of the barrier wall and provide a stable work zone for support of the Onondaga Lake dredging operations. The anchorage system includes the following components:

1. Concrete waler system
2. Pile-supported concrete platform and apron slab
3. Timber piles
4. Segmented sheetpile deadman and waler system
5. Anchor tendons

6. Fendering system
7. Site grading

The methods of construction for the anchorage system are presented below and on the Contract Drawings. The tie back anchorage system drawings are designated as Contract B in Appendix A.

3.4.1 Concrete Work

Concrete work to be completed as part of this projects includes the following:

- Concrete Wale
- Pile Supported Platform
- Grade Supported Apron Slab

Details of each are provide below and on the contract drawings.

3.4.1.1 Concrete Wale

The concrete wale is designed to provide a structural connection between the existing sheet pile wall and the tie back anchors. The wale will consist of a CIP reinforced concrete system on the inboard side of the existing Willis barrier wall. The wale will be formed and cast with Portland Cement Type II air-entrained concrete with a minimum 28-day compressive strength of 4,000 PSI. All concrete work will conform to ACI 306 – Cold Weather Concreting.

3.4.1.2 Pile Supported Platform

The pile-supported platform is designed to support two crawler cranes which will be used to support the Onondaga Lake dredging project. The platform is designed to accommodate a dead load of 357 kips and a pick load of 20 kips at a maximum reach of 100 ft. The platform will consist of a 113.25 ft. x 47.00 ft. x 1.00 ft. CIP reinforced concrete slab. The slab will be formed and cast with Portland Cement Type II air-entrained concrete with a minimum 28-day compressive strength of 6,000 PSI. All concrete work will conform to ACI 306 – Cold Weather Concreting. Construction/expansion joints will be provided as shown on the Contract Drawings.

3.4.1.3 Grade Supported Apron Slab

The grade-supported apron is designed to function as a staging/access area for materials being on/off loaded during dredging operations. The apron interface with the pile-supported slab is designed to function as a hinge to maintain an even grade between the two surfaces. The apron will consist of a 35.00 ft. x 51.00 ft. x 1.00 ft. CIP reinforced concrete slab. The slab will be formed and cast with Portland Cement Type II air-entrained concrete with a minimum 28-day compressive strength of 4,000 PSI. All concrete work will conform to ACI 306 – Cold Weather Concreting. Construction/expansion joints will be provided as shown on the Contract Drawings.

3.4.2 Timber Piling

The timber piling is designed to support the pile-supported concrete platform described above. The support system will consist of a total of 164 Douglas fir timber piles conforming to ASTM D25. All piles will have a minimum butt diameter of 12 inches and a tip diameter of 7 inches. Piles will be treated with chromate copper arsenate (CCA) to a retention of 2.5 pounds per cubic foot (PCF) in accordance with the American Wood Protection Association.

Piles will be driven to the tip elevations indicated on the Contract Drawings using a pile or vibratory hammer. Continuous inspection will be completed throughout the driving process and a pile driving log will be maintained for each pile.

3.4.3 Sheet Piling

A segmented sheet pile deadman system will be installed approximately 100 ft. southeast of the DS-3 portion of the existing Willis barrier wall. The design takes advantage of the passive earth pressure exerted by the granular fill present onsite acting against the face of the sheet pile deadman. The deadman system will consist of a segmented sheet pile wall constructed of Arbed AZ19-700 sheeting, or approved equal, driven to an elevation of 335 ft. AMSL in areas outside of the grade-supported apron, and to an elevation of 331 ft. AMSL within the limits of the grade-supported apron slab. Typical segments outside of the apron will be approximately 32 ft. wide, and typical segments within the limits of the apron will be 13.5 ft. wide.

All sheet piling will be installed to the tip elevations indicated on the Contract Drawings using an impact or vibratory hammer. Continuous inspection will be completed throughout the driving process, and a pile driving log will be maintained for each pile.

Following sheet pile installation, the deadman waler system will be constructed. The waler will consist of two MC 13 channels, steel bearing plates, spacers and fasteners, as indicated on the Contract Drawings.

3.4.4 Anchor Tendons

The anchor system consists of a series of horizontal tendons joining the concrete wale on the existing sheet piling to the deadman waler system. Typical spacing between tendons is 9 ft. The tendons and connectors will sized in accordance with the Contract Drawings and will be constructed of wire rope, or approved equal. Anchor tendons will be placed within HDPE carrier sleeves, as indicated on the Contract Drawings, to minimize soil loading on the tendons during construction and during site operations following construction.

Once installed, anchor tendons will be tensioned to the designated “lock-off” load in accordance with the tensioning sequence, as indicate don the Contract Drawings. Throughout the tensioning process, the existing barrier wall and the anchor sheeting will be monitored for movement. Based upon the observed movement, the designated tensioning sequence/procedure may be adjusted by the engineer to reduce differential movement in the sheeting.

3.4.5 Fendering System

A fendering system will be installed on the outboard side of DS-3 of the existing Willis barrier wall to protect the barrier wall during dredging operations. The fendering system will be constructed of southern yellow pine or doulas fir, as indicated on the Contract Drawings.

3.4.6 Earthwork

Earthwork for this portion of the project will include site grading, LWF placement, backfill behind the sheetpile deadman system, sleeve placement for the dredge slurry pipeline, and topsoil placement/seeding.

Prior to installation of sheet piling/timber piling, the site will be graded to achieve the design grades and material will be removed to allow for sheet pile installation and waler construction. Following installation of timber piles and anchor strands, the site will be backfilled with LWF to the design grades and compacted. Following anchor strand tensioning, the excavation behind the sheetpile deadman will be backfilled and compacted to design grades with RWF. Six inches of topsoil will be placed over a separation geotextile at locations indicated on the Contract Drawings. Following placement of topsoil, the areas will be seeded with a low lawn seed mixture in accordance with Table 3.1.

An access roads and walkway will be constructed of compacted DGA, as indicated on the Contract drawings, to afford access to the pile supported platform and booster pump area. Actual alignment of the access road and walkway will be adjusted, if needed, in the field to optimize site access. 30-inch diameter corrugated metal pipe sleeves will be installed beneath the access road to provide a conduit for the dredge slurry pipeline.

3.5 DEMOBILIZATION

Equipment and excess materials used during construction activities will be decontaminated (as required) and removed from the site following project completion.

3.6 MONITORING

During construction of the engineered floodplain and the tie-back system geotechnical monitoring of the existing barrier wall will be completed on a daily basis in the construction zone and on a weekly basis in all other areas to ensure that there is not excess deflection of the barrier all due to construction activities. Monitoring will include baseline and daily/weekly survey shots of Deflection Monitoring Points (DMPs) and baseline and daily/weekly readings of existing inclinometers within the work zone. Following completion of construction, geotechnical monitoring will be conducted on a monthly basis.

During the Onondaga Lake dredging operations, geotechnical monitoring of the barrier wall will be completed on a weekly basis in the work zone (e.g. DS-3 of the barrier wall). During dredging in the areas immediately adjacent to the wall, monitoring frequency will be increased to collection of one round of DMP and inclinometer readings daily. Upon completion of dredging

and capping, geotechnical monitoring intervals will be re-evaluated and discussed with the New York State Department of Environmental Conservation (NYSDEC).

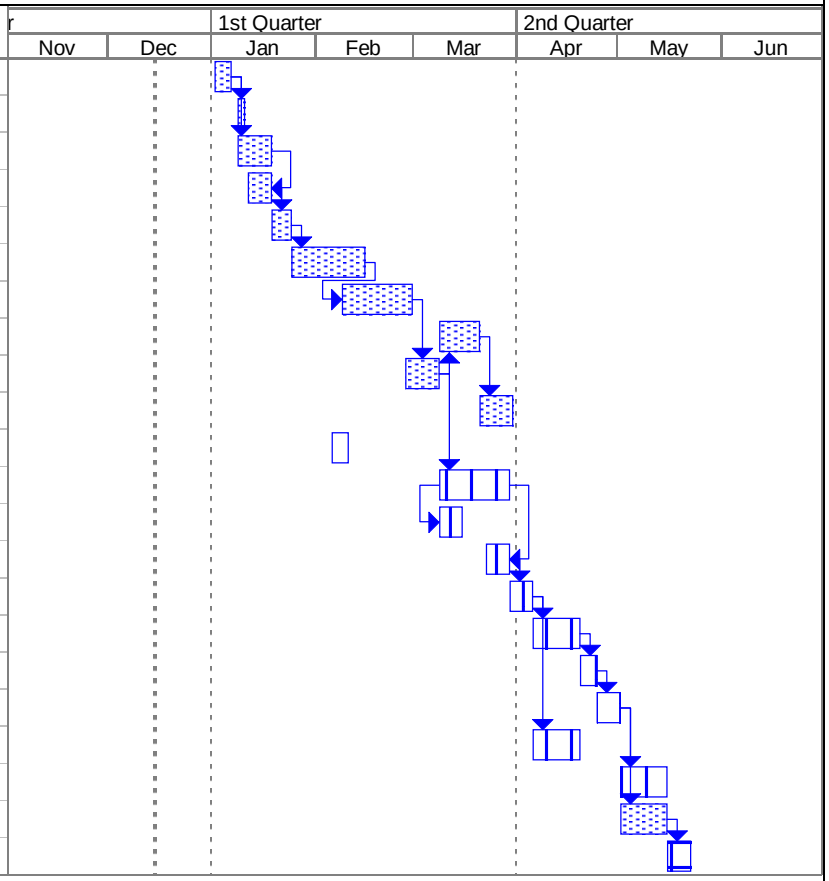
SECTION 4

SCHEDULE

A detailed project schedule is presented in Figure 4.1.

FIGURE 4.1
WILLIS SEMET IRM
TIE BACK AND ENGINEERED FLOODPLAIN

ID		Task Name	Duration	Start	Finish
1		Mob	5 days	Mon 1/2/12	Fri 1/6/12
2		Temporary Road	2 days	Mon 1/9/12	Tue 1/10/12
3		Excavate Floodplain Area	8 days	Mon 1/9/12	Wed 1/18/12
4		Remove Conduit	5 days	Thu 1/12/12	Wed 1/18/12
5		Install Geogred	4 days	Thu 1/19/12	Tue 1/24/12
6		Install Floodplain Wale and Geogrid Anchor	16 days	Wed 1/25/12	Wed 2/15/12
7		Install Floodplain Layers and Backfill	15 days	Thu 2/9/12	Wed 2/29/12
8		Site Restoration (walkways and topsoil)	8 days	Fri 3/9/12	Tue 3/20/12
9		Contract B Excavation	8 days	Tue 2/28/12	Thu 3/8/12
10		Upper Dredge Support	8 days	Wed 3/21/12	Fri 3/30/12
11		SES Mob	5 days	Mon 2/6/12	Fri 2/10/12
12		Contract B Wales	15 days	Fri 3/9/12	Thu 3/29/12
13		Deadman	5 days	Fri 3/9/12	Thu 3/15/12
14		Timber Piles	5 days	Fri 3/23/12	Thu 3/29/12
15		Crane Platform Tie Backs	5 days	Fri 3/30/12	Thu 4/5/12
16		Crane Platform	10 days	Fri 4/6/12	Thu 4/19/12
17		Balance of Timber Piles	3 days	Fri 4/20/12	Tue 4/24/12
18		Balance of Crane Platform	5 days	Wed 4/25/12	Tue 5/1/12
19		Install Balance Tie Back System	10 days	Fri 4/6/12	Thu 4/19/12
20		Fenders. Bollards	10 days	Wed 5/2/12	Tue 5/15/12
21		Site Restoration	10 days	Wed 5/2/12	Tue 5/15/12
22		Demob	5 days	Wed 5/16/12	Tue 5/22/12



Project: Tie Back (rev 01)
Date: Thu 12/15/11

Parsons		Milestone		External Tasks	
SES		Summary		External Milestone	
Parsons/SES		Project Summary		Deadline	

APPENDIX A

CONTRACT DRAWINGS

TIE BACK CONTRACT DRAWINGS

FLOODPLAIN CONTRACT DRAWINGS

RESPONSES TO NYSDEC COMMENTS ON THE

WILLIS LAKESHORE SUBSURFACE BARRIER WALL STABILIZATION DESIGN

(Responses in Bold)

1. A study/paper to evaluate the cause(s) of the observed sheetpile deflections should be completed. The proposed design should address the likely cause(s) of deflection.
   A technical evaluation of the observed sheetpile deflection has been completed by Mueser-Rutledge Consulting Engineers and the results were used in the development of the anchorage system design. A paper summarizing the results of the evaluation is being finalized and will be submitted under a separate cover.
2. It is the Department's understanding that the frequency of the instrumentation monitoring will be increased and/or modified during construction and Onondaga Lake dredging activities to evaluate potential impacts to the subsurface barrier wall. This should be discussed as part of this process as well as part of the Onondaga Lake remedial process.
   Monitoring frequency and requirements during construction and during the Onondaga Lake dredging operations are discussed in Section 3.6 of the IRM Work Plan.
3. It is the Department's understanding that the maximum allowable dredge depth(s) (e.g., 3 meters along the wall as per the dredge condition considered in the wall design) are still obtainable through this design.
   The design of the Engineered Floodplain (Contract A) and the Tie-Back Anchorage System (Contract B) will allow for dredging of the area outboard of the existing barrier wall to the depths indicated on Drawing C019 of the *Willis Portion of the Willis Avenue/Semet Tar Beds Sites IRM – Remedial Action Work Plan* (Parsons, 2008).
4. The designs specify certain conditions and crossings for the dredge slurry pipeline. It should be confirmed that Sevenson has reviewed these items.
   Sevenson is the remedial contractor that will be constructing the tie-back wall portion of this project. As such they have reviewed the design as it pertains to the dredge slurry pipeline.
5. Text should discuss, and the drawings should show, any potential impacts to the existing groundwater collection system and the DNAPL collection system. The drawing(s) referred to in the text to discuss these issues should include the entire groundwater collection system in the Willis lakeshore area and the DNAPL collection system.
   Section 1 of the IRM Work Plan provides a discussion of the potential impacts of the design on existing site utilities.
6. The construction work plan should include a schedule for completing the work.
   A construction schedule is included as Figure 4.1 of the IRM Work Plan.
7. Contract A. The lightweight fill (LWF) should be included in the Materials List on Drawing SPA-009A.
   Drawing SPA-009A has been revised accordingly.

8. Contract A. Low permeable soil should be included in the Materials List on Drawing SPA-009A.
   Low permeability soils are not part of the design presented in the Contract A drawings. The low-permeability soil referenced is the specified subgrade material presented in the NYSDEC-approved *Willis Semet IRM Restoration Work Plan* (Parsons, 2011).
9. Contract B. It is indicated (page 3 of 4, 3rd paragraph) that "Deadman and cable ties are permanent features sized to support materials handling for dredging construction." A list of the design assumptions for materials handling for dredging construction should be included. This would allow for later verification that the actual materials/equipment loads are within the design limits during the Onondaga Lake dredging activities.
   The pile supported platform has been designed to support a Manitowoc 4100W with a total dead weight of 357 kips and a pick load of 20 kips at a maximum reach of 100 feet. Additionally, the following loads were assumed in the design:
   - **350 psf load, 80ft long (parallel to the wall), 20 ft wide (perpendicular to the wall) and set back 5 ft from the wall.**
   - **50 psf load within 5 ft of the wall.**
10. Contract B. Based on the drawings, it appears that the deadman walls could result in a constriction of groundwater flow from the upland areas into the existing groundwater collection system along the Willis lakeshore wall. The potential changes to the hydraulic regime should be evaluated and discussed.
    The deadman wall has been designed as a segmented sheetpile system to allow for flow of groundwater through the deadman wall to the existing groundwater collection piping, this design will allow for the deadman wall to function without interference to the existing groundwater collection system. The groundwater collection system also includes a section of collection piping that extends south of the deadman wall, as shown on Figure 1.1, to provide additional groundwater collection capacity. Additionally, a temporary collection system has been installed to the east of the deadman wall to provide additional pumping capacity, if required.