CONSTRUCTION COMPLETION REPORT
FOR THE
GEDDES BROOK INTERIM REMEDIAL MEASURE
SITE NUMBER NYD986913580

ONONDAGA COUNTY, NEW YORK

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Response to Comments on "Draft Construction Completion Report for the Geddes Brook Interim Remedial Measure," Prepared by Parsons for Honeywell, March 2014

1. A discussion of IC/ECs, site monitoring (since mercury levels have been left behind in certain areas site management will be needed, this can be included with the full Geddes Brook/Ninemile Creek Site if there is a site management plan for that), etc. should be included (see Section 3.13 of the West Wall IRM report).

   Response: *A Site Management Plan (SMP) will be provided as part of the Final Engineering Report (FER) for the Geddes Brook/Ninemile Creek Site. Engineering and institutional controls (EC/ICs) will be discussed in the SMP. Documentation of their implementation will be provided in the FER. The report text has been revised accordingly by adding Section 3.7.*

2. Page 3-8, Paragraph 2, Section 3.3.2. In the sixth sentence of this paragraph replace "'show" with "shown".

   Response: *Revised as requested.*

3. Page 3-15, Bullet 1, Section 3.5. This bullet should be revised as follows:

   "Additional removals occurred during the excavation phase of the Geddes Brook western floodplain. These removals allowed the western floodplain to be redesigned to provide for larger and deeper wetland pools. The modified grading in the west floodplain is described in Field Change #4 in Appendix C."

   Response: *Revised as requested*

4. Appendix B-2, Drawings C-005 and C-006. There appears to be less restoration zone B 1 present in the southern wetland pool located in the western floodplain compared to the design/field changes. This should be evaluated/discussed in the annual report or the response to comments.

   Response: *During the design and construction process, elevation 367 feet was selected to represent the expected water surface elevation to define the expected restoration zones in the western floodplain. There are two large ledges along the north-west and south west banks of the southern wetland pool in the western floodplain. These two ledges have surface elevations of 364 feet to just below 366 feet. As a result, the as-built drawings show them as B-2 (>1' water depth) while at the time of the design change, we had anticipated more area to be slightly higher than elevation 366 which was portrayed as B-1. These ledges are establishing as a diverse mix of persistent emergent vegetation (generally predominant in B-1 zones) and non-persistent emergent vegetation (generally predominant in B-2 zones) achieving the function for these pond edges originally intended in the field design change. We also note that the western floodplain ponds will*

not be erosional, so the extra couple of inches of water depth should provide additional allowance for the gradual build-up of organic soils on the pond bottom which is expected to slowly expand the B-1 zone over time.

5. Page 3-16, Section 3.6. In the first paragraph it states the irrigation system was installed and removed in 2012, should this should be 2013? Please revise as necessary.

   Response: *The date has been revised to 2013 from 2012.*

6. Page 3-16, Bullet I, Section 3.6. Was any biodegradable REHP placed after the photodegradable REHP was removed since vegetation was established at this time? Please revise as necessary.

   Response: *Biodegradable RECP was generally not placed after the photodegradable RECP was removed because vegetation had been established. The text has been revised.*

7. Page 3-16, last bullet, Section 3.6. The following revisions to this bullet will need to be made:

   "The NYSDEC observed sloughing/erosion of the vertical clay banks of the Geddes Brook Sinuous channel following re-diversion of flow into this area. ~~Parsons and Anchor QEA provided information supporting that no design alterations should be made to the channel and that the sloughing was a natural process inherent in the Rosgen E-6 channel geometry requested by NYSDEC.~~ NYSDEC required the construction team to install coir logs, RECP, and live stakes to alter the channel conditions to minimize future sloughing of the banks. These proposed alterations and their execution are summarized in Appendix M. ~~In Parsons' opinion,~~ While the influence of these alterations on the channel hydraulics is not known ~~and may accelerate channel avulsion, particularly for the high flow channel. However~~, the channel and wetland system appear robust and self-adapting, and there are numerous channel and wetland variations that would accomplish the objectives. The ROD objective to provide sinuosity, better connectivity with the floodplain, and ability for channel migration will be met even if the channel condition has been modified."

   Response: *The paragraph has been revised as follows: "Sloughing/erosion of the vertical clay banks of the Geddes Brook Sinuous channel was observed following re-diversion of flow into this area. The construction team, with NYSDEC's approval installed coir logs, RECP, and live stakes to alter the channel conditions to minimize future sloughing of the banks. These proposed alterations and their execution are summarized in Appendix M. While the influence of these alterations on the channel hydraulics is not known, the channel and wetland system appear robust and self-adapting, and there are numerous channel and wetland variations that would accomplish the objectives. The ROD objective to provide sinuosity, better connectivity with the floodplain, and ability for channel migration will be met even if the channel condition has been modified."*

8. Tables. A table that compares the pre-construction wetland and habitat zone acreage to the expected as-built acreage should be included.

   Response: *The table has been added as requested.*

9. Table 3. A footnote which indicates what Type A and Type B fill is should be included.

   Response: *A footnote has been added as requested.*

10. Appendix G, Do the results include only the days when turbidity sampling was performed? Please clarify.

    Response: *The turbidity results only cover the days when turbidity was measured. A note clarifying this has been added to Appendix G.*

11. Appendix I. Page 11. Replace "Outfall 091" with "Outfall 019" in description.

    Response: *Revised as requested.*

CERTIFICATION STATEMENT

GEDDES BROOK INTERIM REMEDIAL MEASURE CONSTRUCTION COMPLETION REPORT

I, Raymond D'Hollander, certify that I am currently a New York State registered professional engineer, I had primary direct responsibility for the implementation of the subject construction program, and I certify that the Remedial Design was implemented and that all construction activities were completed in substantial conformance with the DER-approved Remedial Design.

STATE OF NEW YORK
RAYMOND D. D'HOLLANDER
No. 064790
LICENSED PROFESSIONAL ENGINEER

11/20/14

Raymond D. D'Hollander, P.E. Date
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Unauthorized alteration or addition to this engineering document is a violation of Section 7209. Provision 2 of the New York State Education Law

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ACRONYMS

AES	Applied Ecological Services, Inc.
CAMP	Community Air Monitoring Program
CCR	Construction Completion Report
cfs	cubic feet per second
CPOI	Chemical Parameter of Interest
CQAP	Construction Quality Assurance Plan
CWTP	Construction Water Treatment Plant
cy	cubic yards
DMR	Discharge Monitoring Report
DUSR	Data Usability Summary Report
EC/IC	Engineering control/institutional control
FER	Final Engineering Report
GWTP	Groundwater Treatment Plant
HDPE	High-density polyethylene
IRM	Interim Remedial Measure
Hg	Mercury
LCP	Linden Chemical and Plastics
mg/kg	milligrams per kilograms
NYSDEC	New York State Department of Environmental Conservation
NYCRR	New York Codes Rules and Regulations
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
OSWER	(USEPA) Office of Solid Waste and Emergency Response
OU-1	Operating Unit 1
PSP	Project Safety Plan
QA/QC	Quality Assurance/Quality Control
RAD	Response Action Document
RAO_S	Remedial Action Objectives
RECP	Rolled erosion control product
ROD	Record of Decision
SHSO	Site Health and Safety Officer
SMP	Site Management Plan
SWPPP	Stormwater Pollution Prevention Plan
USEPA	United States Environmental Protection Agency

SECTION 1

INTRODUCTION

This Construction Completion Report (CCR) documents the remedial action phase of the Geddes Brook Interim Remedial Measure (IRM) that began in May 2011 and was substantially completed in February 2013.

1.1 BACKGROUND

Honeywell entered into the Geddes Brook IRM Order on Consent (Index #D7-0003-01-09) with the New York State Department of Environmental Conservation (NYSDEC) in April 2002 (NYSDEC, 2002) to investigate and remediate the approximately 21-acre property located in Onondaga County, New York. NYSDEC issued a Response Action Document (RAD) for implementation of the Geddes Brook IRM in April 2009 (NYSDEC and United States Environmental Protection Agency (USEPA), 2009b) pursuant to this Consent Order. Concurrently, the RAD for the Geddes Brook IRM was incorporated by reference into the Geddes Brook/Ninemile Creek Record of Decision (ROD) as the remedy for the Geddes Brook portion of the site in April 2009 (NYSDEC and USEPA, 2009a). On December 30, 2010, Honeywell entered into the Geddes Brook/Ninemile Creek Consent Decree that formally incorporated the Geddes Brook IRM as the remedy for this portion of the site (NYSDEC, 2010a). The Consent Decree also expanded the Geddes Brook IRM to include the Outfall 019 Drainage Ditch Area.

An electronic copy of this CCR with all supporting documentation is included as Appendix A.

1.2 SITE DESCRIPTION

Geddes Brook is located on the southwest side of Onondaga Lake. It originates in the Town of Camillus and flows approximately 3 miles northeast to its confluence with the West Flume, then an additional 1,600 feet (ft.) to Ninemile Creek. The area subject to the IRM consists of middle and lower Geddes Brook. It is located downstream of the confluence of Geddes Brook with the West Flume, and includes adjacent floodplains, portions of Iron Brook and the Outfall 019 Drainage Ditch as shown on Figure 1. The remedial design elements are summarized on Figure 2.

Middle Geddes Brook receives surface water inflow from the West Flume and from the Outfall 019 – Drainage Ditch that conveys stormwater from the west. Geddes Brook also receives surface discharge from numerous sources, including residential neighborhoods and road runoff.

The site is identified as portions of:

- Block 01, Lots 02.1 and 05.2, Section 26 Town of Geddes
- Block 01, Lots 09.1 and 09.2, Section 27 Town of Geddes
- Block 01, Lot 26.1, Section 11 Town of Camillus

Appendix B-1 includes tax maps for these areas and Land Title Survey Drawings that show the property boundaries.

SECTION 2

SUMMARY OF SITE REMEDY

2.1 REMEDIAL ACTION OBJECTIVES AND SELECTED RESPONSE ACTION

The following remedial action objectives (RAOs) were identified for this site during the remedial investigation and presented in the Order on Consent (NYSDEC, 2002):

- Eliminate, to the extent practicable within the scope of this IRM, the transport of mercury into Ninemile Creek from Geddes Brook sediments and floodplain soils
- Eliminate, to the extent practicable within the scope of this IRM, potential impacts to human health and fish and wildlife resources associated with Geddes Brook sediments and floodplain soils

The selected response action, as presented in the April 2009 RAD (NYSDEC and USEPA, 2009b), includes:

> *"…the full bank-to-bank removal of channel sediments to the underlying clay (estimated to be 4,200 cubic yards) from the confluence of Geddes Brook with the West Flume to its confluence with Ninemile Creek, including any sediment within the Geddes Brook culverts [CSX culverts]. Floodplain soil/sediment will be excavated vertically to an underlying clay layer that is typically 2 to 4 feet below ground surface, and horizontally to a break in grade that bounds the floodplain (estimated to be 63,000 cubic yards). The remediation of the floodplain pursuant to this IRM will result in the removal of 100% of mercury above the sediment toxicity targets (0.15, 0.5, 1.3, and 2 mg/kg) in the sediment/soil above the clay layer in the Geddes Brook floodplain. Following removal, approximately 1 ft of vegetated cover will be placed in areas where soil/sediment had been excavated, resulting in a lower overall elevation with the intent to establish an emergent wetland. In addition, the Geddes Brook channel will be relocated westward downstream of the culverts to provide improved sinuosity, increased channel length, better connectivity with the floodplain, and increased buffer from the State Fair landfill. The excavated channel sediment and floodplain soil sediment will be placed within the LCP Bridge Street subsite containment system."*

As previously mentioned in Section 1.1, the Consent Decree expanded the Geddes Brook IRM to include the Outfall 019 Drainage Ditch Area. The extent of the IRM in the Outfall 019 Drainage Ditch area was determined based on the mercury concentrations present in soil/sediment samples collected during design investigations. Samples from the area upstream of the IRM in the drainage ditch had concentrations one to two orders of magnitude lower than downstream samples.

2.2 DESCRIPTION OF SELECTED REMEDY

The site was remediated in accordance with the remedy selected by the NYSDEC and presented in the Consent Decree (NYSDEC 2010a). The factors considered during the selection of the remedy include those listed in 6 New York Codes Rules and Regulations (6 NYCRR) 375-1.8. The remedy included the following components:

- Removal of channel sediment from Geddes Brook and the CSX culverts
- Removal of soil/sediment from floodplains adjoining Geddes Brook
- Removal of soil/sediment from Outfall 019 Drainage Ditch and adjoining floodplains
- Removal of soil/sediment from Iron Brook
- Consolidation of removed sediment and soil/sediment at the Linden Chemical and Plastics (LCP) Final Cover Area
- Implementation of erosion controls during construction and treatment of construction water
- Placement of clean materials throughout the site and restoration of creek bed, banks, floodplains, wetlands, and habitats to provide the following ecological benefits:

  A relocated Geddes Brook channel to increase sinuosity

  Increased connectivity between the Geddes Brook channel and floodplain

  Riparian buffers to provide shading to Geddes Brook

  Increased habitat diversity to support native plants and animals

2.2.1 Remediation Performance Criteria

Channel sediment and floodplain soil/sediment were excavated vertically to an underlying clay layer that was typically 2 to 4 ft. below ground surface. Floodplain soil/sediment was excavated horizontally to a break in grade that bounds the floodplain, or to access roads or railroad embankments that adjoined the floodplain. Two feet of soil/sediment were removed from the utility berm that bisected the Geddes Brook floodplain and from floodplain banks up to the top of the break in grade.

The site was restored with clean materials, which included topsoil, other suitable habitat material (stream channel and floodplain), and/or common fill. As-built drawings are included in Appendix B-2.

SECTION 3

DESCRIPTION OF REMEDIAL ACTIONS PERFORMED

The Geddes Brook IRM remedial design was developed to fulfill the regulatory and legal requirements in the documents discussed in Sections 1 and 2. Parsons issued the 100% Design Report on March 18, 2011 (Parsons, 2011a) and it was approved by NYSDEC on March 30, 2011. Parsons issued the Geddes Brook Interim Remedial Measure Work Plan, which described the plans and methodologies for the IRM, in April 2011 (Parsons, 2011c). NYSDEC approved the work plan on April 18, 2011. Construction of the remedial action began on May 23, 2011 following approval of the design and planning documents. Subsequent modifications to the design are documented in Field Design Changes attached in Appendix C.

3.1 GOVERNING DOCUMENTS

3.1.1 100% Design Report

The 100% Design Report (Parsons, 2011a) presented plans and specifications required to complete the Geddes Brook remediation and restoration. In accordance with the design, submittals were provided and are included in Appendix D. The Construction Quality Assurance Plan (CQAP) was included as an appendix to the 100% Design Report.

3.1.1.1 Construction Quality Assurance Plan (CQAP)

The remedial action tasks were managed in accordance with the CQAP through designed and documented quality assurance/quality control (QA/QC) methodologies applied in the field. The CQAP described the observation and testing activities that were used to monitor construction quality and confirm that remedial construction conformed with the RAOs and specifications.

The CQAP also outlined the project organization. The functions and responsibilities of various team members involved with the Geddes Brook remediation are described below.

NYSDEC

The NYSDEC was the lead regulatory agency for the site, and Mr. Tracy Smith was the NYSDEC Project Manager for the Geddes Brook IRM. The NYSDEC reviewed and approved plans, drawings, reports, and schedules.

USEPA

The USEPA was the federal regulatory agency overseeing the remedial action for the site. NYSDEC coordinated with USEPA, which reviewed submitted plans, drawings, and reports to assess compliance with USEPA regulatory criteria. Mr. Robert Nunes was the USEPA Project Manager for the Geddes Brook IRM.

HONEYWELL

Honeywell was responsible for the design and implementation of the Geddes Brook IRM. Mr. John McAuliffe, P.E., is the Honeywell Syracuse Program Director and was the primary Honeywell contact for this project. Mr. William Hague was Honeywell's Director for Remediation Design and Construction and reviewed and provided input on project approaches and deliverables. Mr. Larry Somer and Mr. Michael Savage were Honeywell site representatives with whom activities and decisions could be reviewed during the remedial action.

PARSONS

Parsons was the prime contractor for the design-build construction of the remedy and managed the schedule and execution of the remedial action. The responsibilities of key Parsons' personnel are described below.

Project Manager

Mr. Matt Warren was the Parsons Project Manager and was responsible for the overall execution of the remedial action and for meeting the project objectives. The Project Manager was accountable to the Parsons Program Manager (Mr. Steve Warren), Honeywell Syracuse Program Director (Mr. McAuliffe), and Honeywell's Director of Remediation Design & Construction (Mr. Hague). Mr. Warren was responsible for managing subcontractors, maintaining the project schedule, managing the project budget, and ensuring the technical adequacy of the work performed. He was also the primary point-of-contact for Honeywell on technical, schedule, and contractual issues. Mr. Warren was assisted by Ms. Rebecca Absolom, the Deputy Project Manager for this project.

Design/Certifying Engineer

Mr. Raymond D'Hollander, P.E., was the Design/Certifying Engineer for this project. Mr. D'Hollander was responsible for managing design issues during construction, including reviewing submittals for compliance with the design, approving all changes to the design, periodically inspecting the site to assess compliance of construction with the design, and preparing this CCR.

Construction Manager

The Construction Manager for the project was Mr. Darren Fuller. Mr. Fuller was responsible for completion of the construction work. He implemented on-site construction activities and directed on-site construction personnel, including subcontractors. He also submitted documentation to the design/certifying engineer as required in the contract documents and maintained construction quality and safety standards.

Mr. Fuller supervised the following activities:

- Subcontractor work scope
- Excavation and restoration activities
- Water treatment
- Materials management
- Operations at the LCP Final Cover Area

Site Health and Safety Officer

The Site Health and Safety Officer (SHSO) for this project was Mr. John Scurek. Mr. Scurek reviewed and implemented the Project Safety Plan and was responsible for implementation of the Community Air Monitoring Program (CAMP). Mr. Scurek conducted periodic health and safety audits of the project, which included a review of personnel training records to verify personnel were trained in accordance with the site-specific health and safety plan. He also coordinated with site personnel and project management so that safe and compliant site work practices were implemented.

Remedial Contractor Personnel

Honeywell selected Parsons as the Remedial Contractor to carry out the remedial construction. Additional project personnel for Parsons included:

- Tracey Brown (Construction Superintendent)
- Ben Monohon (QA/QC)
- Elizabeth Kneebone (QA/QC)
- Jesse Carr (QA/QC)
- Leonard Hamilton (Assistant SHSO)
- Nancy Giocondo (Document Control/Administration)

The following subsections identify Parsons' construction subcontractors.

Sub-Consultants

Under subcontract to Parsons, Anchor QEA, LLC of Seattle, WA, assisted the Certifying Engineer with technical issues related to the Geddes Brook sinuous channel design and the floodplain hydrology and restoration.

Subcontractors

The following companies performed as subcontractors to Parsons:

- Applied Ecological Services, Inc. (AES) of Waterloo, NY, performed site restoration services.
- Atlantic Testing Laboratories of Syracuse, NY, provided earthen materials testing services.
- O'Connell Electric Co. of Victor, NY, provided general electrician services.
- Op-Tech of Syracuse, NY, provided waste transport and disposal services.
- Parratt–Wolf of East Syracuse, NY, performed piezometer abandonment.
- Riccelli Enterprises of North Syracuse, NY, provided earthen materials and trucking services.
- RH Law, Inc., of East Syracuse, NY, performed trucking services.
- Saunders Concrete of Syracuse, NY, performed trucking services and materials for soil/sediment solidification.

- Seaway Diving and Salvage Co. of Waterford, NY, performed inspection of Geddes Brook culvert pipes.
- Thew Associates Land Surveyors of Utica, NY, performed land surveying services.

Test America of Syracuse, NY, provided earthen materials and post-excavation sample analytical testing services as a subcontractor to Honeywell.

3.1.2 IRM Work Plan

The Geddes Brook Interim Remedial Measure Work Plan (Parsons, 2011c) included plans, methodologies, and a milestone schedule for implementing the remediation. The below documents were also included in the IRM work plan.

3.1.2.1 Community Air Monitoring Plan (CAMP)

A CAMP was developed for the Geddes Brook IRM based on the New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan (NYSDOH, 2000). The CAMP was implemented to provide protection for the downwind community from potential airborne contaminant releases as a direct result of remedial work activities. The downwind community included off-site receptors such as residences and businesses and on-site workers not directly involved with the subject work activities. Air monitoring took place at the upwind and downwind perimeter of work zones. Wind direction was assessed twice a day based on field observations, and monitoring locations were adjusted accordingly. The work zones included excavation areas associated with the Geddes Brook IRM and the LCP Final Cover Area. No exceedences of the VOC or particulate action levels occurred during construction.

3.1.2.2 Project Safety Plan (PSP)

Remedial work at the Site was performed in full compliance with governmental requirements, including site and worker safety requirements mandated by the Occupational Safety and Health Administration (OSHA). The PSP described monitoring in excavation areas for worker protection and was complied with for remedial and invasive work performed at the Site.

3.1.2.3 Stormwater Pollution Prevention Plan (SWPPP)

The erosion and sediment controls for remedial construction were performed in conformance with requirements presented in the New York State Guidelines for Urban Erosion and Sediment Control and the site-specific SWPPP.

3.2 REMEDIAL PROGRAM ELEMENTS

IRM Construction began in May 2011 and was substantially completed in February 2013, with punch list items completed in May 2013. The IRM activities are described in detail below.

3.2.1 Site Preparation

Site preparation activities included clearing and grubbing of vegetated areas in the uplands and clearing of large trees within the floodplains. Permanent and temporary fencing was erected as required. Existing haul roads were graded for drainage purposes before placement of crushed limestone and clean limestone gravel. Silt fencing and other erosion and stormwater controls

were placed as per the SWPPP requirements. The SWPPP was included as Appendix B of the Geddes Brook IRM work plan (Parsons, 2011c).

A temporary 6-inch high-density polyethylene (HDPE) conveyance pipe was installed to convey construction water to the Construction Water Treatment Plant (CWTP) from local sedimentation tanks that were placed near the excavation areas.

Temporary facilities including trailers, utilities, and storage areas were erected. Tire washes were installed at both the Geddes Brook Floodplain and the LCP Final Cover Area exits.

A pre-construction meeting was held with NYSDEC and all contractors on May 26, 2011.

Agency approvals required by the remedial design and/or IRM work plan are documented in Appendices C and D. Other permits relating to the remediation project are provided in Appendix E.

3.2.2 General Site Controls

The following site control activities were completed:

- Site security – Parsons and its subcontractors coordinated locking of site trailers and perimeter gates daily during non-working hours.
- Job site record keeping – Parsons maintained records of personnel present at the site on the trailer sign-in sheet.
- Erosion and sedimentation controls – Parsons inspected the erosion and sediment control features per the approved SWPPP and made repairs when needed.
- Equipment decontamination and residual waste management – Subcontractors coordinated with Parsons to decontaminate equipment prior to its leaving the site and to remove residual waste material for disposal at the LCP Final Cover Area.

3.2.3 Nuisance Controls

Parsons controlled construction haul road dust as needed during dry periods. Dust control consisted of applying water using a water truck. Subcontractors limited construction traffic to temporary access roads stabilized with gravel to reduce the potential erosion of soil outside of road areas.

No nuisance dust or other complaints associated with the construction were received.

3.2.4 Survey

A licensed surveyor provided temporary survey benchmarks around the perimeter of the LCP Final Cover Area, Outfall 019 area, and Geddes Brook floodplain. The benchmark locations are provided as a submittal in Appendix D.

Surveying was conducted in accordance with Specification 01720 – Project Surveying which was modified to allow for as-built drawing surveys to be performed under the direction and supervision of a Professional Engineer. This change to Section 01720 is documented in Field Change #3 in Appendix C. As-built drawings were developed using topographic data obtained using a Trimble TSC2 Controller paired with an R8 receiver global positioning system unit calibrated daily on a temporary survey benchmark.

Since nearly all of the earthwork was completed in relatively dry excavations, backfill thicknesses were generally verified by laying out wooden survey stakes with marks showing the required thickness in the field, recording the elevation and location of the subgrade surface at the stake, verifying the backfill surface at the stake was at least as high as the mark, and resurveying the elevation and location of the surface at the stake locations. The thickness marking and surveying process was repeated until the finished grade surface was achieved. The stakes were removed after the finished grade and backfill thicknesses were verified and surveyed. The stakes were generally placed at approximately 50-ft. spacing with additional stakes placed where there were distinct breaks in grade. Additional survey points were obtained as needed to accurately define the topography details.

3.2.5 CAMP Results

Weekly summaries of the CAMP data are provided in Appendix F, which also includes raw CAMP data in electronic format on a compact disk. No exceedences of the VOC or particulate action levels occurred during construction.

3.2.6 Turbidity Monitoring Results

Outfall 019, Geddes Brook and Ninemile Creek were monitored periodically for turbidity. Turbidity monitoring results did not trigger the need for corrective actions and are included in Appendix G.

3.2.7 Meetings and Reporting

Weekly project coordination meetings were conducted every Thursday during construction. Meeting attendees included representatives from Honeywell, the NYSDEC Project Manager, Parsons Construction Manager, Parsons Certifying Engineer, Parsons Construction Quality Assurance personnel, Parsons SHSO, and subcontractor representatives. Weekly meeting minutes are provided in Appendix H.

Parsons prepared daily construction reports that described the operations conducted for the day, equipment, and personnel on-site, problems encountered, weather conditions, and monitoring results. Parsons also maintained a separate photographic log of the daily construction activities. Daily reports and the photographic log are included in Appendix I.

3.3 CONTAMINATED MATERIALS REMOVAL

Approximately 102,400 cubic yards (cy) of impacted soil/sediment were removed and consolidated at the LCP Final Cover Area during the 2011 construction season. As-built excavation surfaces are shown on Drawing C-001 in Appendix B-2. Channel sediment and floodplain soil/sediment were removed with standard excavation equipment. In general, the floodplain and channel areas were excavated to the underlying clay surface which was visible due to its distinctive color and generally stiff consistency.

The banks surrounding the floodplains were excavated so that 2 ft. of soil were removed. Steep banks were generally cut to a grade of 2H:1V or to a maximum of 1.5H:1V to provide relatively stable and erosion resistant slopes.

Bills of lading associated with the transport of these materials over public roads are included in Appendix J. Table 1 summarizes both design and removal volumes. More sediment was removed from Outfall 019 than expected. Daily observations and post-excavation survey indicated that the elevation of the native clay layer was deeper than expected during the design phase. Subsequently, the backfill elevations were adjusted from the design phase so that the design thickness of clean backfill would create deeper pools that would be beneficial in the restoration. More sediment than expected was also removed from the Geddes Brook floodplain. Accordingly, the subgrade and finished grade design elevations in the western floodplain were adjusted, with NYSDEC approval, to provide for larger and deeper wetland pools that would be beneficial in the restoration.

Various mixes of solidification material were added to the sediment during the removal process to provide for safe transport of excavated material to the containment area and its subsequent stability within the containment area. After some initial experimentation, the optimal mix contained Portland cement, flyash and sand. This mix was delivered to the site in standard on-road haul trucks and stockpiled. The mix was usually added directly to the in-place sediment and mixed during the excavation process before the excavated material was transported to the containment area. The pre-mixing in the excavation allowed the material to be drier during transport and improved its placement characteristics at the containment area. A total of 15,700 tons of the dry Portland cement mixture were used for solidification purposes during the project.

Areas within the project were excavated as separate entities and are further described in the subsections below.

3.3.1 Outfall 019

As shown on Figure 3, a diversion berm was constructed at the western excavation extent of Outfall 019 using an imported weathered shale material (designated Brickyard shale). The flow from upstream was pumped to Iron Brook or Middle Geddes Brook to minimize the volume of construction water requiring treatment.

Haul spurs were constructed across the excavation out of Brickyard shale at approximate 100-ft. intervals, effectively creating cells along the extent of Outfall 019.A sump was created upstream of each spur using perforated HDPE pipe and clean #1 and #2 limestone gravel. Construction water from each cell was pumped from the sump to the nearby sedimentation tanks and subsequently to the CWTP for treatment.

Excavation of Outfall 019 began on July 19, 2011, and was fully completed by September 13, 2011. With one exception, excavations extended vertically to the underlying clay surface and horizontally to the shoulder of the access road to the south and to the toe of the railway embankment to the north, consistent with the design. The exception to this occurred in the Elantic/National Grid Area, which is discussed in Section 3.3.2 below.

An unknown manhole was uncovered in the base of the Outfall 019 excavation by the Iron Brook confluence (See Drawing C-002 in Appendix B-2). Water and sediment in the manhole was sampled, and the results were submitted to NYSDEC. Based on the analytical results and consultation with the NYSDEC, it was determined that no further action was necessary.

Analytical results and associated correspondence can be found in electronic format in Appendix C. The manhole was buried in-place with approximately 4 ft. of habitat subgrade fill and topsoil during the Outfall 019 backfilling.

3.3.2 National Grid and Elantic Area within Outfall 019

Property belonging to National Grid and an easement for their two steel transmission towers and power lines lie within the Outfall 019 excavation area. A right-of-way for a buried fiber-optic cable belonging to Elantic is also present in the excavation area. National Grid restricted removals to a depth of two feet in the vicinity of the transmission towers. Removals away from the transmission towers but over the Elantic communication line were restricted to a depth of 3 ft. The area surrounding each tower footing was excavated to an additional depth indicated by National Grid so tower maintenance could be completed by National Grid during the process. Post-excavation sample results and elevations are shown on Drawing C-002 in Appendix B-2. As discussed in Section 3.5, additional cover was placed to be protective. These modifications to the design are documented in Field Change #2 in Appendix C.

3.3.3 Iron Brook

A sump and 12-inch pump were installed upstream of the culvert south of the excavation limits to Iron Brook (as seen on Figure 3), and flow was pumped to Middle Geddes Brook to minimize the volume of construction water requiring treatment. A smaller sump pump was installed at the downstream end of the Iron Brook limits of excavation. Construction water from this sump was pumped directly into the adjacent sedimentation tanks for conveyance and subsequent treatment at the CWTP.

Excavation of Iron Brook took two days, beginning on August 30 and ending on August 31, 2011. Excavation was completed to the horizontal and vertical extents defined in the design.

3.3.4 Middle Geddes Brook

The excavation in Middle Geddes Brook was completed from September 21 through September 23, 2011. The area was excavated to the horizontal limits defined in the design, except in one area opposite the Upper Geddes Brook Diversion Berm. Armor stone was encountered at this location and left in place with NYSDEC's approval. Excavation was completed vertically to the clay surface where evident. In areas where the clay surface was not evident, sign-off was received from the NYSDEC following post-excavation sampling.

Diversion berms were constructed out of weathered shale (Brickyard) upstream of the Upper Geddes Brook culverts and at the downstream end of the West Flume, as shown on Figure 3. Upstream flows were subsequently pumped via two HDPE pipes directly into the CSX culverts downstream of Middle Geddes Brook. The pumping system was designed to accommodate up to 35 cubic feet per second (cfs) of flow. Three pumps were installed on the upstream side of the culverts, and a fourth was installed in the West Flume.

A significant flood event, estimated to be on the order of 70 cfs, occurred during backfilling on September 29, 2011. This caused the Upper Geddes Brook Diversion Berm to overtop, breaching the berm, and allowing flow into Middle Geddes Brook. The pumping equipment was removed shortly following this event. Local additional excavation occurred just below the

culverts at sampling grid point 364 after careful evaluation of the field survey data indicated insufficient material was removed at that location and the backfill thickness was inadequate. This is discussed further in Section 3.4.4.

3.3.5 Geddes Brook Floodplain

Both the eastern and western floodplains were excavated from north to south. Temporary haul roads were constructed of HDPE mats placed across each floodplain, effectively creating linear excavation cells. A sump was installed in each cell, and the area was graded to drain construction water into these sumps. Drainage ditches were installed where appropriate. Construction water was pumped from the cells and conveyed to the CWTP.

Following communication with National Grid and the NYSDEC, the easement around a steel transmission tower inside the western floodplain was excavated to a depth of two feet. The easements around three wooden transmission poles also belonging to National Grid were left at existing grade because National Grid did not allow any removal around these poles or guy wires. Remediation around the wooden poles and guy wires consisted of additional backfill to provide cover. These modifications are documented in Field Change #4 in Appendix C.

A pumped diversion was set up for two weeks in October 2011 to allow for sediment excavation in the Lower Geddes Brook channel from the CSX culverts to the confluence with Ninemile Creek. The diversion included two 12-inch pumps, an 18-inch HDPE conveyance pipe, and a sedimentation pond for minimizing turbidity and scour into Ninemile Creek at the diversion outlet. Berms constructed from imported Brickyard shale material, geotextile, and a face of medium rip rap were placed downstream of the CSX culverts and at the confluence of Ninemile Creek and Geddes Brook on October 19, 2011. Excavation commenced on October 25, 2011, from both sides of the Lower Geddes Brook. Solidification materials were mixed with the excavated materials within the excavation. The excavation was completed on November 9, 2011.

Medical waste in the form of hypodermic needles, probably from veterinary services, was found during excavation of the eastern-most extent of the Geddes Brook Floodplain, bordering the NY State Fairgrounds property. This waste was properly segregated, characterized, removed from the site, and transported to the Stericycle Inc. disposal facility. Transportation manifests for this waste are included as a submittal in Appendix D.

3.3.6 CSX Culverts

Sediment removal from the CSX Culverts (Figure 3) was not required based on investigations that were conducted during implementation of the IRM. These investigations are discussed in Section 3.4.7.

3.3.7 Consolidation of Excavated Material at LCP

Excavated channel sediment and floodplain soil/sediment were consolidated at the LCP Operating Unit 1 (OU-1) Final Cover Area in accordance with the ROD (NYSDEC and USEPA 2009a) and the 100 % Remedial Design Report (Parsons, 2011a).

3.3.8 Construction Water Treatment Plant

Construction water generated during the Geddes Brook IRM was treated at a temporary CWTP. The temporary CWTP was constructed in early 2011 immediately east of the LCP Final Cover Area in accordance with the Geddes Brook and Ninemile Creek Construction Water Treatment Plant Report (Parsons, 2011b).

In 2011, the temporary CWTP treated approximately 6,300,000 gallons of construction water associated with both the Geddes Brook and LCP OU-1 remedial projects. Effluent was sampled in accordance with Specification 02140 – Construction Water Management and discharged to the West Flume. Discharge Monitoring Reports (DMRs) summarizing the effluent sample results are included as a submittal in Appendix D

Maintenance of the temporary CWTP was conducted on an as-needed basis. As part of these maintenance activities, used bag filters and sludge from tanks and clarifiers were handled as summarized below.

- Used bag filters – 1,037 bags were taken to the Willis Avenue Groundwater Treatment Plant (GWTP) for disposal.
- Sludge - 61,000 gallons were hauled to the Willis Avenue GWTP for processing.

Documentation associated with the waste streams summarized above is included as a submittal in Appendix D.

3.4 REMEDIAL PERFORMANCE/DOCUMENTATION SAMPLING

Post-excavation samples (547) were obtained from the excavation surface and tested consistent with the CQAP. This included 36 re-samples and 37 non-record samples retrieved for planning purposes. The test results are shown on Drawing C-002 in Appendix B-2. A Data Usability Summary Report (DUSR) and the raw laboratory data (electronic format) are included in Appendix K.

Post-excavation sampling was conducted upon completion of soil/sediment removal. Samples were collected as follows:

- 2,500–square-foot grids were staked out with pin flags in the field.
- Representative composite samples consisting of five grab samples were collected from each grid area using sterilized scoops.
- Grab samples were homogenized in plastic bags and then placed into 4-ounce jars.
- Samples were shipped to Test America Laboratories in Pittsburgh, PA, via local courier service.

Post-excavation samples were analyzed for mercury concentrations. Results were e-mailed to on-site personnel, as well as uploaded to TestAmerica's on-line database. Parsons validated the data as results were received. Validated results were then summarized in a comprehensive spreadsheet and placed on figures depicting the on-site location of each result for submission to the NYSDEC. The validated test results are summarized on Drawing C-002 in Appendix B-2, and a DUSR is included in Appendix K. In general, if validated mercury analytical results for a

sample location were greater than expected, an extra foot of material was removed from that grid to the extent practicable unless otherwise approved by the NYSDEC. Following removal of the additional material, re-sampling was conducted following the same procedure.

In some instances, existing infrastructure, physical site conditions, or property owner restrictions did not allow for a complete removal of impacted soil/sediment. Potential risks associated with these areas were mitigated on a case by case basis and each instance was approved by the NYSDEC. Each area's post-excavation sample results are further discussed below.

3.4.1 Outfall 019

Consistent with the design and as approved by the NYSDEC, the base of the Outfall 019 drainage ditch was excavated to the visible natural clay layer except in the National Grid and Elantic area as discussed below.

The south slope of the outfall was excavated to the excavation limits dictated by slope stability and OSHA excavation requirements along the access road. The north slope was excavated to the "Theoretical Embankment Line" used by CSX to identify safe limits of excavations along their railroad tracks. Further excavation was not practicable due to the excavation limits described above. In order to ensure compliance with the intent of the ROD and following communication with the NYSDEC (Appendix C), a woven geotextile was placed on the excavation surface along the side slopes where post-excavation results exceeded the RAOs to separate the remaining impacted material from the imported backfill. The limits of the geotextile placement were from Station 02+00 to 13+00 on the north slope (even numbered side slope samples 396 to 410) and from Station 09+80 to 10+80 on the south slope (side slope sample 411). At least 2 ft. of backfill were placed during the restoration phase mitigating potential risks associated with any remaining mercury impacts in these areas.

3.4.2 National Grid and Elantic Area within Outfall 019

As discussed in Section 3.3.2, the area within the National Grid and Elantic property lines and right-of-way was not excavated to clay. Following consultation with the NYSDEC, woven geotextile was placed on the side slope excavation surfaces along the edges of the elevated pad. At least 3 ft. of backfill material was then placed on both the slopes and the surface mitigating potential risks associated with remaining mercury impacts in these areas. These modifications to the design are documented in Field Change #2 in Appendix C.

3.4.3 Iron Brook

Excavation was completed to the horizontal and vertical extents defined in the design. Post-excavation sampling was conducted from materials in the excavator bucket for the base and both side slopes because the excavation was deemed too deep and unstable for safe entry. The NYSDEC agreed that removals and post-excavation sample results in Iron Brook met the design intent.

3.4.4 Middle Geddes Brook

Excavation in the Middle Geddes Brook was limited by the depth to clay in the creek and the geometry of the infrastructure immediately adjacent to the creek. Infrastructure to the south included the access road, the upper Geddes Brook culverts, and associated headwall. To the north, infrastructure included the CSX railroad embankment, the I-695 overpass footings, existing armor stone, and the CSX culverts and associated headwall.

Post-excavation results were conveyed to the NYSDEC with expected backfill thicknesses to mitigate potential risks associated with remaining mercury impacts in these areas. NYSDEC subsequently approved the results, with the exception of grid point 364 by the culverts from Upper Geddes Brook. This location was re-excavated to provide additional backfill cover on October 14, 2011, but was not re-sampled because it was excavated in deep water. This area was subsequently approved by the NYSDEC (Appendix C).

3.4.5 Geddes Brook Floodplain

Generally, excavations in the Geddes Brook floodplain (including the eastern and western floodplains, and the floodplain east of the existing lower Geddes Brook channel) and Lower Geddes Brook channel were conducted to the native clay layer consistent with the design. Four post-excavation sample results in the eastern Geddes Brook floodplain slightly west of the existing Geddes Brook channel were drawn from an area where the expected clay was non-existent; the area was instead underlain by a thick black silt formation. A subsequent re-excavation and survey indicated that the finished grade in that area would result in at least a 2-ft. backfill thickness to mitigate potential risks associated with remaining mercury impacts in this area. This area was subsequently approved by the NYSDEC.

Following implementation of excavations consistent with the design for the utility berm and banks of the Geddes Brook floodplain, sampling was conducted. The NYSDEC agreed that removals and associated post-excavation sample results on the utility berm and banks of the Geddes Brook floodplain met the design intent.

3.4.6 National Grid Tower and Poles in Geddes Brook Floodplain

As discussed in Section 3.3.5, only the easement around the National Grid steel transmission tower in the western floodplain was excavated to a depth of 2 ft. The easements around the three wooden transmission poles were left at existing grade. Prior to the winter of 2011/2012, clay was placed over the surface and slopes of the areas surrounding the wooden transmission poles to mitigate potential risks associated with remaining mercury impacts in this area. These modifications were approved by the NYSDEC and are documented in Field Change #4 in Appendix C.

3.4.7 CSX Culverts

During construction, investigations were conducted to determine the possible extent of contaminated sediment build-up in the CSX culverts. These investigations are summarized below.

Although sediments were sampled from the lower end of the culverts on November 22, 2011, the results were inconclusive.

On July 12, 2012, a Parsons employee entered each of the two 48-inch-diameter pipes from the upstream end to take photographs and retrieve sediment samples at 25-ft. intervals for the first 150 ft. Deep water in the pipes precluded the employee from progressing further down the pipes. Although the employee did not find any sediment to sample, he was able to provide photographic documentation of the culvert interior.

Seaway Diving and Salvage conducted an investigation of the full length of the pipes on August 2, 2012. Video/audio documentation was recorded and sediment samples were retrieved from various intervals within the culverts. The investigation results are summarized in the correspondence section of Appendix C (specifically, the August 7, 2012, e-mail titled "GB Culvert Investigation Sample Results"). Parsons received approval from the NYSDEC that no additional work was needed in the culverts on August 7, 2012 (in the same e-mail chain).

3.5 BACKFILL

Following NYSDEC approval of the post-excavation sample results, reshaping and backfilling activities were conducted as appropriate. Reshaping or backfill differences from the design lines and grades are discussed in this section.

Backfill placement started in Outfall 019 near the Iron Brook outfall on September 26, 2011, and ended on October 10, 2011. Backfilling of all areas south of the CSX railroad tracks was completed in early November 2011 and met the design intent.

With approval from the NYSDEC, a temporary diversion channel was cut to facilitate regrading and backfilling activities in the Geddes Brook Floodplain area north of the CSX railroad tracks. The channel ran along the entire length of the west side of the West Geddes Brook Floodplain in the location of the *phragmites* control trench in the design. Three 36-inch HDPE culverts were installed through the Utility Berm to divert flow into the new diversion channel (Figure 3). A Brickyard shale berm was built to the north of the temporary culverts to block flow into the existing Geddes Brook channel. Flow into the temporary channel began on April 5, 2012, and was terminated with the completion of the Geddes Brook Sinuous Channel on August 9, 2012. The diversion system was able to manage all of the flooding events during this period without allowing overtopping of the diversion berm. The diversion was decommissioned by removing the outer 20-ft. segments of the HDPE culverts on each side of the Utility Berm and backfilling with clay to prevent a hydraulic connection between the east and west floodplains.

Very soft natural soils remained in an area in the middle of the eastern floodplain after the excavations were complete. This area was over-excavated, and stiff clay was brought in from the west floodplain. The softer over-excavated clays were placed in the borrow area in the west floodplain and contoured into a deep wetland pool with a couple of small islands to improve habitat. Clay fills placed in the alignment of the sinuous channel were compacted with a smooth-drum roller to create a strong, homogeneous soil. The sinuous channel was then shaped through excavation consistent with the design. Drawing C-003 in Appendix B-2 shows the as-built subgrade.

During implementation, some minor modifications were made in the field. These modifications were made in consultation with NYSDEC (written or verbal) and are summarized below:

- A Newberry riffle (elevation 371.5 ft.) was placed just upstream of the outlet of Iron Brook into Outfall 019 as an added habitat feature.
- The weathered shale diversion berm at the upstream end of Outfall 019 was left in place to mitigate the potential for *phragmites australis* rhizomes entering the restored wetland pools. A weir was cut into the berm at elevation 373.5 ft., and rounded stone was placed as the facing material over the weir.
- As instructed by NYSDEC, medium to large riprap was placed around the upstream end of the CSX culverts to provide additional long term erosion protection.
- The armor stone opposite the Upper Geddes Brook culverts, at the confluence with the West Flume, was left in place to provide long term erosion protection.
- A wedge of rounded stone was placed at the waterline of both sides of Middle Geddes Brook to minimize scour of the channel substrate material.
- Rounded stone was placed on slopes where localized erosion of backfill materials occurred due to inflow of offsite stormwater.

Several of the above minor modifications enhanced the final site condition are summarized in e-mails to the NYSDEC. These e-mails are included in Appendix C.

In addition to the minor modifications summarized above, some variations from the design were needed and are documented in field change forms (Appendix C). A summary of these changes is provided below:

- The regraded clay surface in the Outfall 019 weir was lowered from elevation 371.0 to 370.5 ft. because the clay surface at the bottom of the excavation was lower than anticipated. Lowering the weir elevation maintained water elevations consistent with the original design intent to support habitat goals. This is documented in Field Change #1 in Appendix C.
- The National Grid transmission tower and pole pads in Outfall 019 and Geddes Brook Floodplain that had post-excavation surficial mercury levels higher than clean-up goals were backfilled in accordance with NYSDEC direction. Access roads to the tower pad in Outfall 019 and the west floodplain were built at the request of National Grid. Culverts were installed through the access roads to provide for year-round hydraulic connection between adjacent wetland pools. One 36-inch-diameter culvert and one 24-inch-diameter culvert were placed within the access roads to allow flow along the outfall channel and allow for fish and wildlife passage. Details are shown on the as-built drawings in Appendix B-2. These modifications are documented in Field Changes #2 and #4 in Appendix C.
- Additional removals occurred during the excavation phase of the Geddes Brook western floodplain. These removals allowed the western floodplain to be redesigned to provide for larger and deeper wetland pools. The modified grading in the west floodplain is described in Field Change #4 in Appendix C.

- A cul-de-sac at the northwest end of the utility berm in the Geddes Brook Floodplain was designed in November 2012 as a means of access for Interbed Conveyance Line clean-outs installed by O'Brien and Gere. This modification is documented in Field Change #6 in Appendix C.

As-built drawings showing adherence to the lines/grades in the design drawings are provided in Appendix B-2. The breakdown of both design and backfill volumes are presented in Table 2 and truck tickets for imported materials can be found in Appendix L.

Analytical and geotechnical testing of imported backfill material was performed and approved prior to its placement on-site. A list of the total quantity of each backfill type used on-site and the corresponding number of approved analytical and geotechnical tests meeting the design goals are included in Table 3. Analytical results for backfill are provided as submittals in Appendix D. Several QA samples of topsoil being placed at the site were obtained and confirmed that mercury concentrations were similar to the approved concentrations in the initial borrow source testing submitted prior to placement. These samples are also included in Appendix K.

Limestone borrow materials brought to site were from the Saunders Marcellus quarry, which is a NYS Department of Transportation approved source. These materials were generally placed outside the site restoration limits and used as road material. Where they were placed within the restoration limits (e.g., access roads), the materials were generally excavated out during the site remediation and restoration and placed in the LCP OU-1 Final Cover Area. See Table 4 for the volumes of borrow materials imported for non-restoration purposes.

3.6 RESTORATION

Several habitat enhancements were integrated into the design and construction of Geddes Brook. Approximately five (5) woody debris structures per acre were installed throughout the restored area by the remedial contractor. In addition, prior to remediation the site was dominated by invasive species, such as common reed (Phragmites australis). The common reed was removed during remedial excavations and replaced with thousands of native plants as part of the restoration. AES was awarded a subcontract to perform site restoration activities for both Outfall 019 and the Geddes Brook Floodplain. AES mobilized to the site to restore Outfall 019, Iron Brook, and Middle Geddes Brook on October 26, 2011. Live stakes, small trees, shrubs, large trees, rolled erosion control product (RECP), and seed were installed in these areas during this mobilization, which ended on November 9, 2011. AES then returned to the Geddes Brook site on June 25, 2012, to complete mulching, install herbaceous plugs in the Outfall 019 area, and begin restoration activities in the Geddes Brook Floodplain. Mulching and plug installation in the Outfall 019 area was completed on August 3, 2012. Herbaceous plugs, live stakes, small trees, shrubs, large trees, brush mattresses, live fascine, RECP, seed, mulch, and predation fencing were all installed in the Geddes Brook Floodplain area by February 22, 2013 (Drawings C-005 and C-005A in Appendix B-2 provide as-built restoration plans). Parsons installed and operated an irrigation system in 2013 to enhance the growth of native species at the Site. Following the 2013 growing season and successful initial establishment of the new vegetation, the irrigation system was removed. Table 5 provides a detailed list of site restoration activity completion dates. Table 6 compares the expected habitat zone acreages with the pre-construction acreages. Variations from the design are summarized below:

Outfall 019

- AES originally installed the ECS-2 Double Net Straw rolled erosion control product (RECP) (with photodegradable polypropylene netting) along the banks of Outfall 019. During a site visit, NYSDEC representatives requested that the photodegradable product be removed and replaced with a biodegradable product. The ECS-2 product was removed by July 6, 2012.
- AES delivered and installed a number of SP4 sized shrubs in Outfall 019. This size was smaller than the specified #1 size. Many of these were replaced in April 2013 due to heavy losses of the plants of all sizes during the hot, dry summer of 2012. These replacements met the specified sizes and fulfilled the design intent.

Geddes Brook Floodplain

- The brush mattresses along the Geddes Brook Sinuous Channel banks were installed live (leaves budding) because restoration occurred during the summer instead of during their dormancy period as specified. NYSDEC required all brush mattresses be removed to rectify this issue. Parsons removed the brush mattresses on March 27, 2013. The Brush Mattresses were replaced by topsoil covered with RECP. These areas were seeded, and shrubs and trees were installed on May 3, 2013 in accordance with the NYSDEC request.
- The cul-de-sac and vegetated road on the utility berm for maintenance of the Interbed Conveyance Line were a change to the original design and approved by the NYSDEC. These were restored by AES as documented in Field Change #6 in Appendix C.
- The clay in the base of the primary flow channel in the sinuous channel was stiff to hard. Installing wooden stakes into it to secure the RECP was found to be impractical. Metal staples were used instead in this one instance as approved by NYSDEC and documented in Field Change #5 in Appendix C.
- Sloughing/erosion of the vertical clay banks of the Geddes Brook Sinuous Channel was observed following re-diversion of flow into this area. The construction team, with NYSDEC's approval, installed coir logs, RECP, and live stakes to alter the channel conditions to minimize future sloughing of the banks. These proposed alterations and their execution are summarized in Appendix M. While the influence of these alterations on the channel hydraulics is not known, the channel and wetland system appear robust and self-adapting, and there are numerous channel and wetland variations that would accomplish the objectives. The ROD objective to provide sinuosity, better connectivity with the floodplain, and ability for channel migration will be met even if the channel condition has been modified.

3.7 ENGINEERING AND INSTITUTIONAL CONTROLS

A Site Management Plan (SMP) will be provided as part of the Final Engineering Report (FER) for the Geddes Brook/Ninemile Creek Site. EC/ICs will be discussed in the SMP. Documentation of their implementation will be provided in the FER.

SECTION 4

REFERENCES

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Parsons, 2011c. *Geddes Brook Interim Remedial Measure Work Plan.* Prepared for Honeywell, Inc. by Parsons. April 2011.

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TABLES

Table 1
Summary of Design and As-Built Removal Areas and Volumes

Excavation:

LOCATION	DESIGN AREA (sf)	SURVEY AREA (sf)	DESIGN VOLUME (cy)	SURVEY VOLUME (cy)
OUTFALL 019	109,200	110,900	13,700	17,200
IRON BROOK	3,100	2,100	300	300
MIDDLE GEDDES BROOK	18,700	20,700	1,800	1,000
GEDDES BROOK FLOODPLAIN	783,100	786,100	68,500	83,900
TOTALS:	**914,100**	**919,800**	**84,300**	**102,400**

Table 2
Summary of Design and As-Built Backfill Areas and Volumes

Backfill:

LOCATION	DESIGN AREA (sf)	SURVEY AREA (sf)	DESIGN VOLUME (cy)	SURVEY VOLUME (cy)
OUTFALL 019	115,400	115,500	5,400	9,600
IRON BROOK	2,000	4,300	200	300
MIDDLE GEDDES BROOK	19,100	17,300	1,900	900
GEDDES BROOK FLOODPLAIN	841,500	779,100	32,600	34,700
TOTALS:	**978,000**	**916,200**	**40,100**	**45,500**

Table 3
Imported Materials Testing and Quantities Tracking

Material	Source	Quantity (ton)		Multiplier	Quantity (cy)		Total	Sample Date	Tests	Total # Approved	COC	Submittal
		2011	2012	(tons/cy)	2011	2012	Quantity (cy)		Needed	Tests		
Habitat Subgrade Fill	Elbridge	6000	20800	1.7	3500	12200	15700	7/8/2011 7/7/2011 7/9/2011 9/20/2011 3/15/2012	7	13	GBC-0009 GBC-0015 GBC-0014 GBC-0018 GBC-0022	GB-02200-010R GB-02200-011 GB-02200-013 GB-02200-015
Channel Substrate Fill - Type A / Common Fill[1]	Granby	3300	0	1.7	1900	0	1900	9/28/2011	1	1	GBC-0020	GB-02200-012
Channel Substrate Fill - Type B[2]	Granby	400	0	1.6	250	0	250	10/3/2011	1	1	GBC-0019	GB-02200-014
Topsoil	Black Creek	6000	22500	1.5	4000	15000	19000	6/7/2011 6/7/2011 8/12/2011 8/12/2011 4/25/2012	8	9	GBC-0009 GBC-0010 GBC-0016 GBC-0017 GBC-0023 and GBC-0026	GB-02990-005 GB-02990-005 GB-02990-009 GB-02990-009 GB-02990-012
Topsoil	Island Rd	0	1900	1.5	0	1300	1300	6/7/2011 6/7/2011 8/12/2011 8/12/2011	1	3	GBC-0009 GBC-0010 GBC-0016 GBC-0017	GB-02990-004 GB-02990-004 GB-02990-008 GB-02990-008

Notes:
1. Type A Channel Substrate Fill is a well graded gravel and sand with cobbles and a maximum grain-size of 24 inches
2. Type B Channel Substrate Fill is a well graded gravel and sand with a maximum grain size of 4 inches. It was used only in Middle Geddes Brook.

Table 4
Non-Restoration Imported Material Quantities

MATERIAL	SOURCE	QUANTITY USED (TONS)	TOTAL (TONS)
Limestone Crusher Run	Saunders	10,850	62,720
#1 and #2 Limestone	Saunders	6,680	
#4 Limestone	Saunders	12,310	
Weathered Shale (Clay)	Brickyard	31,450	
Cobbles	Granby	1,430	

Table 5
Site Restoration Activity Completion Dates

	Outfall 019 and Iron Brook	Geddes Brook Floodplain	Sinuous Channel Alterations
Herbaceous Plugs	8/3/2012	8/15/2012	NA
Live Stakes	9/1/2011	1/17/2013	2/7/2013
Small Trees/Shrubs	9/1/2011	12/3/2012	2/22/2013
Large Trees	9/1/2011	12/3/2012	NA
RECP	7/6/2013	11/20/2012	NA
Seed	9/1/2011	2/22/2013	NA
Mulch	9/1/2011	2/22/2013	NA
Brush Mattress	NA	7/10/2012	1/25/13 (removal)
Live Fascine	NA	11/9/2012	NA
Coir Logs	NA	NA	1/22/2013

Table 6
Comparison of Pre-Construction and Expected Post-Restoration Habitat Zones

Restoration Zone	Pre-Construction[1]			Post-Restoration[2]		
	Geddes Brook Floodplain[3]	Middle Geddes Brook and Outfall-019[3]	Total[3]	Geddes Brook Floodplain[3]	Middle Geddes Brook and Outfall-019[3]	Total[3]
Riparian Habitat (A1)	6.3	0.6	6.9	6.1	0.8	6.9
Riparian Habitat, Seasonally Inundated (A2)	11.9	2.3	14.2	3	0.5	14.2
Persistent Emergent Wetland (B1)				4.6	0.3	
Non-Persistent Emergent Wetland (B2)				4.5	1.3	
Open Water (C)	0.4	0.2	0.6	0.4	0.2	0.6
Total Areas	18.6	3.1	21.7	18.6	3.1	21.7

Notes:
1. The wetland mapping boundaries for the pre-construction condition included A2, B1, and B2 wetland types without distinguishing them.
2. The expected post-restoration areas are based on as-built topography and expected hydrologic conditions as shown on 446369-100-C-005 and C-005A.
3. All areas are in acres

FIGURES

Onondaga Lake
N
A
B
C
D
Wastebeds 1-8
Wastebeds 9&10
Wastebed 11
Wastebeds 12-15
Ninemile Creek
Geddes Brook Floodplain
Geddes Brook
Geddes Brook Culverts
Outfall 019 – Drainage Ditch
Iron Brook
West Flume
NYS Fairgrounds
Pleasant Beach Road
Lake Country Drive
Dubiel Avenue
Powell Street
Stasko Drive
80
Regatta Row
Armstrong Road
Scorpio Drive
Beigner Road
Smelkoff Road
State Fair Boulevard
690
Tonawanda Street
Mohegan Street
Cheyenne Street
Belle Isle Avenue
Cattaragus Street
. .GURE 1-1
Honeywell
Ninemile Creek
Syracuse, New York
Site Map
PARSONS
301 Plainfield Rd, Suite 350, Syracuse, NY 13212, Phone 315-451-9560

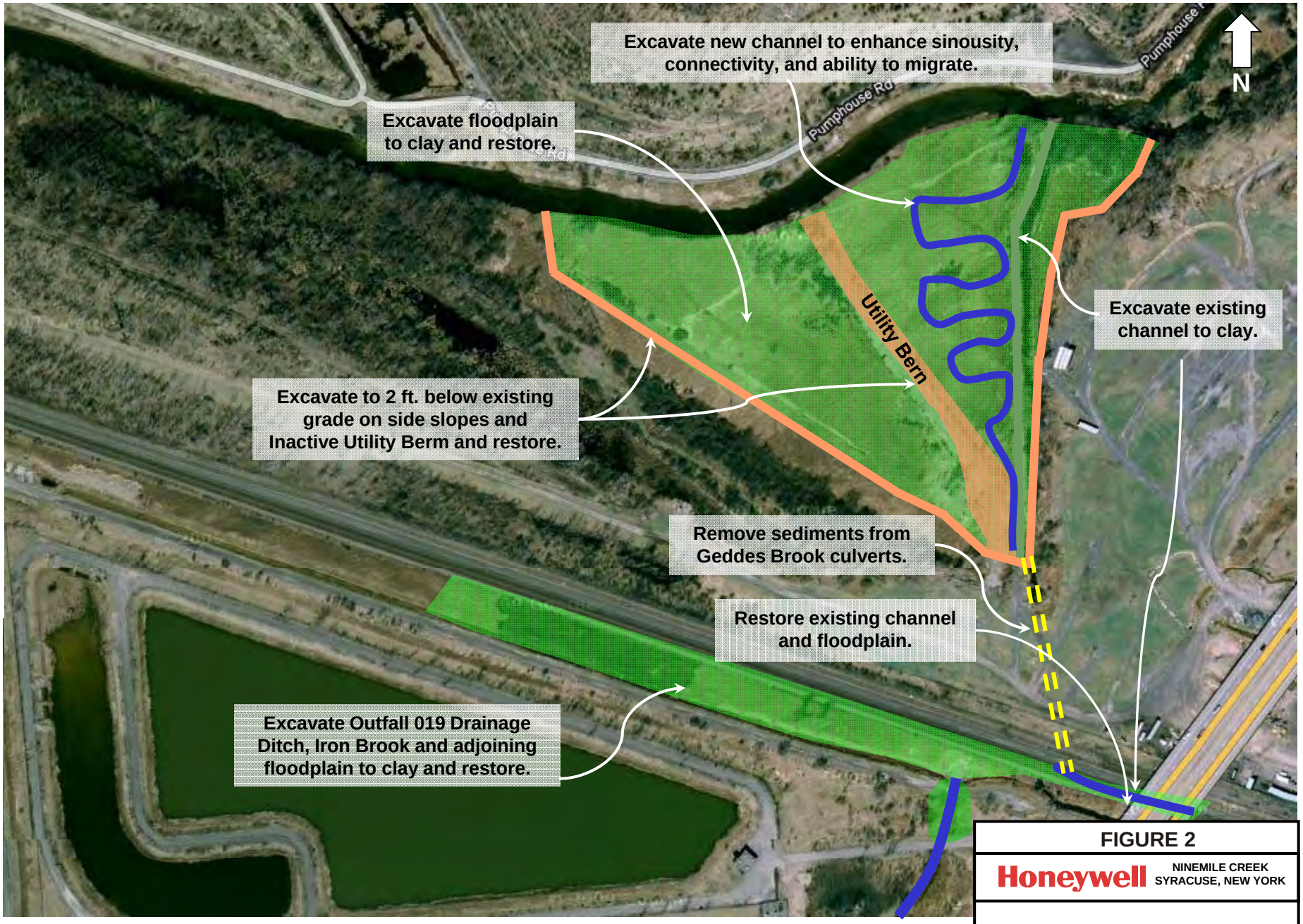

FIGURE 2

Honeywell — NINEMILE CREEK, SYRACUSE, NEW YORK

Remedial Design Summary

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Legend:
Diversion berm
Approximate location of temporary bypass piping

FIGURE 3

Honeywell

NINEMILE CREEK
SYRACUSE, NEW YORK

Temporary Channel Diversions and Excavation Areas

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APPENDIX A

ELECTRONIC COPY OF CONSTRUCTION COMPLETION REPORT

APPENDIX B

SURVEY DRAWINGS AND TAX MAPS

B-1 Tax Maps and Land Title Survey Drawings

B-2 As-Built Drawings

B-1 Tax Maps and Land Title Survey Drawings

B-2 As-Built Drawings

APPENDIX C

FIELD DESIGN CHANGES AND CORRESPONDENCE (pdf copies) WITH THE NYSDEC

(Correspondence located on disc in Appendix A)

APPENDIX D

SUBMITTAL LOG AND SUBMITTALS

(Located on disc in Appendix A)

APPENDIX E

PERMITS

(Located on disc in Appendix A)

APPENDIX F

COMMUNITY AIR MONITORING DATA

(Located on disc in Appendix A)

APPENDIX G

TURBIDITY MONITORING DATA

(Located on disc in Appendix A)

APPENDIX H

WEEKLY MEETING MINUTES

(Located on disc in Appendix A)

APPENDIX I

PHOTOGRAPHS

(Located on disc in Appendix A)

APPENDIX J

BILL OF LADING

(Located on disc in Appendix A)

APPENDIX K

DATA USABILITY SUMMARY REPORT AND RAW LABORATORY DATA

(Located on disc in Appendix A)

APPENDIX L

IMPORTED MATERIALS TRUCK TICKETS

(Located on disc in Appendix A)

APPENDIX M

POST-CONSTRUCTION GEDDES BROOK CHANNEL MODIFICATIONS

(Located on disc in Appendix A)