TETRA TECH EC, INC.

June 29, 2009

Ms. Jamie Verrigni
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Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
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SUBJECT: Final Interim Remedial Measure Work Plan
Cayadutta Creek Bank Restoration
Johnstown (N. Market St.) Former MGP Site (#518020)

Dear Ms. Folsom:

Enclosed please find two copies of the subject work plan for your records. We have incorporated your comments from the June 9, 2009 approval letter into this final version. A copy of this work plan will be forwarded to the Johnstown Repository.

Please contact Steve Stucker at (315) 428-5652 or Steven.Stucker@us.ngrid.com or me at (973) 630-8517 or lee.haymon@tteci.com if you have any questions on this submittal or other project matters.

Sincerely,

Lee Haymon
Project Manager

Enclosure:

cc S. Stucker National Grid

SGS

2907.0004-09-OT-014

FINAL INTERIM REMEDIAL MEASURE WORK PLAN

FOR THE

CAYADUTTA CREEK BANK RESTORATION

JOHNSTOWN (N. MARKET STREET) FORMER MANUFACTURED GAS PLANT
105 N. MARKET STREET
JOHNSTOWN, FULTON COUNTY, NEW YORK
SITE #5-18-020

June 29, 2009

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1 INTRODUCTION

1.1 General

This Interim Remedial Measure (IRM) Work Plan for the Cayadutta Creek Bank Restoration at the Johnstown (N. Market Street) Former Manufactured Gas Plant (MGP) Site (the Site) (Site #5-18-020) has been prepared by Tetra Tech EC, Inc. (TtEC) on behalf of National Grid. National Grid had been addressing the Site environmental conditions under an Order on Consent (Index Number D0-0001-9210), dated April 1999, with the New York State Department of Environmental Conservation (NYSDEC). That Order on Consent was for the investigation and remediation of 21 former MGP sites, including the Johnstown (N. Market Street) Site. It was superseded by a new Order on Consent (Index Number A4-0473-0000), dated November 7, 2003.

Preparation of this Work Plan is in accordance with the requirements set forth in the NYSDEC Division of Environmental Remediation *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (DER-10, December 2002). The proposed IRM detailed in this Work Plan includes re-establishment of vegetation along the riprap portion of the Cayadutta Creek bank, as proposed in the NYSDEC-approved Final Addendum to the Supplemental Remedial Investigation Report (TtEC, 2009). This IRM Work Plan discusses the methods and procedures that will be used to perform the remedial measure and achieve remedial objectives.

1.2 IRM Work Plan Objectives

The objectives of this IRM Work Plan are to:

- Provide a conceptual design for the Johnstown Cayadutta Creek Bank IRM;
- Provide a preliminary schedule for the activities of the IRM and Operation, Maintenance, and Monitoring (OM&M) activities;
- Provide a preliminary cost estimate; and
- Obtain NYSDEC approval of the IRM.

1.3 IRM Work Plan Organization

In addition to Section 1.0 – Introduction, the IRM Work Plan includes the following sections:

- Section 2.0 – Site Background
- Section 3.0 – Applicable Remedial Standards and Remedial Objectives
- Section 4.0 – Proposed Interim Remedial Measures

- Section 5.0 – Site Specific Health and Safety Plan
- Section 6.0 – IRM Cost Estimate
- Section 7.0 – IRM Schedule
- Section 8.0 – Operation, Maintenance, and Monitoring
- Section 9.0 – References

2 SITE BACKGROUND

The information contained in this section includes a description of present site conditions including geology and hydrogeology, a history of the Site, and a summary of previous activities.

2.1 Site Description

The Site is located on North Market Street in Johnstown, Fulton County, New York (Figure 1), and is 0.7 acres. The Site is bordered by Market Street to the east, a small cemetery (Colonial Cemetery) to the south, a wooded bank on residential property to the west, and Cayadutta Creek to the north. The only structure at the Site is a natural gas regulator station owned and operated by National Grid. A North Market Street concrete bridge spans the Cayadutta Creek immediately to the northeast of the Site's boundary.

Most of the Site is open and grassy, with the gas regulator station located in the center of the southern part of the Site. An embankment parallels Cayadutta Creek. There is an approximately 60 foot long concrete wall along the southern bank of Cayadutta Creek immediately to the west of the North Market Street Bridge. A chain link fence exists along the north and west boundaries of the Site, and a historic limestone block retaining wall runs along the south side of the Site. Access to the Site is from North Market Street to the east. Figure 2 shows the layout of the Site.

Land use near the Site is mainly mixed usage, commercial, and residential. The Johnstown Hospital is located south of the Site within one mile, and numerous residences exist to the west and east.

2.1.1 Topography and Surface Cover

The ground surface slopes northward towards Cayadutta Creek. Elevations range from approximately 672 feet above mean sea level (msl) along the retaining wall at the southern Site boundary to approximately 652 feet msl along the Creek. The slope is relatively gentle in the southern portion of the Site, becoming increasingly steep adjacent to the Creek. A riprap cover exists on the lower half of the slope adjacent to the Creek. Outside of the regulator station, the land surface is covered with either vegetation or stone. Surface drainage is primarily to the north into the Cayadutta Creek.

2.1.2 Regional Geology

The Site is located in the Mohawk lowlands, approximately five miles southeast of the Adirondack foothills. Much of the unconsolidated deposits in the Mohawk lowlands were formed as a result of Pleistocene glaciation. The area glacial deposits are underlain by Ordovician-age Canajoharie Shale bedrock (Fisher et. al., 1970). The Canajoharie Shale is the youngest and most widespread of sedimentary formations in Fulton County that overlie the crystalline bedrock. These sedimentary formations tend to be nearly horizontal, except near faults, with a generally southward dip less than 6° (Arnow, Theodore, 1951). The Canajoharie Shale consists of gray to black fine-grained and thin-bedded shale with numerous tension joints.

Granitic gneiss groups of the Adirondacks outcrop within five miles to the northwest of the Site. A north-south trending normal eastward-dipping 30-degree fault underlies the vicinity of the Site (Isachsen and McKendree, 1977).

2.1.3 Site Geology

The main units of unconsolidated deposits identified at the Site can be characterized in descending order as fill and two types of native glacial deposits: a layer of sand, silt and gravel; and glacial till. Utica Shale bedrock was reached underneath the till in two of the borings conducted during the 1998 Supplemental Preliminary Site Assessment. These stratigraphic units are described below, based on information obtained from the previous investigations, and from the soil borings and monitoring well borings conducted during the 2007-2008 Supplementary Remedial Investigation (SRI) (TtEC, 2008c).

The fill is composed of sand, gravel, silt, clay, wood, coal, and anthropogenic materials including ash, cinders, clinkers, brick fragments, wire, and wood chips. The glacial deposits consist of a heterogeneous mixture of stratified sand, silt and gravel, overlying a dense glacial till unit. During the 2002-2003 Holder IRM (TtEC, 2008a), the fill material and the underlying native silt, sand and gravel were excavated from the central and northern areas of the Site, where they were impacted by the MGP-related contamination. The excavation proceeded to the top of the till unit, at depths ranging between approximately 5 and 30 feet. The excavated material was replaced with imported fill and re-usable site soils. There is a small area, located around well MW-15, where the excavation did not proceed to the top of till; therefore, some native soils still remain there. In the southern area of the Site, the fill and the sand/silt/gravel units were not excavated; therefore, they remain at their pre-IRM thicknesses.

The glacial till unit comprises various amounts of silt and clay, as well as stringers of sand and gravel. The thickness of till at two locations where the underlying shale was reached during the SRI was approximately 3 and 11 feet.

During the 2007 SRI activities, four samples were collected from above the till unit during installation of MW-13, MW-14, and MW-15, to obtain information on the bulk density, porosity, and organic carbon content of the on-site soils. Samples were obtained from borings MW-13 and MW-14, which are located in the area where the soils were excavated during the Holder IRM, and replaced with either imported fill or re-worked re-usable Site soils. Therefore, parameters obtained from these samples are considered to be characteristic of the recently placed fill. Samples obtained from MW-15 may be representative of either the post-Holder IRM fill, or the native soils, as the Holder IRM excavation did not proceed to the top of till in the vicinity of that well. The bulk densities are in the 133 to 145 lb/ft^3 range (2.1-2.3 kg/L), while the porosity values are approximately 30% to 40%.

2.1.4 Cayadutta Creek

Cayadutta Creek flows to the west, along the northern boundary of the Site. It is 25 to 30 feet wide under typical flow conditions, with a depth of approximately 3 to 4 feet. In the vicinity of the Site, the stream gradient is modest at roughly 20 feet/mile and riffles occur as the water flows

past rocks and debris. The southern bank of the stream along the Site has been stabilized with rip-rap as part of the Holder IRM and Bridge reconstruction (TtEC, 2008a and 2008b, respectively). Limited amounts of native vegetation are present where this rip-rap was placed and is confined to an area within 6 to 10 feet of the mean water level. Vegetation, consisting of solely volunteer species comprising a mix of native, non-native and invasive species, has established in the riprap interstitial spaces where sediments have deposited during high flow events. Dominant species present in spring of 2009 include: goldenrods, mugwort, crown vetch, yellow rocket, garlic mustard, and various grasses. Also scattered throughout the area were occasional plants of coltsfoot, cucumber root, wormwood, Japanese knotweed, and purple loosestrife. A few stems of three woody species, red-osier dogwood, box elder and green ash, were also observed. Access to the stream along the southern bank is limited by a chain-link fence. Along the northern bank, rubble and concrete debris line much of the bank.

Upstream of the Site, Cayadutta Creek drains over 25 square miles of urban, agricultural, and forested lands. Runoff from most of the City of Gloversville and the northern portions of the City of Johnstown flows into the Creek, as well as water from agricultural land east of Johnstown. Cayadutta Creek is classified by NYSDEC as a Class C surface water body. Class C waters are suitable for fishing and fish propagation; water quality is suitable for primary and secondary contact recreation even though other factors may limit the use for that purpose.

2.1.5 Site History

The Johnstown MGP site was incorporated in March 1857 as the Johnstown Gas Light Company. The company operated a small coal gas plant with a 20,000 cubic foot holder. In 1861, the plant was improved with the addition of a coal shed and covering for the tank holder. In 1886, the Johnstown and Gloversville Gas Light Corporation was formed, and the company purchased the rights to the Lowe water gas process. The United Gas Improvement Company was to proceed with the construction of a water gas plant for the Johnstown and Gloversville franchises.

In 1887, the Site consisted of a tool shop, an office, a coal gasometer, a gasometer, a lime house, a purifier room, a retort house, and a coal shed. In 1892, a steam generator was constructed adjacent to the coal shed for the Lowe water gas process. Between 1912 and 1918, the western small gas holder in the middle of the Site was removed. In 1929, a gas pipeline from a MGP in Troy, New York reached Johnstown, and local gas production was only performed on a seasonal (winter) basis, until local production of gas ceased in 1931. Niagara Hudson Power Company was the owner of the Site in 1930, which then consolidated into National Grid Power Company in 1950. By 1980, all Site buildings were removed. Currently, National Grid operates a natural gas regulator station located at the Site.

2.2 Summary of Remedial History

2.2.1 Preliminary Site Assessment/Interim Remedial Measure/Remedial Investigation 1998-2001

In February 1998, National Grid completed a Preliminary Site Assessment/Interim Remedial Measure (PSA/IRM) Study of the Site and submitted the results to the NYSDEC in a PSA/IRM Report. During July and November 1998, a Supplemental PSA/IRM Study was performed, and the results were submitted to the NYSDEC in a Supplemental PSA/IRM Report. During December 1999 and January 2000, a Remedial Investigation (RI) was undertaken, and the results of this investigation were submitted to the NYSDEC in the RI Report dated March 2000.

From March 2000 through December 2001, supplemental investigations were undertaken for the purpose of facilitating IRM planning and implementation. These investigations included sediment sampling in Cayadutta Creek, a treatability study to screen soil disposal options, a treatability study to evaluate *in situ* oxidative treatment of impacted groundwater, investigations to define the location of Holder No. 2, investigations to locate existing natural gas pipelines located east of Holder No. 2, data collection to support the design of excavation alternatives, and investigations to define the extent of impacts beneath North Market Street.

Details describing the above activities and results are provided in the RI Report dated March 2000 and the Interim Remedial Measure Summary Report dated March 2008.

2.2.2 Interim Remedial Measure 2002-2003

In March 2002, National Grid mobilized for the Holder Removal IRM. The IRM, completed in 2003, was conducted according to the NYSDEC-approved Work Plan. This IRM consisted of installation of sheet piles and soil excavation. The purpose of the IRM was to achieve the following five objectives:

- Remove MGP-impacted source material within former Holder No. 2 and within the northern half of former Holder No. 3;
- Demolish and remove former Holder No. 2 and the northern half of former Holder No. 3;
- Remove MGP-impacted source material from beneath former Holder No. 2 and the northern half of former Holder No. 3;
- Remove MGP-impacted source material surrounding former Holder No. 2 and downgradient of former Holder No. 2 and former Holder No. 3; and
- Mitigate the migration of MGP-impacted source material within and north of the former holders.

Excavation and demolition activities preceded down to the top of the underlying glacial till confining unit, and post-excavation soil samples were obtained. Backfilling was accomplished with imported clean backfill and re-useable site soils. Accomplishments of the IRM included removal of MGP-impacted source material within and beneath the former holders to the top of the glacial till confining unit, and demolition and removal of the former holders. Approximately

13,870 cubic yards of soil were excavated and disposed as non-hazardous waste, and approximately 6,640 cubic yards of soil were excavated and subsequently re-used as backfill on the Site. Confirmation soil samples were collected from the bottom of the excavation and analytical results were within the NYSDEC-approved criteria for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) and Polyaromatic Hydrocarbons (PAHs). At the conclusion of the IRM, permanent steel sheeting was left in place along the perimeter of the northeastern Site quadrant.

Site restoration activities included grading the creek shoreline, stabilizing it with riprap cover placed over a geo-textile fabric on the lower half of the slope adjacent to the creek, and fitting the upper half of the slope further from the Creek with a polyethylene erosion control mat. A 4-foot site cap was then installed over geo-textile fabric using imported fill with a 6-inch layer of topsoil on the surface. The cap was graded and fitted with perimeter berms to guide surface drainage directly to the northern slope and from there to the creek and maintain a more general slope towards the creek. The topsoil was then seeded, fertilized, mulched, and watered. Currently, limited amounts of native vegetation are present along the southern creek bank of Cayadutta Creek where the riprap and geo-textile fabric was placed.

A full description of the activities performed was provided to NYSDEC in the Interim Remedial Measure (IRM) Summary Report for the Johnstown (North Market St.) Site (TtEC, 2008a).

2.2.3 Interim Remedial Measure 2005-2006

Mobilization for the City of Johnstown Bridge IRM occurred in June 2005. This entailed National Grid providing support to the City of Johnstown for subsurface work associated with the replacement of the North Market Street Bridge (Bridge) across Cayadutta Creek. The Bridge is located on North Market Street adjacent to the Site.

Based on discussions between National Grid and the City of Johnstown, it was determined that the most practical way of removing the MGP-impacted soil and groundwater at the Bridge site was to perform activities during the Bridge construction. National Grid used the City's construction subcontractor to excavate and remove the MGP-impacted materials in the work construction area, provide treatment of water generated during construction, and transport and dispose of the MGP-impacted materials. The IRM consisted of the installation of a sheet pile cofferdam around the existing Cayadutta Creek Bridge, followed by sequential demolition of former bridge elements and excavation of MGP-related soils within the cofferdam area and down to approximately 1-foot below the bottom of the new bridge footing elevation. During this excavation work on the south side of Cayadutta Creek, about 1,413 cubic yards of soil were excavated and disposed as non-hazardous waste at the Fulton County Landfill.

The Bridge IRM was completed in November 2006. A full description of the activities performed was provided to NYSDEC in the report titled Construction Completion Report for the North Market Street Bridge Replacement Project (TtEC 2008b).

2.2.4 Supplemental Remedial Investigation 2007-2008

The primary objectives of the SRI was to collect data to characterize potential residual MGP-related contaminants remaining in groundwater at the Site, assess hydrogeologic conditions and groundwater quality on the Site, and secure a No Further Action determination from the NYSDEC for sediments in Cayadutta Creek adjacent to the Site. A specific objective for the SRI included improving the delineation of the horizontal and vertical extent of potential residual MGP-related contaminants in soil and groundwater at the Site.

To achieve these objectives, TtEC performed the following:

- Collected subsurface soil samples for analytical and geotechnical analyses;
- Installed six new monitoring wells;
- Collected two rounds of groundwater elevation measurements and groundwater samples from the existing monitoring well network;
- Performed slug tests to calculate hydraulic conductivity and groundwater seepage velocities at four site monitoring; and
- Evaluated the natural attenuation capacity of the aquifer by collecting groundwater samples for natural attenuation parameters and conducting a qualitative analysis of natural attenuation, as well as using the BIOSCREEN model.

Additional details regarding the specific activities performed during the SRI are provided in the December 2008 SRI Report (TtEC, 2008c).

Data obtained during the SRI indicated dissolved phase contaminant concentrations decreased, likely because of the removal of the former gas holders and source soils. In the area where the source soils were left in place as a result of difficulties in advancing the sheet piles that supported the IRM excavation, a residual source might exist, and the concentrations of dissolved-phase contaminants are elevated. However, biodegradation appears to be occurring within the water-bearing zone resulting in the attenuation of these concentrations to low levels, and a negligible impact on Cayadutta Creek. Additional data regarding the potential impacts to Cayadutta Creek are provided in the Final Addendum to the Supplemental RI Report (TtEC, 2009). Concentrations throughout the Site will gradually decrease with time as the contaminant mass remaining within the residual source is depleted. The residual contamination at the Site has been delineated. Sufficient data was collected to be able to proceed with the Feasibility Study. The SRI Report was approved by the NYSDEC on January 7, 2009.

2.2.5 Final Addendum to the Supplemental RI Report 2009

The Final Addendum to the Supplemental RI Report submitted by TtEC on February 9, 2009, was a continuation of the SRI effort, and focused on the sediment and surface water media encountered in Cayadutta Creek. Sediment samples were collected from Cayadutta Creek on

three occasions: 1) during the Supplemental Preliminary Site Assessment in July 1998, 2) during the RI in December 1999; and 3) during the SRI in February 2001.

The results of the sediment investigation, as presented in the Final Addendum to the Supplemental RI Report, include:

- The IRM activities resulted in removal of the source of PAH contamination from the upland portion of the Site. Based on the assessment of the post-IRM contaminant mass loading to the creek from residual groundwater contamination, the Site's impact on the water quality in the creek is negligible.
- Biological assessments indicate the stream reach encompassing the Johnstown Site has water quality that is only slightly impaired, a rating comparable to most of the other reaches along Cayadutta Creek.
- Background (upstream) total PAH levels within the creek sediments are comparable to total levels adjacent to the Site. Recontamination of the sediments is likely given geomorphology of stream relative to upstream transport.
- Downstream total PAH levels are lower than the levels along the Site boundary, indicating PAHs adjacent to the Site have not migrated sufficiently downstream to elevate levels beyond the general background levels documented.
- Surface sediments show evidence of winnowing of fines and the development of the erosion resistant coarser surface pavement, suggesting that the erosion of the sediments adjacent to the Site is unlikely under most flow conditions.
- Water quality adjacent to the Site is not impacted by PAHs.
- Sediments are not impacted by MGP-related NAPL.
- Access to the creek sediments is limited by the fencing along the northern edge of the Site, the vertical bridge abutments built upstream of the new N. Market Street Bridge, and the steep rubble and concrete strewn bank opposite the Site.
- The majority of the source material has been removed from the Site, while the levels of the MGP-related contamination in the creek sediments are indistinguishable from background.

The Final Addendum to the Supplemental RI Report was approved by the NYSDEC on March 3, 2009.

3 APPLICABLE REMEDIAL STANDARDS AND REMEDIAL OBJECTIVES

This IRM is not intended to remove/address contaminated soil, sediment, groundwater, or surface water at the Site. Therefore, remedial standards are not specified. The remedial objective of this IRM is to enhance the vegetation present along the southern creek bank of Cayadutta Creek at the locations of the 2002 and 2005 IRMs. To meet the overall requirements of 6 NYCRR Part 608, National Grid proposes to enhance the restored riprap area to allow for the establishment of stream-side vegetation.

4 PROPOSED INTERIM REMEDIAL MEASURES

4.1 General

This section describes the proposed IRM for restoring the Cayadutta Creek bank. As discussed with NYSDEC Fish and Wildlife personnel, National Grid proposes to enhance the current restoration by implementing the following elements:

1) Soil erosion and sediment control measures;
2) Removal of excess artificial materials (geo-textile fabric, poly erosion control mat) from the edges of the sod restoration on the terrestrial portions of the Site and along the placed rip-rap apron;
3) Placement of soil (soil choking) into the crevices and on the surface of the rip-rap;
4) Seeding of the placed soil with a riparian seed mix and cover crop. The species makeup of the riparian seed mix will match the species already present within the stream corridor as feasible;
5) Planting of native shrubs at the stream-side edge of the re-vegetation area; and
6) Maintenance of the seeded area until plant establishment.

In selecting the vegetation cover, the following criteria were considered:

- NYDEC recommended seed mixes;
- Low maintenance species;
- Establishment of plant cover in July;
- Preventing enrichment of receiving waters;
- Preventing sediment loaded run-off;
- Enhancing the diversity of the wildlife habitat; and
- Improving the aesthetic qualities of the Site.

4.2 IRM Description

The restoration effort will include the following elements:

<u>Installation of Soil Erosion and Control Measures</u>

The following soil erosion and control measures shall be placed in the temporary work area prior to initiation of restoration activities:

- Installation of temporary silt fencing along the water's edge;
- Placement of construction straw bales around the temporary imported soil stockpile area; and
- Placement of temporary straw bale barriers upgrade of the restored area.

The temporary straw bales will be placed upgrade of the restored area once mulch has been placed to protect against erosion of the freshly seeded area by diverting stormwater run-on from

the portion of the Site located upgrade of the restoration area. The temporary straw bales and the temporary silt fence will remain in place until vegetation is established. See Figure 4 for more soil erosion and sediment control details.

Removal of Excess Artificial Material

Excess artificial materials (geo-textile fabric, poly erosion control mat) shall be hand removed from the edges of the areas where sod was restored on-site and along the bank. Material removed shall be properly disposed of off-site.

Placement of Soil

A method known as soil choking shall be used to promote vegetation growth on the restored bank stabilized with rip-rap. Sandy loam shall cover the existing rip-rap by ½ inch on the portion of the slope located above the limits of the existing volunteer vegetation. Figure 3 shows the approximate area to receive soil. Once placed, soils shall be evenly distributed and tamped into place.

Seeding

To accelerate vegetation reestablishment, the newly placed soil shall be seeded with the following grass/legume mix:

Table 1: Seed Mixture Table

Seed mixture	Variety/Species	Rate lbs. (pure live seed) per acre	Rate lbs. (pure live seed) per 1000 sq. feet
Flatpea[1]	Lathco	10	0.23
Perennial pea[1]	Lancer	2	0.046
Crownvetch[1]	Penngift/Chemung	10	0.23
Tall fescue	KY-31/Rebel	10	0.23
Riparian Mix	(see Table 2)	15	0.34

1 Inoculate legume seed immediately prior to actual seeding.

Table 2: Riparian Seed Mixture

Common Name	Scientific Name	Percent of Mix
New England Aster	*Aster novae-angliae*	3
Blue Wood Aster	*Aster cordifolia*	2
Blue Stem Goldenrod	*Solidago caesia*	5
White Snake Root	*Eupatorium rugosum*	5
Joe Pye Weed	*Eupatorium purpureum*	5
Nodding Sedge	*Carex gynandra,*	10
Fox Sedge	*Carex vulpinoidea*	10
Riverbank Wildrye	*Elymus ripairus*	20
Virginia Wildrye	*Elymus virginicus*	20
Soft Rush	*Juncus effusus*	10
Path Rush	*Juncus tenuis*	10

Once seeded, small grain straw mulch shall be applied at a rate of two tons per acre. Preferred planting dates for this seed mix are early spring through June 15 or after August 15 until the ground freezes. For seeding between June 15 and August 15, annual ryegrass shall be added to the seed mix at a rate of 30 lbs. per acre (approximately 1 lb./1,000 sq. ft.). The seeded area shall be watered as necessary from June 16 through August 15. If schedule necessitates planting after August 15, annual ryegrass shall not be added to the seed mix and the seeded areas should not be watered.

Planting

Following seeding, two rows, approximately 18 inches apart, of rooted stock shall be planted along the lower most edge (stream side) of the restoration area. The species shall consist of native fast-growing shrubs identified in Table 3. Plants will be planted approximately 5-feet on center.

Table 3: Planted Shrubs

Common name	Species	Number of Plants
Silky Dogwood	*Cornus amomum*	32
American willow	*Salix dicolor*	32

Seedlings shall be planted in dug pits using a shovel or dibble as appropriate. Planting pits shall be made large enough and deep enough so that when the roots of the seedlings are placed in the ground they will assume a natural position and will not be twisted, compacted, or turned up at the ends. It is not acceptable to bend the root system to fit in a dug pit that is too shallow.

Seedlings shall be placed in the pit and soil backfilled and firmed around the seedling, so that there are no mounds, depressions or air pockets around the seedling roots. Backfill material will consist of a mixture of three (3) parts topsoil and one (1) part sand. All backfill material shall be

in a loose, friable condition when mixed and at the time of planting. Fertilizer will not be used unless specified.

Tamp the backfill material during placement and thoroughly water after backfilling has been completed. This watering shall completely saturate planting. After the ground settles, as a result of watering, the voids shall be filled to the proper level with prepared backfill material.

Maintenance

The restored area will be watered regularly during the first growing season. A wetland biologist will inspect the Site once a month for the first three months following seeding to determine success of re-establishment. Any issues with re-establishment will be identified during these assessments and corrective actions will be recommended. Care shall be taken during watering that erosional channels or gullies are not created.

4.3 IRM Implementation

The interim remedial measure will be conducted in accordance with the following steps:

Pre-Remedial Activities

- Prepare Construction Specifications for landscaping construction elements;
- Obtain bids from contractors for construction activities; and
- Contractor Mobilization/Site Preparation.

IRM Construction Activities

- Mobilize Site;
- Install temporary silt fence and construction straw bale barriers;
- Construct soil staging area with straw bale perimeter;
- Remove chain link fabric of existing fence (posts to remain in place);
- Remove artificial material;
- Transportation and disposal of artificial material;
- Soil delivery and staging;
- Place soil/tamp into riprap crevices;
- Seed and place straw mulch;
- Install temporary upgrade straw bale barriers for growing season;
- Remove construction straw bale barriers;
- Perform operation, maintenance, and monitoring activities for vegetation growth; and
- After vegetation is established, remove all temporary stabilization measures and restore chain link fabric of existing fence.

5 SITE SPECIFIC HEALTH AND SAFETY PLAN

A site-specific Health and Safety Plan (HASP) for the Cayadutta Creek bank restoration activities will be prepared to address the health and safety of on-site workers, visitors, and the surrounding public during construction activities. The Health and Safety Plan will be prepared in accordance with applicable Federal, State, and Local requirements, including, but not limited to, the requirements of the Occupational Safety and Health Administration (OSHA). Upon selection of a contractor for the remediation activities, the HASP will be prepared.

6 IRM COST ESTIMATE

The estimated capital cost for the implementation of the proposed IRM for the Site is approximately $26,000 (see Appendix A for details). This estimate does not include the costs for remedial design.

7 IRM SCHEDULE

TtEC proposes to implement the restoration elements during the end of the growing season/start of low-flow period to allow grass and plants to establish themselves and not be impacted by high velocity flow events. The proposed time for initiation of the IRM is July 2009. The conceptual schedule for the IRM is included as Figure 5.

8 OPERATION, MAINTENANCE, AND MONITORING

The restored area will be watered regularly during the first growing season. A wetland biologist will inspect the Site once per month for the first three months following seeding to determine success of re-establishment. The Post-IRM Inspection Checklist is included as Appendix B. Any issues with re-establishment will be identified during these assessments and corrective actions will be recommended. Care shall be taken during watering that erosional channels or gullies are not created.

A contingency plan will be developed as part of the design process. The plan will be implemented if any element of the remedial design fails to achieve its objectives.

9 REFERENCES

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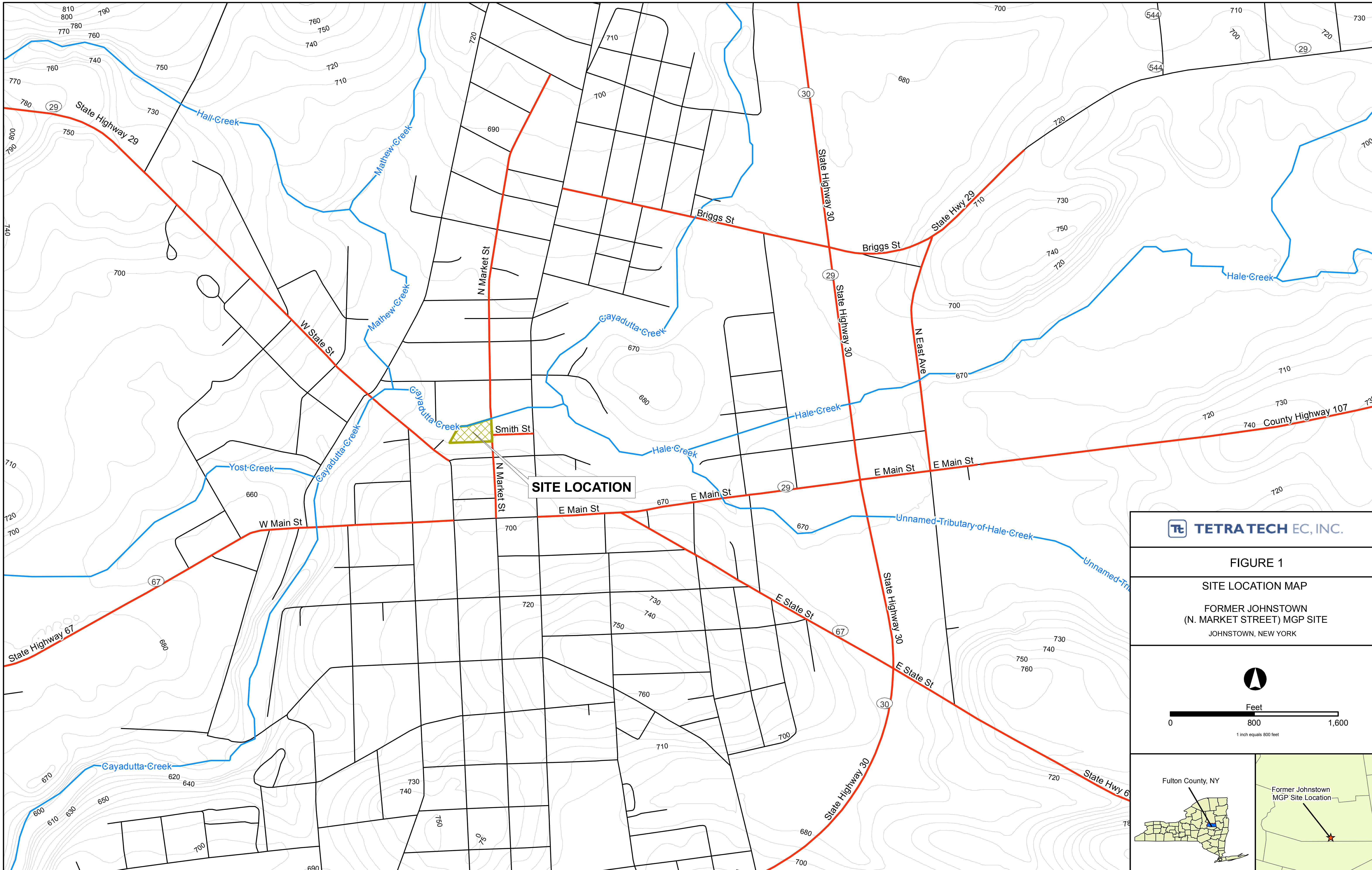
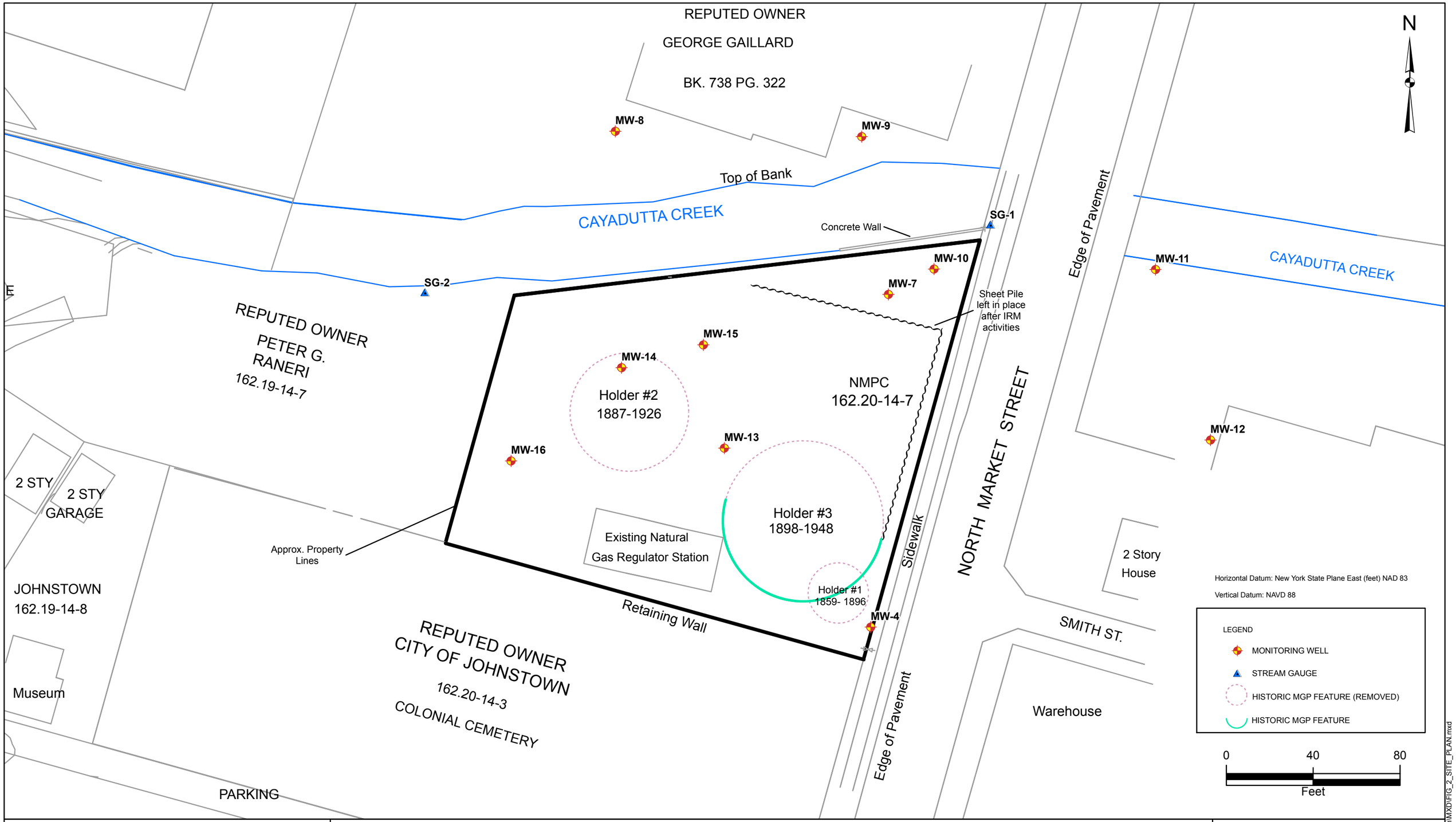
FIGURES


TETRA TECH EC, INC.
FIGURE 1
SITE LOCATION MAP
FORMER JOHNSTOWN
(N. MARKET STREET) MGP SITE
JOHNSTOWN, NEW YORK
Feet
0
800
1,600
1 inch equals 800 feet
Fulton County, NY
Former Johnstown
MGP Site Location
SITE LOCATION
Smith St
N Market St
W State St
W Main St
E Main St
E State St
Briggs St
N East Ave
State Highway 29
State Hwy 29
State Highway 30
State Highway 67
State Hwy 67
County Highway 107
Hall Creek
Mathew Creek
Cayadutta Creek
Yost Creek
Hale Creek
Unnamed Tributary of Hale Creek



TETRA TECH EC, INC.

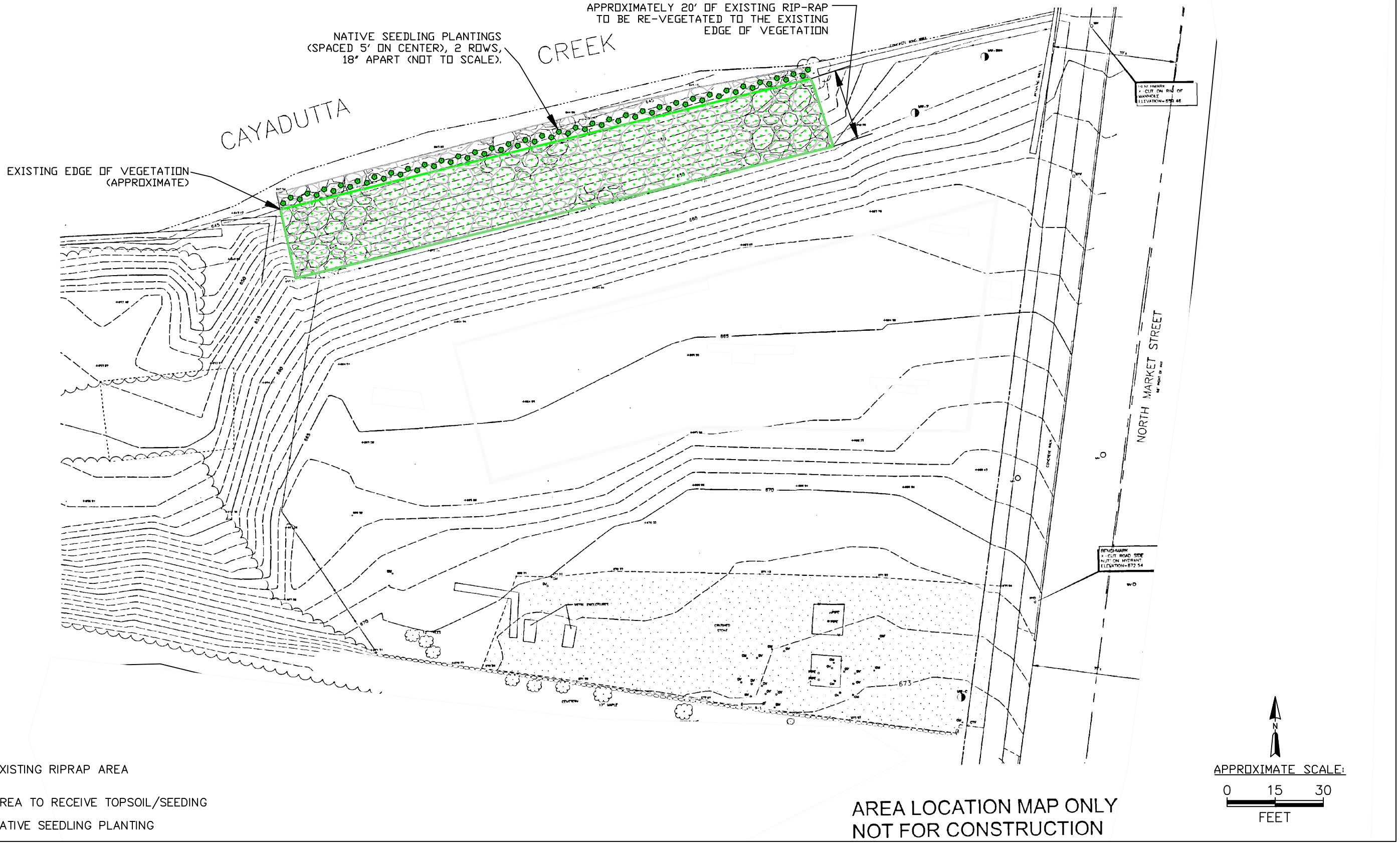
SITE LOCATION PLAN
SHOWING MONITORING WELL LOCATIONS, HISTORIC MGP FEATURES, AND SURROUNDING AREA

JOHNSTOWN (N. MARKET STREET) FORMER MGP SITE
JOHNSTOWN, NEW YORK

nationalgrid

FIGURE 2

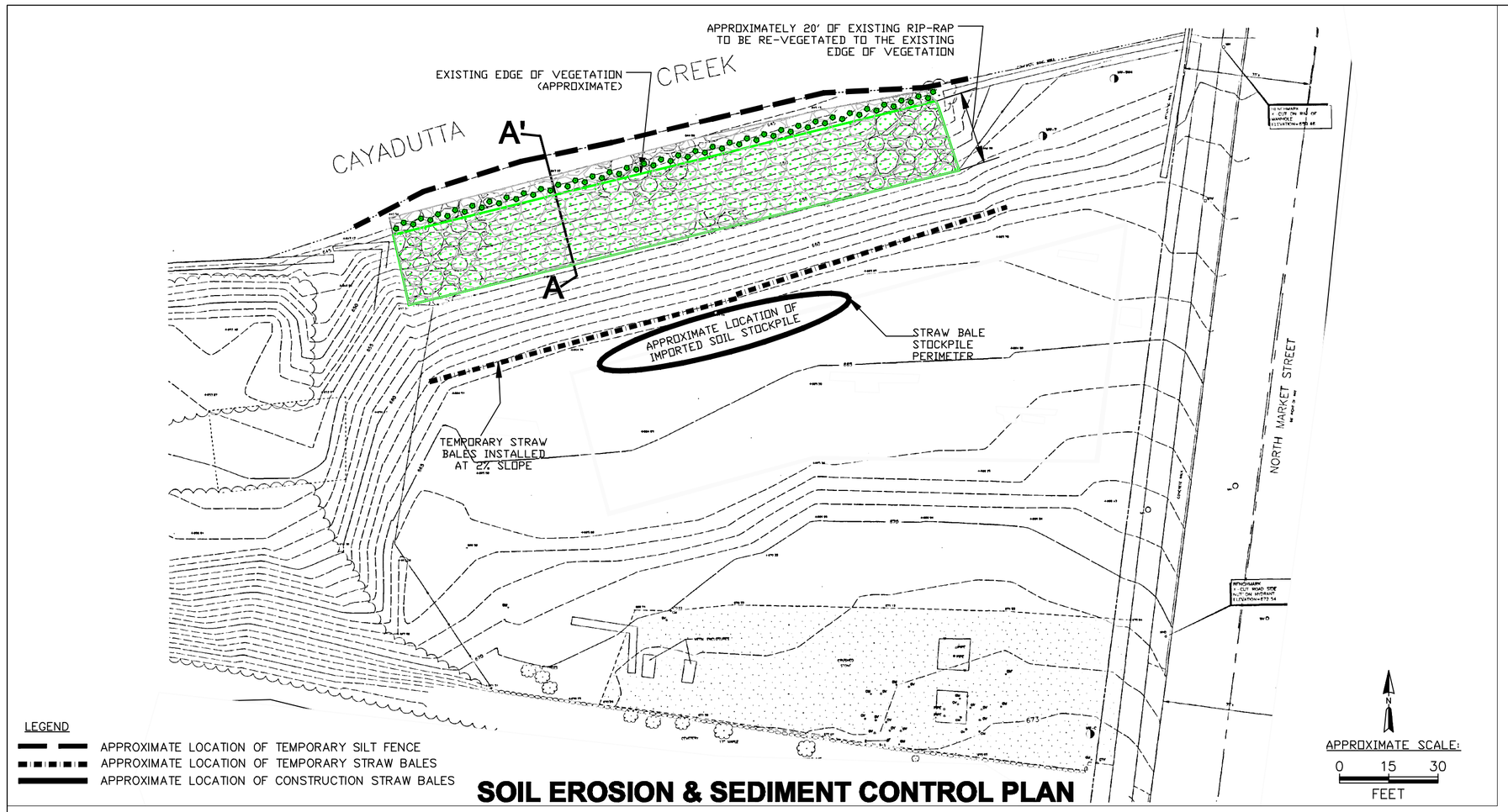
T:\GIS\National_Grid\Johnstown\MXD\FIG_2_SITE_PLAN.mxd



TETRA TECH EC, INC.

TITLE:
Site Restoration Plan
Johnstown (N. Market Street) Site
Cayadutta Creek Bank Interim Remedial Measure

DWN.: EAG	DATE: 06/22/09	PROJECT NO.: 106-2907.0004	
CHKD: MO/RC	REV.: 1		
DES.: MO	APPD:	FIGURE NO.: 3	



SOIL EROSION & SEDIMENT CONTROL PLAN

NARRATIVE

Project Description

The project is to re-establish vegetation at the existing riprap along the stream bank of Cayadutta Creek at the Johnstown (N. Market Street) Former Manufactured Gas Plant Site (the Site). The total area to be restored is approximately 3,000 ft² (0.069 acres).

Site Description

The Site is located on North Market Street in Johnstown, Fulton County, New York, and covers 0.7 of an acre. The Site is bordered by Market Street to the east, a small cemetery (Colonial Cemetery) to the south, a wooded bank on residential property to the west, and Cayadutta Creek to the north. The only structure at the Site is a gas regulator station owned and operated by National Grid. A North Market Street concrete bridge spans the Cayadutta Creek immediately to the northeast of the Site's boundary.

Most of the Site itself is open and grassy, with the gas regulator station located in the center of the southern part of the Site. A relatively steep embankment parallels Cayadutta Creek. There is an approximately 60 feet long concrete wall along the stream bank immediately to the west of the North Market Street bridge. A chain link fence exists along the north and west boundaries of the Site, and a retaining wall runs along the south side of the Site. Access to the Site is from North Market Street to the east. Land use near the Site is mainly urban and residential.

PLANNED EROSION AND SEDIMENTATION CONTROL PRACTICES

1. Temporary Silt Fence: A silt fence will be constructed downgradient of the construction area, along Cayadutta Creek. The proposed location of the silt fence is outside of the existing riprap area. The Temporary Silt Fence will be erected prior to construction activities and will be left in place until vegetation is established.

2. Construction Straw Bale Barrier: A straw bale barrier will be constructed around the temporary imported soil stockpile area. The Construction Straw Bale Barrier will be removed once mulch is placed and the Temporary Straw Bale Barrier (see below) is constructed.

3. Temporary Straw Bale Barrier: A straw bale barrier will be constructed upgrade of the revegetated area after mulch is placed. The Temporary Straw Bale Barrier will remain in place until vegetation is established.

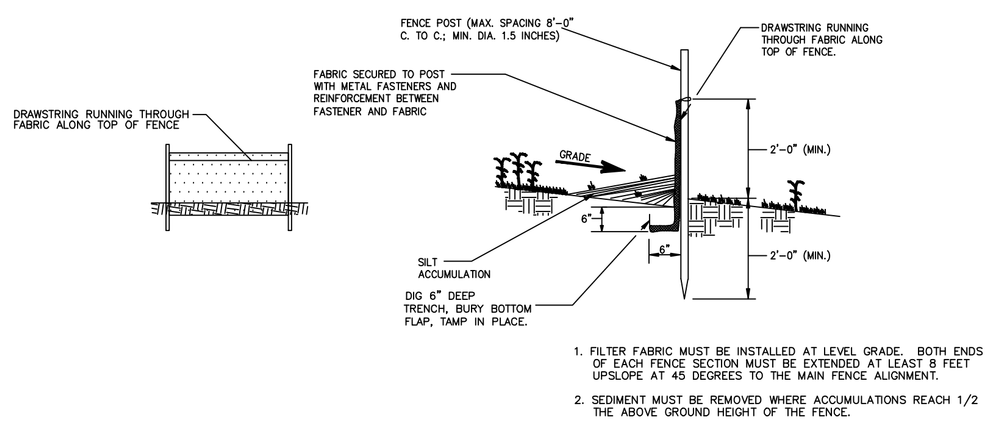
CONSTRUCTION SCHEDULE

1. Mobilize at Site.
2. Install temporary silt fence and construction straw bale barriers.
3. Place soil/tamp into riprap crevices.
4. Seed, place straw mulch, and plant seedlings.
5. Install temporary straw bale barriers for growing season.
6. Remove construction straw bale barriers.
7. Temporary silt fence and temporary straw bale barriers will be left in place until end of growing season. Temporary erosion controls will be inspected weekly and after rainfall events. Needed repairs will be made.
8. After vegetation is established, remove all temporary measures.

MAINTENANCE PLAN

1. All erosion and sediment control practices will be checked for stability and operation following every runoff-producing rainfall but in no case less than once every week. Any needed repairs will be made immediately to maintain all practices as designed and installed for their appropriate phase of the project.

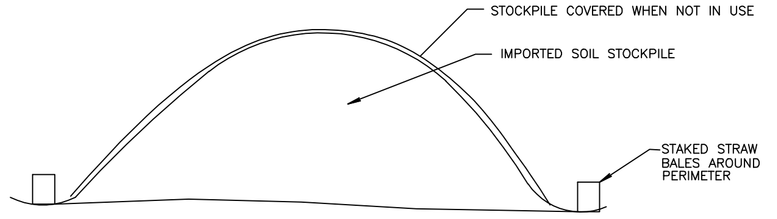
2. Sediment will be removed from behind the silt fence and straw bale barriers when it becomes about 0.5 ft deep at the barrier. The silt fence and straw bale barriers will be repaired as necessary to maintain a barrier.



1. FILTER FABRIC MUST BE INSTALLED AT LEVEL GRADE. BOTH ENDS OF EACH FENCE SECTION MUST BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
2. SEDIMENT MUST BE REMOVED WHERE ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.

SILT FENCE DETAIL

NOT TO SCALE

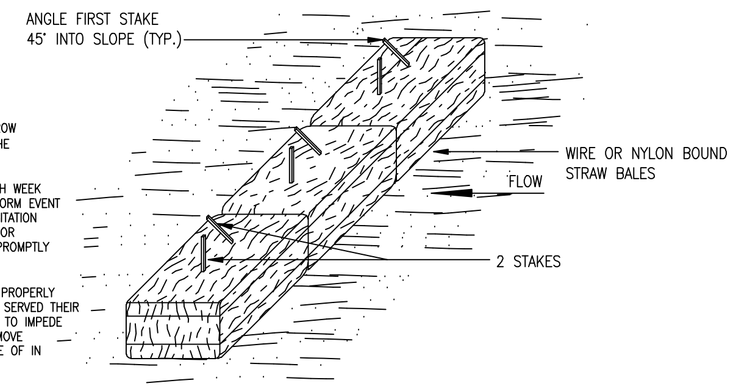


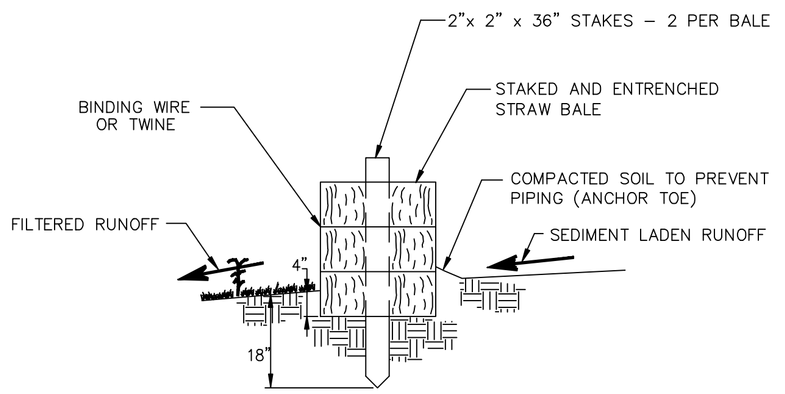
IMPORTED SOIL STOCKPILE AREA DETAIL

NOT TO SCALE

NOTES:

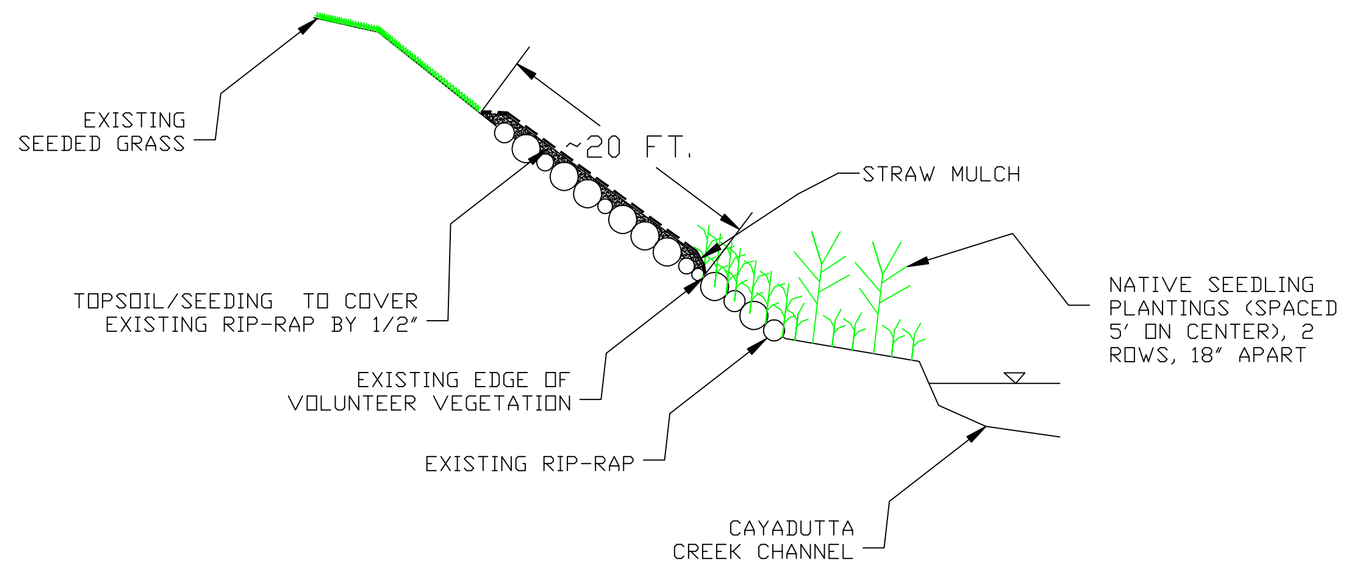
1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. INSPECTION SHALL BE ONCE EACH WEEK AND WITHIN 24 HOURS OF A STORM EVENT YIELDING 0.5 INCHES OF PRECIPITATION IN A 24 HOUR PERIOD. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
3. BALES SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN THEY HAVE SERVED THEIR INTENDED PURPOSE SO AS NOT TO IMPEDE STORM FLOW OR DRAINAGE. REMOVE ACCUMULATED SILT AND DISPOSE OF IN A PROPER MANNER.





TYPICAL STRAW BALE DETAILS

NOT TO SCALE



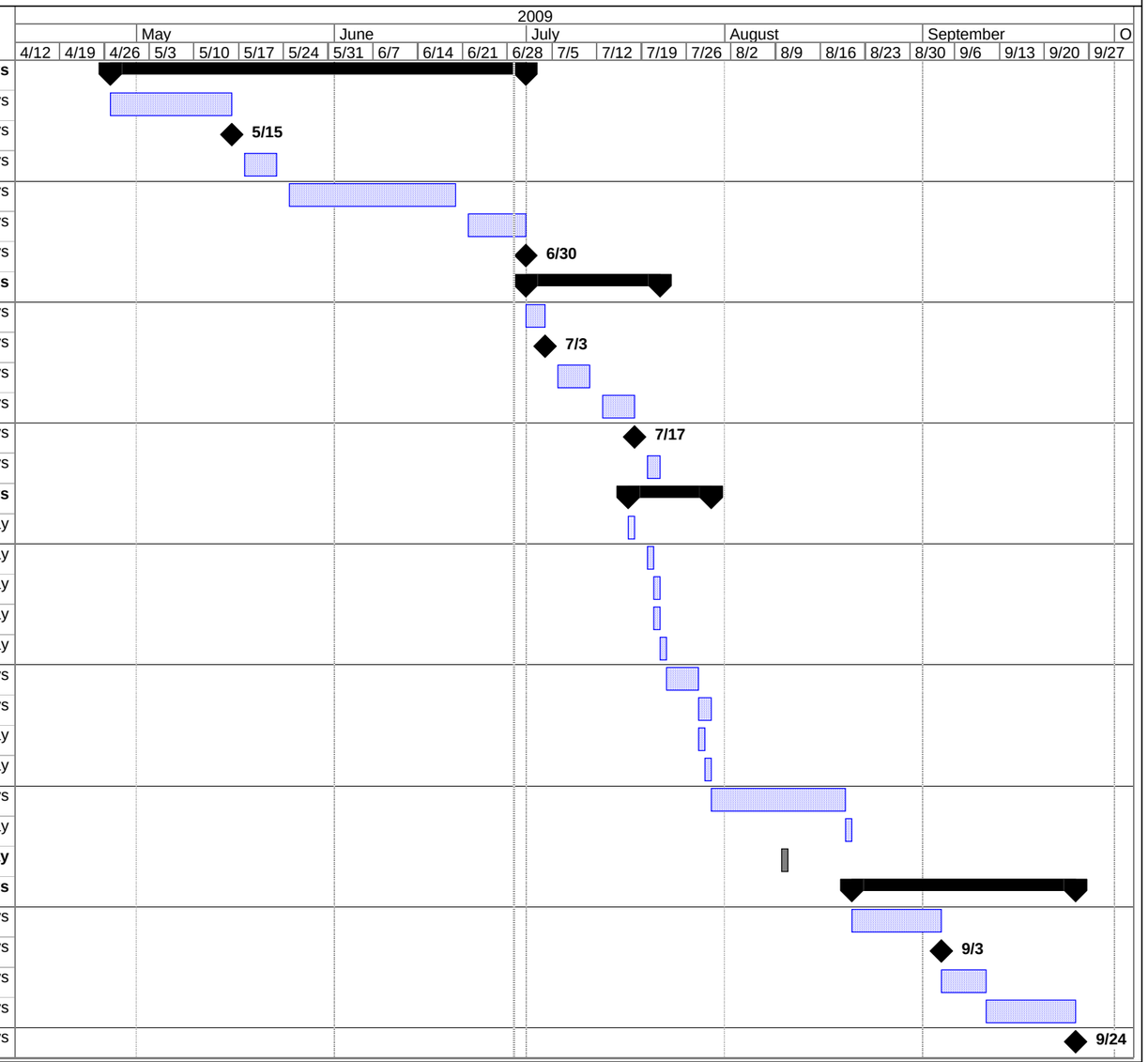
CONCEPTUAL CROSS SECTION A-A'

NOT TO SCALE

TETRA TECH EC, INC.	TITLE: Soil Erosion and Sediment Control Plan Johnstown (N. Market Street) Site Cayadutta Creek Bank Interim Remedial Measure
DWN.: EAG	DATE: 06/22/09
CHKD: MO/RC	REV.: 1
DES.: MO	APPD:
PROJECT NO.: 106-2907.0004	
FIGURE NO.: 4	

Figure 5
Johnstown Former MGP
Cayadutta Creek Bank
Conceptual Project Schedule

ID	Task Name	Start	Finish	Duration
1	**Stream Bank Work Plan**	**Mon 4/27/09**	**Tue 6/30/09**	**47 days**
2	Draft Stream Bank Work Plan	Mon 4/27/09	Fri 5/15/09	15 days
3	Submit Draft Stream Bank Work Plan to National Grid	Fri 5/15/09	Fri 5/15/09	0 days
4	National Grid Review and Comment	Mon 5/18/09	Fri 5/22/09	5 days
5	NYSDEC Review of Draft Stream Bank Work Plan	Mon 5/25/09	Fri 6/19/09	20 days
6	Prepare Final Stream Bank Work Plan	Mon 6/22/09	Tue 6/30/09	7 days
7	Submit Final Stream Bank Work Plan to NYSDEC	Tue 6/30/09	Tue 6/30/09	0 days
8	**Construction Specifications**	**Wed 7/1/09**	**Tue 7/21/09**	**15 days**
9	Prepare Draft Specifications	Wed 7/1/09	Fri 7/3/09	3 days
10	Submit Draft Specifications to National Grid	Fri 7/3/09	Fri 7/3/09	0 days
11	National Grid SC Review Draft Specifications	Mon 7/6/09	Fri 7/10/09	5 days
12	Prepare Final Specifications	Mon 7/13/09	Fri 7/17/09	5 days
13	Submit Final Specifications to National Grid	Fri 7/17/09	Fri 7/17/09	0 days
14	National Grid Procurement of Contractor	Mon 7/20/09	Tue 7/21/09	2 days
15	**Stream Bank Restoration Activities**	**Fri 7/17/09**	**Wed 7/29/09**	**9 days**
16	Restoration Planning	Fri 7/17/09	Fri 7/17/09	1 day
17	Site Mobilization	Mon 7/20/09	Mon 7/20/09	1 day
18	Install Construction Erosion Control Measures	Tue 7/21/09	Tue 7/21/09	1 day
19	Remove Artificial Material	Tue 7/21/09	Tue 7/21/09	1 day
20	Soil Delivery & Stockpile	Wed 7/22/09	Wed 7/22/09	1 day
21	Place Soil/Tamp	Thu 7/23/09	Mon 7/27/09	3 days
22	Seed/Straw	Tue 7/28/09	Wed 7/29/09	2 days
23	Remove Construction Erosion Control Measures	Tue 7/28/09	Tue 7/28/09	1 day
24	Install Temporary Erosion Control Measures	Wed 7/29/09	Wed 7/29/09	1 day
25	Establish Vegetation/Monitoring	Thu 7/30/09	Wed 8/19/09	15 days
26	Remove Temporary Erosion Control Measures	Thu 8/20/09	Thu 8/20/09	1 day
27	**Progress Reports**	**Mon 8/10/09**	**Mon 8/10/09**	**1 day**
29	**Stream Bank IRM Report**	**Fri 8/21/09**	**Thu 9/24/09**	**25 days**
30	Prepare Draft IRM Report	Fri 8/21/09	Thu 9/3/09	10 days
31	Submit Draft IRM Report to National Grid	Thu 9/3/09	Thu 9/3/09	0 days
32	National Grid Review IRM Report	Fri 9/4/09	Thu 9/10/09	5 days
33	Prepare Final IRM Report	Fri 9/11/09	Thu 9/24/09	10 days
34	Submit Final IRM Report (as part of Engineering Report) to National Grid	Thu 9/24/09	Thu 9/24/09	0 days



Task Milestone Summary Rollup

Revised: Mon 6/29/09

APPENDICES

APPENDIX A

IRM COST ESTIMATE

Appendix A
Johnstown (N. Market St.) Site
Cayadutta Creek Bank
Cost Estimate

Item #	Description	Estimated Quantity	Unit of Measure	Unit Cost	Estimated Cost
1	ARTIFICIAL MATERIAL REMOVAL				
1.1	Removal of Excess Artificial Material	50	SY	$ 5	$ 250
1.2	Disposal of Excess Artificial Material	1	LS	$ 250	$ 250
				Subtotal Artificial Material Removal	$ 500
2	SOIL				
2.1	Topsoil	21	CY	$ 35	$ 745
2.2	Straw Mulch (Bales)	6	EA	$ 5	$ 30
				Subtotal Soil	$ 775
3	APPLICATION				
3.1	Topsoil	3	MSF	$ 100	$ 300
3.2	Mulch	333	SY	$ 2	$ 666
				Subtotal Application	$ 966
4	SEEDING/PLANTING				
4.1	Seeding (Grass)	3	MSF	$ 97	$ 290
4.2	Seedlings	2	Trays	$ 144	$ 288
				Subtotal Seeding/Planting	$ 578
5	EROSION AND SEDIMENT CONTROL				
5.1	Silt Fence & Installation	200	LF	$ 5	$ 1,000
5.2	Straw Bales & Installation	350	LF	$ 8	$ 2,800
				Subtotal Erosion and Sediment Control	$ 3,800
6	FENCE				
6.1	Remove & Reset Existing Chain Fabric	150	LF	$ 7	$ 1,050
				Subtotal Fence	$ 1,050
7	OPERATION AND MAINTENANCE				
7.1	Watering	6	EA	$ 500	$ 3,000
7.2	Monitoring	3	EA	$ 1,200	$ 3,600
				Subtotal Operation & Maintenance	$ 6,600
8	REPLACEMENT				
8.1	Replacement - 25% on items 2, 3 and 4 (Note 1)	1	LS	$ 580	$ 580
				Subtotal Replacement	$ 580

Subtotal	$ 14,849
Contingency (20%)	$ 5,900
Engineering	$ 5,000
Grand Total	**$ 25,749**

CY = Cubic Yard
EA = Each
LF = Linear Foot
LS = Lump Sum
MSF = One Thousand Square Feet
SY = Square Yard

Notes:

(1) Assume that 25% of the soil/seeding will have to be replaced during the course of the growing season as a result of weather-related damage.

Assumptions:

1) 50 SY of artificial material will be removed
2) Total area to be restored is approximately 3,000 SF
3) Topsoil - Screened, delivered by dozer, applied by hand
4) Topsoil volume - 1/2 inch layer above 6 inch gravel layer (assume gravel 30% void space)
5) Placement - Topsoil placement and grading, spread from pile to rough grade finish by hand
6) Silt Fence - Polypropylene, adverse conditions
7) Straw Bales for Erosion Control - Staked, for 3 to 1 slope
8) Fence - Remove & reset existing chain link fence fabric
9) Seeding - Slope mix, push spreader
10) Mulch Quantity - 2 bales per 1,000 SF
11) Watering - Water twice per week for three weeks
12) Monitoring - 3 visits by wetland biologist
13) Seedlings - 2 trays of 32 12"-18" seedlings, includes labor.

APPENDIX B

POST-IRM INSPECTION CHECKLIST

POST-IRM INSPECTION CHECKLIST

Project Name _____

Project Location _____

Name of Operator _____

Name of Inspector _____

Date of Inspection _____

	Yes	No
Are straw bales in place and functioning?	❑	❑
Is there evidence of erosion on slope?	❑	❑
Is silt fence in place and functioning?	❑	❑
Is there build-up of soil deposits behind silt fencing?	❑	❑
Does silt fence require maintenance?	❑	❑
Is there increased turbidity causing a substantial visible contrast to natural conditions?	❑	❑
Has stream been affected by silt deposits from project?	❑	❑
Are there any non-vegetated areas that may require soil stabilization?	❑	❑
Do any seeded areas require:		
Maintenance?	❑	❑
Irrigation?	❑	❑
Mulching?	❑	❑
What is the percent vegetation coverage of seeded area?	_____	
Are there woody species present in the seeded area?	❑	❑
Are there invasive species present in the seeded area?	❑	❑

Notes: