Justin Starr
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Division of Environmental Remediation
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ENVIRONMENT

Subject:
Transloading Area Restoration Plan (Revised)
NYSEG Court Street Former Manufactured Gas Plant Site
NYSDEC Site No. 7-04-031

Date:
September 10, 2019

Contact:
Jason Golubski, P.E.

Phone:
315.671.9437

Email:
jason.golubski@arcadis.com

Our ref:
30003434 #10

Dear Mr. Starr:

On behalf of NYSEG, this letter presents the revised restoration plan (Restoration Plan) for the transloading area that was constructed to support the ongoing remedial activities at the NYSEG Court Street Former Manufactured Gas Plant (MGP) Site, Operable Unit No. 2 (OU-2) located in Binghamton, New York.

Previous versions of the Restoration Plan were submitted to the New York State Department of Environmental Conservation (NYSDEC) on August 27 and August 28, 2019. NYSDEC Flood Protection and Dam Safety provided comments on August 29, 2019 (via email) and additional NYSDEC comments (consisting of those from the Division of Fish and Wildlife) were provided via a September 3, 2019 letter to NYSEG. Responses to NYSDEC comments are detailed in the September 10, 2019 comment response letter (provided under separate cover) and the Restoration Plan has been revised, presented herein and as appropriate.

A summary of the pre-construction site conditions is presented below, followed by the proposed restoration details, the associated monitoring and maintenance activities, and reporting requirements.

PRE-CONSTRUCTON CONDITIONS

As the extent of the upland area to be disturbed during remedial construction was unknown at the time, the NYSDEC-approved May 2017 Interim Remedial Design Report (IRM Design Report) generally indicated that disturbed areas/features would be restored with in-kind (or equivalent) grasses, shrubs, and trees. Pre-construction survey activities and results are presented below, followed by a summary of the completed tree removal activities and information regarding historic structures.

Pre-Construction Surveys and Assessments

To facilitate the remedial construction activities, Arcadis (i.e., the Design Engineer) completed a tree survey and habitat assessment in October 2017 in support of developing a Joint Application Permit (JAP) to obtain a United States Army Corps of Engineers (USACE) Nationwide Permit 38 (NWP 38) and a New York State Department of Environmental Conservation (NYSDEC) Water Quality Certification (WQC) under Section 401 of the Clean Water Act. The tree survey and habitat assessment noted trees greater than 3 inches diameter at breast height (DBH), along with supporting sub-canopy and herbaceous cover in areas of potential disturbance. The survey/assessment results were documented in a November 27, 2017 letter from Arcadis to NYSEG (included as Attachment 1 to this Restoration Plan). Based on the anticipated site layout presented in the IRM Design Report, the submitted permit applications indicated up to 10 trees would be removed in total, from the planned transloading area (i.e., approximately 0.3 miles upstream of the ScottTech [JMT Logistics] property) and potentially from the area immediately east/upstream of the ScottTech property (to allow for additional staging/access).

GEI (i.e., the Remediation Engineer) completed a tree survey and habitat assessment in September 2018, prior to DA Collins (i.e., the Remediation Contractor) initiating tree clearing activities, to document pre-construction conditions. Results of the September 2018 survey were documented in a November 1, 2018 letter from GEI to NYSEG (included as Attachment 2 to this Restoration Plan).

The Arcadis and GEI surveys provide the basis for the vegetation restoration proposed herein. Both surveys generally indicated the following:

- Dominant tree species consist of Silver Maples (*Acer saccharinum*) and Red Maples (*Acer rubrum*).
- Shrub species identified in potential disturbance areas included: saplings of Cottonwood (*Populus deltoides*), Green Ash (*Fraxinus pennsylvanica*) and Box Elder (*Acer negundo*); Silky dogwood (*Cornus amomum*), Staghorn Sumac (*Rhus typhina*); Tartarian Honeysuckle (*Lonicera tatarica*); and Thimbleberry (*Rubus parviflorus*).
- Herbaceous cover within the various bank and upland habitats were dominated by Japanese Knotweed (*Polygonum cuspidatum*), Riverbank Grape (*Vitis riparia*), Reed Canary Grass (*Phalaris arundinacea*), Riverbank Rye (*Elmus riparius*), Late Goldenrod (*Solidago altissima*), Garlic Mustard (*Alliaria petiolata*), Sensitive Fern (*Onoclea sensibilis*), Purple Loosestrife (*Lythrum salicaria*), and Carex species. Many of these are known invasive or nuisance species, including Tartarian Honeysuckle, Japanese Knotweed, Reed Canary Grass, Garlic Mustard, and Purple Loosestrife; which is indicative of the previously disturbed (by others) bank and upland habitats.

Based on pre-construction habitat observations in the current transloading area, the limited canopy consisted of Box Elder and Cottonwood, with no significant shrub layer, and herbaceous cover dominated by stands of Japanese Knotweed and Reed Canary Grass. The lower bank area in the vicinity of the current transloading area was largely covered with rubble and rip rap (see Photograph 9 in the November 27, 2017 letter, included as Attachment 1 to this Restoration Plan). Lower bank areas upstream of the current transloading area were largely free of armoring and/or vegetation.

Tree Removal

As presented in Table 1, a total of 31 trees were removed in October 2018, as part of the initial mobilization/site preparation. The total number of trees removed was greater than originally anticipated,

especially along the access road to the transloading area identified in the IRM Design Report. Removed trees mostly consisted of Silver Maples, with some Cottonwood (*Populus deltoides*) and Boxelder (*Acer negundo*).

After the initial tree removal was completed at the access road and original transloading area, DA Collins and NYSEG chose to construct the transloading area at the current location, immediately east of the ScottTech property. Additional tree removal was subsequently completed at the current transloading area.

In total, 8 trees (5 Cottonwood and 3 Box Elder) were removed from the current transloading area; 15 Silver Maple were removed along the access road; and 8 Silver Maple were removed from the originally anticipated transloading area. Pre-construction conditions and the locations of removed trees are shown on Figure 1.

Historic Structures

Per NYSDEC's request, the approximate location of three concrete "groins" (as shown on historic flood wall plan/profile drawings) are shown on Figure 2. While, exposed concrete groins were not observed during site work, a concrete wall/structure was encountered during excavation of existing site material to facilitate construction of the transloading area ramp (see Figure 2). The origin/purpose of this structure is unknown; the structure could be associated with former buildings located in this area or could be one of the historic concrete groins. Regardless, the structure was not damaged or otherwise altered during site work. As part of the site restoration activities, fill material will be placed around/over the concrete structure (as detailed below), such that transloading area is restored to pre-construction conditions.

TRANSLOADING AREA RESTORATION

Although 15 trees were removed from the access road, more than 200 trees (with DBH greater than 3 inches) remain along the access road. Trees removed from the access road area were mostly immediately adjacent to and overhanging to the access road (i.e., removed to facilitate haul truck access) and therefore, provided little to no added canopy cover over the near-shore river areas. Additionally, the survivability of new trees (if planted) is expected to be low, given the density of the remaining trees/canopy cover along the access road. Therefore, as detailed in the following subsections, this Restoration Plan focuses on the current transloading area, as well as the original transloading area. The current transloading area will be restored to match pre-construction lines and grades, and restoration at the original transloading area will consist of tree planting only.

As indicated above, lower bank at the current transloading area was largely covered with rubble and rip rap. Upper bank at the current transloading area was covered with invasive species (e.g., Japanese knotweed); no natural native shrub cover existed in the current transloading area. Therefore, live stakes or other bank vegetation (e.g., shrubs) is not warranted. Additional restoration details are presented below.

Earthwork

The transloading area will be restored to match the original lines and grades, as shown on Figure 2. Where removal of existing site material was necessary to construct the transloading area, removed

material was temporary stockpiled on-site for future re-use. That stockpiled material will be used to restore disturbed areas to within 4 inches of the original elevation. The stockpiled material has been submitted for laboratory compaction testing via ASTM D698 (Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort).

The subgrade will be shaped and compacted in 8-inch lifts with self-propelled rollers (or similar). Material will be compacted to 95% maximum compaction with an optimum moisture content +/- 2% (per NYSDEC's Article 16 Flood Control Land Use Permit). Field moisture content and density testing will be completed every approximately 6,000 square-feet of each lift in accordance with ASTM D6938 (Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods, Shallow Depth) to verify that compaction requirements have been achieved. Laboratory and field compaction test results will be included as part of the project's Construction Completion Report.

During backfilling and compaction of subgrade materials, vibration monitoring will be conducted in general accordance the October 2018 Survey Plan, Vibration and Optical Structural Movement Plan prepared by DA Collins. Specifically, consistent with that completed during construction of the transloading area in May 2019, vibration monitoring will be conducted at two locations on the flood wall.

Herbaceous Ground Cover

The disturbed portions of the current transloading area will be covered with a minimum of 4 inches of seeded topsoil (see Figure 2). In general, topsoil will be vegetated with a wildflower and grass seed mixture. Any existing ground cover will be removed (via grubbing or other mechanical means) and topsoil will be placed at elevations that match pre-construction lines and grades (i.e., no net cut/fill). Requirements for the topsoil and the wildflower and grass seed mix were previously presented in the IRM Design Report, Specification Sections 31 05 05 – Aggregates for Earth and 32 92 00 – Turfs and Grasses (respectively, included in Attachment 3 to this Restoration Plan).

Within 20 feet of the flood wall seeding requirements are as follows (per NYSDEC's Article 16 Flood Control Land Use Permit):

- Seed – Kentucky Blue Grass, Kentucky Blue Grass, Perennial Rye Grass, each applied at a rate 1.5 pounds per 1,000 square-feet
- Fertilizer – 5-10-5 product applied at a rate of 15 pounds per 1,000 square-feet
- Mulch – Straw or timothy hay applied at a rate of 100 pounds per 1,000 square-feet

All seed mixes will be certified as free of invasive species. Herbaceous ground cover will be installed down to the approximate pre-construction vegetation/scour line.

Temporary erosion control measures (i.e., erosion blanket) will be installed over seeded surfaces. Consistent with that recommended by Arcadis during the 2018-2019 winter shutdown/demobilization (as detailed in a November 12, 2018 letter to NYSDEC), the erosion blanket shall consist of a double-sided, coconut-fiber erosion control matting (i.e., North American Green C125BN blanket or equivalent). The blanket will be secured with 6-inch long (minimum) biodegradable staples/pins (i.e., not metal or plastic), installed at least every 3 feet on-center (or more frequently, in accordance with manufacturer's recommendations).

Trees

A total of 14 trees (6 Silver Maple and 8 Red Maple) will be planted in the disturbed portions current transloading area (see Figure 2), spaced approximately 15 feet on-center with the Silver Maples planted further inland and Red Maples planted closer to the river. Per NYSDEC's request, an additional 8 Silver Maple will be planted in the original transloading area, spaced approximately 15 feet on-center (see Figure 3). Trees will be approximately 2-inch diameter at breast height (i.e., ball and burlap). All burlap and any wiring will be removed from the root ball prior to planting.

A typical tree planting detail is provided on Figure 2 and tree planting requirements were previously presented in the IRM Design Report, Specification Section 32 90 00 – Plantings and General Site Restoration (included in Attachment 3 to this Restoration Plan). Note that trees will not be planted within 20 feet of the flood wall (per NYSDEC's Article 16 Flood Control Land Use Permit).

Rip Rap

As indicated above, the lower bank area in the vicinity of the current transloading area was largely covered with rubble and rip rap. The existing rip rap material was sporadic and typically less than 24 inches in size (see Photographs 8 and 9 in the November 27, 2017 letter, included as Attachment 1 to this Restoration Plan).

The lower bank in the vicinity of the current transloading area (i.e., between approximately 50 to 150 feet from the flood wall) has been restored with armor stone (i.e., rip rap). To provide a rip rap sized similarly to (or larger than) that present prior to construction, New York State Department of Transportation (NYSDOT) medium stone fill has been placed at the location shown in Figure 2. Per NYSDOT specifications, medium stone fill has approximate D50 of 14 inches, and typically ranges in size up to 24 inches.

The rip rap has been placed from the approximate pre-construction vegetation/scour line down (at approximate elevation of 835', as observed at adjacent non-disturbed bank areas) to the toe of slope (at approximate elevation of 829'). The rip rap has been placed in manner that results in no net fill below the mean high-water level (i.e., keyed into the bank). The rip rap layer has an approximate thickness of 2 feet (i.e., more than 1.5 times the D50), covering approximately 1,250 square feet; an estimated 90 cubic yards of rip rap has been placed as part of the site restoration activities.

Note that NYSEG has proceeded with placement of the medium stone fill rip rap. NYSEG recognizes that the completed restoration is being conducted at risk, but elected to proceed with the rip rap placement, in good faith, such that the bank would be protected if a storm event were to occur while the restoration plan was being reviewed by NYSDEC. For reference, photographs of the installed medium stone fill rip rap are included as Attachment 4. Compared to pre-construction conditions, the lower portion of the bank has been restored to more protective conditions as a similarly (or larger) sized rip rap has been placed more uniformly throughout the disturbed bank area.

MONITORING AND MAINTENANCE

The transloading area will be monitored and maintained following restoration to evaluate the status of the restoration relative to performance objectives and identify proposed maintenance or corrective actions (if necessary).

Performance Criteria

The following performance criteria will be used to evaluate the success of the completed restoration activities:

- Trees:
  - 100% survival by Year 5 monitoring (limit to two replacements total)
- Total vegetative cover:
  - 85% cover within one growing season
  - 90% cover by Year 3 of monitoring
  - 95% cover by Year 5 of monitoring

As presented in the 2017 and 2018 tree survey and habitat assessment reports, the site banks (including the current transloading area) were vastly covered with Japanese Knotweed and other invasive and/or nuisance species. Per NYSDEC's request, the presence of any invasive species identified in the current List of Prohibited Invasive Plant Species in New York State is prohibited. Any other invasive plant species not specified on the noted prohibited list may not occupy more than 5% of the restored areas throughout the monitoring period.

Monitoring Methods

Monitoring events will be conducted once annually (anticipated late spring/early summer) to provide an assessment of tree and ground cover establishment. All work will be directed by a Restoration Ecologist familiar with this Restoration Plan. NYSEG will notify NYSDEC of all scheduled monitoring and maintenance activities, a minimum of 14 days in advance.

Restoration will be completed in "Year 0". The restored area will be monitored and maintained for up to 5 years (i.e., Years 1 through 5) to document establishment of the desired vegetative community. If performance criteria are met by Year 3, NYSEG may request NYSDEC's approval to cease monitoring, which will be communicated in the Annual Monitoring Report (discussed below).

Vegetation

Planted trees will be individually counted during monitoring events. A quantitative assessment of herbaceous cover will be completed within the restored area using a minimum of five randomly placed 1-meter by 1-meter sample quadrats. Within each quadrat, the following measurements will be taken annually:

- Total vegetative cover
- Total herbaceous cover
- General cover type characterization (i.e., cover percent estimations for various cover types such as vegetation, bare soil, other)
- Identification of predominant species within quadrat
- Percent cover of all species within quadrat
- Average and maximum height of vegetation within quadrat
- Observations of stress or herbivory

Tree counts and assessment of percent cover for herbaceous growth and vegetation restored will include natural recruits of native species, as well as the presence of observed invasive/nuisance species.

Vegetation conditions/quantity will be documented in the field via a Monitoring Inspection Checklist and associated monitoring summary table(s) to be included in the Annual Monitoring Report (as discussed below). Examples of the inspection checklist and summary table are included as Attachment 5. Observations made during the inspections will be photo documented to provide a record of the monitored conditions. Fixed photograph locations will be established in the field to provide a general overview of the stability and development of the vegetative community.

Bank Stability

Qualitative riverbank stability monitoring will be performed at the restored transloading area for up to five years, concurrently with each vegetation monitoring event. During the riverbank inspection, the restored riverbank will be visually inspected for the following:

- Evidence of significant erosion (e.g., undercutting, lateral erosion above rock protection, exposed geotextile fabric, erosion down the face of the bank from surface runoff).
- Areas where excessive settlement has occurred relative to the surrounding areas.
- Drainage problems.

Observed signs of any of these stability inspection elements will be noted on the Monitoring Inspection Checklist (examples included in Attachment 4) and documented in the Annual Monitoring Report (discussed below), as appropriate.

Correction Actions

When conditions are observed requiring maintenance, NYSEG will evaluate what specific corrective actions should be taken. Within three weeks of completing the monitoring event, NYSEG will propose any corrective actions, for NYSDEC review and approval prior to implementation, if required. Alternatively, anticipated corrective actions may be communicated with NYSDEC prior to the monitoring event, such that corrective actions can be implemented during the same mobilization. Corrective actions taken will be documented in the Annual Monitoring Report (discussed below).

For corrective actions to address tree mortality, “equivalent species” that show greater survivability may be favored for replacement plantings (compared to the plant species originally specified) to improve long-term survivability of the vegetation within the restored area. During monitoring activities, observations of species-specific survival characteristics will assist in the design of the replanting efforts, if needed.

Corrective actions may include, but will not be limited to:

- planting alternate vegetation species
- applying additional soil amendment
- implementing a watering plan
- applying herbicides and/or implementing other mechanical controls to address invasive/exotic species

If warranted, additional seeding/planting will be implemented in the spring or fall.

Control of exotic/invasive species will be accomplished through an integrated approach that includes the use of mechanical, chemical and biological methods, as appropriate. The methods and techniques chosen to manage a particular species will depend on the target plant's life history, level of infestation, and other site-specific conditions. NYSEG will coordinate with NYSDEC to review the type and extent of invasive species observed during the annual monitoring events, and then make a cooperative decision regarding potential corrective actions at that time, based on the observed conditions. If necessary, herbicide application will be conducted by a licensed applicator. Additionally, application will occur in terrestrial areas and herbicides will not be applied to bodies of water without pre-approval of an Aquatic Pesticide Permit, pursuant to NYCRR 327. Notification and treatment area posting requirements identified in NYCRR Parts 325 and 327 will be followed as applicable.

If the riverbank areas are observed to show signs of any of the above-mentioned stability inspection elements, appropriate corrective action(s) will be proposed to address any conditions that could jeopardize the stability of the restored banks.

Reporting

An Annual Monitoring Report will be submitted to NYSDEC (each year that monitoring is conducted) to document the results of the annual monitoring event and the as-built condition of corrective actions, if implemented. The reports will include the following:

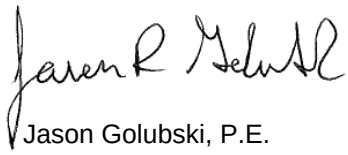
- An introduction, including a summary of the performance criteria and objectives of the annual monitoring events.
- A summary of the methods used to compete the quantitative assessments.
- A summary of the observations made during the monitoring activities, including the quantitative assessment of the vegetative cover throughout the restoration area and a comparison to "as-built" conditions and defined performance criteria.
- Figures illustrating the monitoring plots observed, the location of any key observations made, and photograph locations/direction.
- A photo log depicting the conditions observed during the monitoring event.
- Completed the Monitoring Inspection Checklist and associated summary tables to support the required performance standard calculations.
- A summary of the corrective actions implemented, if any, including photographs and figures.
- Discussion of progress toward, or deviation from, the performance criteria as defined in this Restoration Plan, and if necessary, corrective actions to move or maintain progress toward the performance criteria as defined herein.
- The planned monitoring activities and/or recommendations for the following year, if any.

The Annual Monitoring Report will be submitted to NYSDEC within 90 days of the monitoring event or the completed corrective action, if any are required.

Please contact Tracy Blazicek at 585.484.6839 or tlblazicek@nyseg.com if you have any questions or require any additional information.

Sincerely,

Arcadis of New York, Inc.



Jason Golubski, P.E.
Principal Environmental Engineer

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Mark Gravelding, PE, Arcadis
Dave Perry, DAC
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Jerry Peake, GEI

Enclosures:

Table

1 Tree Removal Summary

Figures

1 Pre-Construction Conditions and Removed Trees
2 Current Transloading Area Restoration Plan
3 Original Transloading Area Restoration Plan

Attachments

1 Tree Survey and Habitat Assessment Letter, September 2018
2 Summary Report for Binghamton Court Street MGP Habitat Assessment and Tree Survey, November 2018
3 Select Specifications
4 Medium Stone Fill Rip Rap Photos
5 Example Monitoring Inspection Checklist and Monitoring Summary Table

Table

Table 1
Summary of Removed Trees
NYSEG Court Street Former MGP Site
Binghamton, New York

Species	Size (in)
Boxelder	12
Boxelder	10
Boxelder	10
Total (Boxelder)	**32**
Cottonwood	20
Cottonwood	9
Cottonwood	11
Cottonwood	14
Cottonwood	12
Total (Cottonwood)	**66**
Silver Maple	10
Silver Maple	8
Silver Maple	11
Silver Maple	6
Silver Maple	9
Silver Maple	12
Silver Maple	12
Silver Maple	6
Silver Maple	10
Silver Maple	10
Silver Maple	9
Silver Maple	21
Silver Maple	6
Silver Maple	16
Silver Maple	23
Silver Maple	26
Silver Maple	12
Silver Maple	14
Silver Maple	40
Silver Maple	16
Silver Maple	10
Silver Maple	9
Silver Maple	11
Total (Silver Maple)	**307**
Total (inches)	**405**
Total Trees	**31**

Figures

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XREFS:
IMAGES:
Design-X01
Design-X16
Design-X17
TARP-X-Titleblock-LDR
VRP-X-TREE Loc
VRP-X- Contours

2018 TREE SURVEY

- BLACK CHERRY
- BLACK WILLOW
- BOXELDER
- COTTONWOOD
- SILVER MAPLE
- SUGAR MAPLE
- REMOVED TREE (2018)

LEGEND:

- PARCEL BOUNDARY
- NYSDEC EASEMENT PARCEL
- RAILROAD TRACK
- MEAN HIGH WATER LEVEL
- 850 TOPOGRAPHIC CONTOUR

NOTES:

1. TREE SURVEY COMPLETED BY GEI CONSULTANTS, INC., PC ON SEPTEMBER 27, 2018 AND OBTAINED FROM GEI FIGURE 1: TREE REMOVAL SURVEY, DATED JULY 2019.
2. TOPOGRAPHIC SURVEY COMPLETED BY DA COLLINS ON OCTOBER 4, 2018 AND OBTAINED FROM DA COLLINGS DRAWING 18514–2
3. HORIZONTAL DATUM (US SURVEY FEET): NORTH AMERICAN DATUM OF 1983 (NAD 83), NEW YORK STATE PLANE COORDINATE SYSTEM, NEW YORK CENTRAL ZONE, FIPSZONE 3102.
4. ALL ELEVATIONS ARE IN FEET AND ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. ALL LOCATIONS, INCLUDING PROPERTY LINES, ARE APPROXIMATE, REFLECT AVAILABLE INFORMATION, ARE PROVIDED FOR REFERENCE ONLY, AND ARE SUBJECT TO FIELD VERIFICATION.
6. MEAN HIGH WATER LEVEL DELINEATED IN THE FIELD BY ARCADIS IN OCTOBER 2017, IN ACCORDANCE WITH RGL 05–05.

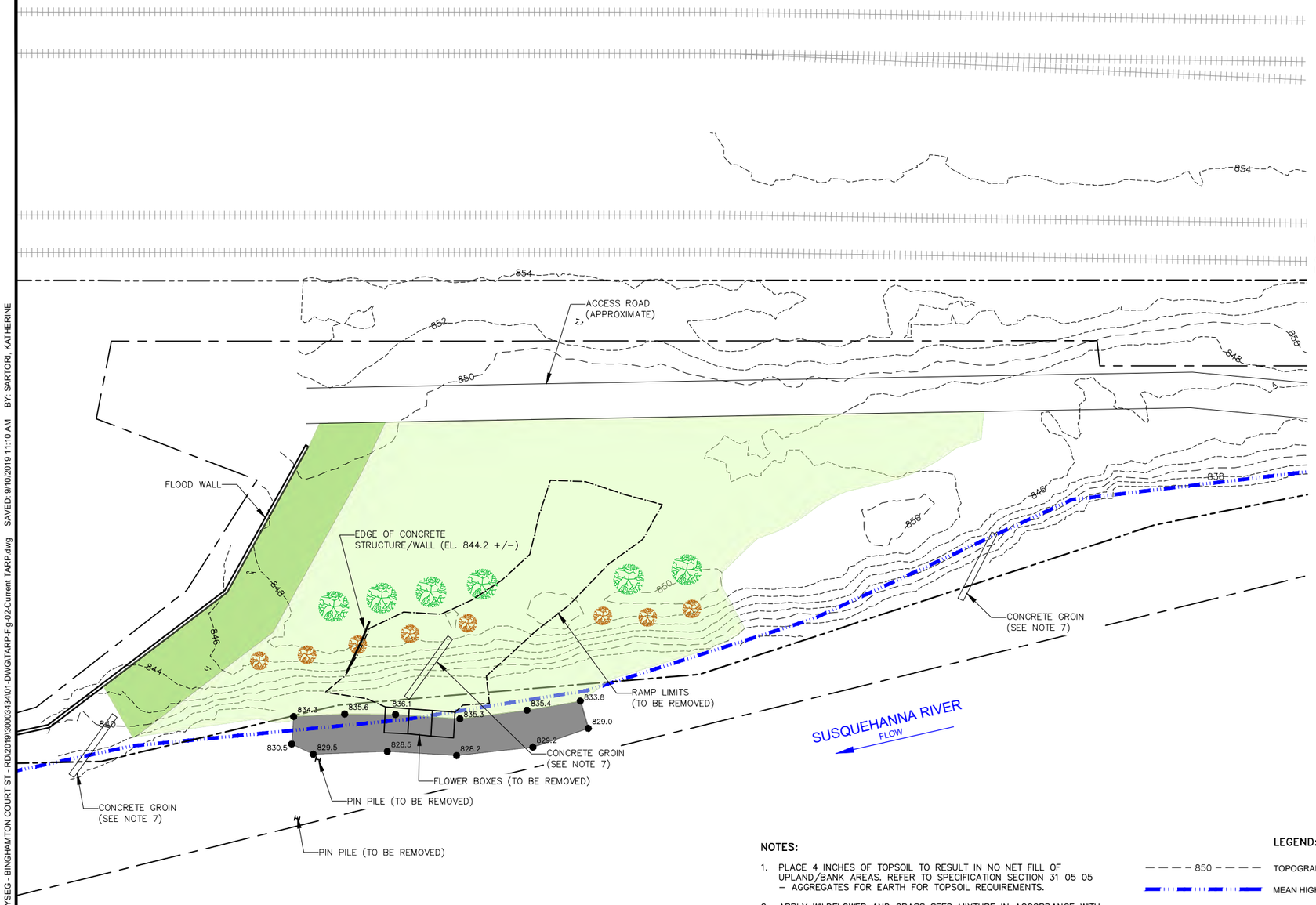
0 60' 120'
GRAPHIC SCALE

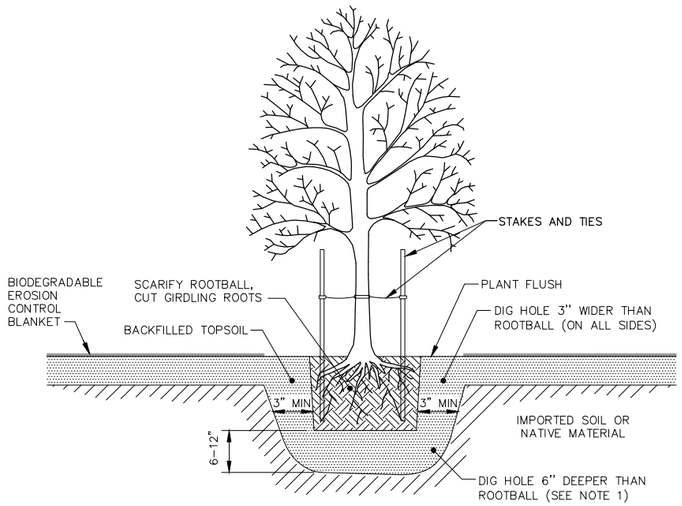
NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK
TRANSLOADING AREA RESTORATION PLAN

PRE-CONSTRUCTION CONDITIONS AND REMOVED TREES

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1





NOTE:

1. IF AT LEAST 6 INCHES OF SOIL IS PRESENT BELOW THE BOTTOM OF THE HOLE 6 INCHES MIN. OF TOPSOIL WILL BE PLACED BELOW THE ROOTBALL. IF LESS THAN 6 INCHES OF NATIVE SOIL IS PRESENT BELOW THE BOTTOM OF THE HOLE, THE HOLE WILL BE DUG DEEPER SUCH THAT UP TO 12 INCHES OF TOPSOIL CAN BE PLACED BELOW THE ROOTBALL.

TYPICAL TREE PLANTING DETAIL 1

NOT TO SCALE

NOTES:

1. PLACE 4 INCHES OF TOPSOIL TO RESULT IN NO NET FILL OF UPLAND/BANK AREAS. REFER TO SPECIFICATION SECTION 31 05 05 – AGGREGATES FOR EARTH FOR TOPSOIL REQUIREMENTS.
2. APPLY WILDFLOWER AND GRASS SEED MIXTURE IN ACCORDANCE WITH SPECIFICATION SECTION 32 92 00 – TURFS AND GRASSES FOR SEED MIX REQUIREMENTS DOWN TO PRE-CONSTRUCTION SCOUR LINE. APPLY FLOOD WALL SEED MIX.
3. PLANT TREES IN ACCORDANCE WITH DETAIL 1 AND SPECIFICATION SECTION 32 90 00 – PLANTINGS AND GENERAL SITE RESTORATION. DO NOT PLANT TREES WITH 20 FEET OF THE FLOOD WALL.
4. MEAN HIGH WATER LEVEL DELINEATED IN THE FIELD BY ARCADIS IN OCTOBER 2017, IN ACCORDANCE WITH RGL 05-05.
5. TREE LOCATIONS MAY BE ADJUSTED IN THE FIELD BASED ON SITE CONDITIONS.
6. EXTENT OF HERBACEOUS GROUND COVER AND RIP RAP IS APPROXIMATE. GROUND COVER TO BE INSTALLED TO MATCH PRE-CONSTRUCTION VEGETATION/SCOUR LINE. RIP RAP TO BE INSTALLED FROM VEGETATION/SCOUR LINE TO TOE OF BANK SLOPE.
7. CONCRETE GROINS NOT ENCOUNTERED IN THE FIELD AND ARE SHOWN PER NYSDEC'S REQUEST. LOCATIONS ARE APPROXIMATE BASED ON DRAWING FROM SOUTHERN NEW YORK FLOOD CONTROL PROJECT, BINGHAMTON NY SECTION NO. 3, PLAN AND PROFILE, FILE NO. 6406-44, ISSUED 10/22/1940, REVISED 8/1/41.

LEGEND:

- 850 — TOPOGRAPHIC CONTOURS
- MEAN HIGH WATER LEVEL (SEE NOTE 4)
- PARCEL BOUNDARY
- NYSDEC EASEMENT PARCEL
- RAILROAD TRACK
- FLOOD WALL
- SILVER MAPLES
- RED MAPLES
- HERBACEOUS GROUND COVER (WILDLIFE AND GRASS SEED MIX)
- HERBACEOUS GROUND COVER (FLOOD WALL SEED MIX)
- RIPRAP
- SURVEYED POINTS WITH ELEVATIONS

0 20' 40'
GRAPHIC SCALE

NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK
TRANSLOADING AREA RESTORATION PLAN

CURRENT TRANSLOADING AREA RESTORATION PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

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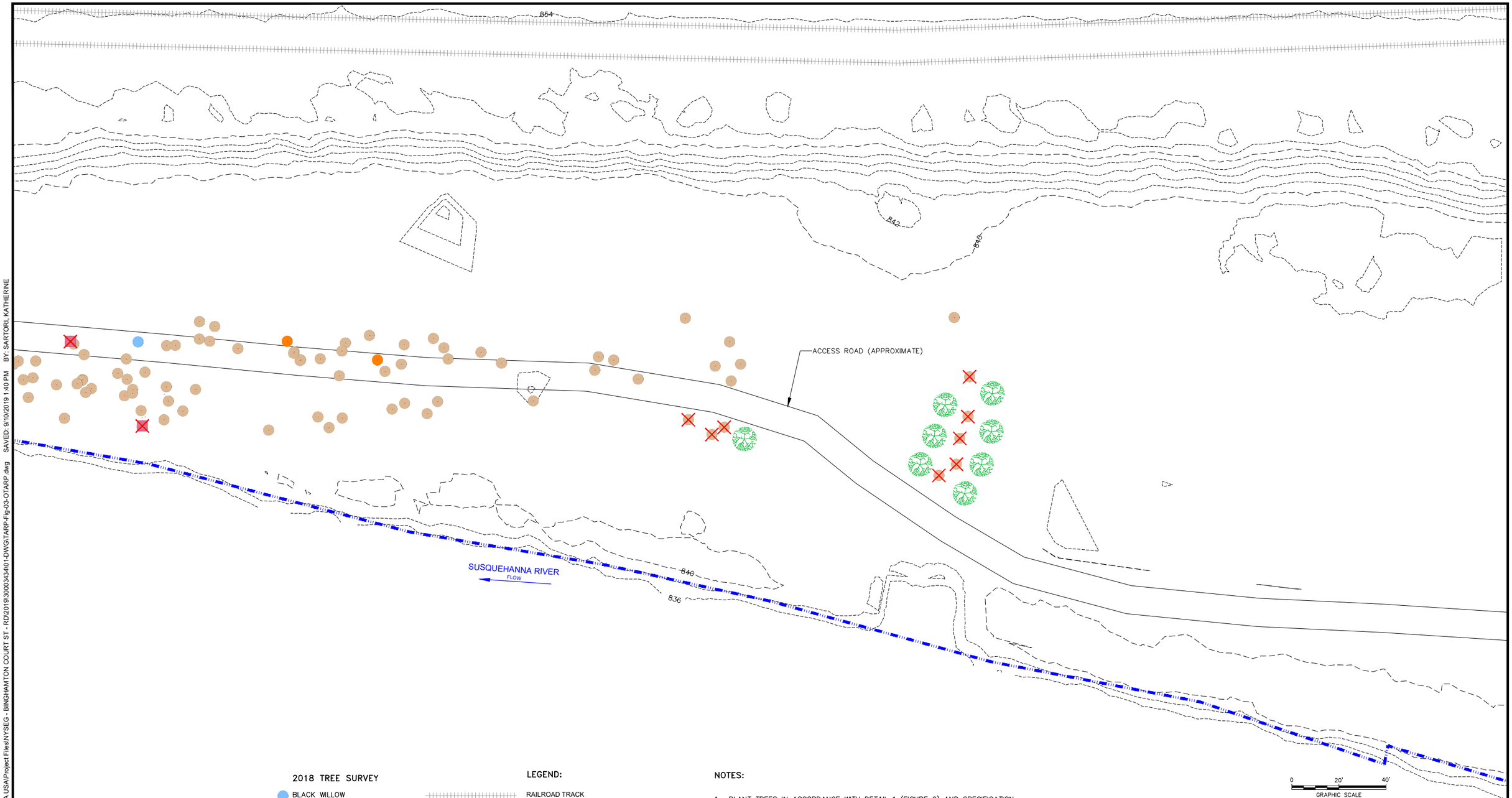
VRP-X- Contours



2018 TREE SURVEY

- BLACK WILLOW
- SILVER MAPLE
- SUGAR MAPLE
- REMOVED TREE (2018)

LEGEND:

- RAILROAD TRACK
- MEAN HIGH WATER LEVEL (SEE NOTE 2)
- 850 TOPOGRAPHIC CONTOUR
- SILVER MAPLES

NOTES:

1. PLANT TREES IN ACCORDANCE WITH DETAIL 1 (FIGURE 2) AND SPECIFICATION SECTION 32 90 00 –PLANTINGS AND GENERAL SITE RESTORATION.
2. MEAN HIGH WATER LEVEL DELINEATED IN THE FIELD BY ARCADIS IN OCTOBER 2017, IN ACCORDANCE RGL 05–05.
3. TREE LOCATIONS MAY BE ADJUSTED IN THE FIELD BASE ON SITE CONDITIONS.

NYSEG
COURT STREET FORMER MGP SITE
BINGHAMTON, NEW YORK

TRANSLOADING AREA RESTORATION PLAN

ORIGINAL TRANSLOADING AREA RESTORATION PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

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XREFS: IMAGES:
Design-X01
Design-X16
Design-X17
TARP-X-Titleblock-LDR
VRP-X- Contours

Attachment 1

Tree Survey and Habitat Assessment Letter, September 2018

ARCADIS Design & Consultancy for natural and built assets

Tracy Blazicek, CHMM
Lead Environmental Analyst
Site Investigation and Remediation
New York State Electric & Gas Corporation
18 Link Drive
Binghamton, New York 13904

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ENVIRONMENT

Subject:
Binghamton Court Street Former MGP Site
Tree Survey and Habitat Assessment

Date:
November 27, 2017

Contact:
Jason Golubski, PE

Phone:
315.671.9437

Email:
jason.golubski@arcadis.com

Our ref:
B0013103.0010.00001

Dear Mr. Blazicek:

The letter presents a summary of the tree survey and habitat assessment activities completed in connection with Operable Unit No. 2 (OU-2) of NYSEG's the former manufactured gas plant (MGP) site located on Court Street in Binghamton, New York (the Site). These activities were performed to support development of the Joint Application Permit (JAP) to obtain a United States Army Corps of Engineers (USACE) Nationwide Permit 38 (NWP 38) and a New York State Department of Environmental Conservation (NYSDEC) Water Quality Certification (WQC) under Section 401 of the Clean Water Act.

The tree survey and habitat assessment activities were completed on October 16 and 17, 2017 in the following areas:

- The length of the proposed temporary access road, a minimum of 15 feet on either side of the proposed road, or to a property boundary or natural boundary (e.g., the Susquehanna River), whichever is first.
- The entire area provided to the Remediation Contractor for use as the transloading area.
- Any other small areas that the potential Remediation Contractors identified (during bidding) as possible support areas that may require clearing.

Within the investigation areas, Arcadis identified the following:

- All trees greater than 3 inches diameter breast height (DBH).
- Potential trees that may support summer roosting for the state and federally threatened northern long-eared bat.
- Representative vegetative communities found with the surveyed area.
- The approximate ordinary high-water mark (OHWM) / mean high-water level (MHWL) found throughout the transloading area.

A summary tree survey and habitat assessment are presented in the following sections.

Tree Survey

Tree locations are shown on Figure 1 and a summary of the tree species and sizes are provided in Table 1. Arcadis identified and measured 457 trunks greater than 3 inches DBH from 296 individual trees. A total of 13 tree species were identified throughout the surveyed area, with silver maple being the most dominant species observed. During the tree survey both red maples and silver maples were observed, but also potential hybrids of the two species were noted by melds of bark appearance, bud structure, and leaf characteristics. Trees were speciated by these three characteristics and defaulted to bark and bud structure when leaf characteristics were non-descript.

Habitat Assessment

Within the surveyed area, five distinct vegetative communities were observed, including successional field, forested floodplain, wet meadow wetland, and two types of vegetated banks. Surveyed plot areas are indicated on Figure 2 and a summary of the dominant vegetation species and relative percent cover observed within each vegetative stratum is presented in Table 2. Canopies found within most of the areas were dominated by red maple and silver maple. As noted above, potential hybridization of red maple and silver maple were observed within this floodplain area. Several invasive plant and shrub species were observed within these habitats, including Japanese knotweed, purple loosestrife, and Tartarian honeysuckle. Additionally, ten silver maple trees with potential northern long-eared bat summer roosting habitat (e.g., cavities, exfoliated bark) were identified throughout the surveyed area.

A total of 38 approximate OHWM / MHWL locations were assessed throughout the transloading area and slightly downstream. The identified OHWM / MHWL is shown on Figure 2.

A general bank assessment was performed at five representative areas, as shown on Figure 2. At location BS1, an approximately 30% slope was observed and was likely the most accessible area to set up near-shore transloading of materials and equipment. Other areas assessed included a gas pipeline crossing (BS2), high cut bank with erosion (BS3), steep slope (60-70%) at BS4, and highly eroded bank (BS5). A representative photo log showing examples of the vegetative communities, potential roost trees, OHWM / MHWLs and existing banks is provided as Attachment 1.

Sincerely,

Arcadis of New York, Inc.

Jason Golubski, PE
Senior Environmental Engineer

Copies:
Jason Vogel, Arcadis

Enclosures:

Tables

1 Tree Survey Results
2 Vegetation Characterization – Uplands and Banks

Figures

1 OU-2 Tree Survey
2 OU-2 Habitat Assessment

Attachment

1 Photo Log

TABLES

Table 1
Tree Survey Results
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
1	Silver maple	9.8	1	
2	Silver maple	35.8	1	
3	Silver maple	29.5	1	
4	Silver maple	11.5	1	
5	Silver maple	18.5	1	
6	Green ash	15.7	2	
7	Green ash	15.1	2	
8	Box elder	3.7	3	
9	Cottonwood	4.8	4	
10	Staghorn sumac	5.0	5	
11	Green ash	8.4	6	
12	Box elder	8.3	7	
13	Silver maple	10.9	8	
14	Silver maple	15.7	9	
15	Box elder	6.3	10	
16	Box elder	6.2	11	
17	Black walnut	16.8	12	
18	Silver maple	62.3	13	
19	Box elder	5.1	14	
20	Box elder	3.5	15	
21	Box elder	4.4	16	
22	Silver maple	5.4	17	
23	Silver maple	12.5	17	
24	Silver maple	18.4	17	
25	Silver maple	13.9	17	
26	Silver maple	6.7	18	
27	Silver maple	9.7	18	
28	Green ash	3.1	19	
29	Silver maple	12.3	20	
30	Green ash	6.8	21	
31	Silver maple	14.8	22	
32	Silver maple	9.4	23	
33	Black cherry	5.1	24	
34	Black walnut	12.4	25	
35	Black cherry	4.1	26	
36	Green ash	7.6	27	
37	Green ash	5.8	28	
38	Silver maple	5.7	29	
39	Silver maple	8.7	29	
40	Silver maple	46.3	29	
41	Silver maple	18.2	30	
42	Silver maple	16.5	30	
43	Silver maple	16.7	30	
44	Silver maple	14.9	30	

Table 1
Tree Survey Results
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
45	Silver maple	28.8	30	
46	Silver maple	11.4	31	
47	Silver maple	10.2	32	
48	Silver maple	4.7	32	
49	Silver maple	13.9	33	
50	Silver maple	9.5	34	
51	Silver maple	5.4	34	
52	Silver maple	8.7	34	
53	Silver maple	14.6	35	
54	Silver maple	8.9	36	
55	Silver maple	7.9	36	
56	Silver maple	7.6	37	
57	Silver maple	9.2	38	
58	Box elder	8.9	39	
59	Speckled alder	4.6	40	
60	Silver maple	23.7	41	
61	Silver maple	4.0	42	
62	Box elder	8.9	43	
63	Cottonwood	7.0	44	
64	Cottonwood	4.2	45	
65	Silver maple	3.1	46	
66	Cottonwood	3.1	47	
67	Cottonwood	3.1	48	
68	Cottonwood	3.8	49	
69	Cottonwood	4.5	50	
70	Cottonwood	6.7	51	
71	Cottonwood	8.8	52	
72	Silver maple	4.6	53	
73	Cottonwood	10.8	54	
74	Cottonwood	15.0	54	
75	Cottonwood	32.8	54	
76	Grey birch	8.7	55	
77	Grey birch	5.6	55	
78	Grey birch	8.5	55	
79	Grey birch	6.3	55	
80	Grey birch	6.0	55	
81	Staghorn sumac	3.1	56	
82	Box elder	13.3	57	
83	Box elder	12.0	57	
84	Box elder	11.2	57	
85	Box elder	12.5	58	
86	Silver maple	12.5	59	
87	Silver maple	9.7	59	
88	Silver maple	13.0	60	
89	Silver maple	8.8	60	
90	Silver maple	18.7	60	
91	Silver maple	22.9	60	
92	Green ash	15.5	61	

Table 1
Tree Survey Results
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
93	Silver maple	12.9	62	
94	Silver maple	5.2	62	
95	Black cherry	3.8	63	
96	Box elder	3.4	64	
97	Silver maple	13.2	65	Potential roost tree
98	Silver maple	6.2	65	Potential roost tree
99	Silver maple	52.8	65	Potential roost tree
100	Box elder	8.0	66	
101	Box elder	20.5	67	
102	Box elder	3.9	68	
103	Box elder	4.4	68	
104	Silver maple	14.1	69	
105	Silver maple	13.7	69	
106	Silver maple	7.9	69	
107	Box elder	16.2	70	
108	Green ash	6.5	71	
109	Box elder	11.9	72	
110	Silver maple	11.0	73	
111	Cottonwood	32.3	74	
112	Cottonwood	27.5	74	
113	Silver maple	6.7	75	
114	Silver maple	15.4	75	
115	Silver maple	13.2	75	
116	Box elder	9.9	76	
117	Green ash	11.2	77	
118	Green ash	14.3	77	
119	Box elder	8.5	78	
120	Red maple	11.7	79	
121	Silver maple	15.4	80	
122	Silver maple	19.0	81	
123	Silver maple	11.3	82	
124	Silver maple	4.6	82	
125	Silver maple	14.1	82	
126	Silver maple	9.8	82	
127	Silver maple	4.8	83	
128	Silver maple	16.3	84	
129	Silver maple	8.7	85	
130	Cottonwood	32.8	86	
131	Silver maple	17.0	87	
132	Silver maple	3.7	88	
133	Silver maple	9.8	88	
134	Silver maple	15.2	88	
135	Silver maple	8.0	89	
136	Silver maple	8.2	90	
137	Silver maple	6.2	91	
138	Silver maple	14.3	91	
139	Silver maple	12.7	92	
140	Silver maple	10.9	92	

Table 1
Tree Survey Results
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
141	Silver maple	25.1	92	
142	Silver maple	5.8	92	
143	Box elder	13.2	93	
144	Silver maple	24.5	94	
145	Box elder	3.6	95	
146	Box elder	9.5	95	
147	Box elder	16.2	96	
148	Box elder	13.2	96	
149	Silver maple	12.4	97	
150	Silver maple	16.5	98	
151	Silver maple	40.1	98	
152	Silver maple	16.2	99	
153	American elm	3.0	100	
154	Silver maple	13.6	101	
155	Silver maple	11.0	102	
156	Silver maple	14.7	103	
157	Silver maple	17.7	104	
158	Silver maple	3.5	105	
159	American elm	5.5	106	
160	Silver maple	9.1	107	
161	Silver maple	10.8	108	
162	Silver maple	10.0	109	
163	Silver maple	10.7	109	
164	Silver maple	10.7	109	
165	Silver maple	7.5	110	
166	Silver maple	12.4	110	
167	Silver maple	16.0	111	
168	Silver maple	8.5	112	
169	Silver maple	10.7	112	
170	Silver maple	16.8	112	
171	Silver maple	4.8	112	
172	Silver maple	16.5	112	
173	Silver maple	15.3	113	
174	Silver maple	14.6	113	
175	Silver maple	13.5	113	
176	Silver maple	10.8	114	
177	Silver maple	16.2	115	
178	Silver maple	6.5	116	
179	Silver maple	7.3	117	
180	Silver maple	6.6	117	
181	Silver maple	8.9	118	
182	Silver maple	9.9	119	
183	Silver maple	14.4	120	
184	Silver maple	12.2	121	
185	Silver maple	3.7	122	
186	Silver maple	6.0	122	
187	Silver maple	7.9	122	
188	Silver maple	11.1	123	

Table 1
Tree Survey Results
NYSEG
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Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
189	Silver maple	9.4	124	
190	Cottonwood	20.5	125	
191	Silver maple	13.0	126	
192	Silver maple	7.6	127	
193	Silver maple	8.5	128	
194	Silver maple	5.3	129	
195	Silver maple	10.1	129	
196	Silver maple	9.7	130	
197	Silver maple	15.9	130	
198	Silver maple	7.4	131	
199	Cottonwood	27.4	132	
200	Silver maple	13.7	133	
201	Silver maple	7.7	134	
202	Silver maple	12.6	135	
203	Silver maple	4.3	136	
204	Silver maple	9.2	137	
205	Silver maple	11.0	138	
206	Silver maple	11.5	138	
207	Silver maple	9.9	139	
208	Black willow	12.8	140	
209	Black willow	11.5	140	
210	Silver maple	16.0	141	
211	Silver maple	7.2	141	
212	Silver maple	6.7	142	
213	Silver maple	18.3	143	
214	Silver maple	11.5	144	
215	Silver maple	11.2	144	
216	Silver maple	15.5	144	
217	Silver maple	5.5	144	
218	Silver maple	8.6	144	
219	Silver maple	10.2	144	
220	Silver maple	5.5	145	
221	Silver maple	5.5	145	
222	Silver maple	23.4	145	
223	Silver maple	22.6	145	
224	Silver maple	9.3	146	
225	Silver maple	9.8	146	
226	Silver maple	9.5	147	
227	Silver maple	9.5	148	
228	Silver maple	6.5	149	
229	Silver maple	6.3	150	
230	Silver maple	7.2	150	
231	Silver maple	7.7	151	
232	Silver maple	10.3	152	
233	Silver maple	10.5	153	
234	Silver maple	4.7	154	
235	Silver maple	9.8	155	
236	Silver maple	8.2	156	

Table 1
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Tag #	Species	DBH (in)	Tree #	Notes
237	Silver maple	12.2	157	
238	Silver maple	9.4	158	
239	Silver maple	12.2	159	
240	Silver maple	7.9	160	
241	Silver maple	15.6	160	
242	Silver maple	4.3	161	
243	Silver maple	8.8	161	
244	Silver maple	7.9	162	
245	Silver maple	12.3	162	
246	Silver maple	5.6	162	
247	Silver maple	8.0	162	
248	Silver maple	7.6	162	
249	Silver maple	4.0	163	
250	Silver maple	13.2	163	
251	Silver maple	4.6	164	
252	Silver maple	7.3	165	
253	Silver maple	9.4	166	
254	Silver maple	8.6	166	
255	Silver maple	9.4	167	
256	Red maple	10.8	168	
257	Red maple	11.1	168	
258	Silver maple	6.8	169	
259	Silver maple	12.2	170	
260	Silver maple	13.6	171	
261	Silver maple	12.4	172	
262	Silver maple	14.0	172	
263	Silver maple	8.8	173	
264	Silver maple	17.6	174	
265	Silver maple	9.2	175	
266	Silver maple	9.7	176	
267	Silver maple	10.4	176	
268	American elm	3.5	177	
269	Box elder	14.2	178	
270	Box elder	16.4	178	
271	Box elder	5.3	179	
272	Box elder	13.4	179	
273	Box elder	25.8	180	
274	Box elder	7.3	181	
275	American elm	5.7	182	
276	Box elder	13.0	183	
277	Box elder	17.0	183	
278	Cottonwood	17.4	184	
279	Cottonwood	18.7	184	
280	Cottonwood	14.2	184	
281	Cottonwood	29.0	184	
282	Cottonwood	24.2	184	
283	Box elder	6.0	184	
284	Box elder	8.8	185	

Table 1
Tree Survey Results
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
285	Box elder	16.4	186	
286	Silver maple	13.5	187	
287	Silver maple	7.3	187	
288	Silver maple	9.8	187	
289	Silver maple	13.5	187	
290	Silver maple	17.4	187	
291	Silver maple	5.4	188	
292	Silver maple	5.2	188	
293	Silver maple	7.1	188	
294	Silver maple	11.9	188	
295	Silver maple	7.2	188	
296	Silver maple	22.3	188	
297	Box elder	15.4	189	
298	Silver maple	7.1	190	
299	Silver maple	10.3	190	
300	Silver maple	4.5	190	
301	Silver maple	16.2	191	
302	Box elder	16.4	192	
303	Box elder	7.9	193	
304	Silver maple	18.0	194	
305	Silver maple	6.8	194	
306	Silver maple	15.8	194	
307	Silver maple	5.3	194	
308	Silver maple	9.2	194	
309	Silver maple	8.5	194	
310	Silver maple	10.6	194	
311	Box elder	8.0	195	
312	Box elder	11.9	196	
313	Box elder	10.6	197	
314	Box elder	8.0	198	
315	Box elder	9.9	199	
316	Norway maple	3.4	200	
317	Silver maple	15.8	201	
318	Silver maple	6.0	201	
319	Silver maple	16.0	202	
320	Silver maple	6.7	203	
321	Silver maple	7.7	204	
322	Silver maple	5.8	205	
323	Silver maple	9.9	206	Potential roost tree
324	Silver maple	13.2	207	
325	Silver maple	11.1	208	
326	Silver maple	6.6	209	
327	Silver maple	7.2	120	
328	Silver maple	11.2	211	
329	Silver maple	5.8	212	
330	Silver maple	7.3	213	
331	Red maple	5.9	214	
332	Silver maple	10.4	215	

Table 1
Tree Survey Results
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
333	Silver maple	10.5	216	
334	Silver maple	8.1	217	
335	Red maple	5.4	218	
336	Red maple	9.9	219	
337	Red maple	10.8	220	
338	Red maple	9.9	221	
339	Red maple	7.0	222	
340	Red maple	7.8	223	
341	Red maple	9.1	224	
342	Red maple	8.8	225	
343	Red maple	8.6	226	
344	Silver maple	7.5	227	
345	Red maple	5.7	228	
346	Red maple	6.3	229	
347	Red maple	9.4	230	
348	Red maple	6.8	231	
349	Red maple	8.8	232	
350	Red maple	5.1	233	
351	Red maple	8.4	234	
352	Red maple	12.0	235	
353	Red maple	9.1	236	
354	Red maple	11.8	237	
355	Red maple	9.5	237	
356	Red maple	18.3	237	
357	Red maple	7.2	238	
358	Red maple	6.9	238	
359	Red maple	9.2	238	
360	Red maple	8.1	239	
361	Red maple	10.0	240	
362	Red maple	9.4	240	
363	Red maple	10.8	240	
364	Red maple	13.4	241	
365	Red maple	6.4	241	
366	Silver maple	24.5	242	
367	Silver maple	19.1	243	Closest trunk included
368	Silver maple	15.1	244	Closest trunk included
369	Silver maple	13.6	245	
370	Red maple	10.8	126	
371	Red maple	9.2	247	
372	Red maple	11.4	248	
373	Red maple	9.2	249	
374	Red maple	8.8	250	
375	Red maple	12.2	251	
376	Red maple	8.9	252	
377	Red maple	10.4	253	
378	Red maple	9.8	254	
379	Red maple	10.3	255	
380	Red maple	9.9	256	

Table 1
Tree Survey Results
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
381	Red maple	14.2	257	
382	Red maple	9.9	258	
383	Red maple	10.0	258	
384	Red maple	4.3	258	
385	Red maple	7.4	259	
386	Silver maple	8.6	260	
387	Silver maple	18.6	260	
388	Silver maple	11.5	261	
389	Silver maple	14.5	261	
390	Silver maple	10.1	261	
391	Silver maple	15.3	262	
392	Silver maple	14.1	263	
393	Silver maple	12.5	263	
394	Silver maple	16.7	263	
395	Red maple	16.2	264	
396	Silver maple	21.9	265	
397	Box elder	9.9	266	
398	Red maple	13.0	267	
399	Black walnut	3.9	268	
400	Black walnut	4.0	269	
401	Silver maple	12.2	270	Potential roost tree
402	Silver maple	37.0	270	Potential roost tree
403	Silver maple	6.6	270	Potential roost tree
404	Silver maple	29.4	270	Potential roost tree
405	Silver maple	15.1	270	Potential roost tree
406	Silver maple	26.8	271	Potential roost tree
407	Silver maple	12.0	271	Potential roost tree
408	Silver maple	42.8	271	Potential roost tree
409	Silver maple	9.9	272	
410	Silver maple	28.9	273	
411	Silver maple	13.0	274	
412	Silver maple	5.7	275	
413	Silver maple	32.7	275	
414	Silver maple	12.1	275	
415	Silver maple	8.2	276	
416	Silver maple	13.8	276	
417	Silver maple	25.3	276	
418	Silver maple	8.7	277	
419	Silver maple	9.3	277	
420	Silver maple	5.4	278	
421	Silver maple	5.0	278	
422	Silver maple	10.0	278	
423	Silver maple	41.2	278	
424	Box elder	5.5	279	
425	Silver maple	36.2	280	Potential roost tree
426	Silver maple	52.7	281	Potential roost tree
427	Box elder	6.9	282	
428	Box elder	8.1	282	

Table 1
Tree Survey Results
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Tag #	Species	DBH (in)	Tree #	Notes
429	Box elder	14.4	282	
430	Box elder	15.2	282	
431	Silver maple	26.5	283	Potential roost tree
432	Silver maple	22.8	283	Potential roost tree
433	Silver maple	7.2	283	Potential roost tree
434	Silver maple	26.7	283	Potential roost tree
435	Silver maple	18.5	284	
436	Silver maple	23.6	284	
437	Silver maple	29.0	284	
438	Silver maple	17.7	285	
439	Silver maple	24.6	285	
440	Silver maple	21.0	286	Potential roost tree
441	Black walnut	10.0	287	
442	Silver maple	55.0	288	Potential roost tree
443	Silver maple	31.8	288	Potential roost tree
444	Silver maple	28.2	289	
445	Black walnut	3.2	290	
446	Silver maple	11.5	291	Potential roost tree
447	Silver maple	13.9	291	Potential roost tree
448	Silver maple	46.5	291	Potential roost tree
449	Silver maple	32.0	291	Potential roost tree
450	Silver maple	15.8	292	
451	Silver maple	19.9	292	
452	Silver maple	16.4	293	
453	Silver maple	20.5	293	
454	Black walnut	5.2	294	
455	Silver maple	12.2	295	
456	Silver maple	34.5	296	Potential roost tree
457	Silver maple	16.3	296	Potential roost tree

Notes:
1. Tree survey conducted on October 16 and 17, 2017 by Arcadis.
2. Tag # identifies all individual trunks that were greater than 3 inch DBH.

DBH = diameter at breast height
in = inches

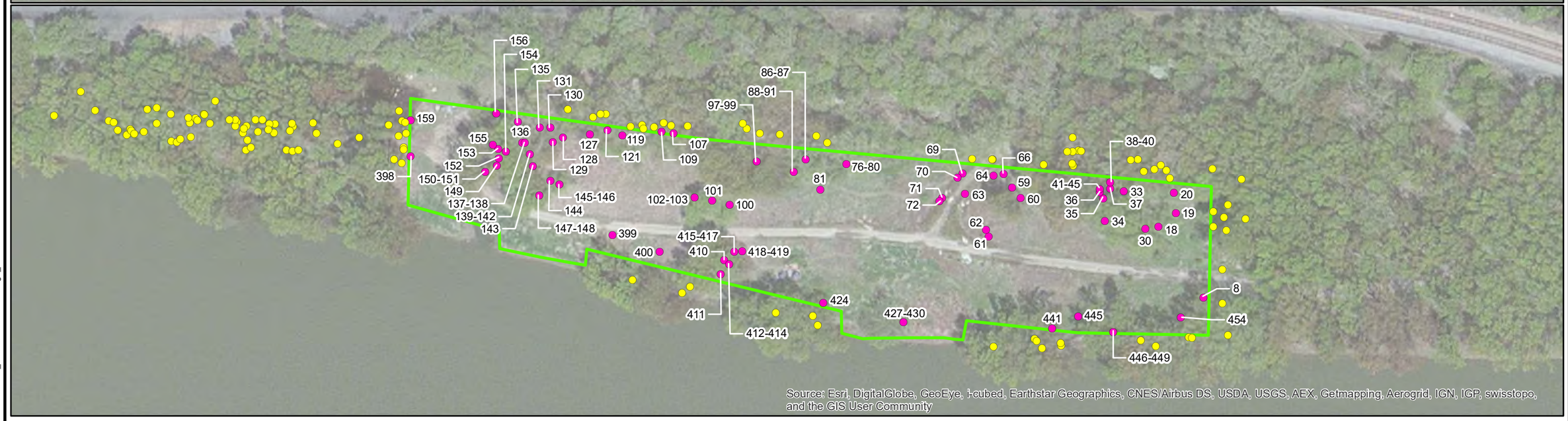
Table 2
Vegetation Characterization - Uplands and Banks
NYSEG
Binghamton Court Street Former MGP Site
Binghamton, New York

Vegetative Stratum / Species	Successional Field	Forested Floodplain	Wet Meadow Wetland	Bank (Native)	Bank (Disturbed)
Dominant Herbaceous Species					
	Japanese knotweed	Box elder seedlings	Carex spp. (sedges)	Reed canary grass	Japanese knotweed
	Late goldenrod	Garlic mustard		Riverbank rye	Riverbank grape
	Purple loosestrife	Late Goldenrod		Sensitive fern	
	Reed canary grass				
Herbaceous Cover (%)	**100**	**25-30**	**100**	**90**	**100**
Dominant Shrub Species					
	Cottonwood saplings	Box elder	Thimbleberry	Green ash	
	Silky dogwood	Green ash		Silky dogwood	
	Staghorn sumac	Tartarian honeysuckle			
Shrub Cover (%)	**10**	**40**	**10**	**85**	**0**
Dominant Tree Species					
	Red maple	Red maple	Box elder	Red maple	Red maple
	Silver maple	Silver maple	Red maple	Silver maple	Silver maple
			Silver maple		
Canopy Cover (%)	**<5**	**75**	**5-10**	**20**	**40**

Note:

1. Site observations of vegetative communities found within potential limits of disturbance were conducted on October 17, 2017 by Arcadis.

FIGURES



Legend

- TREES - EXISTING
- TREES - POTENTIAL REMOVAL
- POTENTIAL ACCESS AREA

NOTES:

1. HABITAT SURVEY PERFORMED BY ARCADIS ON OCTOBER 16-17, 2017.

0 100 200 Feet

GRAPHIC SCALE

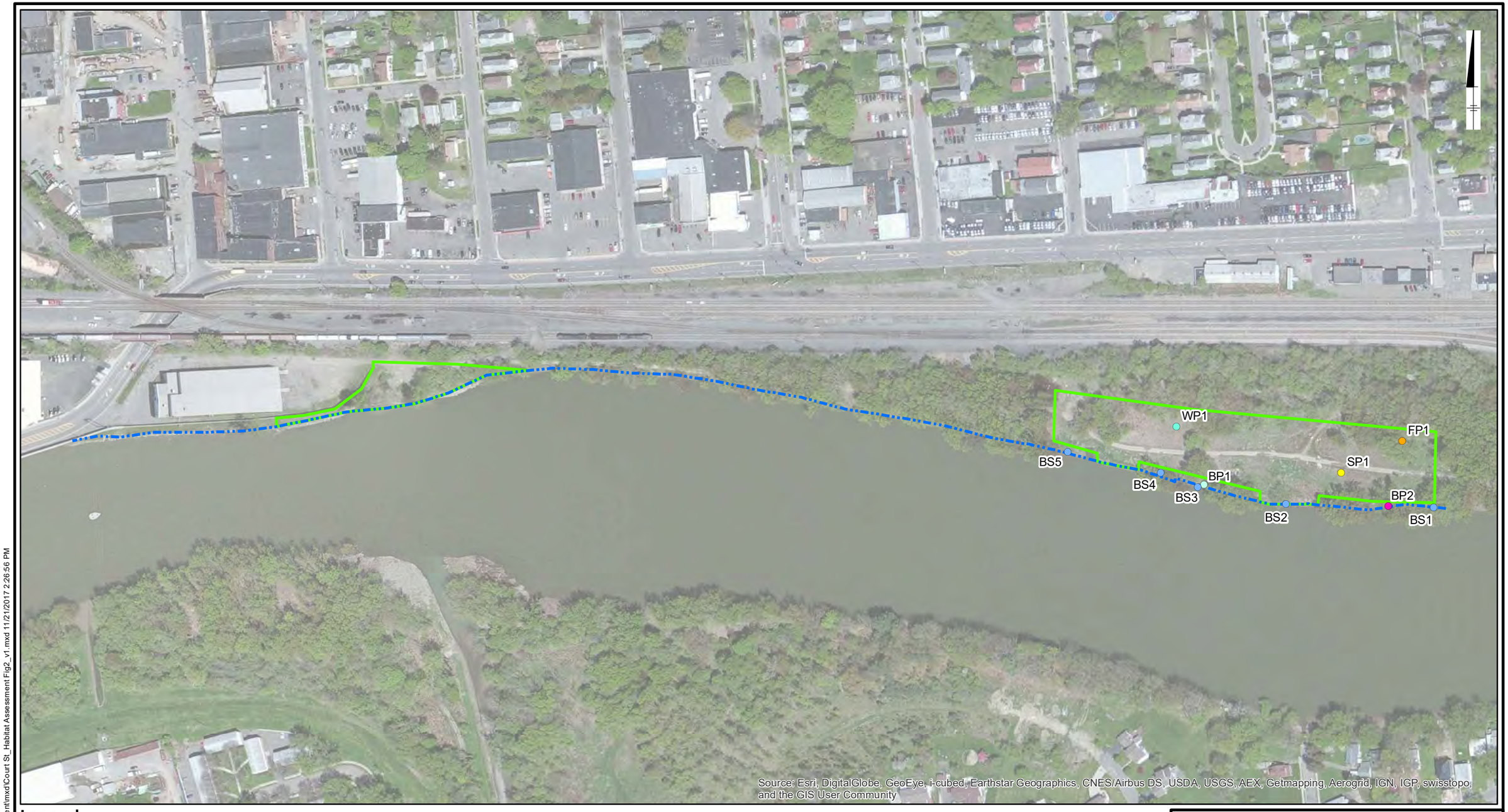
NYSEG
BINGHAMTON COURT ST. FORMER MGP SITE
BINGHAMTON, NEW YORK

OU-2 TREE SURVEY

ARCADIS

FIGURE
1

City: Div/Group: Created By: Last Saved By: jbistrovich
Project (Project #)
Q:\NYSEG\Binghamton_NY\Habitat Assessment\mxd\Court St_Habitat Assessment Fig1_v1.mxd 11/21/2017 2:27:49 PM



Legend

- SUCCESSIONAL FIELD
- FORESTED FLOODPLAIN
- WET MEADOW WETLAND
- RIVERBANK - DISTURBED
- RIVERBANK - NATURAL
- RIVERBANK ASSESSMENT AREA
- MEAN HIGH WATER LEVEL
- POTENTIAL TRANSLOADING AREA

NOTES:

1. HABITAT SURVEY PERFORMED BY ARCADIS ON OCTOBER 16-17, 2017.
2. MEAN HIGH WATER LEVEL DETERMINED IN THE FIELD IN ACCORDANCE WITH RGL 05-05.

0 200 400 Feet

GRAPHIC SCALE

NYSEG
BINGHAMTON COURT ST. FORMER MGP SITE
BINGHAMTON, NEW YORK

OU-2 HABITAT ASSESSMENT

ARCADIS

FIGURE 2

City: Div/Group: Created By: Last Saved By: jbistrovich
Project (Project #)
Q:\NYSEG\Binghamton_NY\Habitat Assessment\mxd\Court St_Habitat Assessment Fig2_v1.mxd 11/21/2017 2:26:56 PM

ATTACHMENT 1

Photo Log

PHOTOGRAPH LOG

New York State Gas & Electric Corporation
Binghamton - Court Street Former MGP Site
Binghamton, NY

Photograph: 1

Description:
Successional Field

Location: SP1

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 2

Description:
Forested Floodplain

Location: FP1

Photograph taken by:
Jason Vogel

Date: 10/16/2017

New York State Gas & Electric Corporation
Binghamton - Court Street Former MGP Site
Binghamton, NY

Photograph: 3

Description:
Wet Meadow Wetland

Location: WP1

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 4

Description:
Bank (Native)

Location: BP1

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 5

Description:
Bank (Disturbed)

Location: BP2

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 6

Description:
Potential roost tree with exfoliating bark

Location:
Tree #65 - Silver maple

Photograph taken by:
Jason Vogel

Date: 10/16/2017

Photograph: 7

Description:
Potential roost tree with large cavity

Location:
Tree #206 - Silver maple

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 8

Description:
OHWM – rock staining and vegetation break

Location:
OHW7

Photograph taken by:
Jason Vogel

Date: 10/16/2017

Photograph: 9

Description:
OHWM – well-defined vegetation break

Location:
OHW10

Photograph taken by:
Jason Vogel

Date: 10/16/2017

Photograph: 10

Description:
OHWM – exposed root line on eroded bank

Location:
OHW20

Photograph taken by:
Jason Vogel

Date: 10/16/2017

Photograph: 11

Description:
OHWM – erosion line present

Location:
OHW28

Photograph taken by:
Jason Vogel

Date: Click here to enter a date.

Photograph: 12

Description:
Bank assessment area

Location:
BS1

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 13

Description:
Bank assessment area

Location:
BS2

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 14

Description:
Bank assessment area

Location:
BS3

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 15

Description:
Bank assessment area

Location:
BS4

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Photograph: 16

Description:
Bank assessment area

Location:
BS5

Photograph taken by:
Jason Vogel

Date: 10/17/2017

Attachment 2

Summary Report for Binghamton Court Street MGP Habitat Assessment and Tree Survey, November 2018

November 1, 2018
Project: 1803107

Consulting
Engineers and
Scientists

VIA EMAIL: tlblazicek@nyseg.com

Mr. Tracy Blazicek
NYSEG
18 Link Drive
Binghamton, New York 13902

Re: Summary Report for Binghamton Court Street Former MGP Habitat Assessment and Tree Survey

Dear Tracy:

On September 27, 2018, GEI Consultants, Inc., P.C. (GEI) completed the field data collection for the Binghamton Court Street Former MGP OU2 Habitat Assessment and Tree Survey. This summary letter report is being sent as a notification and summary of findings, thus completing our approved tasks on this portion of the project.

Methodology

As outlined in GEI's project scope of work, GEI has performed a Habitat Assessment and Tree Survey of the proposed access road along the northern bank of the Susquehanna River, behind the ScottTech building and on the Norfolk Southern Railroad property. The Habitat Assessment and Tree Survey was performed in accordance with Scope of Work Payment Item No. 5. The Habitat Assessment and Tree Survey was performed for the following areas:

- The length of the proposed temporary access road, a minimum of 15 feet on either side of the proposed road or to a property boundary or natural boundary (e.g., the Susquehanna River), whichever is first.
- The area provided to the Remediation Contractor for use as the transloading area.
- Any other small areas (up to one acre total) that the Remediation Contractor may identify for clearing.

The purpose of this Habitat Assessment and Tree Survey is to document and survey all trees greater than 6 inches DBH and their diameter and species; document and survey all trees that may be considered a preferred habitat for threatened and/or endangered species and note their species; and document the variety of and dominant species of tree (including those less than 6 inches DBH), shrub, and vegetative cover found within the surveyed area.

Data collection included:

Tree identification, GPS location, latitude, longitude, and potential preferred habitat for Endangered or Threatened Species.

Appendix A includes the GPS data recorded as part of the Tree Survey.

GEI Consultants, Inc., P.C.
1301 Trumansburg Road, Suite N, Ithaca, New York 14850
607.216.8955 fax: 607.274.7577

Findings of the Binghamton Court Street OU2 Habitat Assessment

Endangered and Threatened Species Suitable Habitat

GEI reviewed the New York State Department of Environmental Conservation Environmental Resource Mapper website for documented evidence of any known Rare, Threatened, or Endangered species that have been identified in the Habitat Assessment Survey Area. According to the information provided here, http://www.dec.ny.gov/gis/erm/, there are no identified Rare, Threatened, or Endangered species that have been found within the vicinity of the Binghamton Court Street OU2 area.

GEI did not observe any trees that would appear to provide suitable habitat for protected bat species nor did we observe any Rare, Threatened, or Endangered plant or fauna species.

Findings of the Binghamton Court Street OU2 Tree Inventory

Species Composition

With the exception of two areas, one at the eastern end of the Access Road behind the ScottTech Building and one at the west end of the proposed Access Road, the majority of the Binghamton Court Street OU2 Habitat Assessment and Tree Survey is well covered by mature canopy trees. The table below lists the dominant species composition for the OU2 survey area.

TABLE 1

Common Name	Botanical Name	Number Observed	Representation
Black Cherry	*Prunus serotina*	5	2.0%
Black Willow	*Salix nigra*	1	0.4%
Boxelder	*Acer negundo*	23	9.1%
Cottonwood	*Populus deltoides*	9	3.5%
Silver Maple	*Acer saccharinum*	210	82.7%
Sugar maple	*Acer saccharum*	6	2.4%

Applying the New York Natural Heritage Program (NYNHP) classification system, the dominant ecological community of the Binghamton Court Street OU2 Site is the Floodplain Forest (NYNHP, 2014, Edinger et al.). As described by NYNHP, the Floodplain Forest is:

> "typically a hardwood forest that occurs on mineral soils on low terraces of river floodplains and river deltas. These sites are characterized by their flood regime; low areas are annually flooded in spring and high areas are flooded irregularly. Some sites may be quite dry by late summer whereas other sites may be flooded again in late summer or early autumn (these floods are caused by heavy precipitation associated with tropical storms). This is a broadly defined community; floodplain forests are quite variable and may be very diverse.
>
> Characteristic trees include silver maple (*Acer saccharinum*), ashes (*Fraxinus pennsylvanica, F. nigra, F. americana*), cottonwood (*Populus deltoides*), red maple (*Acer rubrum*), boxelder (*Acer negundo*), elms (*Ulmus americana, U. rubra*), hickories (*Carya cordiformis, C. ovata, C. laciniosa*), butternut and black walnut (*Juglans cinerea, J. nigra),* sycamore (*Platanus occidentalis*), oaks (*Quercus bicolor, Q. palustris*), and river birch (*Betula nigra*). Other trees include hackberry (*Celtis occidentalis*), tulip tree (*Liriodendron tulipifera*), basswood (*Tilia americana*), and sugar maple (*Acer*

saccharum). Introduced trees, such as white willow (*Salix alba*) and black locust (*Robinia pseudoacacia*), have become established in some floodplain forests. Multiple trunked silver maples are typical in this setting as an adaptation to flooding."

Overall, the Binghamton Court Street OU2 Site is dominated by Silver Maple trees; Boxelder and Cottonwood are the second and third most prevalent trees respectively, but are non-dominate species. The length of the survey area averages approximately 7 to 8 feet above the normal surface water elevation of the Susquehanna River. At the time of the survey, GEI observed that the ground surface was moist with some areas of ponded surface water. A non-typical late summer season of higher than average precipitation and storm events has presented evidence that the river surface water levels have topped the bank recently and inundated the survey area.

GEI did not observe any invasive tree species within the survey area. However, several areas along the riverbank, and particularly at the eastern and western portions of the survey area, were populated by dense stands of Japanese knotweed (*Polygonum cuspidatum*). Japanese knotweed tends to colonize disturbed/marginal areas and clearings that are not quickly revegetated with native species. It offers low wildlife value and can become particularly troublesome in open spaces.

Recommendations

Tree Replacements

Trees should be carefully chosen to replace any that die off or need to be removed. While there are many horticultural varieties to choose from, native trees are highly recommended as replacements, because of their adaptability to the site conditions and ability to thrive with minimal long-term maintenance. The types of trees recommended for replacements are Silver Maple (*Acer saccharinum*), Boxelder (*Acer saccharum*), Cottonwood (*Populus deltoides*), and Black Cherry (*Prunus serotina*) as these are native to the area and are likely to best survive in the existing conditions.

Sincerely,

GEI CONSULTANTS, INC., P.C.

Daniel Kopcow, P.E., PMP
Senior Engineer

Jerry Peake
Construction Manager

JP:mlr

Attachment: Appendix A – Recorded GPS Data

B:\Working\NYSEG\1803107 Binghamton Ct St CM\Construction Management\Hab Assess_Tree Survey\Bing Court St Habitat Assessment and Tree Survey Summary_11.1.18.docx

Appendix A

Recorded GPS Data

Point Id,Point Role,Easting,Northing,Ortho. Height,Geoid Separation,Target Height,Project Easting,Project Northing,Date/Time,SD Easting,SD Northing,SD Ortho. Height,Projection Scale Factor,Elevation Scale Factor,Average Combined Factor,Code,Code Group,Code Description,Code Information,Annotation 1,Annotation 2,Annotation 3,Annotation 4,Attribute Name & Value

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10:03:59,0.7313,1.3738,2.1409,0.9999778593,0.9999642857,0.9999421458
HORN12,GNSSCodeMeasuredRTK,1008123.6477,767186.2733,846.5374,-105.9592,5.9050,,,09/27/2018
10:05:05,0.9272,1.8194,3.0265,0.9999778522,0.9999645993,0.9999424523
HORN13,GNSSCodeMeasuredRTK,1008171.5694,767154.6225,847.9910,-105.9571,5.9050,,,09/27/2018
10:10:46,0.7702,1.4987,2.2827,0.9999778728,0.9999645297,0.9999424033
HORN14,GNSSCodeMeasuredRTK,1008235.2705,767182.1755,849.5275,-105.9553,5.9050,,,09/27/2018
10:14:05,1.2089,2.4644,3.7954,0.9999779002,0.9999644562,0.9999423572
RTCM-Ref 0012,GNSSSetup,1025315.3731,769552.5081,1132.5308,-105.3676,,,,09/24/2018
09:41:41,,,,0.9999855733,0.9999509015,0.9999364755
SIL MA,GNSSPhaseMeasuredRTK,1008377.5697,767143.6686,838.7092,-105.9499,5.9050,,,09/27/2018
12:13:14,0.0170,0.0249,0.0521,0.9999779614,0.9999649730,0.9999429352
SIL MA1,GNSSCodeMeasuredRTK,1008136.2810,767141.9901,846.9498,-105.9581,5.9050,,,09/27/2018
10:07:26,0.8567,1.5018,2.6592,0.9999778577,0.9999645795,0.9999424380
SIL MA2,GNSSCodeMeasuredRTK,1008151.1268,767141.9224,843.5048,-105.9576,5.9050,,,09/27/2018
10:08:22,1.3730,2.6482,3.6397,0.9999778640,0.9999647442,0.9999426090
SIL MA3,GNSSCodeMeasuredRTK,1008183.1190,767149.1236,840.3373,-105.9567,5.9050,,,09/27/2018
10:12:27,0.5804,1.1646,1.9176,0.9999778778,0.9999648955,0.9999427741
SIL MA4,GNSSPhaseMeasuredRTK,1008377.5714,767143.6965,838.6852,-105.9499,5.9050,,,09/27/2018
12:13:48,0.0182,0.0229,0.0545,0.9999779614,0.9999649742,0.9999429363
SIL MA5,GNSSCodeMeasuredRTK,1008418.7050,767138.3015,842.4780,-105.9484,5.9050,,,09/27/2018
12:18:20,1.1377,1.2923,2.8266,0.9999779790,0.9999647928,0.9999427726
SIL MA6,GNSSCodeMeasuredRTK,1008576.4547,767127.2681,839.5287,-105.9429,5.9050,,,09/27/2018
12:21:25,1.5525,1.9999,3.6994,0.9999780469,0.9999649335,0.9999429812
SIL MA7,GNSSCodeMeasuredRTK,1008682.9075,767123.3240,842.0433,-105.9392,5.9050,,,09/27/2018
12:22:31,1.3172,1.8608,3.3839,0.9999780928,0.9999648132,0.9999429067
SIL MA8,GNSSCodeMeasuredRTK,1008683.0151,767118.8098,845.4998,-105.9391,5.9050,,,09/27/2018
12:22:56,1.4509,1.4925,3.5392,0.9999780928,0.9999646479,0.9999427415
SIL MA9,GNSSCodeMeasuredRTK,1008686.1309,767122.2107,844.2648,-105.9390,5.9050,,,09/27/2018
12:23:25,2.3440,2.1652,5.4310,0.9999780942,0.9999647070,0.9999428019
SIL MA10,GNSSCodeMeasuredRTK,1008689.7020,767119.9747,839.1727,-105.9389,5.9050,,,09/27/2018
12:23:56,1.2092,1.4208,3.2115,0.9999780957,0.9999649504,0.9999430468
SIL MA11,GNSSCodeMeasuredRTK,1008692.6193,767121.7799,843.4639,-105.9388,5.9050,,,09/27/2018
12:24:19,2.0297,2.2706,5.5230,0.9999780970,0.9999647452,0.9999428430
SIL MA12,GNSSCodeMeasuredRTK,1008693.4449,767144.2143,826.8962,-105.9391,5.9050,,,09/27/2018
12:24:46,1.9913,2.9222,5.4848,0.9999780973,0.9999655372,0.9999436352
SIL MA13,GNSSCodeMeasuredRTK,1008695.0225,767136.1307,827.9618,-105.9389,5.9050,,,09/27/2018
12:25:09,1.4492,1.8175,3.8729,0.9999780980,0.9999654862,0.9999435850
SIL MA14,GNSSCodeMeasuredRTK,1008697.6020,767136.0854,844.7275,-105.9389,5.9050,,,09/27/2018
12:25:36,1.5435,1.9510,4.1178,0.9999780991,0.9999646848,0.9999427847
SIL MA15,GNSSCodeMeasuredRTK,1008698.1264,767129.9172,846.4648,-105.9387,5.9050,,,09/27/2018
12:26:05,1.9318,1.8916,4.6904,0.9999780993,0.9999646018,0.9999427019
SIL MA16,GNSSCodeMeasuredRTK,1008697.2815,767123.7087,843.9932,-105.9387,5.9050,,,09/27/2018
12:26:27,1.2826,1.4877,3.2429,0.9999780990,0.9999647199,0.9999428197
SIL MA17,GNSSCodeMeasuredRTK,1008707.0548,767134.5908,841.7841,-105.9385,5.9050,,,09/27/2018
12:27:01,1.7013,2.1273,3.9865,0.9999781032,0.9999648255,0.9999429295

SIL MA18,GNSSCodeMeasuredRTK,1008713.7500,767128.6348,840.9810,-105.9382,5.9050,,,09/27/2018 12:27:25,1.7841,2.1745,4.3986,0.9999781061,0.9999648639,0.9999429707
SIL MA19,GNSSCodeMeasuredRTK,1008720.5099,767122.2308,850.4945,-105.9379,5.9050,,,09/27/2018 12:27:54,2.1707,1.8266,4.5387,0.9999781090,0.9999644091,0.9999425189
SIL MA20,GNSSCodeMeasuredRTK,1008721.0445,767125.7784,851.8255,-105.9379,5.9050,,,09/27/2018 12:28:19,1.2502,1.4227,3.1402,0.9999781092,0.9999643455,0.9999424555
SIL MA21,GNSSCodeMeasuredRTK,1008722.6838,767121.5283,838.9086,-105.9378,5.9050,,,09/27/2018 12:28:50,1.4595,1.4269,2.8093,0.9999781099,0.9999649629,0.9999430736
SIL MA22,GNSSCodeMeasuredRTK,1008722.8740,767124.7738,839.4648,-105.9378,5.9050,,,09/27/2018 12:29:14,2.0741,1.6328,4.5203,0.9999781100,0.9999649363,0.9999430471
SIL MA23,GNSSCodeMeasuredRTK,1008723.5869,767122.0353,843.3549,-105.9378,5.9050,,,09/27/2018 12:29:39,1.6598,1.5071,3.3670,0.9999781103,0.9999647504,0.9999428615
SIL MA24,GNSSCodeMeasuredRTK,1008725.8734,767127.8805,848.2133,-105.9378,5.9050,,,09/27/2018 12:30:09,2.0208,1.7147,4.5939,0.9999781113,0.9999645182,0.9999426302
SIL MA25,GNSSCodeMeasuredRTK,1008735.5751,767124.6543,848.7437,-105.9374,5.9050,,,09/27/2018 12:30:35,1.3472,1.3417,2.8875,0.9999781155,0.9999644928,0.9999426090
SIL MA26,GNSSCodeMeasuredRTK,1008736.7503,767121.5107,843.8529,-105.9373,5.9050,,,09/27/2018 12:30:57,1.7116,1.7881,3.7020,0.9999781160,0.9999647266,0.9999428433
SIL MA27,GNSSCodeMeasuredRTK,1008751.3896,767128.5166,845.3500,-105.9369,5.9050,,,09/27/2018 12:31:26,1.7515,1.4979,3.5561,0.9999781223,0.9999646550,0.9999427780
SIL MA28,GNSSCodeMeasuredRTK,1008754.5239,767127.7219,842.9207,-105.9368,5.9050,,,09/27/2018 12:31:49,1.6562,1.6003,3.3893,0.9999781236,0.9999647711,0.9999428955
SIL MA29,GNSSCodeMeasuredRTK,1008757.0587,767125.1634,841.5427,-105.9367,5.9050,,,09/27/2018 12:32:13,1.7123,1.5708,3.3990,0.9999781247,0.9999648370,0.9999429625
SIL MA30,GNSSCodeMeasuredRTK,1008761.9883,767125.0102,847.0943,-105.9365,5.9050,,,09/27/2018 12:32:40,2.0611,2.1017,4.9165,0.9999781268,0.9999645716,0.9999426992
SIL MA31,GNSSCodeMeasuredRTK,1008769.1498,767122.4031,836.0437,-105.9362,5.9050,,,09/27/2018 12:33:08,1.3569,1.3773,2.9760,0.9999781299,0.9999650998,0.9999432305
SIL MA32,GNSSCodeMeasuredRTK,1008766.5761,767121.9034,836.0396,-105.9363,5.9050,,,09/27/2018 12:33:34,1.3699,1.6438,2.8875,0.9999781288,0.9999651000,0.9999432296
SIL MA33,GNSSCodeMeasuredRTK,1008770.8987,767112.5536,842.2245,-105.9360,5.9050,,,09/27/2018 12:33:59,1.1016,1.1989,2.3981,0.9999781307,0.9999648043,0.9999429358
SIL MA34,GNSSCodeMeasuredRTK,1008771.7044,767109.5517,849.8836,-105.9359,5.9050,,,09/27/2018 12:34:21,2.1644,1.8815,4.1405,0.9999781310,0.9999644382,0.9999425701
SIL MA35,GNSSCodeMeasuredRTK,1008776.8491,767104.9591,851.7083,-105.9357,5.9050,,,09/27/2018 12:34:45,1.9744,2.1086,4.1280,0.9999781332,0.9999643510,0.9999424850
SIL MA36,GNSSCodeMeasuredRTK,1008774.0576,767118.3835,846.2562,-105.9360,5.9050,,,09/27/2018 12:35:11,1.5008,1.7826,3.0363,0.9999781320,0.9999646116,0.9999427445
SIL MA37,GNSSCodeMeasuredRTK,1008783.6546,767119.9027,844.3128,-105.9357,5.9050,,,09/27/2018 12:46:06,2.3910,2.1087,4.1220,0.9999781362,0.9999647045,0.9999428415
SIL MA38,GNSSCodeMeasuredRTK,1008784.9795,767113.6927,840.7324,-105.9355,5.9050,,,09/27/2018 12:48:22,1.5631,1.4871,2.8580,0.9999781368,0.9999648756,0.9999430132
SIL MA39,GNSSCodeMeasuredRTK,1008778.3276,767112.1128,849.5160,-105.9357,5.9050,,,09/27/2018 12:48:43,2.0891,2.1318,3.7110,0.9999781339,0.9999644558,0.9999425905
SIL MA40,GNSSCodeMeasuredRTK,1008794.4877,767113.8788,842.1563,-105.9352,5.9050,,,09/27/2018 12:49:09,2.0080,1.8843,3.3837,0.9999781409,0.9999648076,0.9999429492
SIL MA41,GNSSCodeMeasuredRTK,1008799.2739,767115.5909,846.8331,-105.9351,5.9050,,,09/27/2018 12:49:29,1.2293,1.3001,2.3077,0.9999781429,0.9999645840,0.9999427277

SIL MA42,GNSSCodeMeasuredRTK,1008799.0731,767112.8088,843.0287,-105.9350,5.9050,,,09/27/2018 12:50:17,1.5356,1.8523,2.8358,0.9999781428,0.9999647659,0.9999429095
SIL MA43,GNSSCodeMeasuredRTK,1008799.4088,767112.1975,846.8248,-105.9350,5.9050,,,09/27/2018 12:50:40,1.4684,1.5932,2.6157,0.9999781430,0.9999645844,0.9999427282
SIL MA44,Averaged,1008812.3614,767109.8742,852.7390,-105.9345,,,,09/27/2018 12:51:23,1.9388,1.9510,3.6612,0.9999781486,0.9999643017,0.9999424510
SIL MA45,GNSSCodeMeasuredRTK,1008804.3257,767104.4758,844.8018,-105.9347,5.9050,,,09/27/2018 12:52:07,2.3072,1.9979,3.4234,0.9999781451,0.9999646811,0.9999428270
SIL MA46,GNSSCodeMeasuredRTK,1008799.4878,767099.9794,841.1756,-105.9348,5.9050,,,09/27/2018 12:52:31,2.6026,3.1854,4.9465,0.9999781430,0.9999648544,0.9999429982
SIL MA47,GNSSCodeMeasuredRTK,1008818.1154,767090.5760,850.9231,-105.9341,5.9050,,,09/27/2018 12:52:56,2.9645,3.2380,5.4082,0.9999781510,0.9999643885,0.9999425403
SIL MA48,GNSSCodeMeasuredRTK,1008814.3123,767110.3277,849.1476,-105.9345,5.9050,,,09/27/2018 12:53:23,1.6354,1.6752,2.8267,0.9999781494,0.9999644734,0.9999426235
SIL MA49,GNSSCodeMeasuredRTK,1008822.3147,767114.9239,850.7262,-105.9343,5.9050,,,09/27/2018 12:53:48,2.3904,2.2754,4.2929,0.9999781528,0.9999643979,0.9999425515
SIL MA50,GNSSCodeMeasuredRTK,1008814.8541,767098.9480,840.1496,-105.9343,5.9050,,,09/27/2018 12:54:15,1.9892,2.2853,3.5757,0.9999781496,0.9999649034,0.9999430538
SIL MA51,GNSSCodeMeasuredRTK,1008830.3925,767096.0659,859.4107,-105.9337,5.9050,,,09/27/2018 12:54:38,2.1039,2.9189,4.1727,0.9999781563,0.9999639828,0.9999421399
SIL MA52,GNSSCodeMeasuredRTK,1008828.8568,767105.8545,836.6445,-105.9339,5.9050,,,09/27/2018 12:55:03,1.5808,1.9618,2.9917,0.9999781557,0.9999650710,0.9999432274
SIL MA53,GNSSCodeMeasuredRTK,1008819.5454,767104.8123,837.5605,-105.9342,5.9050,,,09/27/2018 12:55:28,1.9041,2.2834,3.4343,0.9999781517,0.9999650272,0.9999431796
SIL MA54,GNSSCodeMeasuredRTK,1008821.9959,767107.8925,841.8426,-105.9342,5.9050,,,09/27/2018 12:55:52,1.7776,2.0726,3.2589,0.9999781527,0.9999648225,0.9999429760
SIL MA55,GNSSCodeMeasuredRTK,1008821.3369,767109.7910,845.3552,-105.9342,5.9050,,,09/27/2018 12:56:16,1.2934,1.5803,2.4649,0.9999781524,0.9999646546,0.9999428078
SIL MA56,GNSSCodeMeasuredRTK,1008838.8562,767116.3413,856.5675,-105.9337,5.9050,,,09/27/2018 12:56:49,2.1793,2.5414,3.9607,0.9999781600,0.9999641187,0.9999422794
SIL MA57,GNSSCodeMeasuredRTK,1008841.9179,767108.6469,855.4765,-105.9335,5.9050,,,09/27/2018 12:57:14,2.6127,2.7837,4.4478,0.9999781613,0.9999641708,0.9999423329
SIL MA58,GNSSCodeMeasuredRTK,1008847.3985,767106.6035,847.2616,-105.9333,5.9050,,,09/27/2018 12:57:39,1.6771,1.9317,2.9454,0.9999781637,0.9999645635,0.9999427279
SIL MA59,GNSSCodeMeasuredRTK,1008858.7694,767120.7968,857.1978,-105.9331,5.9050,,,09/27/2018 12:58:06,1.7872,2.0719,3.3100,0.9999781686,0.9999640885,0.9999422579
SIL MA60,GNSSCodeMeasuredRTK,1008863.2822,767109.2555,850.4856,-105.9328,5.9050,,,09/27/2018 12:58:35,1.8422,1.8192,3.0343,0.9999781705,0.9999644093,0.9999425806
SIL MA61,GNSSCodeMeasuredRTK,1008860.1125,767105.3523,852.0923,-105.9328,5.9050,,,09/27/2018 12:59:05,1.7897,1.9699,3.2884,0.9999781691,0.9999643325,0.9999425024
SIL MA62,GNSSCodeMeasuredRTK,1008868.9556,767101.2625,846.6343,-105.9325,5.9050,,,09/27/2018 12:59:31,1.9307,2.0920,3.2805,0.9999781730,0.9999645934,0.9999427671
SIL MA63,GNSSCodeMeasuredRTK,1008908.1458,767087.8894,857.7910,-105.9309,5.9050,,,09/27/2018 13:00:14,3.9096,3.5010,7.0603,0.9999781899,0.9999640601,0.9999422507
SIL MA64,GNSSCodeMeasuredRTK,1009021.9911,767066.7103,859.8233,-105.9267,5.9050,,,09/27/2018 13:01:08,3.8898,3.1021,5.4782,0.9999782390,0.9999639627,0.9999422025
SIL MA65,GNSSCodeMeasuredRTK,1009042.0708,767081.6552,845.8958,-105.9262,5.9050,,,09/27/2018 13:01:52,2.6243,2.6854,4.2032,0.9999782476,0.9999646284,0.9999428768

SIL MA66,GNSSCodeMeasuredRTK,1009091.1958,767073.9673,856.0108,-105.9244,5.9050,,,09/27/2018 13:02:33,2.2512,2.4147,4.0544,0.9999782688,0.9999641448,0.9999424144
SIL MA67,GNSSCodeMeasuredRTK,1009089.1384,767065.0986,841.4674,-105.9244,5.9050,,,09/27/2018 13:03:04,3.5555,2.2956,4.6129,0.9999782679,0.9999648400,0.9999431087
SIL MA68,GNSSCodeMeasuredRTK,1009106.0426,767062.7400,845.2111,-105.9238,5.9050,,,09/27/2018 13:03:29,2.6017,2.5298,4.3639,0.9999782752,0.9999646610,0.9999429370
SIL MA69,GNSSCodeMeasuredRTK,1009110.3116,767047.2891,851.8209,-105.9234,5.9050,,,09/27/2018 13:03:53,3.1228,2.9688,5.4730,0.9999782771,0.9999643450,0.9999426229
SIL MA70,GNSSCodeMeasuredRTK,1009100.7306,767069.7370,850.5542,-105.9240,5.9050,,,09/27/2018 13:04:20,3.4254,3.0992,5.7613,0.9999782730,0.9999644056,0.9999426794
SIL MA71,GNSSCodeMeasuredRTK,1009108.1594,767054.8053,841.8182,-105.9236,5.9050,,,09/27/2018 13:04:49,1.7296,1.4629,2.7767,0.9999782762,0.9999648232,0.9999431001
SIL MA72,GNSSCodeMeasuredRTK,1009113.4155,767062.7656,847.4793,-105.9235,5.9050,,,09/27/2018 13:05:15,2.0357,1.9697,3.8744,0.9999782784,0.9999645526,0.9999428318
SIL MA73,GNSSCodeMeasuredRTK,1009122.2103,767052.7273,864.0104,-105.9231,5.9050,,,09/27/2018 13:05:36,2.9468,2.5478,4.6507,0.9999782822,0.9999637624,0.9999420454
SIL MA74,GNSSCodeMeasuredRTK,1009112.1986,767055.6552,842.9952,-105.9235,5.9050,,,09/27/2018 13:05:58,1.6459,1.6852,3.0587,0.9999782779,0.9999647669,0.9999430456
SIL MA75,Averaged,1009103.9931,767061.4263,856.6116,-105.9238,,,,09/27/2018 13:32:55,1.9219,1.7898,3.4175,0.9999782744,0.9999641161,0.9999423912
SIL MA76,GNSSCodeMeasuredRTK,1009133.9578,767065.4770,835.1007,-105.9228,5.9050,,,09/27/2018 13:33:23,2.4889,3.0330,6.3901,0.9999782873,0.9999651442,0.9999434323
SIL MA77,GNSSCodeMeasuredRTK,1009131.0032,767053.0680,827.4557,-105.9228,5.9050,,,09/27/2018 13:33:51,2.9806,2.8174,7.1800,0.9999782860,0.9999655096,0.9999437964
SIL MA78,GNSSCodeMeasuredRTK,1009125.5915,767038.4727,837.0455,-105.9227,5.9050,,,09/27/2018 13:34:36,2.9091,2.9099,6.9180,0.9999782837,0.9999650513,0.9999433357
SIL MA79,GNSSCodeMeasuredRTK,1009132.9546,767054.4781,836.3237,-105.9227,5.9050,,,09/27/2018 13:35:04,3.0839,3.1635,8.0614,0.9999782869,0.9999650858,0.9999433734
SIL MA80,GNSSCodeMeasuredRTK,1009137.1215,767051.0928,830.9329,-105.9225,5.9050,,,09/27/2018 13:35:50,1.6273,1.6455,3.8974,0.9999782887,0.9999653434,0.9999436328
SIL MA81,GNSSCodeMeasuredRTK,1009133.3684,767054.8950,850.5145,-105.9227,5.9050,,,09/27/2018 13:36:17,2.2499,2.2439,5.6545,0.9999782870,0.9999644075,0.9999426953
SIL MA82,GNSSCodeMeasuredRTK,1009148.2343,767057.5331,838.1015,-105.9222,5.9050,,,09/27/2018 13:36:44,1.9224,1.8917,3.9108,0.9999782935,0.9999650008,0.9999432950
SIL MA83,GNSSCodeMeasuredRTK,1009151.9242,767063.6649,839.4851,-105.9222,5.9050,,,09/27/2018 13:37:11,2.5301,3.5940,6.9903,0.9999782951,0.9999649346,0.9999432304
SIL MA84,GNSSCodeMeasuredRTK,1009151.1041,767048.0537,838.8869,-105.9220,5.9050,,,09/27/2018 13:37:35,1.7391,1.9545,4.2422,0.9999782947,0.9999649632,0.9999432587
SIL MA85,GNSSCodeMeasuredRTK,1009152.2296,767055.0210,852.3817,-105.9221,5.9050,,,09/27/2018 13:38:18,2.3004,2.7710,5.4985,0.9999782952,0.9999643182,0.9999426141
SIL MA86,GNSSCodeMeasuredRTK,1009159.8364,767058.0218,824.6484,-105.9218,5.9050,,,09/27/2018 13:38:51,2.1787,2.3296,5.0785,0.9999782985,0.9999656438,0.9999439430
SIL MA87,GNSSCodeMeasuredRTK,1009154.6469,767050.7267,851.5110,-105.9219,5.9050,,,09/27/2018 13:39:20,2.7079,3.4617,6.1502,0.9999782962,0.9999643598,0.9999426568
SIL MA88,GNSSCodeMeasuredRTK,1009159.8181,767039.1211,853.1937,-105.9216,5.9050,,,09/27/2018 13:39:44,2.1692,2.2372,4.9901,0.9999782985,0.9999642793,0.9999425786
SIL MA89,GNSSCodeMeasuredRTK,1009158.7222,767035.2187,852.6714,-105.9216,5.9050,,,09/27/2018 13:40:07,2.2835,2.7085,6.0777,0.9999782980,0.9999643043,0.9999426031

SIL MA90,GNSSCodeMeasuredRTK,1009154.5012,767049.1215,839.5715,-105.9219,5.9050,,,09/27/2018 13:40:30,2.2310,2.2707,5.6441,0.9999782962,0.9999649305,0.9999432274
SIL MA91,GNSSCodeMeasuredRTK,1009158.5286,767038.7264,849.3163,-105.9216,5.9050,,,09/27/2018 13:40:56,2.1078,2.1588,4.7249,0.9999782979,0.9999644647,0.9999427634
SIL MA92,GNSSCodeMeasuredRTK,1009158.1883,767041.7112,845.6829,-105.9217,5.9050,,,09/27/2018 13:41:18,1.5594,1.6746,4.2962,0.9999782978,0.9999646384,0.9999429369
SIL MA93,GNSSCodeMeasuredRTK,1009168.0076,767048.6823,835.5790,-105.9214,5.9050,,,09/27/2018 13:41:42,2.5380,3.3197,8.2168,0.9999783020,0.9999651213,0.9999434240
SIL MA94,GNSSCodeMeasuredRTK,1009168.8684,767051.8464,840.2046,-105.9214,5.9050,,,09/27/2018 13:42:07,2.4357,2.4113,6.9035,0.9999783024,0.9999649002,0.9999432033
SIL MA95,GNSSCodeMeasuredRTK,1009175.9131,767041.5628,844.4197,-105.9211,5.9050,,,09/27/2018 13:42:36,2.5825,2.9084,6.8218,0.9999783054,0.9999646987,0.9999430049
SIL MA96,GNSSCodeMeasuredRTK,1009169.7366,767045.7471,846.0880,-105.9213,5.9050,,,09/27/2018 13:43:04,2.5595,2.6174,6.5725,0.9999783027,0.9999646190,0.9999429225
SIL MA97,GNSSCodeMeasuredRTK,1009167.9102,767037.8156,855.7207,-105.9213,5.9050,,,09/27/2018 13:43:29,2.7607,3.2162,7.0273,0.9999783020,0.9999641585,0.9999424613
SIL MA98,GNSSCodeMeasuredRTK,1009181.3081,767050.7220,852.8831,-105.9210,5.9050,,,09/27/2018 13:43:54,2.3553,2.6915,5.9798,0.9999783077,0.9999642942,0.9999426027
SIL MA99,GNSSCodeMeasuredRTK,1009212.2841,767033.4555,850.0584,-105.9197,5.9050,,,09/27/2018 13:44:24,2.0916,2.0660,5.5173,0.9999783211,0.9999644291,0.9999427510
SIL MA100,GNSSCodeMeasuredRTK,1009237.9789,767034.4848,846.0415,-105.9188,5.9050,,,09/27/2018 13:45:00,3.0092,2.5121,6.9602,0.9999783322,0.9999646211,0.9999429541
SIL MA101,GNSSCodeMeasuredRTK,1009233.2295,767039.0606,835.2916,-105.9190,5.9050,,,09/27/2018 13:45:24,2.4171,2.1923,6.7447,0.9999783302,0.9999651349,0.9999434658
SIL MA102,GNSSCodeMeasuredRTK,1009243.5888,767038.5490,848.1979,-105.9187,5.9050,,,09/27/2018 13:45:48,1.9568,2.4509,6.2423,0.9999783347,0.9999645180,0.9999428534
SIL MA103,GNSSCodeMeasuredRTK,1009264.6958,767042.3772,849.1011,-105.9180,5.9050,,,09/27/2018 13:46:43,3.4445,4.1064,10.5468,0.9999783438,0.9999644748,0.9999428193
SIL MA104,GNSSCodeMeasuredRTK,1009284.0116,767045.5638,838.5902,-105.9174,5.9050,,,09/27/2018 13:47:12,1.6845,1.7610,4.6578,0.9999783521,0.9999649772,0.9999433300
SIL MA105,GNSSCodeMeasuredRTK,1009270.0424,767044.8392,866.9419,-105.9178,5.9050,,,09/27/2018 13:47:40,2.8996,3.0056,8.6575,0.9999783461,0.9999636220,0.9999419689
SIL MA106,GNSSCodeMeasuredRTK,1009279.5633,767040.4381,858.4573,-105.9175,5.9050,,,09/27/2018 13:48:05,1.7834,1.9976,5.6773,0.9999783502,0.9999640276,0.9999423785
SIL MA107,GNSSCodeMeasuredRTK,1009324.6349,767045.8280,851.6752,-105.9160,5.9050,,,09/27/2018 13:48:54,1.9305,2.5436,6.8823,0.9999783697,0.9999643517,0.9999427221
SIL MA108,GNSSCodeMeasuredRTK,1009390.4798,767037.8870,867.4613,-105.9136,5.9050,,,09/27/2018 13:49:43,1.5413,2.1151,7.1364,0.9999783981,0.9999635970,0.9999419959
SIL MA109,GNSSCodeMeasuredRTK,1009405.6850,767034.6702,863.8035,-105.9130,5.9050,,,09/27/2018 13:50:20,1.2811,1.8195,5.6778,0.9999784047,0.9999637718,0.9999421773
SIL MA110,GNSSCodeMeasuredRTK,1009400.4602,767031.5982,836.0845,-105.9132,5.9050,,,09/27/2018 13:51:10,0.9986,1.3486,4.0128,0.9999784025,0.9999650967,0.9999434999
SIL MA111,GNSSCodeMeasuredRTK,1009505.6875,767029.9734,849.4426,-105.9095,5.9050,,,09/27/2018 13:53:29,3.3780,6.1529,15.6708,0.9999784480,0.9999644581,0.9999429068
SIL MA112,GNSSCodeMeasuredRTK,1009504.2509,767019.0009,850.9634,-105.9094,5.9050,,,09/27/2018 13:54:14,2.6519,2.5551,8.4435,0.9999784473,0.9999643854,0.9999428335
SIL MA113,GNSSCodeMeasuredRTK,1009496.8244,767014.2378,912.2649,-105.9096,5.9050,,,09/27/2018 13:54:55,1.9735,4.1053,17.7790,0.9999784441,0.9999614553,0.9999399003

SIL MA114,GNSSCodeMeasuredRTK,1009509.1347,767039.2095,846.1364,-105.9095,5.9050,,,09/27/2018 13:55:32,2.6839,3.7316,10.6665,0.9999784495,0.9999646161,0.9999430663
SIL MA115,GNSSCodeMeasuredRTK,1009509.8462,767056.1073,803.4838,-105.9097,5.9050,,,09/27/2018 13:56:16,1.9217,3.1921,13.1071,0.9999784498,0.9999666548,0.9999451053
SIL MA116,GNSSCodeMeasuredRTK,1009503.2609,767081.2657,858.5425,-105.9103,5.9050,,,09/27/2018 13:57:18,1.4851,1.8136,7.3657,0.9999784469,0.9999640231,0.9999424708
SIL MA117,GNSSCodeMeasuredRTK,1009408.6012,767054.2716,861.7230,-105.9132,5.9050,,,09/27/2018 13:58:32,1.5686,2.4336,8.0619,0.9999784060,0.9999638713,0.9999422780
SIL MA118,GNSSCodeMeasuredRTK,1009407.9331,767070.9232,842.6255,-105.9135,5.9050,,,09/27/2018 13:59:00,1.7449,2.4626,8.0089,0.9999784057,0.9999647841,0.9999431905
SIL MA119,GNSSCodeMeasuredRTK,1009412.6449,767061.4572,874.3460,-105.9132,5.9050,,,09/27/2018 13:59:25,3.0619,3.3475,12.2719,0.9999784077,0.9999632679,0.9999416764
SIL MA120,GNSSCodeMeasuredRTK,1009401.8532,767060.6145,834.4827,-105.9135,5.9050,,,09/27/2018 13:59:51,2.0653,2.9027,8.3625,0.9999784031,0.9999651733,0.9999435771
SIL MA121,GNSSCodeMeasuredRTK,1009389.1447,767080.9389,820.6921,-105.9142,5.9050,,,09/27/2018 14:00:25,2.8836,3.0257,10.6493,0.9999783976,0.9999658325,0.9999442308
SIL MA122,GNSSCodeMeasuredRTK,1009358.7543,767063.1871,846.6318,-105.9150,5.9050,,,09/27/2018 14:01:23,1.3031,1.9637,6.7999,0.9999783844,0.9999645927,0.9999429779
SIL MA123,GNSSCodeMeasuredRTK,1009369.1303,767055.1206,844.6771,-105.9146,5.9050,,,09/27/2018 14:01:55,2.0656,2.8544,9.2218,0.9999783889,0.9999646861,0.9999430758
SIL MA124,GNSSCodeMeasuredRTK,1009350.7325,767058.8779,843.1758,-105.9153,5.9050,,,09/27/2018 14:02:29,2.2358,3.0163,11.3160,0.9999783810,0.9999647579,0.9999431396
SIL MA125,GNSSCodeMeasuredRTK,1009352.2691,767064.5567,844.8356,-105.9153,5.9050,,,09/27/2018 14:02:55,1.9120,3.0077,9.5894,0.9999783816,0.9999646785,0.9999430609
SIL MA126,GNSSCodeMeasuredRTK,1009311.1388,767061.8762,845.8639,-105.9167,5.9050,,,09/27/2018 14:03:33,3.5727,2.5383,9.5114,0.9999783638,0.9999646295,0.9999429941
SIL MA127,GNSSCodeMeasuredRTK,1009302.3957,767066.4865,851.8431,-105.9170,5.9050,,,09/27/2018 14:04:10,2.7934,3.7085,14.1033,0.9999783601,0.9999643437,0.9999427045
SIL MA128,GNSSCodeMeasuredRTK,1009288.4685,767063.6383,834.7649,-105.9175,5.9050,,,09/27/2018 14:04:40,1.6863,2.0106,9.2295,0.9999783540,0.9999651600,0.9999435148
SIL MA129,GNSSCodeMeasuredRTK,1009286.6960,767068.3609,820.6291,-105.9176,5.9050,,,09/27/2018 14:05:10,1.7324,2.1682,6.6506,0.9999783533,0.9999658357,0.9999441897
SIL MA130,GNSSCodeMeasuredRTK,1009282.2182,767072.3581,822.9242,-105.9178,5.9050,,,09/27/2018 14:05:40,1.6132,2.4596,7.9616,0.9999783513,0.9999657260,0.9999440781
SIL MA131,GNSSCodeMeasuredRTK,1009269.8457,767069.6900,826.3096,-105.9182,5.9050,,,09/27/2018 14:06:09,2.0862,2.8967,13.9163,0.9999783460,0.9999655642,0.9999439109
SIL MA132,GNSSCodeMeasuredRTK,1009268.5959,767061.4366,844.8122,-105.9181,5.9050,,,09/27/2018 14:06:39,2.2371,2.7504,9.3463,0.9999783455,0.9999646798,0.9999430260
SIL MA133,GNSSCodeMeasuredRTK,1009261.7189,767058.3498,859.4598,-105.9183,5.9050,,,09/27/2018 14:07:08,2.7865,3.8928,12.6794,0.9999783425,0.9999639797,0.9999423229
SIL MA134,GNSSCodeMeasuredRTK,1009243.4143,767067.0413,861.8369,-105.9191,5.9050,,,09/27/2018 14:08:11,1.8999,2.5805,9.6824,0.9999783346,0.9999638661,0.9999422015
SIL MA135,GNSSCodeMeasuredRTK,1009242.2773,767056.5113,849.2050,-105.9190,5.9050,,,09/27/2018 14:08:41,1.8709,2.4227,9.7191,0.9999783341,0.9999644699,0.9999428047
SIL MA136,GNSSCodeMeasuredRTK,1009244.8676,767070.4117,907.6437,-105.9191,5.9050,,,09/27/2018 14:09:30,3.3643,4.0673,18.3705,0.9999783352,0.9999616766,0.9999400127
SIL MA137,GNSSCodeMeasuredRTK,1009234.2216,767063.7147,823.1895,-105.9194,5.9050,,,09/27/2018 14:13:16,2.5922,2.8796,9.7963,0.9999783306,0.9999657134,0.9999440447

SIL MA138,GNSSCodeMeasuredRTK,1009255.0622,767073.6447,803.8126,-105.9188,5.9050,,,09/27/2018 14:13:50,3.5798,4.2425,15.1427,0.9999783396,0.9999666395,0.9999449799
SIL MA139,GNSSCodeMeasuredRTK,1009223.1715,767066.6253,837.4637,-105.9198,5.9050,,,09/27/2018 14:14:28,1.1977,1.5145,5.5020,0.9999783258,0.9999650311,0.9999433577
SIL MA140,GNSSCodeMeasuredRTK,1009225.9234,767063.2055,900.9638,-105.9196,5.9050,,,09/27/2018 14:14:57,2.0418,2.3040,10.5939,0.9999783270,0.9999619959,0.9999403238
SIL MA141,GNSSCodeMeasuredRTK,1009222.8721,767066.1297,860.1358,-105.9198,5.9050,,,09/27/2018 14:15:22,1.5120,1.9548,6.9651,0.9999783257,0.9999639474,0.9999422739
SIL MA142,GNSSCodeMeasuredRTK,1009225.6376,767062.9981,855.9782,-105.9196,5.9050,,,09/27/2018 14:15:52,2.4935,3.2556,10.9844,0.9999783269,0.9999641462,0.9999424738
SIL MA143,GNSSCodeMeasuredRTK,1009199.1916,767068.0396,883.6385,-105.9206,5.9050,,,09/27/2018 14:17:15,1.6596,2.0874,8.3988,0.9999783155,0.9999628241,0.9999411404
SIL MA144,GNSSCodeMeasuredRTK,1009189.4167,767077.4495,850.6602,-105.9211,5.9050,,,09/27/2018 14:17:42,1.8903,2.3878,9.1068,0.9999783112,0.9999644004,0.9999427124
SIL MA145,GNSSCodeMeasuredRTK,1009182.8807,767072.1055,856.5519,-105.9213,5.9050,,,09/27/2018 14:18:07,1.5679,1.9204,7.2092,0.9999783084,0.9999641188,0.9999424280
SIL MA146,GNSSCodeMeasuredRTK,1009182.9267,767079.4702,830.3601,-105.9214,5.9050,,,09/27/2018 14:18:36,2.3947,3.2237,11.3099,0.9999783084,0.9999653707,0.9999436799
SIL MA147,GNSSCodeMeasuredRTK,1009187.3148,767071.1828,884.5175,-105.9211,5.9050,,,09/27/2018 14:19:05,1.6412,1.6262,8.5878,0.9999783103,0.9999627821,0.9999410933
SIL MA148,GNSSCodeMeasuredRTK,1009172.7209,767069.4396,839.3634,-105.9216,5.9050,,,09/27/2018 14:19:33,2.5760,3.7535,12.1796,0.9999783040,0.9999649404,0.9999432452
SIL MA149,GNSSCodeMeasuredRTK,1009168.9819,767069.2967,842.4917,-105.9217,5.9050,,,09/27/2018 14:20:04,2.5009,3.3243,9.5382,0.9999783024,0.9999647909,0.9999430941
SIL MA150,GNSSCodeMeasuredRTK,1009134.6161,767049.4265,878.8607,-105.9226,5.9050,,,09/27/2018 14:22:28,1.8448,2.7521,8.2274,0.9999782876,0.9999630526,0.9999413410
SIL MA151,GNSSCodeMeasuredRTK,1009129.6128,767070.0060,842.5111,-105.9231,5.9050,,,09/27/2018 14:23:00,2.9910,3.1132,12.9278,0.9999782854,0.9999647900,0.9999430762
SIL MA152,GNSSCodeMeasuredRTK,1009128.2079,767071.0824,816.9591,-105.9231,5.9050,,,09/27/2018 14:23:35,3.7509,2.5941,10.2226,0.9999782848,0.9999660114,0.9999442969
SIL MA153,GNSSCodeMeasuredRTK,1009080.6330,767089.4031,842.5705,-105.9250,5.9050,,,09/27/2018 14:24:21,1.1815,1.3312,5.1879,0.9999782643,0.9999647873,0.9999430523
SIL MA154,GNSSCodeMeasuredRTK,1009072.2125,767077.1914,845.3263,-105.9251,5.9050,,,09/27/2018 14:24:50,1.3788,2.7421,6.1085,0.9999782606,0.9999646556,0.9999429170
SIL MA155,GNSSCodeMeasuredRTK,1009076.3102,767089.2592,858.9436,-105.9252,5.9050,,,09/27/2018 14:25:16,1.1630,1.6832,5.7330,0.9999782624,0.9999640047,0.9999422679
SIL MA156,GNSSCodeMeasuredRTK,1009052.0809,767086.4227,859.4826,-105.9260,5.9050,,,09/27/2018 14:25:51,1.5093,2.3713,6.6305,0.9999782520,0.9999639790,0.9999422317
SIL MA157,GNSSCodeMeasuredRTK,1009052.1320,767111.0605,864.3897,-105.9263,5.9050,,,09/27/2018 14:26:19,2.1299,2.6992,6.6526,0.9999782520,0.9999637444,0.9999419972
SIL MA158,GNSSCodeMeasuredRTK,1009021.5362,767102.2866,834.3417,-105.9272,5.9050,,,09/27/2018 14:27:09,1.7242,1.8711,5.7878,0.9999782388,0.9999651807,0.9999434202
SIL MA159,GNSSCodeMeasuredRTK,1009012.4325,767101.3489,838.5087,-105.9275,5.9050,,,09/27/2018 14:27:36,1.6559,2.5726,5.2031,0.9999782348,0.9999649815,0.9999432171
SIL MA160,GNSSCodeMeasuredRTK,1008986.1481,767114.5560,846.3481,-105.9286,5.9050,,,09/27/2018 14:28:17,2.5438,2.7296,8.7528,0.9999782235,0.9999646069,0.9999428312
SIL MA161,GNSSCodeMeasuredRTK,1008932.0241,767129.8989,841.3780,-105.9307,5.9050,,,09/27/2018 14:30:26,1.3354,1.5590,4.4168,0.9999782002,0.9999648446,0.9999430455

SIL MA162,GNSSCodeMeasuredRTK,1008918.4282,767125.6538,829.6780,-105.9311,5.9050,,,09/27/2018 14:30:59,1.4905,1.5874,4.9508,0.9999781943,0.9999654038,0.9999435989
SIL MA163,GNSSCodeMeasuredRTK,1008915.5290,767115.7588,840.7641,-105.9311,5.9050,,,09/27/2018 14:31:28,1.5822,1.7938,5.7744,0.9999781930,0.9999648739,0.9999430677
SIL MA164,GNSSCodeMeasuredRTK,1008885.5253,767123.1359,844.2205,-105.9322,5.9050,,,09/27/2018 14:32:05,2.1582,2.5174,6.9264,0.9999781801,0.9999647088,0.9999428896
SIL MA165,GNSSCodeMeasuredRTK,1008879.2382,767124.0013,842.2041,-105.9324,5.9050,,,09/27/2018 14:32:28,1.2489,1.4532,3.9669,0.9999781774,0.9999648051,0.9999429833
SIL MA166,GNSSCodeMeasuredRTK,1008869.9195,767125.7930,859.9155,-105.9328,5.9050,,,09/27/2018 14:33:01,1.5287,1.8741,4.9695,0.9999781734,0.9999639586,0.9999421328
SIL MA167,GNSSCodeMeasuredRTK,1008869.0695,767120.3389,857.0326,-105.9327,5.9050,,,09/27/2018 14:33:29,1.6955,2.2844,5.3636,0.9999781730,0.9999640964,0.9999422702
SIL MA168,GNSSCodeMeasuredRTK,1008857.1816,767128.1540,840.9976,-105.9333,5.9050,,,09/27/2018 14:34:04,1.6625,2.1643,4.5118,0.9999781679,0.9999648629,0.9999430315
SIL MA169,GNSSCodeMeasuredRTK,1008854.9295,767126.4707,863.3581,-105.9333,5.9050,,,09/27/2018 14:34:27,1.9517,2.0052,6.4008,0.9999781669,0.9999637941,0.9999419618
SIL MA170,GNSSCodeMeasuredRTK,1008858.9214,767122.1177,840.6010,-105.9331,5.9050,,,09/27/2018 14:34:53,2.1908,2.6840,6.7603,0.9999781686,0.9999648818,0.9999430512
SIL MA171,GNSSCodeMeasuredRTK,1008850.1429,767126.6950,849.2906,-105.9335,5.9050,,,09/27/2018 14:35:21,1.6903,1.7998,4.8501,0.9999781648,0.9999644665,0.9999426321
SIL MA172,GNSSCodeMeasuredRTK,1008835.0425,767106.2160,852.5822,-105.9337,5.9050,,,09/27/2018 14:35:48,2.8085,3.0410,8.2063,0.9999781583,0.9999643092,0.9999424683
SIL MA173,GNSSCodeMeasuredRTK,1008829.4934,767110.7118,876.5819,-105.9340,5.9050,,,09/27/2018 14:36:20,2.7199,3.6720,8.9817,0.9999781559,0.9999631620,0.9999413188
SIL MA174,GNSSCodeMeasuredRTK,1008841.8827,767132.6180,849.2966,-105.9339,5.9050,,,09/27/2018 14:36:53,2.6881,2.1394,5.4575,0.9999781613,0.9999644662,0.9999426283
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Attachment 3

Select Specifications

SECTION 31 05 05

AGGREGATES FOR EARTHWORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Specified
   1. Aggregates for earthwork materials shall be used as shown on the Design Drawings, as specified herein, or as directed by the Owner.

B. Related Work Specified Elsewhere
   1. Section 02 61 15, Handling and Disposal of Impacted Sediment and Debris.
   2. Section 32 12 00, Flexible Paving.
   3. Section 32 90 00, Plantings and General Site Restoration.
   4. Section 32 92 00, Turfs and Grasses.
   5. Section 35 20 23, Dredging and Subaqueous Backfill.

1.02 APPLICABLE CODES, STANDARDS, AND SPECS

A. The following standards are referenced in this section:
   1. ASTM D6913, Standard Test Method for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
   2. ASTM D5519-07, Standard Test Method for Particle Size Analysis of Natural and Man-Made Riprap Materials
   3. TAL Metals in accordance with USEPA SW-846 Method 6010B.
   4. Total VOCs in accordance with USEPA SW-846 Method 8260B.
   5. Total SVOCs in accordance with USEPA SW-846 Method 8270C.
   6. Total PCBs in accordance with USEPA SW-846 Method 8082.
   7. Total Cyanide in accordance with USEPA SW-846 Method 9010C.
   8. Reactive Sulfide in accordance with USEPA SW-846 Method 9030B.

1.03 QUALITY ASSURANCE

A. Remediation Engineer's Testing Laboratory:
   1. The laboratory used to analyze offsite fill materials shall be certified by the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) for the parameters being analyzed.
   2. The laboratory shall be capable of providing detection limits at or below New York State Department of Environmental Conservation (NYSDEC) Technical Guidance for Screening Contaminated Sediments (River Fill Materials) or 6 NYCRR Part 375 unrestricted use soil cleanup objectives (other fill and stone) to allow for comparison of the analytical results to those objectives.

B. Required Quality Assurance Material Testing:
   1. Gradation in accordance with ASTM D6913 and D5519-07 (as appropriate). Perform one test for each type and source of material. Test one sample per 2,000 cubic yards of imported material.
   2. Analytical testing for volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides/herbicides, and

inorganics demonstrating that offsite materials meet the residential soil cleanup objectives outlined in 6 NYCRR Part 375 (Environmental Remediation Programs), unless otherwise noted below. Test one sample per 2,000 cubic yards of imported material.

a. Gravel, rock or stone backfill, consisting of virgin material from a permitted mine or quarry, will be exempt from pre-characterization analytical sampling requirements provided that it contains less than 10% (by weight) material that would pass through a size 80 sieve.

C. Regulatory Requirements: Laws and Regulations applying to the Work under this Section include:
   1. NYSDEC, DER-10 Technical Guidance for Site Investigations and Remediation.
   2. NYSDEC, Title 6 of the Official Compilation of Codes, Rules, and Regulations (6 NYCRR) Part 375 (Environmental Remediation Programs).
   3. New York State Department of Transportation (NYSDOT), Standard Specifications.

1.04 SUBMITTALS

A. At least three weeks prior to bringing fill materials onsite the Remediation Contractor shall submit the following:
   1. Supplier name, source address, copy of NYSDEC mining permit, and proof of NYSDOT approval, as required, for each proposed source of off-site fill material.
   2. A representative sample of each off-site fill material to the Remediation Engineer to perform the grain size profile and analytical testing, as appropriate, and as required by Part 1.03 of this section.
   3.

B. Delivery Tickets: Submit copy of delivery ticket for each load of off-site material delivered to the Site. Each delivery ticket shall indicate Supplier name and source address, project name, contract number, date, material type, NYSDOT item number when applicable, and quantity delivered.

PART 2 – PRODUCTS

2.01 GENERAL

A. Any offsite materials brought onsite for use as fill must be from a NYSDOT-certified source and meet the requirements of this Section.

B. If quality assurance testing shows that the material does not meet the requirements of this Section, the Remediation Contractor must identify a new source for the material and provide the required data report for the new source of material prior to the use of such material onsite.

2.02 MATERIALS

A. Run-of-Crusher:
   1. Run-of-crusher hard durable limestone, or approved equal, having the following gradation by weight as specified in Table 31 05 05-A:

TABLE 31 05 05-A
GRADATION REQUIREMENTS FOR RUN-OF-CRUSHER

U.S. Sieve Size	Percentage by Weight Passing Sieve
4 -inch (100 mm)	100
¼ -inch (6.3 mm)	30-75
No. 40 (0.425 mm)	5-40
No. 200 (0.075 mm)	0-10

B. No. 2 Stone:
   1. Material shall be natural or prepared mixtures consisting predominately of hard, durable particles of stone or gravel and free of organic material. Material shall meet the NYSDOT Standard Specification Section 703-02 or similar.
   2. Gradation shall be as specified in Table 31 05 05-B.

TABLE 31 05 05-B
GRADATION REQUIREMENTS FOR NO. 2 STONE FILL

U.S. Sieve Size	Percentage by Weight Passing Sieve
1 ½ -inch (37.5 mm)	100
1-inch (25 mm)	90-100
½-inch (12.7 mm)	0-15

C. No. 3 Stone:
   1. Material shall be natural or prepared mixtures consisting predominately of hard, durable particles of stone or gravel and free of organic material. Material shall meet the NYSDOT Standard Specification Section 703-02 or similar.
   2. Gradation shall be as specified in Table 31 05 05-C.

TABLE 31 05 05-C
GRADATION REQUIREMENTS FOR NO. 3 STONE FILL

U.S. Sieve Size	Percentage by Weight Passing Sieve
2.5-inch (63.5 mm)	100
2-inch (50 mm)	90-100
1.5-inch (37.5 mm)	35-70
1-inch (25 mm)	0-15

D. Subbase Course Type 2:
   1. Material shall meet the NYSDOT Standard Specification Section 304-2.02 or similar.
   2. Gradation shall be as specified in Table 31 05 05-D.

TABLE 31 05 05-D
GRADATION REQUIREMENTS FOR SUBBASE COURSE TYPE 2

U.S. Sieve Size	Percentage by Weight Passing Sieve
2-inch (50 mm)	100
¼-inch (6.3 mm)	25-60
No. 40 (0.425 mm)	35-70
No. 200 (0.075 mm)	0-15

E. River Backfill:
   1. Material shall be free of rock and gravel larger than 1.5 inches in any dimension, debris, waste, frozen materials, organic material, and other deleterious matter.
   2. Gradation shall be as specified in Table 31 05 05-E.

TABLE 31 05 05-E
GRADATION REQUIREMENTS FOR RIVER BACKFILL

U.S. Sieve Size	Percentage by Weight Passing Sieve
1 ½ -inch (37.5 mm)	100
No. 4 (0.425 mm)	0-50
No. 200 (0.075 mm)	0-15

3. Material shall be free of foreign chemical contaminants and shall comply with the soil cleanup objectives for restricted residential use criteria per DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010).

F. Type "B" Granular Fill:
   1. Material shall be thoroughly washed clean, sound, tough, hard crushed limestone or approved equal free from coatings.
   2. Gradation shall be as specified in Table 31 05 05-F.

TABLE 31 05 05-F
GRADATION REQUIREMENTS FOR TYPE "B" GRANULAR FILL

U.S. Sieve Size	Percentage by Weight Passing Sieve
1 ½ -inch (37.5 mm)	100
¾ -inch (19 mm)	0-25
½ -inch (12.7 mm)	0-5

G. Type "D" Sand:
   1. Material shall be free of foreign chemical contaminants and shall comply with the soil cleanup objectives for restricted residential use, as set forth in 6 NYCRR 375-6.8(b).
   2. Gradation shall be as specified in Table 31 05 05-G.

TABLE 31 05 05-G
GRADATION REQUIREMENTS FOR TYPE "D" SAND

U.S. Sieve Size	Percentage by Weight Passing Sieve
3/8 -inch (9.5 mm)	100
No. 4 (4.8 mm)	95-100
No. 8 (2.4 mm)	80-100
No. 16 (1.2 mm)	50-85
No. 30 (0.6 mm)	25-60
No. 50 (0.3 mm)	10-30
No. 100 (0.15 mm)	2-10

H. Topsoil:
   1. Material shall be fertile loam material free of roots, clay clumps, woody or weedy vegetation, or other deleterious debris of a size and quantity that prevents proper placement of the topsoil material.
   2. Material shall have a pH of between 5.5 and 7.6.
   3. Topsoil material shall meet the following additional requirements, in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (NYSDEC 2005):
      a. Topsoil shall have at least 6% by weight of fine textured stable organic material, and no greater that 20%. Muck soil shall not be considered topsoil.
      b. Shall not have less than 20% fines (passing no. 200 sieve) and not more than 15% clay.
      c. Shall be relatively free of stones greater than 1-1/2 inches in diameter, trash, noxious weeds such as nut sedge and quack grass, and shall have less than 10% gravel.
      d. Shall contain less than 500 parts per million soluble salts.

4. Material shall be free of foreign chemical contaminants and shall comply with the soil cleanup objectives for unrestricted use criteria per DER-10, Technical Guidance for Site Investigation and Remediation.

I. Shoreline Armor:
   1. Material shall be free of debris, waste, frozen materials, organic material, and other deleterious matter.
      Material shall have a:
      a. D_{10} of 4-inches.
      b. D_{50} of 8-inches.
      c. D_{100} of 12-inches.

PART 3 – EXECUTION

3.01 GENERAL

A. Fill materials will be placed in accordance with the Design Drawings and Specifications or Contract Documents.

B. Materials displaced through the use of the above materials will be disposed of by the Remediation Contractor in accordance with Section 02 61 15, Handling and Disposal of Impacted Sediments and Debris.

C. Any settlements in the finished work will be restored to design grade by the Remediation Contractor at no additional cost to the Owner.

3.02 EROSION AND SEDIMENT CONTROLS

A. Provide temporary erosion and sediment controls in accordance with Specification Section 01 57 05, Temporary Controls. When applicable, also comply with requirements of the erosion and sediment control plan approved by authorities having jurisdiction.

3.03 SHORELINE ARMOR AND OTHER ARMOR PROTECTION MATERIALS

A. Shoreline armor and other armor protection materials shall be carefully placed to avoid damage and/or displacement of the underlying materials, particularly River Backfill. Placement of shoreline armor by dumping into chutes shall not be permitted.

B. Shoreline armor and other armor protection materials shall be placed in a single lift, to the full required thickness, to avoid segregation of stone sizes during placement.

C. Shoreline armor and other armor protection materials shall be placed such that the completed top surface of the shoreline armor meets the lines and grades shown on the Design Drawings, unless otherwise directed by the Owner and/or Remediation Engineer.

D. Some hand placement or rearrangement of stones by mechanical equipment may be required to the extent necessary to achieve the results specified.

E. Shoreline armor and other armor protection materials do not require compaction.

END OF SECTION

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SECTION 32 90 00

PLANTINGS AND GENERAL SITE RESTORATION

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Remediation Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install restoration features.
   2. All types of surfaces, sidewalks, curbs, gutters, and other features disturbed, damaged, or destroyed during the performance of the Project, shall be restored and maintained as specified herein.
   3. The quality of materials and the performance of work used in the restoration shall produce a surface or feature equal to or better than the condition of each before the Project began, as reviewed by the Owner.

B. RELATED WORK SPECIFIED ELSEWHERE
   1. Section 32 12 00, Flexible Paving.
   2. Section 31 05 05, Aggregates for Earthwork.
   3. Section 32 92 00, Turfs and Grasses.

1.02 REFERENCE STANDARDS

A. New York State Department of Transportation (NYSDOT) Standard Specifications

1.03 SUBMITTALS

A. The Remediation Contractor shall submit a schedule of restoration operations for review. Any changes to the agreed upon restoration schedule must be reviewed and accepted by the Owner and/or Remediation Engineer. The replacement of surfaces at any time, as scheduled or as directed, will not relieve the Remediation Contractor of the responsibility to repair damages by settlement or other failures.

B. Manufacturer's product data for fencing, concrete curbs and gutters (if pre-cast), fertilizers, hydroseed mix, etc., if used.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Asphalt Pavement – See Section 32 12 00, Flexible Paving.

B. Selected Fill – See Section 31 05 05, Aggregates for Earthwork.

PART 3 – EXECUTION

3.01 STONE OR GRAVEL SURFACING

A. All areas surfaced with stone or gravel shall be replaced with material to match the existing surface unless otherwise specified.
   1. The depth of the stone or gravel shall be at least equal to the existing.
   2. After compaction, the surface shall conform to the slope and grade of the area being replaced.

3.02 OTHER TYPES OF RESTORATION

A. Trees, shrubs, and landscape items damaged or destroyed as a result of the construction operations shall be replaced in like species and based on discussions with the property owner, unless otherwise directed by the Owner.
   1. Dig pits and beds at least 6 inches larger than the plant root system to be installed in that location.
   2. Remove non-biodegradable containers prior to planting.
   3. Support plants as follows:
      a. One-inch diameter plants: one stake and one tie.
      b. Two-inch diameter plants: two stakes and two ties.
   4. Provide and install wood chip mulch by hand to form a continuous blanket over the soil surrounding the plant, approximately 2 inches in uniform thickness at loose measurement.
   5. An initial watering of planted trees will occur immediately after planting and will be performed throughout the growing season, as needed, until accepted by the Owner.
   6. Do not install plant life when the temperature may drop below 35 °F or rise above 90 °F.
   7. Where applicable, install live stakes when dormant (i.e., before budding out) in the late fall or early spring (no later than early April). Additionally, install trees and shrubs in the spring or fall, and not in the summer months.
   8. Do not install plant life when the wind velocity exceeds 30 miles per hour.

B. Turfs and grasses
   1. Install turfs and grasses in accordance with Section 32 92 00, Turfs and Grasses.

C. Fences destroyed or removed as a result of the construction operations shall be replaced in like size and material and shall be replaced at the original location, or as directed by the Owner.

D. Concrete curbs, gutters, and sidewalks destroyed or removed as a result of the construction operations shall be replaced in like size and material and shall be replaced at the original location, or as directed by the Owner

E. All bituminous concrete pavement or other paved driveways shall be replaced with material to match the existing surface condition and in accordance with Section 32 12 00, Flexible Paving, unless otherwise specified.

F. Other site features removed or damaged as a result of the construction operations shall be restored in-kind to their original location and condition unless otherwise indicated in the Remedial Design, or as directed by the Owner.

G. Existing riprap-lined shoreline area will be restored by placing riprap along the riverbank ad in near-shore areas, as necessary, to prevent erosion/scour in accordance with the IRM Design Report and Section 31 05 05, Aggregates for Earthwork.

3.03 ACCEPTANCE CRITERIA AND MAINTENANCE

A. The finished products of restoration shall be maintained in an acceptable condition for and during a period of one year following the date of substantial completion or other such date as determined by the Owner.
   1. Turf and grasses see Section 32 92 00, Turfs and Grasses for details.

B. Where restored features (trees, shrubs, curbs, pavement, etc.) do not comply with specified acceptance criteria, reestablish the feature and continue extended service period until the feature(s) comply with criteria for acceptance.

C. If applicable, remove erosion-control measures after plantings and grasses extended service period ends.

END OF SECTION

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SECTION 32 92 00

TURFS AND GRASSES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Scope:
   1. Remediation Contractor shall provide all labor, materials, tools, equipment and incidentals as shown, specified and required to restore all disturbed grass areas to conditions equal to or better than existing and to the satisfaction of the Owner.
   2. Types of products required include the following.
      a. Topsoil.
      b. Wildflower and Grass seed mixture.
      c. Fertilizers.
      d. Mulches.
      e. Erosion-control materials.
      f. Accessories.

B. Related Sections:
   1. Section 31 05 05, Aggregates for Earthwork.
   2. Section 31 11 00, Clearing and Grubbing.

1.02 DEFINITIONS

A. The term “finish grade” shall be used to describe the finished surface elevation of planting soil.

B. The term “manufactured topsoil” shall be used to describe soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil acceptable as a component of loam.

C. The term “loam” shall be used to describe topsoil that has been mixed with additional organic and inorganic additives, as specified.

D. The term “percentage pure live seed” shall be defined as the percent (%) purity multiplied by percent (%) germination divided by 100 to equal the percent pure live seed (PLS) and shall be calculated for all seed lots using each seed lots own unique purity and germination test results. A PLS pound shall be defined as the bulk weight of seed required to equal one pound of 100 percent pure, germinated seed.

E. The term “subgrade” shall be used to describe the surface of subsoil remaining after completing excavation; or the top surface of a fill or backfill immediately beneath

F. Seed may be mixed by an approved method on-Site or at the seed supplier’s facilities. If the seed is mixed on-site, each variety shall be delivered in the original containers and shall bear the supplier’s certified analysis. Where seed is mixed by the seed supplier, provide Remediation Engineer with the seed supplier’s certified statement as to the composition of the mixture.

1.03 SUBMITTALS

A. Action Submittals: Submit the following:
   1. Product Data:
      a. Manufacturer's product data, specifications and installation instructions for all required materials including but not limited to; seed mix, fertilizers, and erosion control products.
      b. Composition and analysis of commercial fertilizers and all purchase receipts showing the total quantity actually purchased for this Project.
      c. Proportions of each component contained in hydro seed mixture, if required. Identify number of pounds of each component required for each 100 gallons of water. Include the number of square feet of lawn, grass meadow or wildflower meadow mixture that can be installed with each full tank of hydro seed mixture.

B. Informational Submittals: Submit the following:
   1. Certificates:
      a. Certification of Wildflower and Grass Seed mixture: For each seed mixture, furnish seed supplier's certification stating the botanical and common name, and percentage by weight of each species and variety, and percentage of purity, germination and weed seed. Include the year of production and date of packaging. Certify that seed has been stored in compliance with all recommendations of the seed supplier.

1.04 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Proceed with and complete turfs and grasses planting as rapidly as portions of the Site become available, working within the seasonal limitations for each type of lawn, grass and wildflower planting required.
   2. Proceed with planting only when current and forecasted weather conditions are favorable to successful planting and establishment of turfs and grasses.
      a. Do not spread seed when wind velocity exceeds five miles per hour.
      b. Do not plant when drought, or excessive moisture, or other unsatisfactory conditions prevail.
   3. Herbicides, chemicals and insecticides shall not be used on areas bordering wetlands.

B. Scheduling:
   1. Coordinate planting with specified extended service periods to provide required service from date of Substantial Completion. Plant during one of the following periods:
      a. Seeding and planting may be performed between October 1 to freeze-up as well as between April 1, or soon thereafter as the soil can be worked, and July 30.
      b. If topsoil placement occurs between July 30 and September 30, apply a cover crop of annual rye grass at a rate of 25 pounds per acre, in addition to the specified seed mix, and cover with erosion control fabric to provide temporary erosion protection.
      c. Seeding and planting is not recommended between August 1 and September 30.

1.05 WARRANTY

A. General Warranty: The Remediation Contractor shall be responsible for establishing a dense, healthy stand of perennial grass cover, with a uniform cover density of at least 80 percent. The Remediation Contractor shall maintain all vegetative ground cover (including grass), monitor, and maintain temporary erosion and sedimentation controls, repair any observed erosion, and reseed areas of poor grass growth until a dense, healthy stand of grass cover has been established. Upon full establishment of grass cover (i.e. to 80% cover density),

Remediation Contractor shall remove all remaining temporary erosion and sedimentation controls (straw/hay/straw bales, silt fence, etc.) from the site.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Topsoil:
   1. All soil accepted as topsoil, whether obtained from on-Site or off-site sources, shall comply with topsoil requirements in accordance with Section 31 05 05, Aggregates for Earthwork.
   2. Topsoil Source: Reuse surface soil stockpiled on-Site, where possible. Verify suitability of stockpiled surface soil to produce topsoil, as specified. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
      a. Supplement acceptable on-Site soil with manufactured topsoil from off-Site sources, when quantities available on-Site are insufficient to complete the Work.
   3. Topsoil Source: Amend existing in-place surface soil to produce topsoil, where possible. Verify suitability of surface soil to produce topsoil, as specified. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
      a. Supplement acceptable surface soil with manufactured topsoil from off-Site sources, when quantities available on Site are insufficient to complete the Work.

B. Seed Mix:
   1. Ernst Seeds ERNMX-166 Low-Growing Wildflower and Grass mix or approved equal: Provide a mixture of fresh, clean, new-crop seed complying with the tolerance for purity and germination established by AOSA. Provide seed of each species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed specified.
   2. Seed Species: Seed of grass and wildflower species as follows, with not less than 95 percent germination, not less than 80 percent pure seed, and not more than 0.25 percent weed seed by weight:
      a. Full Sun: Proportioned by weight as follows:
         1) Forty-three percent Sheep Fescue (Festuca saximontana)
         2) Thirty-one percent Annual Ryegrass (Lolium multiflorum)
         3) Seven percent Perennial Blue Flax (Linum perenne)
         4) Six percent Partridge Pea (Chamaecrista fasciculate)
         5) Three percent Butterfly Milkweed (Asclepias tuberosa)
         6) Three percent Oxeye Daisy (Chrysanthemum leucanthemum)
         7) Two percent Lanceleaf Coreopsis (Coreopsis lanceolate)
         8) One and one-half percent Shasta Daisy (Chrysanthemum maximum)
         9) One percent Blackeyed Susan (Rudbeckia hirta)
         10) One percent Aromatic Aster (Aster oblongifolius)
         11) One-half percent Orange Coneflower (Rudbeckia fulgida)
         12) One-half percent Spotted Beebalm (Monarda punctate)
         13) One-half percent Common Yarrow (Achillea millefolium)
         14) One-half percent Mistflower (Eupatorium coelestinum)
         15) One-half percent Hairy Beard Tongue (Penstemon hirsutus)

C. Erosion-Control Materials:
   1. Erosion-Control Fiber Mesh: For slopes <3H:1V, 100% Biodegradable twisted jute or spun-coir mesh, a minimum of 0.92 pounds per square yard, with 50 to 65 percent open area. Include manufacturer's recommended 6-inches long steel wire staples.
   2. Erosion Control Blanket: For slopes >3:1, North American Green BioNet C125BN or approved equal, installed in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.01 INSPECTION

A. Remediation Contractor shall examine the areas and conditions under which turfs and grasses Work is to be performed, and notify Remediation Engineer, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Remediation Engineer.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
   1. Protect adjacent and adjoining areas from hydro seeding overspray, as necessary.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Excavate or fill subgrade, as required, to bring subgrade to elevations within 6-inches of existing surface. Maintain all angles of repose. Confirm that subgrade is at proper elevations and that no further earthwork is required to bring the subgrade to proper elevations.

D. Remove all construction debris, trash, rubble and all extraneous materials from subgrade. In the event that fuels, oils, concrete washout or other material harmful to plant growth or germination have been spilled into the subgrade, excavate the subgrade sufficiently to remove all such harmful materials and fill with approved fill, compacted to the required subgrade compaction level.

E. Backfill topsoil, as required, to bring elevations to existing surface grade. Maintain all angles of repose. Confirm that final grade is at proper elevations and that no further earthwork is required to bring the final grade to proper elevations.

3.03 SEEDING

A. In accordance with New York State Standards and Specifications for Erosion and Sediment Control, NYSDEC, November 2016. Sow Low-Growing Wildflower and Grass seed mixture at a minimum rate of not less than 45-pounds for every acre.

B. Remediation shall apply specified seed mix without delay to prevent erosion or displacement of soils and discharge of soil-bearing runoff to adjacent properties or waterways.

C. Protect seeded areas, with slopes less than one on three, by providing erosion-control fiber mesh and where slopes exceed one on three, by providing erosion-control blankets. Install erosion-control materials according to manufacturer's written instructions and as follows:

1. Vertically down slope without stretching fabric.
2. Install hold down staples three per square yard minimum in center of fabric or as required to hold and shape the fabric to the contours of the slope. Install hold down staples along edges and overlaps of fabric at 9 inches on centers minimum, or as required to hold and shape the fabric to the contours of the slope.
3. Lap fabric 4-inches minimum and turn edges of fabric into 8-inch deep by 16-inch wide earth trench and fill trench with earth.

D. Using a uniform fine spray, thoroughly and evenly water seeded areas. Provide adequate water to moisten seedbed to a depth of 2-inches.
   1. Maintain all seedbeds in a uniformly moist condition, conducive to seed germination and plant establishment, as specified.

E. Reseed areas that remain without mulch or erosion controls for longer than three days.

F. Take precautions to prevent damage or staining of construction or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

G. Prevent foot or vehicular traffic, or the movement of equipment, over the mulched areas. Reseed areas damaged as a result of such activity.

3.04 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

3.05 ACCEPTANCE CRITERIA FOR TURFS AND GRASSES

A. Turfs and grasses Work will be considered acceptable when:
   1. Seeded Meadow: A dense, healthy stand of perennial grass and wildflower cover exists with a uniform cover density of at least 80 percent for a minimum of one year post-seeding.

B. Promptly remove soil and debris, created by turfs and grasses Work, from paved areas. Clean wheels of vehicles before leaving Site to avoid tracking soil and loam onto roads, walks, or other paved areas.

C. Remove erosion-control measures after turfs and grasses extended service period ends.

D. Take all precautions to ensure that hydroseed slurry is only placed on the areas designated. Completely clean any overspray, on areas not designated to receive slurry.

3.06 INSPECTION AND ACCEPTANCE

A. Where turfs and grasses do not comply with specified acceptance criteria, reestablish turfs and grasses and continue extended service period until turfs and grasses comply with criteria for acceptance.

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Attachment 4

Medium Stone Fill Rip Rap Photos

Attachment 5

Example Monitoring Inspection Checklist and Monitoring Summary Table

Annual Monitoring Inspection Checklist
Binghamton (Court Street) Former MGP Site

I. GENERAL INFORMATION

Inspection Date: _____

Conducted By: _____

Weather Conditions: _____

II. INSPECTION SUMMARY

1. Vegetation

A. Woody Vegetation *(Note evidence of damage from trespassing or herbivory, note physical changes since last inspection. If a quantitative assessment is performed, complete the attached field form for each planting area.)*

B. Herbaceous Vegetation *(Note evidence of areas of bare/sparse vegetation; note any damage from trespassing or herbivory; note any physical changes since last inspection. If a quantitative assessment is performed, complete the attached field form for each planting area.)*

C. Presence of Invasive Species *(Note the invasive species present. If a quantitative assessment is performed, complete the attached field form for each planting area.)*

2. Riverbank Stability *(Note any physical changes since last inspection; note evidence of significant erosion [e.g., slope failure, ruts, gullies, washouts, or sloughing]; note other conditions that could jeopardize the performance of the completed remediation actions.)*

3. Other Observations *(Confirm that repair/maintenance activities identified during prior inspection, if any, have been performed; note any other general observations.)*

III. FOLLOW-UP MAINTENANCE AND REPAIR ACTIVITIES

ATTACH ADDITIONAL INFORMATION AS APPROPRIATE

Summary of Quantitative Vegetation Assessment - Sample Plots (Year 1 [example])

Binghamton (Court Street) Former MGP Site

Date(s) of Monitoring:

Planting Area	Sample Plot No. (if applicable)	Trees				Herbaceous Ground Cover		Invasive Species	
		# Planted	# Counted	% Survival	Performance Criteria Met?	% Cover	Performance Criteria Met?	% Cover	Performance Criteria Met?
Transloading Area	TBD								
	TBD								
	TBD								
	TBD								
	TBD								
	Average								

Summary of Quantitative Vegetation Assessment - Trees ≥ 2-inch DBH (Year 5 [example])

Binghamton (Court Street) Former MGP Site

Date(s) of Monitoring:

Planting Area	Drawing Reference	Trees (≥ 2-inch DBH)			
		# Planted	# Counted	% Survival	> 90% Survival?
Transitional Bank	C-102				
	C-103				
	C-104				
	C-105				
	C-106				
	C-107				
	Total				
Lower Bank	C-103				
	C-104				
	C-105				
	C-106				
	C-107				
	C-108				
	Total				
Steep Bank	C-103				
	C-107				
	Total				
Upper Bank	C-103				
	C-104				
	C-105				
	C-106				
	C-107				
	Total				

Note:
1. DBH = diameter breast height.

Summary of Quantitative Vegetation Assessment - Live Whip Bundles (Year 5 [example])

Plattsburgh (Saranac Street) Former MGP Site

Date(s) of Monitoring:

Planting Area	Drawing Reference	Live Whip Bundles		
		Trench	% Total Length Demonstrating Growth (est.)	% Total Length Demonstrating Growth (measured)
Inundated Shoreline	C-102	1		
		2		--
		3		--
		4		--
		5		--
		6		
		7		--
		8		--
	C-104	1		--
		2		--
		3		
		4		--
		5		--
		6		--
		7		--
		8		
		9		--
		10		--
		11		--
		12		--
		13		
		14		--
		15		--
		16		--
		17		--
		18		
		19		--
		20		--
		21		--
		22		--
		23		
		24		--
	C-105	1		--
		2		--
		3		--
		4		
		5		--
		6		--
		7		--
		8		--
		9		
		10		--
		11		--
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		13		--
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		21		--
		22		--
		23		--
		24		
		25		--
		26		--
		27		--
		28		--
	C-106	1		
		2		--
		3		--
		4		--
		5		--
		6		
		7		--
		8		--
		9		--
		10		--
		11		
		12		--
		13		--
		14		--
		15		--
		16		
		17		--
		18		--
		19		--
		20		--
		21		
	Average	--		

Note:
1. -- indicates "not applicable".

Summary of Quantitative Bank Stability Assessment (Year 5 [example])

Plattsburgh (Saranac Street) Former MGP Site

Date(s) of Monitoring:
Daily Average Flow at USGS gauging station 04273500 on Date(s) of Monitoring:

Transect	Elevation of Edge of Water	Elevation of Vegetation/ Scour Line
1		
2		
3		
4		

Notes:
1. Elevations are in feet and are referenced to North American Vertical Datum of 1929.