Binghamton-Johnson City
Joint Sewage Treatment Plant
Comprehensive Flood Risk Reduction Project

Appendix G

Cultural Resources Investigations

and Consultations

ELAN.3 CONSULTING
SARATOGA SPRINGS, NEW YORK

Certified NYS WBE/DBE & Federal EDWOSB

18 DIVISION STREET
STUDIO 304
SARATOGA SPRINGS
NEW YORK 12866
PHONE 518-306-3702
FAX 518-226-0469

February 4, 2014

Ms. Ruth Pierpont, Director
Historic Preservation Field Services Bureau
NYS Office of Parks, Recreation and Historic Preservation
Peebles Island Resource Center
P.O. Box 189
Waterford, NY 12188-0189

RE: Binghamton-Johnson City Sewage Treatment Plant Floodwall Project

Ms. Pierpont,

Attached is project information for the above referenced federally funded project. The project objective is to protect the Binghamton-Johnson City Sewage Treatment Plant from repeated flooding.

These documents have been prepared in accordance with Section 106 of the National Historic Preservation Act of 1966 (NHPA) and Section 14.09 of the New York State Parks, Recreation and Historic Preservation Law of 1980. The reports include background information, project description, maps and aerial photographs

Enclosed are:

- Project Summary with maps and photographs

- Phase 1A Cultural Resource Screening
  Binghamton-Johnson Sewer Treatment Plant Project
  Floodwall Construction Project
  Town of Vestal, Broome County New York
  July 2, 2013

- Phase 1B Archeological Survey
  Binghamton-Johnson Sewer Treatment Plant Project
  Floodwall Construction Project
  Town of Vestal, Broome County, New York
  January 15, 2014

ELAN.3 CONSULTING
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NEW YORK 12866
PHONE 518-306-3702
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On behalf of our client we are requesting a review of the project and scope in accordance with SEQRA.

Please review this information and provide us with the State Historic Preservation Officer's comments on the project. We would appreciate receiving your response within 30 days.

If you have any questions or need additional information, please contact me at 518-306-3702, ext. 13.

Sincerely,

Susan Rivers, Senior Planner

Enc.

Introduction

The Binghamton-Johnson City Joint Sewage Treatment Plant (BJCJSTP) has repeatedly suffered severe damage during major storm events. Several mitigation options have been evaluated which would protect the BJCJSTP from future storm damage. After much consideration, the BJCJSTP has developed a project to construct flood barrier walls around the BJCJSTP and dewatering measures within the flood barrier wall.

The flood barrier wall will be elevated to a minimum of 1 foot above the fold of record and constructed of sheet pile with two flood gates. The treatment plant will use an effluent pump system consisting of 3 22,500 GM Pumps to allow water to be pumped from within the walls.

Flood Wall Project Details

The majority of the flood wall design utilizes a reinforced concrete inverted T-type flood wall. A partial depth steel sheet piling cut-off wall will be installed behind the base foundation heel to help control groundwater seepage rates and to provide scour protection. Some areas of the site will be integrally protected by existing reinforced concrete structures modified as required to withstand the hydraulic forces sustained during a flood event.
Where required, openings will be provided in the flood wall to minimize impact on vehicular and pedestrian traffic flow during normal operation of the facility. These openings will be protected with automatic passive closing gates and redundant aluminum lagging during a flood event. Storm and sanitary sewers will also be protected with redundant manual closure devices. All groundwater seepage and interior stormwater will be diverted to pumping stations during flood events.

The flood wall will be designed in accordance with United States Army Corps of Engineers (USACE) *EM 1110-2-2502 Retaining and Flood Walls* and other applicable engineering and design guidelines from USACE. The parameters used in the design will be based on findings and recommendations from results obtained by hydraulic analysis of the Susquehanna River performed by Woidt Engineering and geotechnical engineering considerations provided by Haley & Aldrich. The sliding and overturning stability analysis for the typical T-type flood wall sections will be verified by a USACE computer based analysis program called CTWALL (X0153) and was developed in accordance with *EM 1110-2-2502*. The reinforced concrete requirements will be based on *ACI 350-06 Code Requirements for Environmental Engineering Concrete Structures.*

The flood wall will be designed as per FEMA requirements to the greater height of either three (3) feet of freeboard over the FEMA base flood (100-year recurrence interval storm) or the 500-year recurrence interval storm flood elevation. The resulting top of flood wall elevation is currently set at 845.00' (NAVD 1988) pending final acceptance by the City of Binghamton. The flood wall will be designed to avoid impacts to the 100-year floodway and to avoid any increases in water surface elevations or hazardous increases in channel velocities along the study reach of the Susquehanna River. If necessary, on-site flood plain mitigation measures will be implemented to avoid any increase in water surface elevations from the construction of the flood wall.
The flood wall will be designed and reviewed by New York State Licensed and Registered Professional Engineers and is subject to review and approval by Officials at City of Binghamton, Village of Johnson City, Town of Vestal, New York State Emergency Management Office (SEMO), Federal Emergency Management Agency (FEMA), New York State Department of Environmental Conservation (NYSDEC), and United States Army Corps of Engineers (USACE).

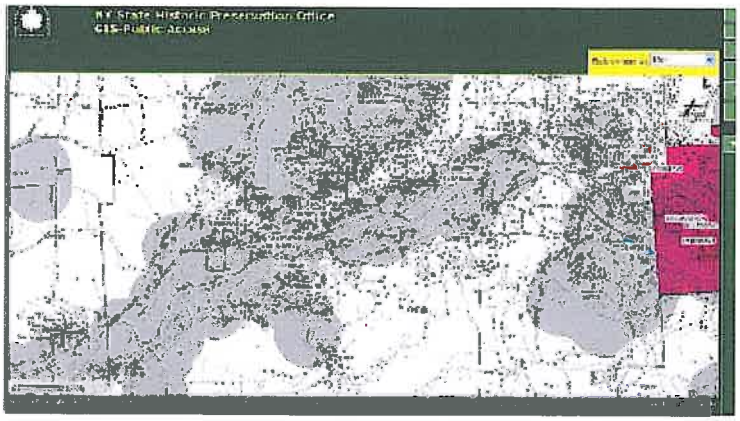
Easements and Right of Way

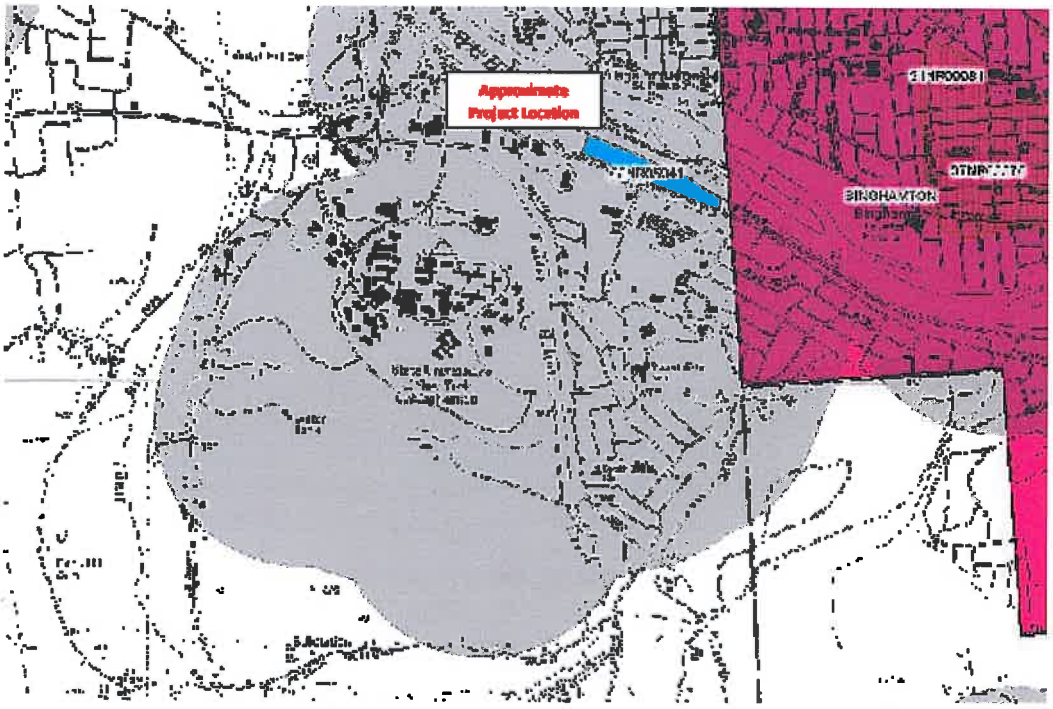
Development of the flood mitigation project will require the preparation of a construction and permanent easement for impact on an adjacent privately owned parcel and work within the Broome County Highway Department Right of Way. Encroachment into the Old Vestal Road wide right of way will be needed for the construction and permanent maintenance of the floodwall road gate and the wall itself. In cases of flooding, runoff from Old Vestal Road will be captured in existing County catch basins and then redirected offline into a stormwater pumping station. Captured stormwater will then be pumped through the floodwall to the existing outfall through a series of manhole connections. During normal conditions this runoff will flow by gravity to the Fuller Hollow Creek outfall. During flooding, backflow prevention will be in place to assure creek/river floodwater will not back up into the right of way through the outfall and piping network.

An easement will be required providing access and alterations during the construction phase and a permanent easement for the siting of the floodwall on private lands and its long term maintenance. Improvements to the private lands will include the rerouting of an existing sanitary line, the floodwall, and guiderail. The City of Binghamton Engineer's office is coordinating a meeting with the landowner to being these discussions.

Work and improvements in the County Old Vestal Road right of way will require inter-municipal agreements be in place to document that the BJCJSTP agrees to maintain the floodgate and other improvements in working order.

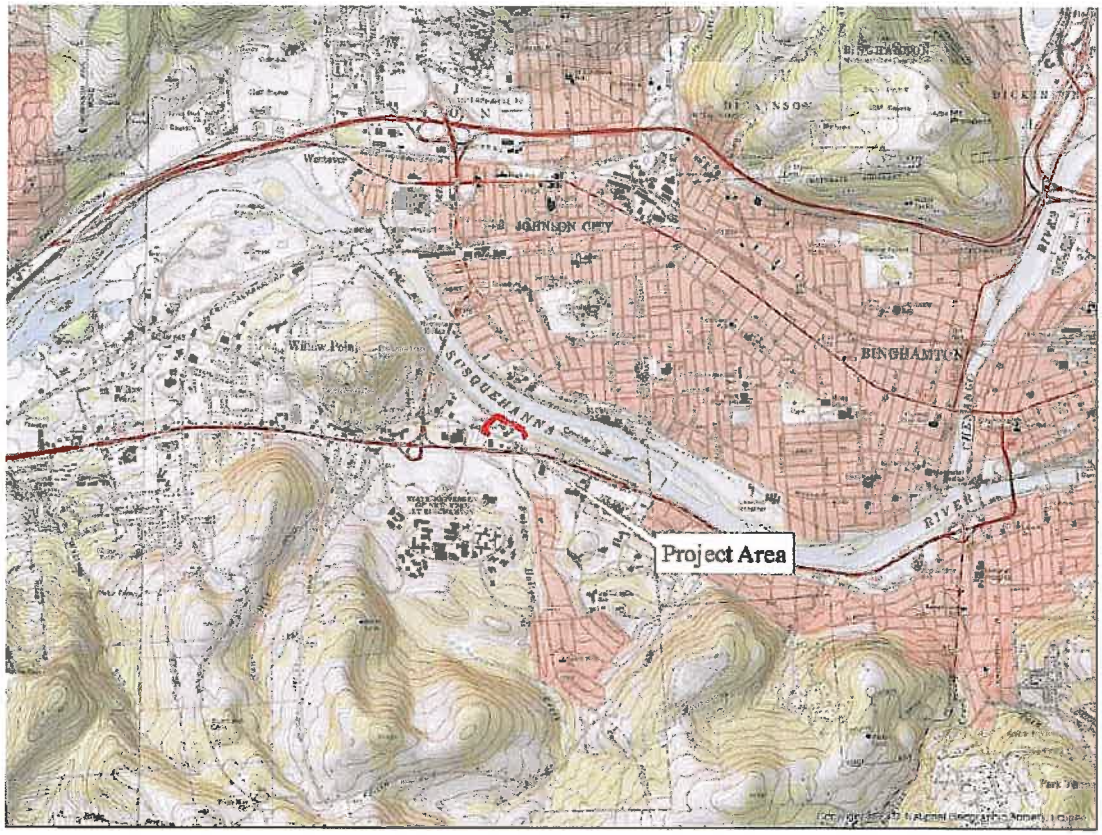
New York State Historic Preservation Archeologically Sensitive Area Map
Town of Vestal, Broome County, New York



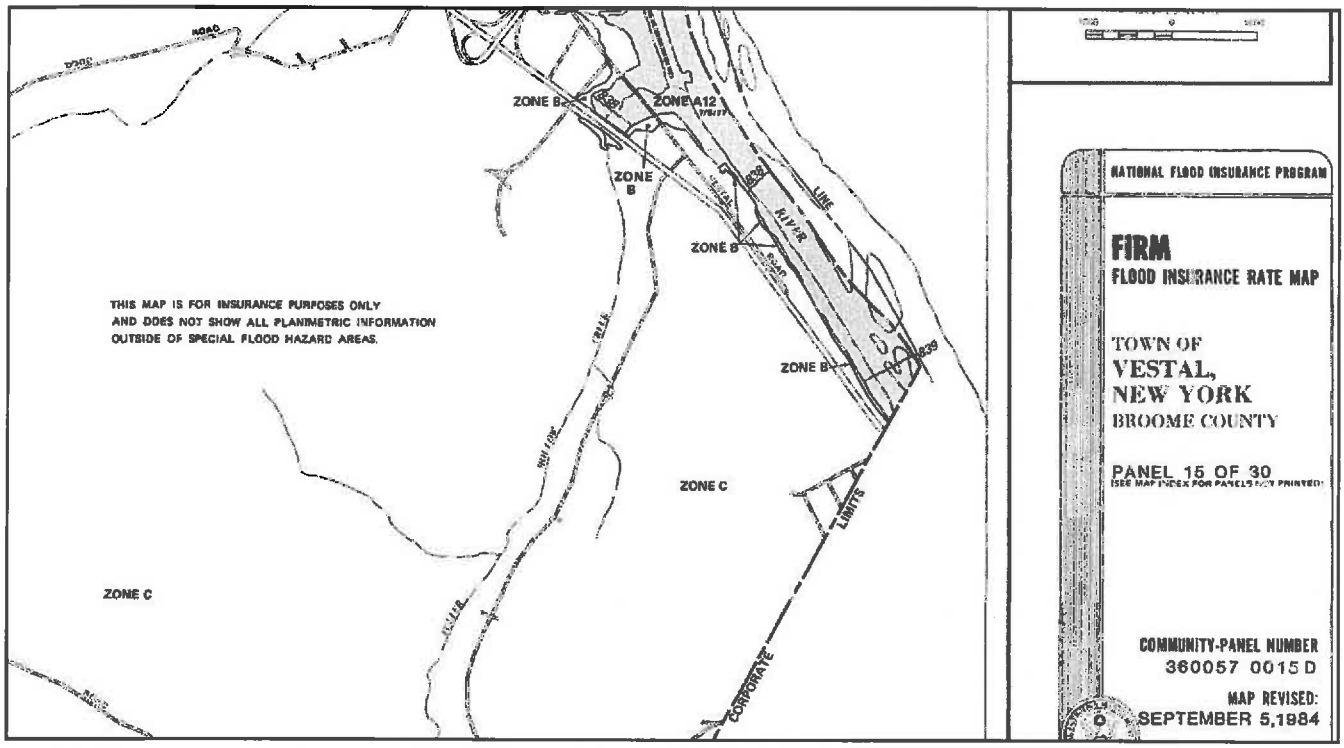


Binghamton Johnson City Sewage Treatment Plant Site Detail

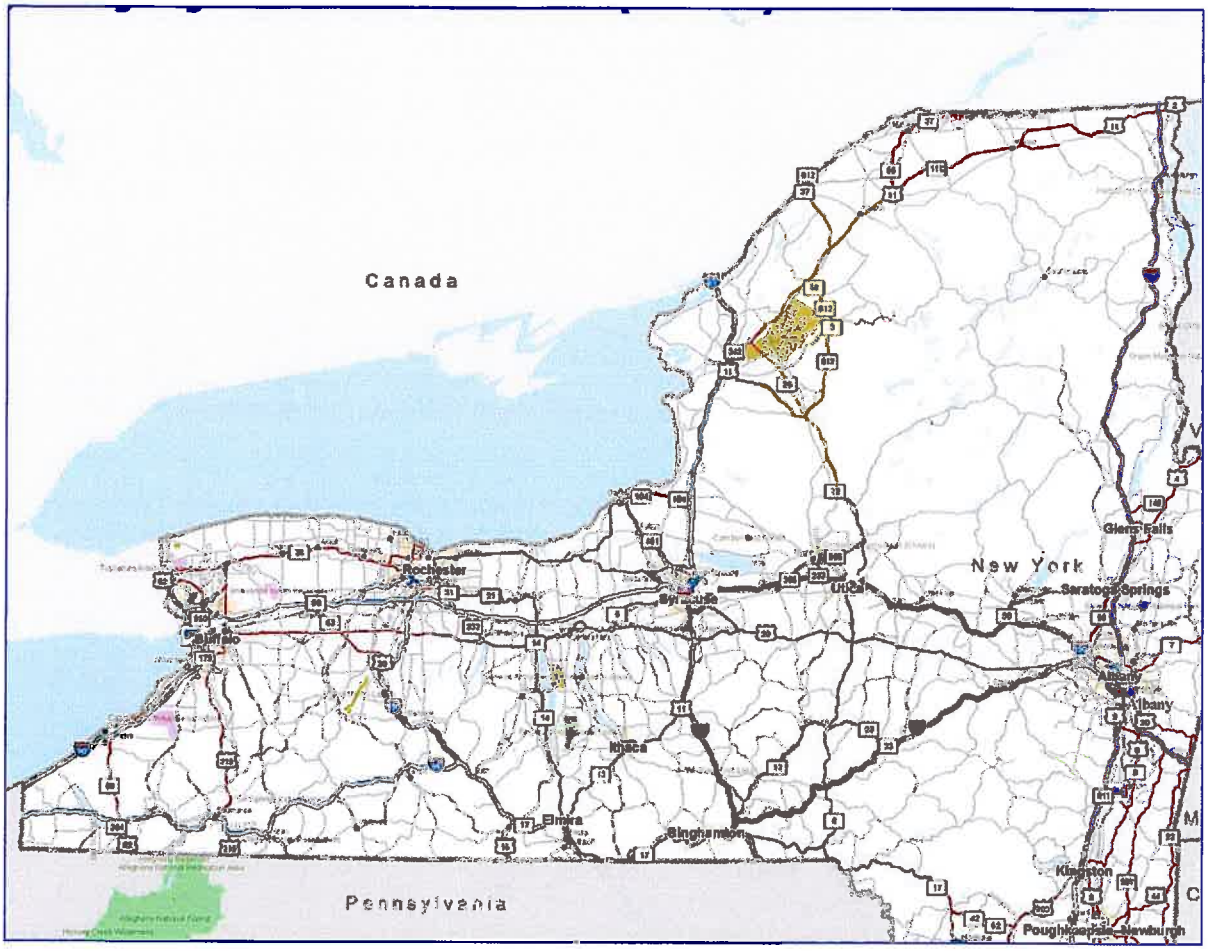
New York State Historic Preservation Archeologically Sensitive Area Map From http://nyparks.state.ny.us



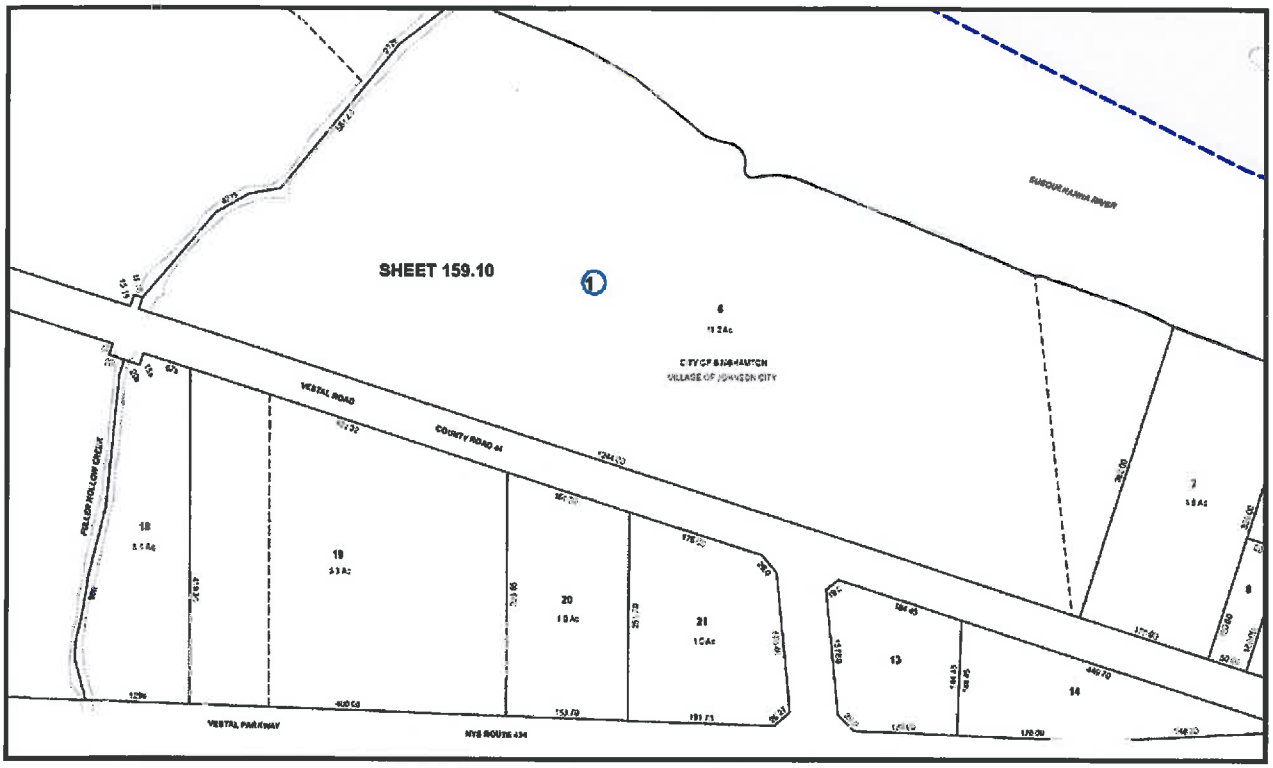
Topographic Map with Project Location



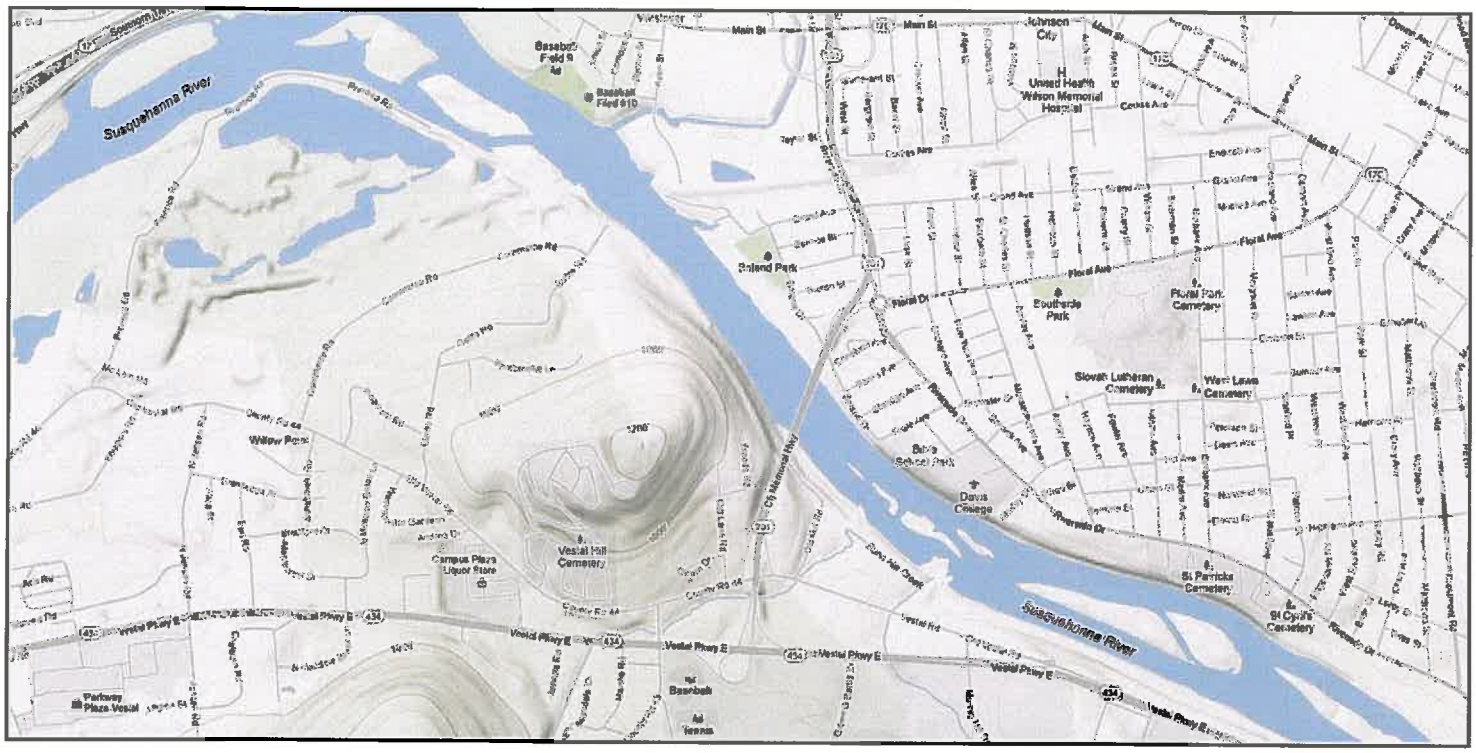
FEMA FIRM Map



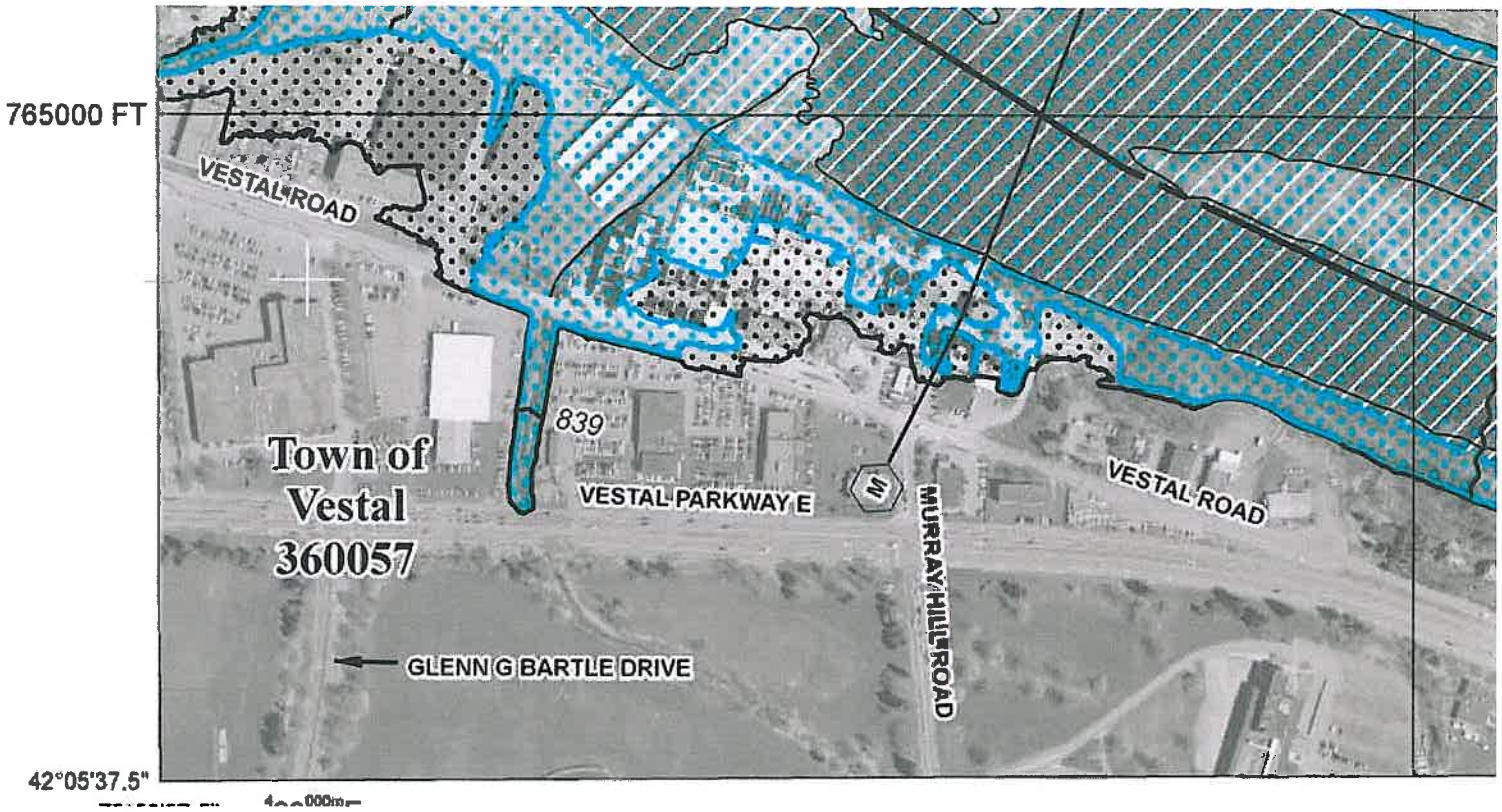
New York State Regional Map



Partial Tax Map



Location Map



Preliminary Floodway Map

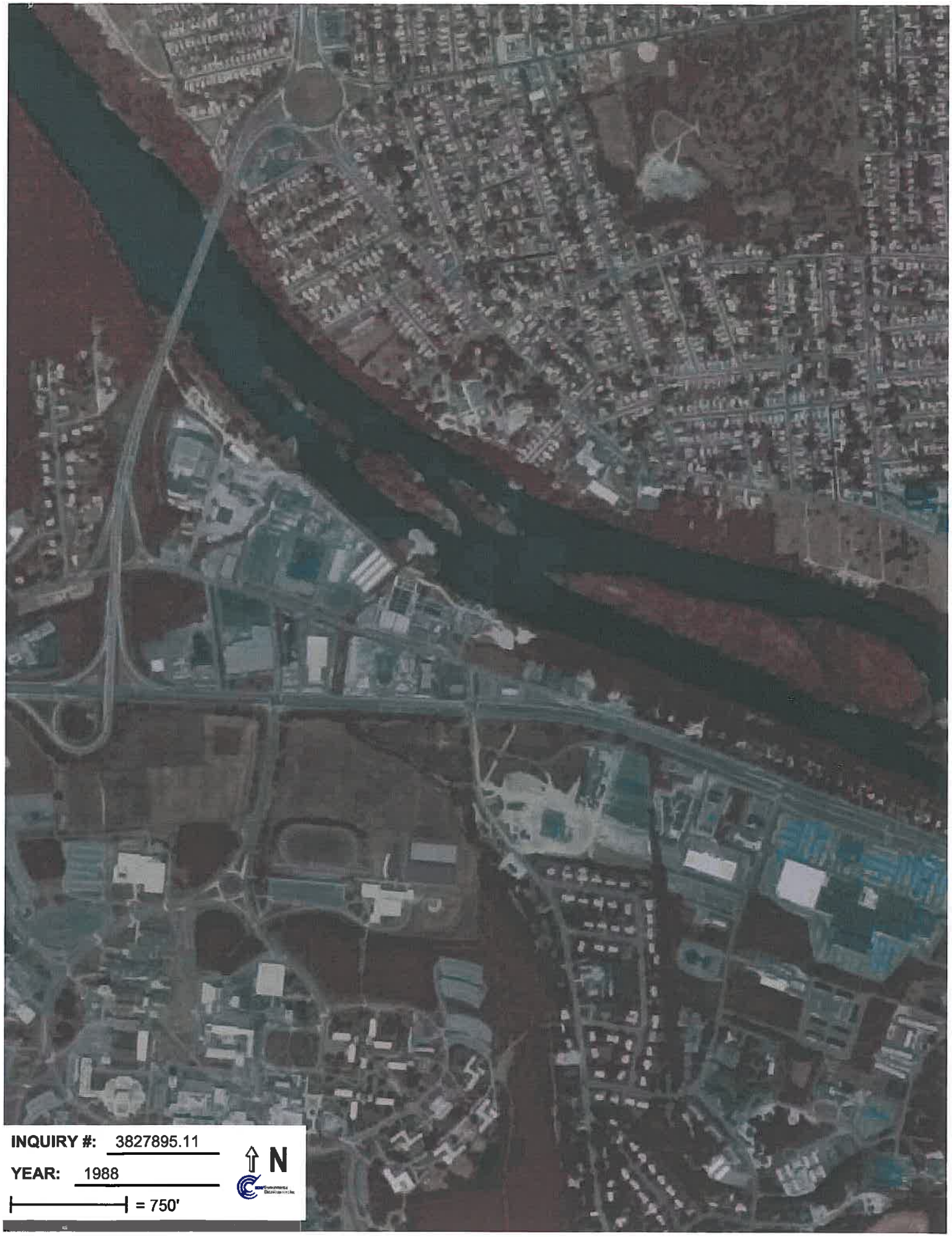
Aerial Photographs

1958
1960
1967
1988
1994
2001
2006
2011

INQUIRY #: 3827895.11
YEAR: 1958
= 500'
N

INQUIRY #: 3827895.11
YEAR: 1960
= 500'
N

INQUIRY #: 3827895.11
YEAR: 1967
= 500'
N


INQUIRY #: 3827895.11
YEAR: 1988
= 750'
N

INQUIRY #: 3827895.11
YEAR: 1994
= 500'
N

INQUIRY #: 3827895.11
YEAR: 2001
= 500'
N

INQUIRY #: 3827895.11
YEAR: 2006
= 500'
N

INQUIRY #: 3827895.11
YEAR: 2011
= 500'
N

Public Archaeology Facility Report

PHASE 1A CULTURAL RESOURCE SCREENING

BINGHAMTON-JOHNSON SEWER TREATMENT PLANT PROJECT,
FLOODWALL CONSTRUCTION PROJECT
TOWN OF VESTAL
BROOME COUNTY, NEW YORK
(MCD 00715)

PREPARED BY:

RICHARD A. KASTL, M.A., RPA

SUBMITTED TO:

GRIFFITHS ENGINEERING, LLC
13 S. Washington Street, Suite 1
Binghamton, NY 13903

SPONSOR:
BINGHAMTON-JOHNSON CITY
JOINT TREATMENT PLANT

JULY 2, 2013

Binghamton University, State University of New York
Binghamton, New York 13902-6000

PHASE 1A CULTURAL RESOURCE SCREENING

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BINGHAMTON-JOHNSON CITY
JOINT TREATMENT PLANT

JULY 2, 2013

MANAGEMENT SUMMARY

Project Name: Binghamton-Johnson City Sewer Treatment Plant Project, Flood wall Construction Project

SHPO Project Review Number (if available):

Involved State or Federal Agencies (DEC, CORPS, FHWA, etc):

Phase of Survey: 1A

Location Information

Location: Old Vestal Road
Minor Civil Division: Town of Vestal (MCD 00715)
County: Broome

Survey Area (Metric & English)

Length: 536 m (774 ft)
Width: 20 m (66 ft)
Depth: (when appropriate): 2 m (6.6 ft)
Number of Acres Surveyed: 3.2 ac (1.32 ha)
Number of Square Meters & Feet Excavated (Phase II, Phase III only):
Percentage of the Site Excavated (Phase II, Phase III only):

USGS 7.5 Minute Quadrangle Map: Binghamton West

Archaeological 1A Survey Overview

Number & Interval of Recommended Shovel Tests: 25-30
Number & Size of Recommended Backhoe Units: 2-3 short trenches

Report Author(s): Richard A. Kastl, M.A, RPA

Date of Report: July 2, 2013

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I. INTRODUCTION

This report presents the results of a Phase 1A cultural resource assessment for the proposed Flood wall Construction Project, Binghamton-Johnson City Sewer Treatment Project, Town of Vestal, Broome County, New York (Figure 1). The facility is located on the south bank of the Susquehanna River, east of the confluence with Fuller Hollow Creek, on Old Vestal Road. The proposed Area of Potential Effect (APE) includes an area approximately 20 m (66 ft) wide around the perimeter of the facility (Figure 2).

The potential impacts associated with this project include the construction of a Flood wall around the perimeter of the Binghamton-Johnson Sewer Treatment plant on Old Vestal Road, Town of Vestal, Broome County, NY. Construction plans call for the installation of a concrete T-Wall, with an estimated depth of excavation of 6 feet (1.83 m) below the existing surface; installation of steel sheet piling; and the construction of a mitigation area. The location of the mitigation area and its size and depth have not yet been determined. (See attached preliminary plans, Appendix II, p. 19.)

The fieldwork summarized in this document was performed under the supervision of Dr. Nina M. Versaggi, Director of the Public Archaeology Facility, Binghamton University. Richard A. Kastl served as the project director and is the author of this report. Maria Pezzuti and Annie Pisani performed all related administrative duties. In compliance with the Standards for Cultural Resource Investigations in New York State (1994) and the National Park Service's How to Apply the National Register Criteria for Evaluation (1990), the area within the project limits is considered the area of impact for the purpose of conducting the survey. *The results of the research performed for this report do not apply to any territory outside the project area.*

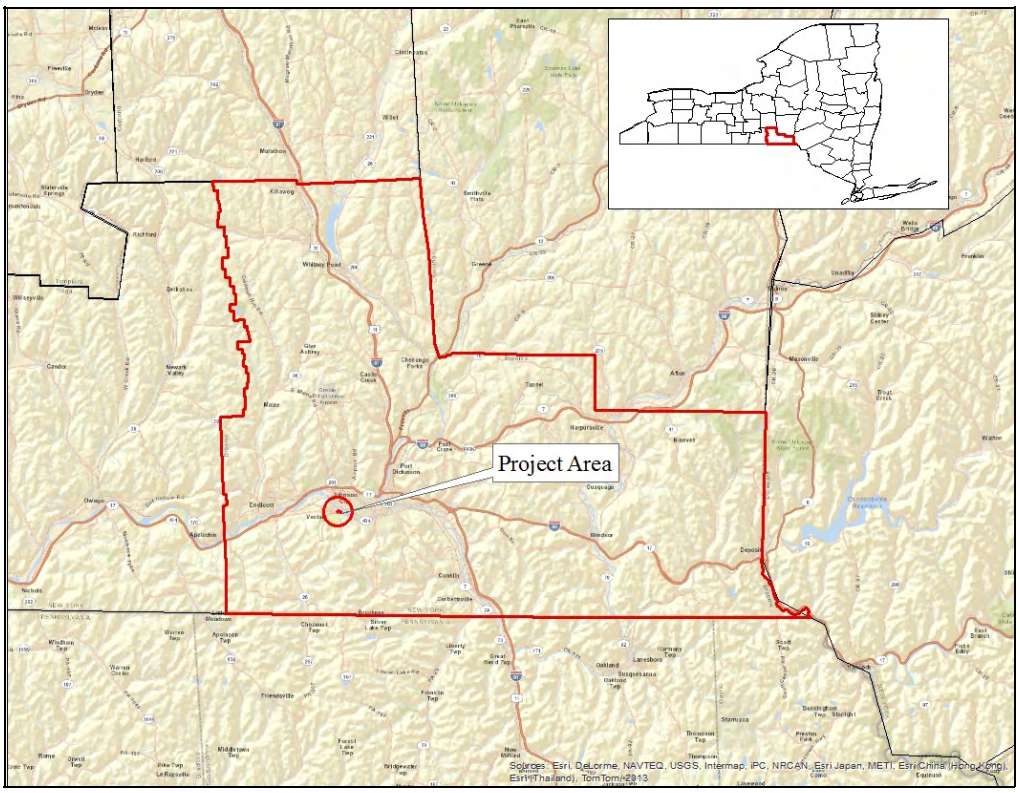

Figure 1. Location of the project area in Broome County and New York State.

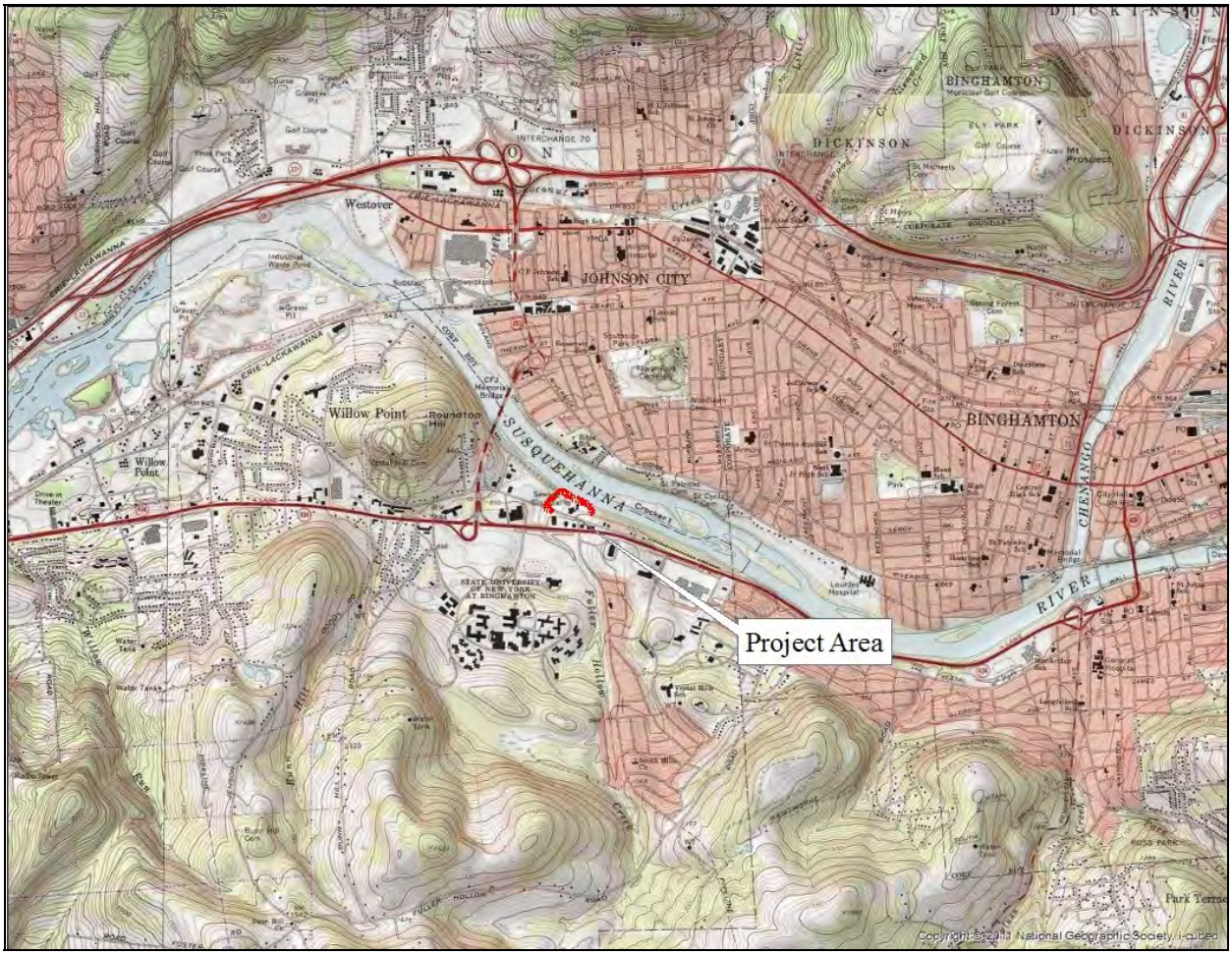

Figure 2. Location of the Project limits on the Binghamton West, 7.5' USGS Quadrangle.

Photo 1. Project Area, looking south onto potential mitigation area at east side of facility.

Photo 2. Project area, looking west along north perimeter.

Photo 3. Project area, facing northwest at the north perimeter.

Photo 4. Project area, facing north from Fuller Hollow Creek.

Photo 5. Project area, looking west along north perimeter.

Photo 6. Project area, looking west along north perimeter.

Photo 7. Project area, looking west along Old Vestal Road.

Photo 8. Project area, looking north along Fuller Hollow Creek.

II. BACKGROUND RESEARCH

2.1 Environmental Context

The Allegheny Plateau is the dominant geologic province in Broome County. The plateau ranges in elevation from 244 to 610 m (800-2000 ft) amsl, and is cross-cut by streams and steep river valleys (USDA 1971). The region has been shaped by several periods of glacial advance and retreat that continuously eroded and redeposited underlying material. The Susquehanna and Chenango Rivers provide the primary drainage for Broome County. The Chenango River forms part of the Susquehanna drainage system, merging with the Susquehanna approximately 2.4 km (1.5 mi) east of the project area. Additional drainage for this region of Broome County is provided by several smaller creeks and ponds, which drain the upland plateaus into the Susquehanna and Chenango Rivers. One of these, Fuller Hollow Creek, flows along the western edge of the project area, and converges with the Susquehanna River to the north. An additional stream, Bunn Hill Creek, merges with the Susquehanna 330 m (1000 ft) west of the project area. The historic maps for the area were georeferenced onto the USGS quadrangle map and indicate that the Fuller Hollow Creek channel has been redirected and that it once went through the middle of the current sewer plant complex.

The project area is located on a portion of the Fuller Hollow Creek flood plain in the Town of Vestal, New York. The elevation of the project area is approximately 256 m (840 ft) amsl. The soil survey map of Broome County indicates the presence of four major soil types within the project area boundaries: Dalton silt loam, 2-8% slopes, Wayland silt loam, Tioga silt loam, and Howard and Chenango series soils. These soil types are described in Table 1, p. 8. The majority of the project area has Tioga silt loam and Wayland silt loam, and lesser amounts of the Dalton and Chenango-Howard associations.

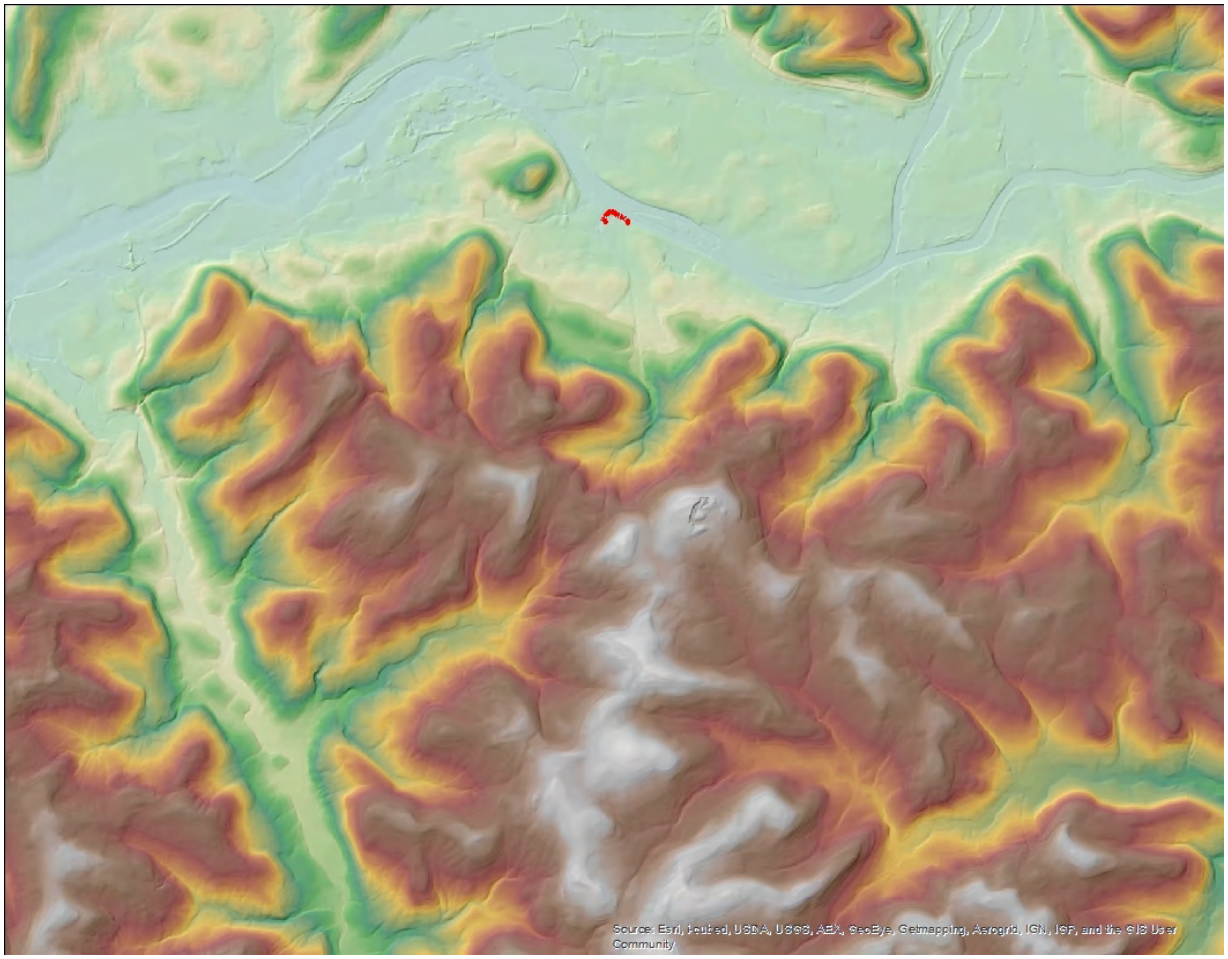

Figure 3. Digital elevation model (DEM) showing the project area and regional landscape.

The environmental context of the project area on a portion of the Fuller Hollow Creek flood plain suggests a high to moderate probability for prehistoric cultural material (if these materials have not been destroyed by ground disturbance). Given the setting, a variety of prehistoric sites may be located within the project area boundaries. If natural soils are encountered, excavation should reach at least 1 m (3.3 ft) below the original A horizon.

Soil Borings

Soil test borings were conducted by Haley & Aldrich to analyze the project area soils for engineering and construction purposes. A draft of the results were made available to PAF in order for us to assess the amount and depth of disturbance inside the project area. Borings were made around the perimeter of the project area that is accessible to shovel testing and included borings labeled (HA-03, 04, 05, 06, 07, 12, 13, 25 and 26, see Appendix II, p. 19). Borings HA-25 and HA-26 were located near the potential mitigation area on the east side of the project area. HA-25 encountered buried topsoil at a depth of 13.6 feet below the surface. HA-26 encountered buried topsoil at a depth of 4.1 feet below the surface. HA 06, 07, 12 and 13 were located on the north perimeter of the facility. HA 12 identified fill to a depth of 7 feet and alluvial deposits between 7 and 12 feet. HA 07 and 13 appeared to have intact soil profiles. HA-06 consisted of fill to a depth of 10 feet. HA-03-05 had fill to depths between 9 and 14 feet.

In general, the area on the north side of the facility next to the Susquehanna River showed at least some sections of intact soils, although there were some areas of deep fill. On the west side of the facility, there was fill to depths between 9 and 14 feet. Kudrle conducted backhoe trenching near these borings, with similar results (Kudrle 2001). The two borings on the east side of the facility have fill to depths between 4 and 13.6 feet. These last two were in the potential mitigation area and will not necessarily be impacted at this stage.

On the basis of the boring results, the project area between the Susquehanna River and the north perimeter of the facility is likely to encounter intact soils and should be tested at 15 m intervals. In the other 2 areas on the east and west sides of the facility, it is unlikely that intact soils can be reached using shovels and other strategies should be employed if impacts will extend into intact soil horizons.

Table 1. Predicted soil types for the Binghamton-Johnson City Flood wall project areas.

Series Name	Slope	Horizons	Color/Texture	Landforms
Tioga silt loam	level	Ap 0-20 cm (0-8 in) Bw1 20-46 cm (8-18 in) Bw2 46-92 cm (18-36 in) C 92-127 cm (36-50 in)	dk gr brown silt loam brown silt loam yl brown silt loam dk yl brown silt loam	Deep, well drained soils formed in alluvium on higher positions in flood plains
Dalton silt loam	2-8%	Ap 0-20 cm (0-8 in) Bg 20-38 cm (8-15 in) Eg 38-46 cm (15-18 in) 2Bx1 46-106 cm (18-42 in) 2Bx2 106-142 cm (42-56 in) 2C 142-183 cm (56-72 in)	v dk gr brown silt loam gr brown silt loam lt br gray silt loam brown ch loam gr brown ch loam gr brown ch loam	Very deep soils that are mainly along lower valley sides. Soils formed in loamy till that has a silty mantle.
Wayland silt loam	level	A 0-15 cm (0-6 in) Bg1 15-31 cm (6-12 in) Bg2 31-46 cm (12-18 in) C1 46-117cm (18-46 in) C2 117-183 cm (46-72 in)	dk gr brown silt loam dk gr brown silt loam gr brown silt loam gray silt loam gray si clay loam	Very deep nearly level soils formed in recent alluvium, found in low areas or slackwater areas on flood plains.
Chenango Series	5-15%	Ap 0-20 cm (0-8 in) Bw1 20-31 cm (8-12 in) Bw2 31-51cm (12-20 in) BC 51-76 cm (20-30 in) 2C 76-183 cm (30-72 in)	v dk gr brown grv si lo dk yl brown grv si lo dk yl brown v grv si lo brown v grav si lo dk gr brown ex grav si lo	Deep soils formed in water sorted material on outwash plains, kames, eskers, terraces and alluvial fans.

Howard Series	5-15%	Ap 0-23 cm (0-9 in) E 23-38 cm (9-15 in) E/B 38-61 cm (15-24 in) B/E 61-69 cm (24-27 in) Bt1 69-76 cm (27-30 in) Bt2 76-114 cm (30-45 in) C 114-183 cm (45-72 in)	dk brown grav loam brown v grav loam pale brown v grav loam brown v grav loam brown v grav loam brown v grav loam gr brown ex grav sand	Very deep soils formed in medium textured glacial outwash deposits, found on valley terraces, outwash plains, kame moraines, and eskers.

KEY=dk=dark; v=very, grav=gravelly; ex=extremely, si=silt, lo=loam, gr=gray, lt=light, br=brown

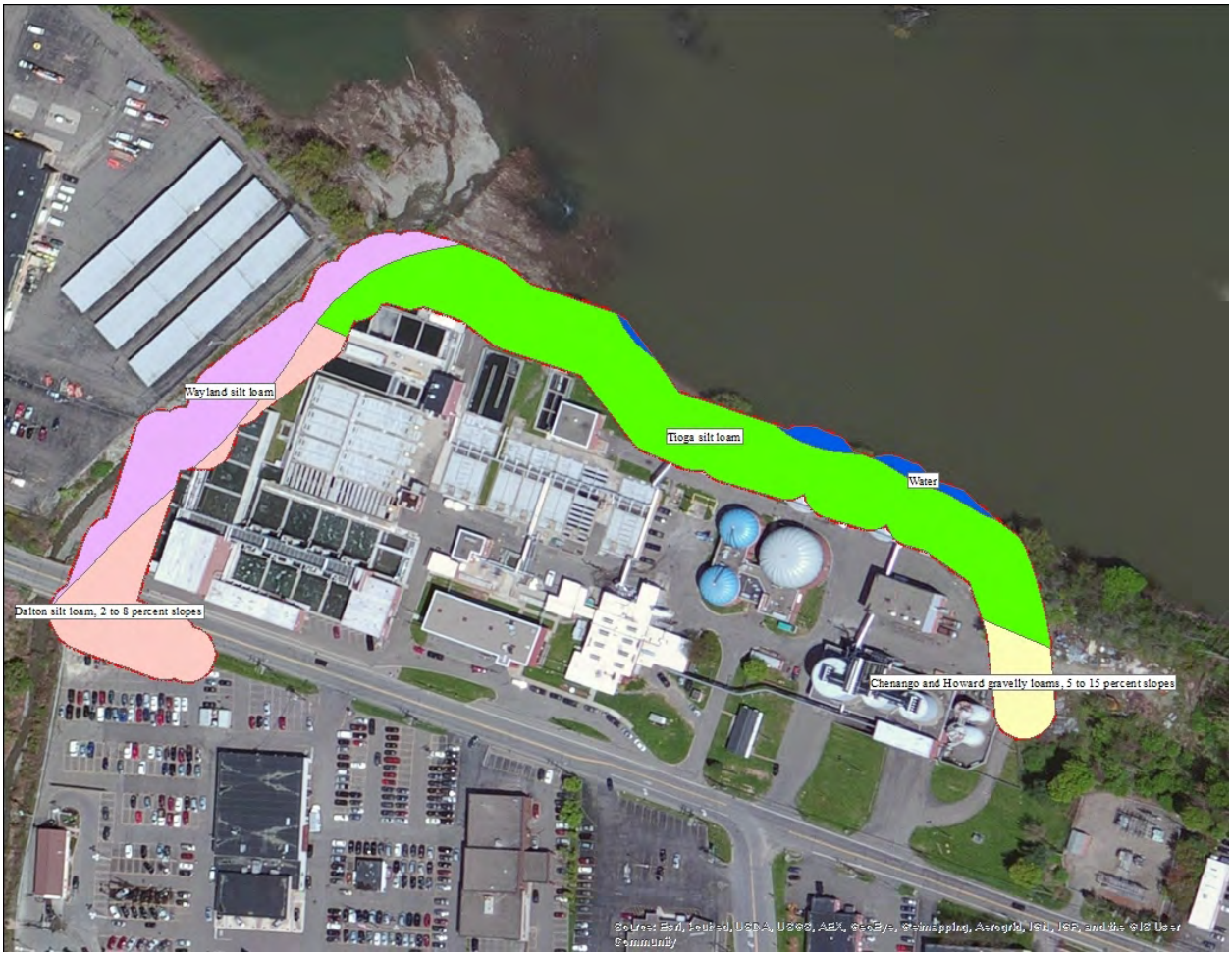

Figure 4. Approximate location of the proposed APE showing the mapped soils.

2.2 Site Files Summary

The site files check at the New York State Office of Parks, Recreation, and Historic Preservation for a previous study (Kudrle 2001) listed 8 prehistoric sites within 3.2 km (2 mi) of the project area. One site, NYSM 2858, is a site identified by Parker (1920), and is listed as adjacent to Fuller Hollow Creek. This location should probably be placed somewhere near the middle to eastern third of the project area, since the creek channel appears to have been moved. The site is listed as an unidentified prehistoric village, and there is no further information. None of the sites has produced diagnostic artifacts, but they do suggest that the land around the project area was intensely utilized throughout the prehistoric period for all types of purposes, ranging from villages and base camps to specialized resource processing locations.

2.3 Prehistoric Context

The prehistory of New York State and the Northeast was characterized by two broad subsistence patterns, both of which influenced settlement and land use patterns, as well as material culture. The first, designated as the pre-agricultural hunter-gatherer, began with the arrival of highly mobile groups during the Paleo-Indian and Early-Middle Archaic periods around 10,000-4000 BC. Mobility was an important adaptation, as these groups relied on gathered plants, game animals, and fish for their subsistence. These groups often followed herds of animals, or migrated from one resource-rich landform (e.g., upland wetlands) to another. Starting in the Late Archaic period and extending through the Middle Woodland (4000 BC to AD 900), hunter-gatherers became seasonally nomadic. People created relatively large base camps in major river or lake valleys, from which daily foragers would radiate outward in search of local resources. During seasons of resource dispersal, the camps would break up into smaller, more mobile units capable of foraging for themselves. Sites associated with hunter-gatherers include the short term camps and resource processing stations used by the early nomads, as well as larger base camps and lithic scatters associated with the daily foragers of the seasonally nomadic groups.

Beginning around AD 900, the Late Woodland period is defined by the widespread shift towards agriculture as a subsistence base, along with the associated sedentism necessary for agricultural pursuits. While these groups continued to forage for plant and animal resources, they relied heavily on cultigens as a primary food source. Permanent villages developed in the region, along with a matrilineal kin structure. Increased needs for defense prompted many groups to develop their villages on elevated landforms situated above major waterways.

Prehistoric Sensitivity Assessment

It is known from the upper Susquehanna River valleys that most prehistoric groups used a system of base camps and logistical sites for collecting and processing resources that could not be obtained within the daily foraging radius around the camp (Versaggi 1996; Ritchie and Funk 1973). Since sources of water played a key role in settlement patterns, prehistoric residential sites, such as villages and base camps were often more likely to be located on the valley bottoms. Upland areas are often located farther away from sufficient water supplies, and therefore were not occupied as intensely as the valley regions. Instead, the upland forests were used regularly for resource gathering and processing. Given the environmental context of the project area adjacent to the confluence of Fuller Hollow Creek and the Susquehanna River, the probability for encountering large residential prehistoric sites is moderate to high (if the soils remain intact below the fill layers).

Research by Versaggi (1987, 1996) has identified base-line models of prehistoric hunter-gatherer settlement along the Upper Susquehanna Valley, and recognizes a set of site types that can be employed in an examination of hunter-gatherer sites. Versaggi's analysis identified four site groupings: base-camps, single-task field camps, multi-task field camps, and resource-processing stations.

- **Base-camps** are large sites with high frequencies of artifacts, tools, features, and spatial clusters. Base-camps were typically located at confluences near winter deer aggregation areas and dense spring fish runs.

- **Single-task field camps** are typically smaller size occupations that contain large numbers of artifacts and specialized tools. Bifacial reduction debitage is prominent as bifacial tool-kits are replaced and maintained. Single-task temporary camps appear to have been occupied by few people for a short duration, and there may have been little need to organize and divide space. Fewer spatial clusters would result and these would tend to be similar in composition, reflecting a focus on a single or limited range of tasks.

- **Multi-task field camps** are typically smaller size occupations that contain lower numbers of artifacts and tools. These sites resemble forager-like camps in which the occupants moved frequently in pursuit of low density and dispersed resources. Multi-task camps occur in a wide variety of contexts. Some were widely scattered within the valleys of major and secondary drainages, and others were mapped onto specific resource patches in the uplands.

- **Resource processing locations** and encounter-like hunting/butchering stations are small occupation with very low numbers of artifacts, tools, and spatial clusters. Expedient flake production and use characterize these small lithic sites. Generally, these sites are expected within the daily foraging radius around a camp or village, as well as around dispersed single- and multi-task camps.

The location of the project near the confluence of Fuller Hollow Creek and the Susquehanna River would favor prehistoric residential sites, such as villages and base camps. The project location on the Susquehanna River near a tributary stream suggests that a wide range of prehistoric site types is likely near this project area. These site types could include villages, small multi-task camps, and temporary foraging sites.

2.4 Historic Context

The project area lies in the Town of Vestal, Broome County. After the Clinton-Sullivan Campaign (1779), the region encompassing the Town of Vestal was open for settlement by early colonists (Versaggi 1988). The project area falls within the lands known as Bingham's patent, purchased by William Bingham in 1786 (Hinman 1984). One of the original settlers in the area was Major David Barney, who arrived in 1785. It is likely that he and others were awarded tracts of land in recognition of their service in the Revolutionary War. Most of the early historic settlements concentrated near travel routes and around major sources of water power. In the Town of Vestal, Choconut Creek and the Susquehanna River provided the necessary elements for historic development. The Town of Vestal was officially formed out of land from the Town of Union in 1823 (Smith 1885:94; Carmody 1999).

A review of historic maps from 1855, 1866, 1876, and 1908 was conducted and it was found that there are no Map Documented Structures (MDSs) within the immediate vicinity of the project area. Most early maps (1855-1908) show farmsteads along present day Vestal Parkway and Old Vestal Road, adjacent to the Susquehanna River. The 1876 map was georeferenced in ArcMap. This map shows that the Fuller Hollow Creek channel was moved west to its present location. The original channel seems to have cut through the eastern third of the sewer treatment facility property. This map also shows that there was a map documented structure on the facility property, but not in an area to be impacted by this project. The 1866 map places the bed of the proposed Chenango Canal Extension between the Susquehanna River and the northern edge of the project area. This extension never materialized beyond about a three-quarter mile ditch, which never reached the project area (Larkin 1998:62). The canal, built in the early 1830s revolutionized both travel and commerce, connecting many outlying communities through the ease of water travel, facilitating the movement of goods both into and out of the Southern Tier. The canal was made quickly obsolete with the construction of railroads by the middle of the 19th century.

Historic Sites Sensitivity Assessment

Based on the results of the historic maps analysis, and the lack of documented historic archaeological sites within a 3.2 km (2 mi) radius of the project area, the probability of encountering historic archaeological sites is low.

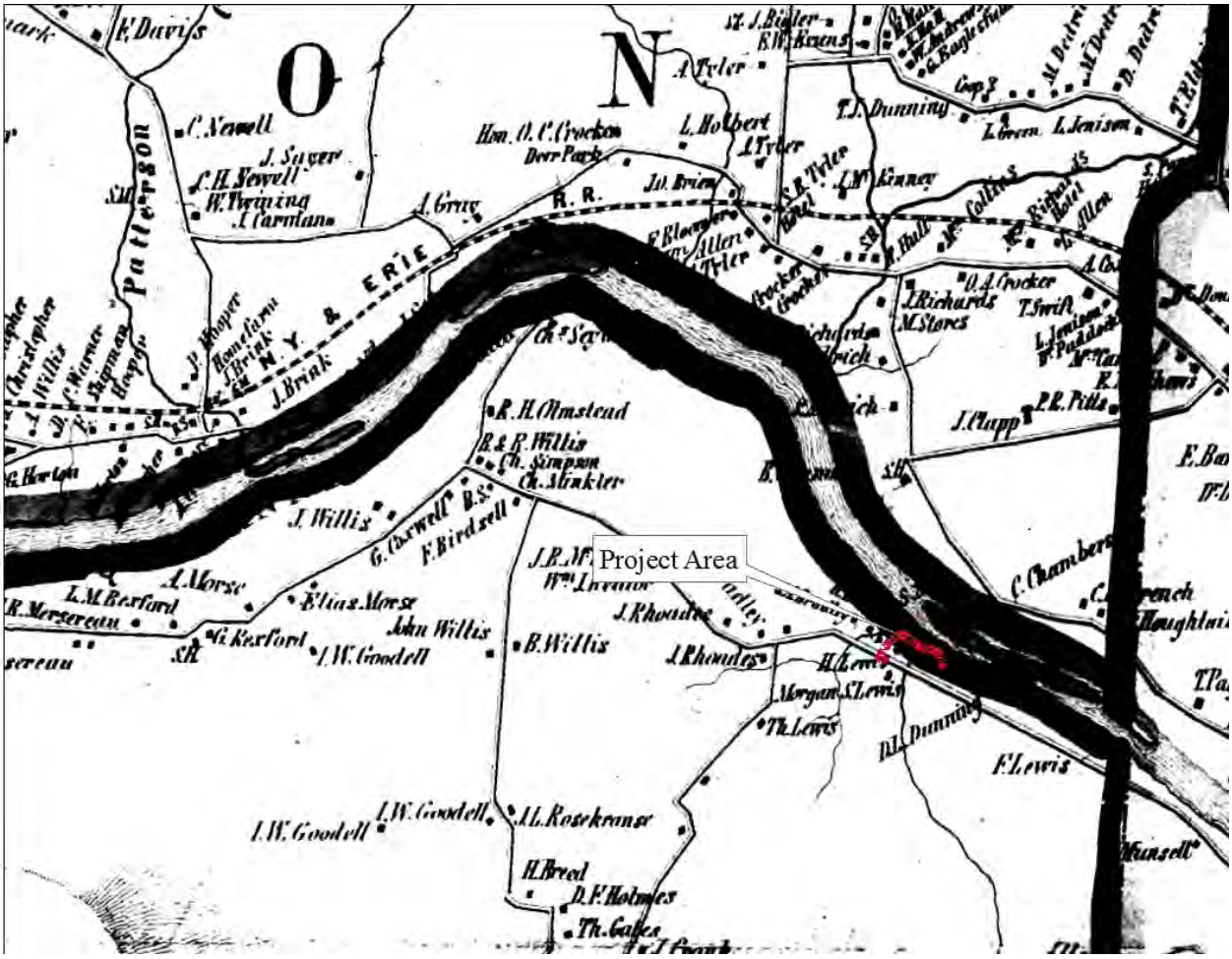

Figure 5. 1855 map showing the project area.

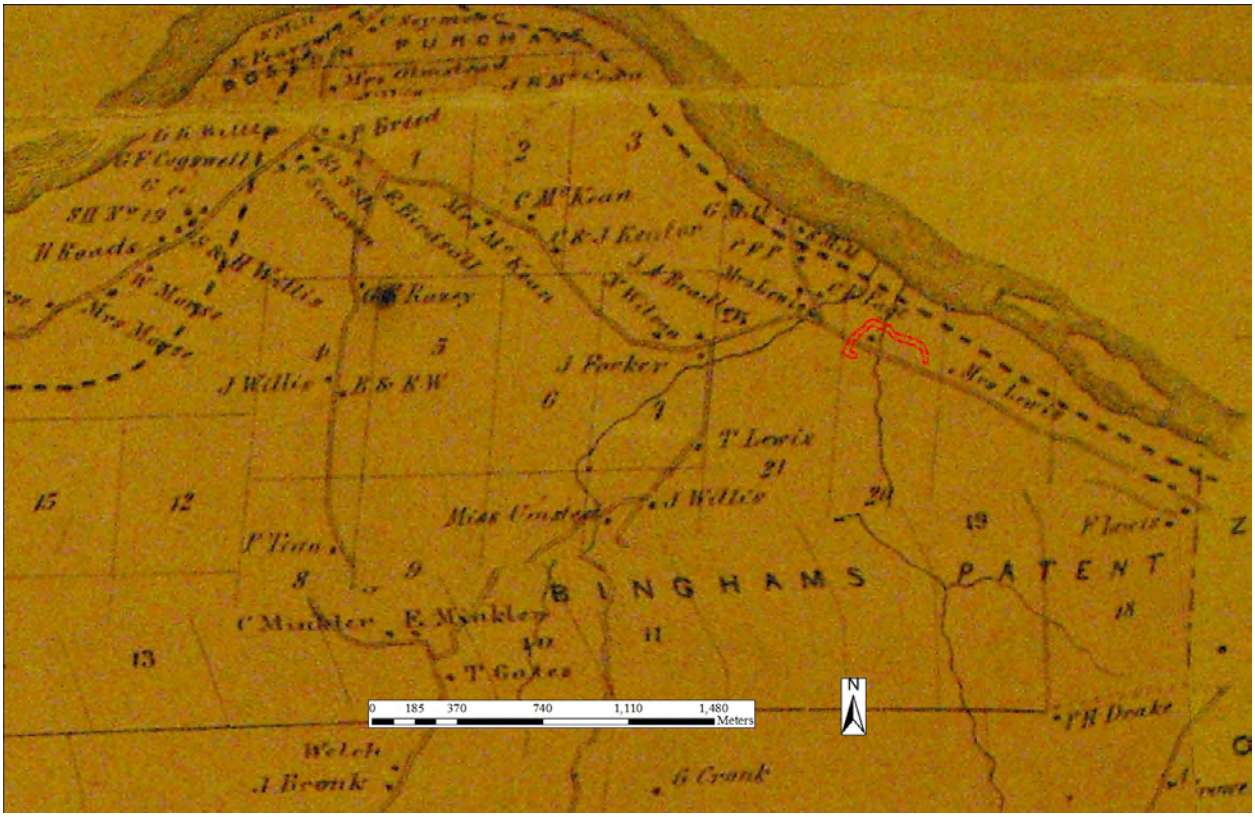

Figure 6. 1866 Beers Map showing the project area.

Figure 7. 1876 Everts, Ensign, and Everts map showing the project area.

Figure 8. 1908 Plat book of Broome county, showing project area.

III. METHODOLOGY

The Phase 1A methodology included a walkover of the proposed impact areas, review of records pertaining to previous ground disturbance including recent soil cores, and photo-documentation of current ground conditions. The goal was to visually examine the entire APE to identify any existing cultural features, determine if there has been any prior ground disturbance and to what depths, and determine appropriate field testing strategies. The author conducted a walkover of the project area during May 2013. A map of the project area is depicted in Figure 9 (p. 38), and photographs of the project area are included on pages 3-6.

IV. PHASE 1A RESULTS

Walkover of the perimeter of the project area where the Flood wall will be constructed showed areas where manual archaeological testing is possible. The area between the north facility perimeter and the Susquehanna River is accessible for testing and has potential for intact soil horizons. The areas on the east and west perimeters, according to the soil borings potentially have intact deposits, but below four feet in depth, and therefore not accessible to shovel testing. There is a small section on the south side of Old Vestal road that is accessible, with some utility disturbance, but with some areas that are potentially intact.

Test Boring Results

There were 9 test borings placed within areas affected by the construction of the flood wall and the steel sheet piling. Borings, HA-03, HA-04, and HA-05 are in an area previously subjected to backhoe testing by Kudrle (2001). These borings show fill to depths between 10 and 14 feet, well below the flood wall depth of 6 feet. We propose no further archaeological testing in this area.

Along the north perimeter of the sewer facility, there were four borings: HA-06, HA-07, HA-12, and HA-13. These borings show varying depths of fill: HA-06, 10 ft; HA-07, 6.2 ft; HA-12, 7 ft, and HA-13, none. However, because this area is adjacent to the river, there are areas between the borings and the river that have less, or no, fill. Therefore, shovel testing in this area is warranted, and likely to encounter intact soils. Some of this testing should be at 7.5 m (25 ft) intervals due to the reported presence of a site near the old stream channel.

The borings along the east perimeter include HA-25 and HA-26. These had fill to 13.6 and 4.1 feet respectively. Since the flood wall may extend to at least 6 feet below the surface, we propose two to three backhoe trenches, 15 m (49.2 ft) apart to test intact soils. If there are intact soils at a sufficiently shallow depth, then STPs will be dug and screened.

V. RECOMMENDATIONS

We recommend that Phase 1B testing will be needed in sections of the project area. We propose a series of shovel tests (STPs) for the accessible areas on the facility perimeter on the north site near the Susquehanna River and on the south side of Old Vestal Road. These areas have an approximate length of 310 m and would include 20-25 STPs at 15 m intervals. Also, along the east perimeter is an area with fill between 4 and 13 feet. We propose 2-3 short backhoe trenches spaced 15 m apart in areas with less than 8 ft of fill to remove that fill so that STPs can be dug. Once intact soils are reached, archaeologists will excavate and screen STPs. If the depth of intact soils exceeds 4 ft, soil will be brought to the surface, and a sample of that soil will be screened.

Plans for the mitigation area are incomplete at this time and the size and location have not been determined. Once plans are complete for the proposed flood mitigation areas, these will require Phase 1B testing if the depth of proposed impacts exceeds the depth of fill and/or disturbance.

APPENDIX I. BIBLIOGRAPHY

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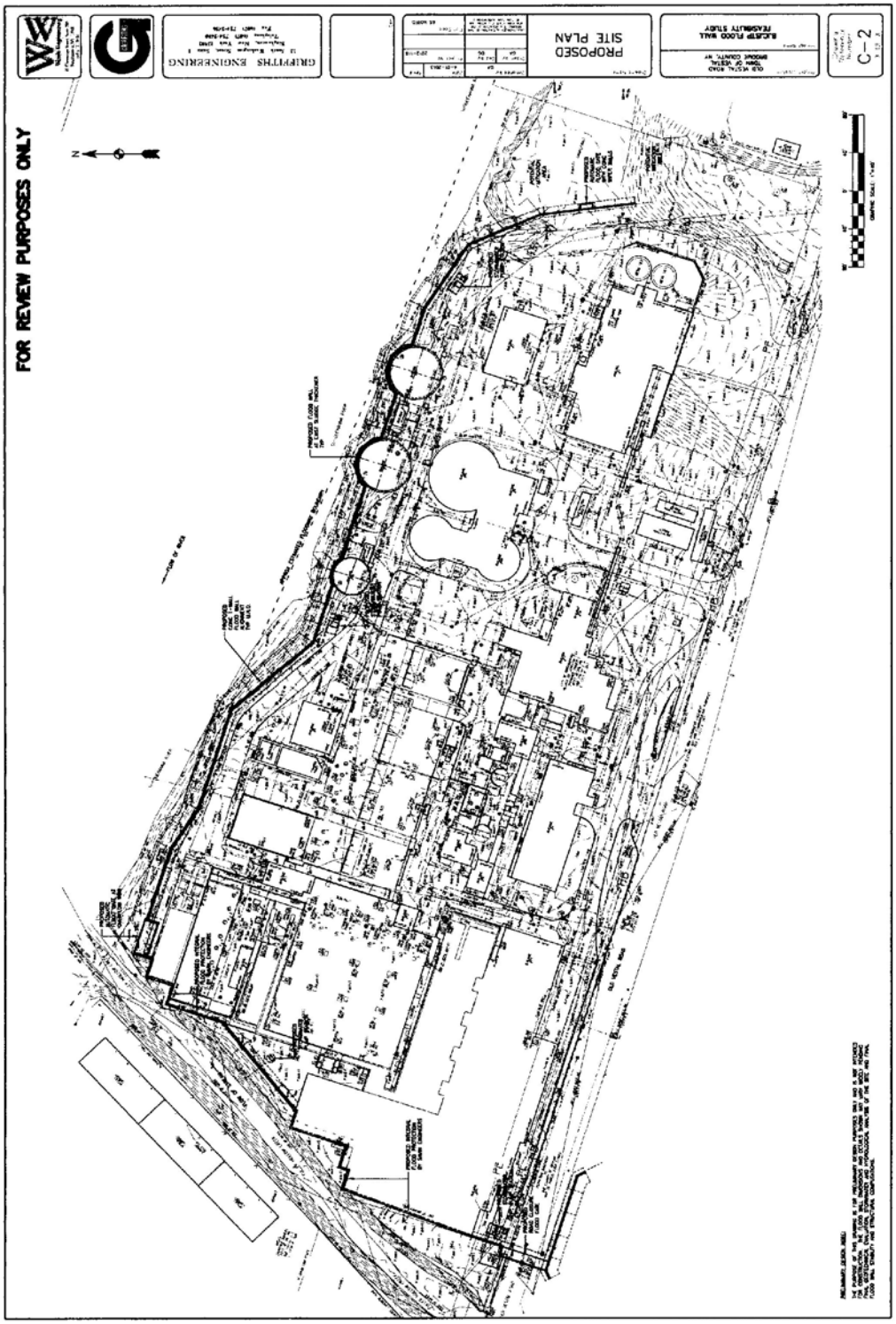
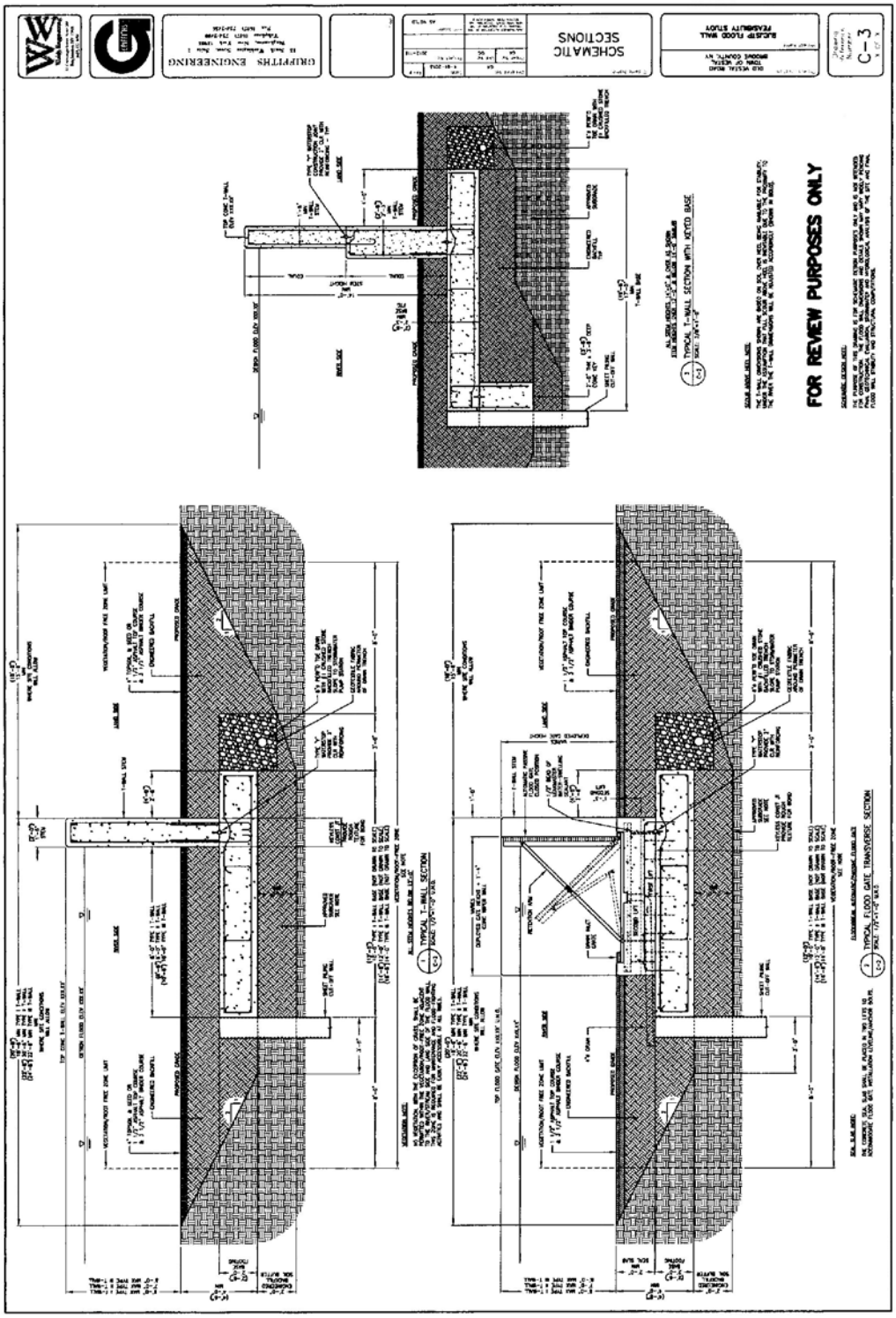
APPENDIX II. CORRESPONDENCE




SCHEMATIC SECTIONS
C-3
FOR REVIEW PURPOSES ONLY
TYPICAL T-WALL SECTION WITH KEYED BASE
TYPICAL T-WALL SECTION
TYPICAL FLOOD GATE TRANSVERSE SECTION

HALEY & ALDRICH

TEST BORING REPORT DRAFT

Boring No. HA-03

Project: Binghamton-Johnson City Joint Sewerage Treatment Plant Floodwall, Vestal, NY
Client: Griffiths Engineering, LLC
Contractor: Earth Dimensions, Inc.

File No. 39155-000
Sheet No. 1 of 2
Start: April 23, 2013
Finish: April 23, 2013
Driller: A. Morris
H&A Rep.: D. Keller/Derouchey
Elevation: 835.0 (est.)
Datum: NAVD 88
Location: See Plan

	Casing	Sampler	Barrel
Type	HSA	S	--
Inside Diameter (in.)	4	1 3/8	1.875
Hammer Weight (lb)	--	140	-
Hammer Fall (in.)	--	30	-

Drilling Equipment and Procedures:
Rig Make & Model: Diedrich D-50 Track
Bit Type: Cutting Head
Drill Mud: None
Casing: Spun
Hoist/Hammer: Cat-Head Safety Hammer
PID Make & Model:

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size*, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test: Dilatancy	Toughness	Plasticity	Strength
0	8 6 10 14	S1 14	0.0 2.0		SM	Medium dense, brown, silty SAND with gravel (SM), mps 30 mm., no odor, moist. Reworked natural -FILL-	10	10	10	20	25	25				
	16 6 6 18	S2 6	2.0 4.0			S2: Similar to S1.										
	1 3 7 6	S3 6	4.0 6.0			S3: Similar to S1.										
5	4 3 5 10	S4 10	6.0 8.0			S4: Similar to S1 except wet.										
	11 6 16 18	S5 14	8.0 10.0	825.7 9.3		S5: Similar to S1 except wet, with wood.										
10	10 100/5	S6 6	10.0 10.9		SM	Very dense, mottled gray and yellow-brown, silty SAND with gravel (SM), mps 30 mm., no odor, moist, with wood.	10	10	5	20	25	30				
	7 12 16 15	S7 12	12.0 14.0			S7: Similar to S6 except no wood.										
15	4 7 7 7	S8 14	14.0 16.0	821.0 14.0	SP-SM	Medium dense, yellow-brown changing to gray, poorly-graded SAND with silt (SP-SM), mps 0.2 mm., no odor, wet, trace organics. -ALLUVIAL DEPOSITS-	0	0	0	0	90	10				
20	1 2 3 3	S9 19	20.0 22.0			S9: Similar to S8 except gray with no organics. Note: Verify S9 did not change to FLUVIAL DEPOSITS										
				811.0 24.0		TOP OF BEDROCK 24.0 FT										
25	96 89 41 62	S10 14	25.0 27.0			Highly to moderately weather SHALE. -BEDROCK-										
				808.0 27.0		Advanced augers to 27.3 ft SEE CORE BORING REPORT FOR ROCK DETAILS										
30																

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID:
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram: Riser Pipe, Screen, Filter Sand, Cuttings, Grout, Concrete, Bentonite Seal

Summary

Overburden (ft)	27.3
Rock Cored (ft)	10.0
Samples	10S, 2C

Boring No. HA-03

Field Tests: Dilatancy: R - Rapid S - Slow N - None; Toughness: L - Low M - Medium H - High; Plasticity: N - Nonplastic L - Low M - Medium H - High; Dry Strength: N - None L - Low M - Medium H - High V - Very High

*Note: Maximum particle size is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A-TEST BORING-07-1 HA-LIB07-REVISED 11-2012.GLB HA-TB-CORE+WELL-07-1.GDT G:\39155\FIELD\2013_0607_BINGJOHNSON CITY TEST BORING.GPJ May 23, 13