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August 26, 2008

Mr. Salvatore F. Priore, P.E.
Environmental Engineer
NYS Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7017

Subject: RG&E Genesee River Work Plan
Rochester, New York

Dear Mr. Priore,

In compliance with the request of the New York State Department of Environmental Conservation (NYSDEC) that was made during a meeting with Rochester Gas and Electric Corporation (RG&E) in March 2007, ENSR Corporation (ENSR) is submitting to you on behalf of our client, RG&E, two copies of the Final Work Plan for a Phased Approach to Assess MGP-Related NAPL Residuals in Sediments in the Genesee River, Rochester, New York. This Work Plan includes the changes submitted by e-mail on August 19th, and the subsequent additional change which you requested.

If you have any questions regarding this submittal, please do not hesitate to contact me at (607) 277-5716 or Mr. Steve Mullin at (585) 771-4556.

Sincerely yours,

Bruce Coulombe

Bruce Coulombe, P.G.
Senior Hydrogeologist

BC:mlr

cc: Mr. David Crosby, P.E. – NYSDEC (w/enclosure)
Mr. Robert W. Schick, P.E. – NYSDEC (w/o enclosure)
Mr. Joseph M. Simone, P.E. – NYSEG (w/o enclosure)
Mr. Steve Mullin – RG&E (w/enclosure)
File: 05768-013

Prepared for:
Rochester Gas and Electric
89 East Avenue
Rochester, NY 14649

Work Plan for a Phased Approach to Assess MGP-Related NAPL Residuals in Sediments in the Genesee River Rochester, New York

ENSR Corporation
August 22, 2008
Document No.: 05768-013-100

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1.0 Introduction

This Work Plan presents a phased approach to assess manufactured gas plant (MGP)-related non-aqueous phase liquid (NAPL) residuals in sediments in a stretch of the Genesee River located in the City of Rochester, New York. The Work Plan has been prepared at the request of the New York State Department of Environmental Conservation (NYSDEC) that was made during a meeting with Rochester Gas and Electric Corporation (RG&E) in March 2007. During that meeting the NYSDEC conveyed the concept of a phased approach to assess sediments in the Genesee River in proximity to RG&E's former MGP sites. Building off that concept, this Work Plan embodies the spirit of the NYSDEC request and has laid out a phased approach which involves several interactions with the NYSDEC during the various phases. For the purposes of this Work Plan, the Genesee River Project Area (Project Area) is defined to extend from the base of the Upper Falls to the northern limits of Seth Green Island, just north of the Lower Falls. The Project Area encompasses an approximate 1.75 river mile reach of the Genesee River (Figure 1-1).

This Work Plan has been prepared by ENSR Corporation (ENSR) on behalf of RG&E. The proposed approach presented in the Work Plan is designed to be comprehensive, flexible, and consistent with the general guidelines of the NYSDEC (2002) *Draft DER-10 Technical Guidance Document (Draft DER-10)*. The physical complexity of the Project Area will require that an adaptive investigation management strategy be evaluated and developed throughout the implementation phases.

The Genesee River near Rochester, New York, has a long tradition of industrialization extending back to the early 1800s. In 1985, NYSDEC identified property in the vicinity of the Lower Falls of the Genesee River in Rochester as an inactive hazardous waste disposal site. In mid-1991, NYSDEC removed it from its Registry of Inactive Hazardous Waste Disposal Sites. Discharges to the River from land use in the perimeter areas continue today with flows from combined sewer overflows (CSOs), storm sewer outfalls (SSOs), and industrial discharges. In addition, RG&E owns two former MGP sites, East Station and West Station, which are located along the River banks within the Project Area. There have been several previous environmental investigations of the Genesee River and surrounding uplands. These investigations have been conducted by several entities and are noted in the Reference Section (Section 7) at the end of this Work Plan.

This Work Plan is organized into seven sections. Section 2 provides a description of the conceptual site model (CSM) as it is currently understood. The CSM will be used as a guide to identify information that needs to be researched and field sampling efforts necessary to complete the Work Plan.

The complete sediment assessment is conceptualized to be conducted in several phases. Section 3 presents an overview of the Work Plan, and highlights the critical elements of the first phase of work and those conceptualized for the second phase. Note that since limited information is available about the River at this time, the first two phases have clearer objectives designed to generate a body of knowledge that will aid in making more informed decisions and creation of plans for defining details of the subsequent phases for subsequent implementation. Therefore, Phases 1 and 2 are described in detail in this Work Plan, while future phases will be detailed later in separate work plan(s) for concurrence by NYSDEC before implementation. The distribution of NAPL in sediments is the focus in Phases 1 and 2. If warranted, then the subsequent phases will involve further sampling and analysis of sediments which are located within areas of potential concern defined by Phases 1 and 2.

The sediment assessment will generate a substantial body of data that will require an organized and quality-focused data management system. Sections 4 and 5 describe how the data collected during the phases of work will generally be managed and reported. Section 4 explains how information will be reported to NYSDEC and decision points for defining additional phases. Section 5 discusses the data management system.

In Section 6 of this Work Plan, the program management structure is presented, including the roles of the members of the Project Team.

References consulted in the preparation of this Work Plan are included in Section 7.

The physical setting of the Project Area, which includes two waterfalls and a hydroelectric facility, poses unique health and safety challenges to the sediment assessment. The Health and Safety Plan (HASP) will be prepared and submitted separately following NYSDEC's approval of the Work Plan and prior to beginning field work.

2.0 Preliminary conceptual site model

This section presents the current understanding of the physical elements of the Genesee River within the Project Area. Specifically, the CSM identifies and describes: (1) characteristics of the Project Area physical features, hydrogeology, and surface water; (2) potential sources of impacts to the Project Area; (3) potential sources of coal tar NAPL to the Project Area; and (4) the dominant sediment fate and transport characteristics within the Project Area (NYSDEC, 2002). The CSM will be updated throughout the phases of work as new information becomes available. Although this section describes the current understanding of the CSM for the Project Area, it also identifies aspects of the CSM which will be further refined by the completion of the work proposed in the Work Plan.

2.1 Characteristics of the Genesee River

2.1.1 Project sub-areas

Within the Project Area, specific physical features, both natural and man-made, inhibit access to the Genesee River and define three distinct Project Sub-Areas, which are shown on Figure 2-1. These include:

1. Sub-Area A is defined as the region between the base of the Upper Falls to Middle Falls Dam, which represents approximately 1.1 river miles;

2. Sub-Area B is defined as the region between Middle Falls Dam and the Lower Falls, which represents approximately 0.2 river miles; and

3. Sub-Area C is defined as the region between the Lower Falls and the northern limits of Seth Green Island, which represents approximately 0.6 river miles.

In addition, a total of three bridges span the Project Area, including from south to north the Platt Street Bridge, the Bausch Street Bridge, and the Driving Park Bridge.

2.1.2 Hydrogeology

The Genesee River is approximately 157 miles long, and includes a watershed of 2,500 square miles. The River begins near Genesee, PA and travels north until it discharges into Lake Ontario in the City of Rochester, Monroe County, NY (Figure 1-1). The Lower Basin, which extends from the New York State Barge Canal (Barge Canal) and the river mouth, is approximately 12 miles long with a drainage area of 27.7 square miles (MCDOH, 1986; RCSI, 2005).

The Genesee River cuts a gorge within the Project Area, exposing relatively flat-lying sedimentary rocks of Ordovician and Silurian age. The regional bedrock strike is generally east-west, in the direction N75°E, and the dip is to the south at approximately 55 feet per mile, in the direction S15°E. Bedrock is suspected to be present at the "bed" of the river over much of the Project Area. Alluvial deposits are generally medium to coarse sand with some gravel (Bailey, 1984; Morrison-Knudsen, 1986). The depths to bedrock and sediment thickness within the entire Project Area are not well known.

2.1.3 Surface water

Surface water flow rates of the Genesee River within the Project Area range from a low of approximately 700 cubic feet per second (cfs) from August through October to a high of nearly 7,000 cfs in late March and April. The average flow rate is 2,800 cfs (USGS, 2008).

Several CSOs and State Pollution Discharge Elimination System (SPDES) outfalls discharge surface water within the Project Area. In addition, the Barge Canal water mixes with the Genesee River upstream of the Project Area (MCDOH, 1986).

2.2 Potential sources of impacts to the Project Area

The Genesee River system is complex, with many sources, historic and ongoing, contributing to the chemical loading in both the sediments and water column. Therefore, in addition to RG&E's MGPs, other potential sources historically affecting sediments in the Project Area include a variety of point and nonpoint discharges or releases. These potential sources may include:

- Historic deposition and/or placement of urban fill materials in the river bed;
- Historic fill areas/sites such as the Deep Hollow Ravine;
- Historic and ongoing direct discharges of sanitary sewage;
- Historic and potentially ongoing industrial discharges (treated and untreated) from industries along the banks and within the watershed;
- Incidental release or placement of chemicals (including industrial raw materials, industrial wastes, and municipal refuse);
- Historic and ongoing releases of storm flows into the River;
- Historic and ongoing discharges of groundwater to the River;
- Historic and ongoing aerial deposition; and
- Listed, known, and/or unknown environmental sites.

2.3 Potential sources of coal tar NAPL

The Work Plan presents a program to assess potential impacts of residuals from former MGPs, specifically coal tar NAPL to sediments, during the initial project phases. There have been some studies conducted to date that provide a partial understanding of coal tar NAPL impacts to the near shore sediments in the Project Area. Based on these studies, potential sources of MGP coal tar NAPL to sediments within the Project Area currently include three primary sites, from south to north (see Figure 2-1):

- RG&E West Station Plant (West Station), located on the west bank of the River, which was used for gas manufacturing (VCA Index No. B8-0547-98-12, Site No. V00593-8);
- RG&E East Station Site (East Station), located on the east bank of the River, which was used for gas manufacturing (VCA Index No. B8-0547-98-12, Site No. V00358-8); and
- Brewer Street Site (Brewer Street), located on the east bank of the River, which was used as a disposal site for tunnel cuttings (RG&E & Monroe County Pure Waters VCA Index No. B8-0547-98-12, Site No. V00214-8); and;
- RG&E Front Street Site, located on the west bank of the River immediately above the Upper Falls, which was used for gas manufacturing (VCA Index No. B8-0547-98-12, Site No. V00073-8). Note, this Site is not included in the Project Area since sediment assessment is being addressed as part of the Sites Remedial Action currently being prepared by RG&E.

The following general statements may be made about the current knowledge of the nature and extent of coal tar NAPL in sediments adjacent to these sites:

- Areas of dried, hard, tar-like material have been observed along the shoreline of the RG&E West Station. Sheens and odors were observed upon sediment disturbance just north of the concrete walkway on the north side of the screen house. Sheens and NAPL blebs were created by moving rocks and other debris or by auguring into the river bank deposits in this area (Ish, Inc., 2004).
- NAPL has been observed intermittently along the shoreline of the RG&E East Station. These visible impacts extend from the Bausch Street Bridge north to approximately 750 feet downriver. Chemical analysis of sediment collected from this area showed detectable levels of mono- and polycyclic

aromatic hydrocarbons (MAHs and PAHs). Subsequent fingerprint analyses determined that the NAPL samples contained coal tar material (META Environmental, 1998; Ish, Inc., 2000).

- Coal tar-like seeps to the river occurred at the Brewer Street site prior to its remediation.

In addition to these RG&E site locations, hydrocarbon-like ground-water seeps were identified in the early 1970s on the rock face of the Lower Falls (MCDOH, 1979; Recra Research, Inc., 1985, 1988; Morrison-Knudsen Engineers, Inc., 1986).

These preliminary observation reports provide a partial understanding of the possible presence of coal tar NAPL in some of the sediments within the Project Area. However, several data gaps exist, which will be addressed through implementation of the Work Plan. Specifically, several fundamental questions about the presence and/or nature and extent of MGP-related impacts are still unknown, including:

- The eastern or western migration of MGP-impacted sediments from the sites toward the River centerline or deepest section of the River bed (thalweg) is unknown;
- The vertical extent of MGP-impacted sediment is unknown; and
- The sediment thickness both along the shoreline and within the thalweg is unknown.

This last component of downriver extent is dependent upon sediment fate and transport characteristics, which are described in detail in the next section.

2.4 Important sediment fate and transport characteristics

Understanding the movement of sediment within the Genesee River system will require an evaluation of several physical characteristics of both the River geomorphology and sediment.

2.4.1 Sediment transport

The downriver or south-north transport of sediment within the Project Area is likely to be controlled in large part by the physical shape of the River, water depths, hydrodynamic conditions, and sediment physical properties. In general, sediment-associated NAPL would be expected to be transported away from areas of higher energy in the south and accumulate in depositional areas of lower energy downriver in the north.

In order to help evaluate the physical and hydrodynamic properties and better understand the movement of sediment within the Project Area, information such as bathymetry, water depth, flow velocity, and sediment thickness information will be collected to provide information about the erosion and entrainment of sediment and subsequent downriver transport within the Project Area (McLaren and Bowles, 1985; Boggs, 2001; USEPA, 2005).

2.4.2 Surface water transport

Suspended particulates which generate sheen may also be transported into the Project Area in surface water. These surface water inputs may originate from CSOs, SSOs, SPDES, or overland runoff. The current locations of surface inputs into the Project Area are not known. Therefore, more information is needed to identify and map such features.

3.0 Sediment assessment approach

The successful completion of the sediment assessment will require an understanding of the dynamics of the Genesee River in the Project Area, which has been affected by extensive urban and industrial use. This section provides an overview of the sediment assessment approach, and provides specific details about the first phase of work, and some details conceptualized for the second phase of work. Decision points for subsequent phases are also presented.

3.1 Overview of approach

This approach contains major components of *Draft DER-10*, which are modified to accommodate the additional complexities posed by the Project Area. Specifically, the approach includes the following features:

- A phased field assessment that recognizes that the River is part of a dynamic environment;
- An investigation strategy designed around capturing physical and visual data and then refining potential areas of concern; and
- Incorporation of a number of decision points throughout the process to clarify and direct subsequent phases.

Figure 3-1 represents the major components of the sediment assessment approach as described in this section. In reviewing the approach presented in this Work Plan, it is important to recognize that there will be at least three separate field data collection efforts. The scheduling of these efforts is dependent upon several factors including completion of preliminary data collection tasks, approval of Work Plans, and targeting access to the River when flows are typically low and more conducive to getting the information designed as effectively and safely as possible. The phases conceptualized include:

- A Phase 1 evaluation which is focused on physical and visual sediment characterization throughout the Project Area. The scope of work includes determining bathymetry, aggressive probing for observing visual sheen and NAPL, and attempting to determine sediment thickness.
- A Phase 2 evaluation which is designed to refine physical and visual characterization of areas of potential concern (i.e., extent of NAPL containing sediments) determined through the Phase 1 evaluation. A higher resolution probing and characterization of the areal and vertical extent of sediment impact will be conducted in this phase with possible collection of sediment samples for grain size and chemical analysis. The sampling approach for Phase 2 is intended to help gather information for refining and determining the type of sampling equipment and resources needed for subsequent phases.
- On completion of Phases 1 and 2, the approaches for subsequent phases will be described in a separate Work Plan(s) to be prepared after the review of Phase 1 and Phase 2 data and submitted for concurrence by the NYSDEC.

3.1.1 Historic data review

The Genesee River is situated in a complex urban setting that has been industrialized since the early 1800s. Environmental data have been collected for the River over several decades. Intensive monitoring of the surface water, discharges, and industries in the Lower Genesee River has been required under a series of programs including the Rochester Pure Waters District, which was formed by Monroe County in 1971. These data are potentially relevant to the development of the CSM and understanding of the current and future state of the River.

Therefore, ENSR will concurrently compile and evaluate environmental data collected on the River as part of the Phase 1 work along with the Phase 1 field program outlined in the next section.

3.1.2 Project schedule

Figure 3-2 presents the project schedule. The schedule was prepared with the following assumptions:

- Tasks are linked to the effective approval date of the Work Plan;
- Deliverables and key decision points are contingent upon successful completion of earlier tasks;
- The field tasks are weather and river flow dependent; therefore, the schedule may be affected by weather and River flow conditions as well as safety considerations;
- The following deliverables are scheduled based on the effective date of the Work Plan:
  - Deliverable 1 – Phase 1 Sediment Assessment Data Summary Report
  - Deliverable 2 – Phase 2 Sediment Assessment Data Summary Report
- Each of the deliverables include the following assumptions for preparation and review of documents:
  - Document preparation time;
  - 45 days for NYSDEC review;
  - 45 days to address NYSDEC comments and provide a response or a revised document; and
  - One meeting with the NYSDEC to review and discuss the results of each report.

3.2 Phase 1 field program

The Phase 1 field work is designed to broadly assess the nature and extent of coal tar NAPL distribution (presence) in sediments within the Project Area and to collect sufficient physical data of the Genesee River to formulate a workable CSM upon which additional evaluations may be built. The objectives of the Phase 1 field program are summarized as follows:

- Identify upland sources of contaminants discharge (e.g. outfalls, seeps, CSOs, and SSOs) to the River;
- Determine the bathymetry of the Genesee River within the Project Area;
- Determine the depth to bedrock and sediment thickness within the Project Area;
- Broadly characterize the nature and extent of visible coal tar NAPL in sediments within the Project Area; and
- Broadly understand the River flow characteristics within the Project Area.

These objectives will be achieved by conducting a reconnaissance of the Project Area, bathymetric and sub-bottom surveys, and physical probing/coring for visual sheen or NAPL. The reconnaissance data will provide information on point sources within the Project Area. The bathymetric survey will provide information about the geometry of the River bottom and sediment thickness. Probing/coring for visual sheen or NAPL will identify, on a broad scale, the presence and distribution of areas of coal tar NAPL.

In summary, the Phase 1 field program will include the following activities, each of which are described in greater detail in the following sections:

- Project Area reconnaissance;
- Bathymetric and sub-bottom surveys; and
- Probing/coring for visual impacts of sheen or NAPL.

There is one deliverable conceptualized with this effort:

- Phase 1 Sediment Assessment Data Summary Report – A summary report will be prepared at the completion of the Phase 1 field program. This report will summarize the data collected during the Phase 1 field program and provide an updated CSM, which will be used to identify remaining data gaps, if any.

3.2.1 Phase 1 project area reconnaissance

The purpose of the reconnaissance is to document the physical characteristics of the Project Area shoreline and to identify upland sources (e.g. outfalls, seeps, CSOs, and SSOs) to the River as well as help identify the type of equipment and resources needed in conducting work in subsequent phases. There are publicly available aerial photographs and maps of the Project Area, the quality and usefulness of which have not been adequately assessed. Comprehensive shoreline assessments beyond those mentioned in Section 2.3 have not been identified. Therefore, the existing data will be supplemented with digital photographs of the shoreline and differential global positioning system (DGPS) mapping of drainage features, structures, erosion features, and sediment deposits. Note, DGPS may be compromised due to poor and/or no satellite reception in the River gorge, and if this happens alternative methods will have to be used.

Features of interest observed during the shoreline reconnaissance will be located with DGPS. Observations made during the reconnaissance may include, but are not limited to, the following: flowing water out of pipes or overland sheet flow, shoreline seeps or hydrocarbon-like sheens, eroding banks, and sediment deposits. Field notes of observations and locations will be maintained as the reconnaissance is performed. In addition, digital photographs will be taken to document observations. A two-person field team from ENSR will conduct the reconnaissance survey using a DGPS unit, digital camera, and field notebook to record observations. The locations of features of interest will be incorporated into the project base map.

3.2.2 Phase 1 bathymetric and sub-bottom survey

The purpose of the bathymetric and sub-bottom surveys will be to document the geometry of the River bottom within the Project Area, including the sediment surface, thickness, and depth to bedrock. This information will be used for various purposes during the Program, including revising the CSM, adjusting sample locations, and evaluating sediment transport and deposition. Existing bathymetric information has not been identified. Therefore, bathymetric and sub-bottom data will be required along the entirety of the Project Area.

The bathymetric and sub-bottom surveys will be conducted differently within the Project Sub-Areas. It is assumed water depth in Sub-Area A will allow acoustical methods to be used successfully. Therefore, a bathymetric survey will be completed in general conformance with a U.S. Army Corps of Engineers (USACE) Engineers Manual No. 1110-2-1003 for hydrographic surveying (USACE, 2002). The reported elevation datum will be North American Vertical Datum 1988 (NAVD88), and the horizontal datum will be North American Datum 1983 (NAD83), New York State Plane West. The survey will be performed at a horizontal accuracy of 1 foot and a vertical accuracy of 0.1 foot. The bathymetric and sub-bottom surveys will be conducted by the subcontractor TG&B Marine Services, Inc. (TG&B). TG&B will use a survey-grade precision fathometer (Odom Hydrotrack fathometer) to collect continuous water depth data along the track and tie lines (Figure 3-3). TG&B will continuously log their geographic position (X-Y location) using DGPS. Depth and geographic location will be sent to the survey computer using the Hypack Integrated Survey Software package. Time will be continuously recorded; therefore, water level correction will be available for post-processing, if needed.

TG&B will use a Strata Box marine geophysical sub-bottom profiling system to collect data indicating the sediment thickness through the survey area. The Strata Box is an acoustic profiling system manufactured by Syqwest Systems, Inc. and consists of a laptop computer with software, transmitter (deck) box, and an acoustic transducer (transmitter/receiver). The system also accepts real-time position data from the DGPS. The transducer is secured on an over-the-side mount such that its position is fixed along the rail of the boat and is submerged approximately 1 foot. The system sends and receives pulses and produces a profile record from which the strata horizons can be determined. The vertical resolution of the system is 0.4 feet. Because the system is acoustic, the signal can be affected by significant turbulence in the water, such as is found immediately downstream of a spillway. Additionally, there are limitations in certain shallow water applications that can reduce the clarity of the record. This occurs when the returned signal is received simultaneously with

the end of the outgoing pulse. Sub-bottom profiling systems are routinely used for determination of marine sediment layers. They are, in essence, extremely high powered echo sounders. The high power allows the signal to penetrate through the river bottom, and is reflected by the underlying strata. The data is both displayed on the laptop and stored for later processing and analysis (Figure 3-3).

It is anticipated that the Project Sub-Area A bathymetric and sub-bottom surveys will be completed in one or two field days.

Parts of Sub-Area B and all of Sub-Area C are anticipated to be too shallow for adequate acoustical methods. Therefore, a series of transects and tie lines will be recorded using a staff gage with a 6-inch plate on the bottom to measure the depth to the top of sediment (Figure 3-4). The top of the staff gage will be mounted with a DGPS receiver, and will be linked to a local GPS station. A secondary vertical measurement will be recorded using a steel tape mounted to the staff gage. The horizontal and vertical position of the top of the staff gage will therefore be recorded at multiple locations along transects and tie lines, which will be used to develop a bathymetric surface for these Sub-Areas. For determining the sediment thickness and depth to bedrock, a similar system will be used; however, the staff gage will be fitted with a drive point and driven through the sediment to a depth of along the same transects and tie lines.

It is anticipated that the Project Sub-Areas B and C bathymetric and sub-bottom surveys will be completed in 2 or 3 field days. Therefore, the bathymetric and sub-bottom data collection process for the entire Project Area is expected to take approximately 5 field days, or one week. Note, access to Area B during the Phase 1 may not be possible due to construction activities occurring at RG&E's Station 5 Hydro-electric station and RG&E's inability to control water flow between the Middle Falls and Lower Falls. If access is not obtained as part of the Phase 1 work, then the work in this area will be completed in the Phase 2.

3.2.3 Phase 1 initial sediment visual and physical assessment

Sediments within the Project Area will be assessed for visual sheens or presence of NAPL to broadly assess the nature and extent of visible coal tar NAPL in sediments within the Project Area. As summarized in Section 2.3, areas of sheen and NAPL have been observed along the shorelines of West Station (Ish, Inc., 2004) and East Station (META Environmental, 1998; Ish, Inc., 2000). In addition, visibly discolored ground-water seeps were identified in the early 1970s on the rock face of the Lower Falls (MCDOH, 1979; Recra Research, Inc. 1985, 1988; Morrison-Knudsen Engineers, Inc., 1986). However, additional information about the distribution of sheen and NAPL in sediments within the Project Area has not been identified. Therefore, the assessment of sheen and NAPL will be conducted along the Project Area, but will focus on known potential sources as defined in the preliminary CSM (Section 2.3).

The probing grids will utilize a variable-spaced grid network with tight grid spacing adjacent to known potential sources of MGP coal tar (e.g. West Station and East Station), and any additional areas identified during the reconnaissance. The initial grid spacing is conceptualized to be on 50-foot centers for areas adjacent to potential sources, and then transition into 100- and 200-foot centers at distance (Figures 3-5 and 3-6). The grid spacing will be dynamic, and real-time field observations will be recorded in the field and the probing locations adapted to field observations and river flows and velocity. In addition to potential source areas, the probing will evaluate depositional areas (e.g. along the shoreline and near ridge and swale accretion topography) between potential source areas. The number of probe locations shown in Figures 3-5 and 3-6 is approximately 550 (Table 3-1).

The probing locations will be recorded with DGPS. Locations will be probed (agitated) using either a 2-inch drive point or appropriate coring tool (e.g. Vibracore™) to observe the presence or absence of hydrocarbon-like sheen or NAPL. The drive point or coring tool will be advanced via winch in Project Sub-Area A, and by hand in Sub-Areas B and C, to a depth of refusal or to the limit of the equipment. The presence or absence of visible sheen will be characterized according to 4 rank levels:

- 1 = No sheen;
- 2 = Trace sheen;

- 3 = Moderate-heavy sheen; and
- 4 = Visible NAPL.

The presence or absence of sheen (rankings 1 through 3) will be evaluated by observing the water column after probing (Note, depending on river flow/velocity in some areas a second boat may have to deployed to monitor for sheens and NAPL down stream behind the boat performing the probing). The presence or absence of visible NAPL will be made by direct observation of the probing tool. For example, the presence of NAPL-like blebs on the probing tool will be considered to represent visible NAPL, and the location will be coded as a rank of 4 (visible NAPL). This ordinal sheen ranking characterization will provide a semi-quantitative measure that can subsequently be converted into interpolations about areas of sheen and/or NAPL. The Phase 1 initial sediment visual and physical assessment will therefore delineate areas of potential concern within the Project Area, which will then be incorporated into the revised CSM and used to guide the sediment sampling for the Phase 2 work.

The probing of sediment throughout the entire Project Area is anticipated to take approximately 5 field days, or one week, to complete.

Field notes of the probing will be maintained as the probing occurs. During the probing, the following type of information will be recorded:

- Date and time of probing collection;
- Reported elevation datum in NAVD88 and horizontal datum in NAD83;
- Water depth;
- Visual evidence of sheen or NAPL (as described above);
- Sediment texture, color, and odor; if available or obtained;
- River velocity;
- Sediment depth; and
- Digital photographs.

3.2.4 Equipment decontamination

Equipment used during the visual assessment will be decontaminated between uses when the equipment is visually impacted. The decontamination will consist of brushing/wiping sediment from the equipment, followed by a River-water rinse. If needed, a hot water pressure washer will be used to clean the equipment.

3.3 Phase 2 conceptual field program

Based upon the Phase 1 evaluation and discussions with the NYSDEC, areas may exist where the frequency of visible sheen or NAPL broadly delineates areas of potential concern, but is insufficient to delineate the nature and extent. Based on the discussions and negotiations with the NYSDEC a Phase 2 scope of work will be prepared and submitted to the Department for review and input prior to it being implemented. At this time, the Phase 2 evaluation is **conceptualized** to be a refined evaluation of areas of potential concern with data obtained at a higher resolution level (e.g. smaller grid spacing) to better define the areal and vertical extent of visible impacts, or simply to complete tasks/work that may not have been completed in Phase 1. The scope of the Phase 2 field program, as conceptualized at the time of this Work Plan, may consist of tasks such as the following:

- Re-evaluate areas that were determined to produce sheen or NAPL during the Phase 1 evaluation and characterize the areal and vertical extent of visible impacts;
- Fill data gaps on sediment thickness, bathymetry, and/or other physical data gaps;

- Broadly characterize the physical properties of the sediments (e.g. grain size and organic carbon content) and surface water (e.g. flow rates) within select locations in the Project Area to ascertain data needed to help evaluate and understand sediment transport and deposition; and,

- Collect a limited set of sediment samples and analyze them, as necessary, to obtain initial concentration ranges and attributes of constituents-of-interest in sediments within areas of potential concern as observed during Phase I.

One deliverable conceptualized with this effort:

- Phase 2 Sediment Assessment Data Summary Report – A summary report will be prepared at the completion of the Phase 2 field program. This report will summarize the data collected during the Phase 1 and 2 field programs and provide an updated CSM, which will be used to identify remaining data gaps, if any.

3.3.1 Phase 2 refined sediment visual and physical assessment

Sediments within and adjacent to areas of potential concern, as defined through the Phase 1 assessment, will be further assessed for visual sheens and NAPL to characterize the areal and vertical extent of impact. The assessment will consist of additional probing and advancement of Vibracore™ borings. The specific method(s) and tools to conduct the field work will be based on information obtained during Phase 1, but may include such methods as Tar-specific Green Optical Screening Tool (TarGOST®), Vibracore™ sampling devices, geoprobe-type equipment, air induced probing, etc. A description, of the Phase 2 approach as conceptualized as of preparation of this Work Plan, is as follows.

Additional probing in Phase 2 will be conducted using methodology used in Phase 1 as well as new methods which may be needed based on lessons learned during the Phase 1 work and the needs for gathering additional data. The re-evaluation will focus the grid network to capture the areal limit of visible sheen or NAPL.

If not used in Phase I, Vibracore™ sediment borings will be collected using a boat equipped to advance a 3-inch diameter Vibracore™ sampler to a depth of refusal or maximum extent of the sampling device, whichever is encountered first.

The sampling and core descriptions will be performed as follows:

- The core sampler, equipped with a plastic liner, will be driven and extracted at each of the designated sample locations;
- The core liner will be extracted from the core barrel and split open;
- The sediment sample will be logged for physical characteristics (e.g. texture, color, and odor) and the presence of MGP residuals (e.g. hydrocarbon-like sheen or NAPL);
- The core description will include depths using a tape measure originating at the top end of the core; and
- Digital photographs will be taken of each core sample.

In select areas that were determined to produce moderate to heavy sheen or NAPL during the Phase 1 assessment, utilization of TarGOST® as a delineation tool will be evaluated. TarGOST® can be used in shallow water with shallow sediment depths all the way through deep water and deep sediments, and can provide detailed information on NAPL distribution at unprecedented speed, detail, and efficiency. If proposed for use, TarGOST® would be conducted using a Geoprobe® that is deployed on a barge. TarGOST® provides high-density (1-inch depth interval) electronic data log, which may subsequently be incorporated into a 3-dimensional CSM of NAPL distribution in sediments. The need to use of TarGOST® tool will be discussed with RG&E and the NYSDEC as the field work progresses.

3.3.2 Phase 2 surface sediment collection

The collection of surface sediment samples (0- to 6-inch depth) for grain size and organic carbon content will be evaluated to assess the usefulness of such data to help broadly characterize the physical properties of the sediments to aid in the understanding of sediment transport and deposition within the Project Area. Six surface sediment samples were evaluated for grain size adjacent to the Brewer Street site (Geomatrix, 2002) and limited descriptions of sediment texture have been provided in other reports (Morrison-Knudsen Engineers, Inc., 1986); however, additional grain size data have not been identified. Therefore, surface sediment samples could help understand the physical characterization.

Transects would be established at select areas in the target area at locations where samples would be collected and evaluated. The need for, location, and number of surface sediment samples that would be collected will be based on information from the Phase 1 work.

Sample collection equipment and methods for the surface sediment may include using such equipment as a Ponar grab sampler, modified Eckman sampler, or modified Van Veen (Ted-Young) sampler or other equipment required to collect the needed sample. Surface sediment would be collected from 0 to 0.5 feet (top 6 inches) below the sediment surface. Care will be exercised during sample collection to avoid problems such as the loss of fine-grained surface sediment from sample washout upon ascent of the sampler. After the sample is collected, the sampling device will be lifted slowly off the bottom and steadily raised to the surface at a speed of not more than 1 foot per second. Only sediments that are correctly collected with the grab sampling devices will be used for subsequent physical analyses (USEPA, 2001).

The surface sediment samples, as conceptualized, may be analyzed for the following:

- Total organic carbon (TOC) by the Lloyd-Khan Method;
- Soot carbon, defined as the TOC remaining following pretreatment at 375 °C in a temperature-controlled oven under oxidizing conditions (Gustafsson et. al., 1997); and
- Grain size by ASTM Method D422 (Table 3-2).

Sample logs and field notes of surface sediment samples would be maintained as samples are collected. During sample collection, the following type of information would be recorded:

- Date and time of sample collection;
- Reported elevation datum in NAVD88 and horizontal datum in NAD83;
- Water depth;
- Visual evidence of sheen or NAPL (as described above);
- Sediment texture, color, and odor; and
- Digital photographs will be taken of each sample.

3.3.3 Phase 2 sediment collection

In order to understand concentration ranges for chemicals-of-interest in sediments from within the areas of potential concern, a limited set of sediment samples will be collected and analyzed for coal tar NAPL parameters. The number and location of sediment samples will be selected based on observations from Phase 1 and modified as needed based on observations during Phase 2 field work. The areas conceptualized for sampling include hot spots of visible NAPL, fringe or transitional areas downstream or outside of these hot spots, and some "background" locations believed to be unimpacted by MGP-related residuals and indicative of "background" conditions of sediments within the general Project Area.

3.3.4 Chain of custody

To establish the documentation necessary to trace the sample possession from the time of sample collection, a Chain of Custody (COC) record would be completed for each sample. The COC record would contain the following information:

- Sample name;
- Sampling date and time;
- Identification of sample collector;
- Analyses to be performed;
- Signatures of persons involved in the chain of possession; and
- Data and time of possession.

The COC records would be included as an appendix to the Phase 2 Sediment Assessment Data Summary Report.

3.4 Phase 3 field program and subsequent phases

As conceptualized at this time, MGP coal tar NAPL distribution is the primary focus in Phases 1 and 2. If warranted, Phase 3 and subsequent phases will be defined after the completion of the Phase 1 and Phase 2 investigations. The scope of work would be detailed in separate work plan(s) for concurrence by NYSDEC before implementation.

4.0 Data synthesis and reporting

The results of the Phase 1 and 2 field activities will be compiled and presented in Sediment Assessment Data Summary Reports. These reports will include:

- A summary of the observations and findings;
- Tables;
- Maps and Figures; and
- Deviations/corrective actions from the Work Plan(s).

RG&E and ENSR will review each report with NYSDEC to discuss the results, data gaps, if any, and subsequent steps.

The proposed project schedule, which is contingent upon NYSDEC approval of the Work Plan, aims to conduct field work on the Genesee River during the months of August through October, when historical flow has been the lowest and water temperatures are likely to be above 10°C (50°F), which are conducive elements for optimum safety considerations. Submittals to NYSDEC would be targeted to occur after the field work and data collection activities, with the goal of targeting the first quarter (Q1) of the succeeding calendar year in which the field work was conducted, with subsequent meetings in Q1 or Q2 so that the subsequent phase work scope could be refined and submitted to NYSDEC for review prior to the optimal time to access the river. A detailed discussion of project deliverables is provided in Sections 3.2 and 3.3. A program schedule is provided in Section 3.1.2 (Figure 3-1), and also in Table 4-1 below.

Table 4-1. Project schedule tasks and target dates

Task Name	Target Date
Step 1	
Workplan Submittal	8/1/2008
Step 2	
Phase 1 - Physical and visual characterization	
Project Area Reconnaissance	Sep/Oct /2008
Bathymetric and Sub-bottom Surveys	Sep/Oct /2008
Probing/Coring for Visual Sheen or NAPL	Sep/Oct /2008
Sediment Thickness	Sep/Oct /2008
Data Synthesis and Reporting	4th Qtr /2008
Phase 1 Submittal to NYSDEC	1st Qtr/2009
Project Review Meeting with NYSDEC	1st / 2nd Qtr /2009
Phase 2 - Refined physical and visual characterization	
Phase 2 Scope of Work – Submittal to Department	2nd Qtr 2009
Probing/Coring for Visual Sheen or NAPL	Sep/Oct /2009
Data Synthesis and Reporting	4th Qtr/2009
Phase 2 Submittal to NYSDEC	1st Qtr/2010
Project Review Meeting with NYSDEC	1st / 2nd Qtr/2010
Phase 3 and subsequent phases	TBD

5.0 Data management approach

Significant quantities of data will be collected during the Program, which will need to be managed and presented in reports. This section briefly describes how this data will be managed and presented.

5.1 Data management

Data management procedures are established to effectively process the data generated during the Program phases such that the relevant data descriptions (e.g. sample numbers, methods, and procedures) are readily accessible and accurately maintained. The major steps of data handling and management are:

- Database setup;
- Documenting locations of field activities;
- Sample collection;
- Field measurements;
- Laboratory analytical data;
- Data validation updates; and
- NYSDEC data submittals.

Data will be collected and recorded in a variety of ways during this project. These include standard field forms (e.g. field data sheets, COC forms, and field books), electronically-recorded field measurements, and laboratory-generated data. Information will be maintained in a project database. Access will be restricted to project personnel and the ability to view and/or add or change data will be granted to only those individuals identified and trained to perform those tasks.

5.2 Data presentation

Data generated during the Program will be arranged and presented in a clear and logical format using tables, graphs, and figures. Analytical data will be presented on computer-generated summary tables. Generally, graphical displays will be prepared using Geographic Information System (GIS) software directly reading from the project database.

6.0 Project management plan

This section describes the project management organization and responsibilities for the implementation of the Program.

6.1 Project manager

The Project Manager has the overall responsibility for the implementation and completion of each of the tasks identified in this Work Plan. The Project Manager will manage the technical and administrative aspects of the project and will function as ENSR's principal contact with RG&E and with NYSDEC.

6.2 Support staff and environmental technicians

The Project Manager will be supported by additional personnel during various phases and stages of the Program. Field implementation of the phases will be conducted by experienced geologists and environmental technicians. Their responsibilities will include the documentation of proper sample collection protocols, sample collection, and chain-of-custody documentation. Each field team will be under the supervision of an experienced team leader.

6.3 Project health and safety

The implementation of the health and safety at this project location will be the shared responsibility of the ENSR Project Manager, the ENSR Regional Health and Safety Manager (RHSM), the ENSR Project Site Safety Officer (PSSO), other ENSR personnel implementing the Work Plan, and ENSR contractors.

6.3.1 Regional health and safety manager

The ENSR RHSM (Kathleen Harvey) is the individual responsible for the preparation, interpretation, and modification of the project-specific HASP. The RHSM advises the Project Manager and PSSO on matters relating to health and safety on the River, recommends appropriate personal protective equipment and safety equipment, and maintains regular contact with the Project Manager and PSSO.

6.3.2 Project site safety officer

The PSSO will be appointed by the Project Manager. The PSSO will be on site during all activities covered by the HASP. The PSSO is responsible for enforcing the requirements of the HASP once work begins and that all personnel, including subcontractors, adhere to the HASP. The PSSO has the authority to immediately correct all situations where noncompliance with the HASP is noted and to immediately stop work in cases where an immediate danger is perceived.

6.4 Quality assurance coordinator

The Project Quality Assurance (QA) Coordinator will review project plans and revisions to the plans to maintain proper QA throughout the Program. In addition, the Project QA Coordinator will be responsible for performance and system audits, data processing quality control, data quality review, monitoring the effectiveness of corrective actions, and coordinating the QA/QC efforts between ENSR and subcontractors, including analytical laboratories.

6.5 Data validator(s)

The Data Validator(s) will be responsible for validating analytical data received from the laboratory according to approved plans and data validation guidelines. Validation reports generated by the Data Validator(s) will be submitted to the Project QA Coordinator for review.

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Table 3-1
Conceptualized Sediment Probing Locations

Location ID	Longitude[1]	Latitude[1]	Location ID	Longitude[1]	Latitude[1]	Location ID	Longitude[1]	Latitude[1]	Location ID	Longitude[1]	Latitude[1]
0	-77.6145	43.1613	75	-77.6158	43.1625	150	-77.6171	43.1631	225	-77.6182	43.1644
1	-77.6143	43.1613	76	-77.6156	43.1625	151	-77.6169	43.1631	226	-77.6180	43.1643
2	-77.6147	43.1614	77	-77.6154	43.1625	152	-77.6167	43.1631	227	-77.6192	43.1645
3	-77.6145	43.1614	78	-77.6153	43.1625	153	-77.6166	43.1631	228	-77.6188	43.1645
4	-77.6143	43.1614	79	-77.6151	43.1625	154	-77.6164	43.1631	229	-77.6184	43.1645
5	-77.6141	43.1614	80	-77.6149	43.1625	155	-77.6162	43.1631	230	-77.6195	43.1648
6	-77.6147	43.1616	81	-77.6147	43.1625	156	-77.6160	43.1631	231	-77.6192	43.1648
7	-77.6145	43.1616	82	-77.6145	43.1625	157	-77.6158	43.1631	232	-77.6188	43.1648
8	-77.6143	43.1616	83	-77.6143	43.1625	158	-77.6156	43.1631	233	-77.6193	43.1650
9	-77.6141	43.1616	84	-77.6141	43.1625	159	-77.6154	43.1631	234	-77.6197	43.1650
10	-77.6140	43.1616	85	-77.6139	43.1625	160	-77.6152	43.1631	235	-77.6199	43.1656
11	-77.6143	43.1617	86	-77.6138	43.1625	161	-77.6151	43.1631	236	-77.6204	43.1662
12	-77.6141	43.1617	87	-77.6136	43.1625	162	-77.6149	43.1631	237	-77.6212	43.1663
13	-77.6140	43.1617	88	-77.6134	43.1625	163	-77.6147	43.1631	238	-77.6210	43.1663
14	-77.6138	43.1617	89	-77.6132	43.1625	164	-77.6145	43.1631	239	-77.6208	43.1663
15	-77.6145	43.1619	90	-77.6169	43.1627	165	-77.6173	43.1632	240	-77.6206	43.1663
16	-77.6143	43.1618	91	-77.6168	43.1627	166	-77.6171	43.1632	241	-77.6204	43.1663
17	-77.6141	43.1618	92	-77.6166	43.1627	167	-77.6169	43.1632	242	-77.6214	43.1664
18	-77.6140	43.1618	93	-77.6164	43.1627	168	-77.6167	43.1632	243	-77.6212	43.1664
19	-77.6138	43.1618	94	-77.6162	43.1627	169	-77.6166	43.1632	244	-77.6210	43.1664
20	-77.6136	43.1618	95	-77.6160	43.1627	170	-77.6164	43.1632	245	-77.6208	43.1664
21	-77.6147	43.1620	96	-77.6158	43.1627	171	-77.6162	43.1632	246	-77.6206	43.1664
22	-77.6145	43.1620	97	-77.6156	43.1627	172	-77.6160	43.1632	247	-77.6216	43.1666
23	-77.6143	43.1620	98	-77.6154	43.1627	173	-77.6158	43.1632	248	-77.6214	43.1666
24	-77.6141	43.1620	99	-77.6153	43.1627	174	-77.6156	43.1632	249	-77.6212	43.1666
25	-77.6140	43.1620	100	-77.6151	43.1627	175	-77.6154	43.1632	250	-77.6210	43.1666
26	-77.6138	43.1620	101	-77.6149	43.1627	176	-77.6152	43.1632	251	-77.6208	43.1666
27	-77.6136	43.1620	102	-77.6147	43.1627	177	-77.6173	43.1634	252	-77.6217	43.1667
28	-77.6134	43.1620	103	-77.6145	43.1627	178	-77.6171	43.1634	253	-77.6216	43.1667
29	-77.6151	43.1621	104	-77.6143	43.1627	179	-77.6169	43.1634	254	-77.6214	43.1667
30	-77.6149	43.1621	105	-77.6141	43.1627	180	-77.6167	43.1634	255	-77.6212	43.1667
31	-77.6147	43.1621	106	-77.6139	43.1627	181	-77.6166	43.1634	256	-77.6210	43.1667
32	-77.6145	43.1621	107	-77.6138	43.1627	182	-77.6164	43.1634	257	-77.6219	43.1669
33	-77.6143	43.1621	108	-77.6136	43.1627	183	-77.6162	43.1634	258	-77.6217	43.1669
34	-77.6141	43.1621	109	-77.6134	43.1627	184	-77.6160	43.1634	259	-77.6216	43.1668
35	-77.6140	43.1621	110	-77.6132	43.1627	185	-77.6158	43.1634	260	-77.6214	43.1668
36	-77.6138	43.1621	111	-77.6169	43.1628	186	-77.6177	43.1635	261	-77.6212	43.1668
37	-77.6136	43.1621	112	-77.6168	43.1628	187	-77.6175	43.1635	262	-77.6221	43.1670
38	-77.6134	43.1621	113	-77.6166	43.1628	188	-77.6173	43.1635	263	-77.6219	43.1670
39	-77.6132	43.1621	114	-77.6164	43.1628	189	-77.6171	43.1635	264	-77.6217	43.1670
40	-77.6154	43.1623	115	-77.6162	43.1628	190	-77.6169	43.1635	265	-77.6216	43.1670
41	-77.6153	43.1623	116	-77.6160	43.1628	191	-77.6167	43.1635	266	-77.6214	43.1670
42	-77.6151	43.1623	117	-77.6158	43.1628	192	-77.6179	43.1637	267	-77.6223	43.1671
43	-77.6149	43.1623	118	-77.6156	43.1628	193	-77.6177	43.1637	268	-77.6221	43.1671
44	-77.6147	43.1623	119	-77.6154	43.1628	194	-77.6175	43.1637	269	-77.6219	43.1671
45	-77.6145	43.1623	120	-77.6153	43.1628	195	-77.6173	43.1637	270	-77.6217	43.1671
46	-77.6143	43.1623	121	-77.6151	43.1628	196	-77.6171	43.1637	271	-77.6216	43.1671
47	-77.6141	43.1623	122	-77.6149	43.1628	197	-77.6169	43.1637	272	-77.6225	43.1673
48	-77.6139	43.1623	123	-77.6147	43.1628	198	-77.6167	43.1637	273	-77.6223	43.1673
49	-77.6138	43.1623	124	-77.6145	43.1628	199	-77.6180	43.1638	274	-77.6221	43.1673
50	-77.6136	43.1623	125	-77.6143	43.1628	200	-77.6179	43.1638	275	-77.6219	43.1673
51	-77.6134	43.1623	126	-77.6141	43.1628	201	-77.6177	43.1638	276	-77.6217	43.1673
52	-77.6132	43.1623	127	-77.6139	43.1628	202	-77.6175	43.1638	277	-77.6227	43.1674
53	-77.6162	43.1624	128	-77.6138	43.1628	203	-77.6173	43.1638	278	-77.6225	43.1674
54	-77.6160	43.1624	129	-77.6136	43.1628	204	-77.6171	43.1638	279	-77.6223	43.1674
55	-77.6158	43.1624	130	-77.6134	43.1628	205	-77.6182	43.1639	280	-77.6221	43.1674
56	-77.6156	43.1624	131	-77.6171	43.1630	206	-77.6180	43.1639	281	-77.6219	43.1674
57	-77.6154	43.1624	132	-77.6169	43.1630	207	-77.6179	43.1639	282	-77.6227	43.1675
58	-77.6153	43.1624	133	-77.6167	43.1630	208	-77.6177	43.1639	283	-77.6225	43.1675
59	-77.6151	43.1624	134	-77.6166	43.1630	209	-77.6175	43.1639	284	-77.6223	43.1675
60	-77.6149	43.1624	135	-77.6164	43.1630	210	-77.6173	43.1639	285	-77.6221	43.1675
61	-77.6147	43.1624	136	-77.6162	43.1630	211	-77.6184	43.1641	286	-77.6229	43.1677
62	-77.6145	43.1624	137	-77.6160	43.1630	212	-77.6182	43.1641	287	-77.6227	43.1677
63	-77.6143	43.1624	138	-77.6158	43.1630	213	-77.6180	43.1641	288	-77.6225	43.1677
64	-77.6141	43.1624	139	-77.6156	43.1630	214	-77.6179	43.1641	289	-77.6223	43.1677
65	-77.6139	43.1624	140	-77.6154	43.1630	215	-77.6177	43.1641	290	-77.6221	43.1677
66	-77.6138	43.1624	141	-77.6152	43.1630	216	-77.6175	43.1641	291	-77.6229	43.1678
67	-77.6136	43.1624	142	-77.6151	43.1630	217	-77.6186	43.1642	292	-77.6227	43.1678
68	-77.6134	43.1624	143	-77.6149	43.1630	218	-77.6184	43.1642	293	-77.6225	43.1678
69	-77.6132	43.1624	144	-77.6147	43.1629	219	-77.6182	43.1642	294	-77.6223	43.1678
70	-77.6168	43.1626	145	-77.6145	43.1629	220	-77.6180	43.1642	295	-77.6230	43.1680
71	-77.6166	43.1626	146	-77.6143	43.1629	221	-77.6179	43.1642	296	-77.6229	43.1680
72	-77.6164	43.1626	147	-77.6141	43.1629	222	-77.6188	43.1644	297	-77.6227	43.1680
73	-77.6162	43.1626	148	-77.6139	43.1629	223	-77.6186	43.1644	298	-77.6225	43.1680
74	-77.6160	43.1625	149	-77.6138	43.1629	224	-77.6184	43.1644	299	-77.6223	43.1680

[1]Longitude and latitude are in North American Datum 1983 (NAD83)

Table 3-1 (cont.)
Conceptualized Sediment Probing Locations

Location ID	Longitude[1]	Latitude[1]	Location ID	Longitude[1]	Latitude[1]	Location ID	Longitude[1]	Latitude[1]	Location ID	Longitude[1]	Latitude[1]
300	-77.6230	43.1681	375	-77.6278	43.1746	450	-77.6281	43.1799	525	-77.6261	43.1875
301	-77.6229	43.1681	376	-77.6276	43.1746	451	-77.6279	43.1799	526	-77.6257	43.1875
302	-77.6227	43.1681	377	-77.6286	43.1747	452	-77.6277	43.1799	527	-77.6254	43.1875
303	-77.6225	43.1681	378	-77.6284	43.1747	453	-77.6285	43.1801	528	-77.6250	43.1875
304	-77.6223	43.1681	379	-77.6282	43.1747	454	-77.6281	43.1801	529	-77.6246	43.1875
305	-77.6230	43.1682	380	-77.6280	43.1747	455	-77.6277	43.1801	530	-77.6257	43.1880
306	-77.6229	43.1682	381	-77.6278	43.1747	456	-77.6277	43.1803	531	-77.6250	43.1880
307	-77.6227	43.1682	382	-77.6287	43.1749	457	-77.6281	43.1803	532	-77.6242	43.1880
308	-77.6225	43.1682	383	-77.6286	43.1749	458	-77.6285	43.1804	533	-77.6250	43.1886
309	-77.6230	43.1684	384	-77.6284	43.1749	459	-77.6281	43.1806	534	-77.6242	43.1885
310	-77.6228	43.1684	385	-77.6282	43.1749	460	-77.6281	43.1812	535	-77.6228	43.1707
311	-77.6227	43.1684	386	-77.6280	43.1749	461	-77.6274	43.1862	536	-77.6228	43.1714
312	-77.6225	43.1684	387	-77.6278	43.1749	462	-77.6273	43.1862	537	-77.6238	43.1721
313	-77.6230	43.1685	388	-77.6287	43.1750	463	-77.6271	43.1862	538	-77.6237	43.1728
314	-77.6228	43.1685	389	-77.6286	43.1750	464	-77.6269	43.1862	539	-77.6247	43.1728
315	-77.6227	43.1685	390	-77.6284	43.1750	465	-77.6267	43.1862	540	-77.6267	43.1736
316	-77.6225	43.1685	391	-77.6282	43.1750	466	-77.6265	43.1862	541	-77.6257	43.1729
317	-77.6230	43.1686	392	-77.6280	43.1750	467	-77.6263	43.1862	542	-77.6276	43.1765
318	-77.6228	43.1686	393	-77.6278	43.1750	468	-77.6261	43.1862	543	-77.6276	43.1772
319	-77.6227	43.1686	394	-77.6287	43.1751	469	-77.6259	43.1862	544	-77.6276	43.1779
320	-77.6225	43.1686	395	-77.6286	43.1751	470	-77.6274	43.1864	545	-77.6276	43.1787
321	-77.6230	43.1688	396	-77.6284	43.1751	471	-77.6273	43.1864	546	-77.6276	43.1794
322	-77.6228	43.1688	397	-77.6282	43.1751	472	-77.6271	43.1864	547	-77.6275	43.1830
323	-77.6227	43.1688	398	-77.6280	43.1751	473	-77.6269	43.1864	548	-77.6275	43.1837
324	-77.6225	43.1688	399	-77.6287	43.1753	474	-77.6267	43.1864	549	-77.6275	43.1845
325	-77.6228	43.1689	400	-77.6286	43.1753	475	-77.6265	43.1864	550	-77.6275	43.1852
326	-77.6225	43.1689	401	-77.6284	43.1753	476	-77.6263	43.1864	551	-77.6275	43.1859
327	-77.6228	43.1692	402	-77.6282	43.1753	477	-77.6261	43.1864			
328	-77.6225	43.1692	403	-77.6280	43.1753	478	-77.6259	43.1864			
329	-77.6226	43.1695	404	-77.6287	43.1754	479	-77.6258	43.1864			
330	-77.6223	43.1695	405	-77.6285	43.1754	480	-77.6273	43.1865			
331	-77.6224	43.1700	406	-77.6284	43.1754	481	-77.6271	43.1865			
332	-77.6224	43.1706	407	-77.6282	43.1754	482	-77.6269	43.1865			
333	-77.6280	43.1739	408	-77.6280	43.1754	483	-77.6267	43.1865			
334	-77.6278	43.1739	409	-77.6287	43.1756	484	-77.6265	43.1865			
335	-77.6276	43.1739	410	-77.6285	43.1755	485	-77.6263	43.1865			
336	-77.6274	43.1739	411	-77.6284	43.1755	486	-77.6261	43.1865			
337	-77.6273	43.1739	412	-77.6282	43.1755	487	-77.6259	43.1865			
338	-77.6271	43.1739	413	-77.6280	43.1755	488	-77.6258	43.1865			
339	-77.6269	43.1739	414	-77.6278	43.1755	489	-77.6272	43.1867			
340	-77.6267	43.1739	415	-77.6287	43.1757	490	-77.6271	43.1866			
341	-77.6282	43.1740	416	-77.6285	43.1757	491	-77.6269	43.1866			
342	-77.6280	43.1740	417	-77.6284	43.1757	492	-77.6267	43.1866			
343	-77.6278	43.1740	418	-77.6282	43.1757	493	-77.6265	43.1866			
344	-77.6276	43.1740	419	-77.6280	43.1757	494	-77.6263	43.1866			
345	-77.6274	43.1740	420	-77.6278	43.1757	495	-77.6261	43.1866			
346	-77.6273	43.1740	421	-77.6285	43.1758	496	-77.6259	43.1866			
347	-77.6271	43.1740	422	-77.6282	43.1758	497	-77.6257	43.1866			
348	-77.6269	43.1740	423	-77.6285	43.1761	498	-77.6272	43.1868			
349	-77.6284	43.1742	424	-77.6282	43.1761	499	-77.6271	43.1868			
350	-77.6282	43.1742	425	-77.6282	43.1764	500	-77.6269	43.1868			
351	-77.6280	43.1742	426	-77.6285	43.1794	501	-77.6267	43.1868			
352	-77.6278	43.1742	427	-77.6283	43.1794	502	-77.6265	43.1868			
353	-77.6276	43.1742	428	-77.6281	43.1794	503	-77.6263	43.1868			
354	-77.6274	43.1742	429	-77.6287	43.1795	504	-77.6261	43.1868			
355	-77.6273	43.1742	430	-77.6285	43.1795	505	-77.6259	43.1868			
356	-77.6271	43.1742	431	-77.6283	43.1795	506	-77.6257	43.1868			
357	-77.6284	43.1743	432	-77.6281	43.1795	507	-77.6256	43.1868			
358	-77.6282	43.1743	433	-77.6279	43.1795	508	-77.6271	43.1869			
359	-77.6280	43.1743	434	-77.6277	43.1795	509	-77.6269	43.1869			
360	-77.6278	43.1743	435	-77.6287	43.1797	510	-77.6267	43.1869			
361	-77.6276	43.1743	436	-77.6285	43.1797	511	-77.6265	43.1869			
362	-77.6274	43.1743	437	-77.6283	43.1797	512	-77.6263	43.1869			
363	-77.6273	43.1743	438	-77.6281	43.1797	513	-77.6261	43.1869			
364	-77.6286	43.1745	439	-77.6279	43.1797	514	-77.6259	43.1869			
365	-77.6284	43.1745	440	-77.6277	43.1797	515	-77.6257	43.1869			
366	-77.6282	43.1744	441	-77.6287	43.1798	516	-77.6256	43.1869			
367	-77.6280	43.1744	442	-77.6285	43.1798	517	-77.6254	43.1869			
368	-77.6278	43.1744	443	-77.6283	43.1798	518	-77.6269	43.1872			
369	-77.6276	43.1744	444	-77.6281	43.1798	519	-77.6265	43.1872			
370	-77.6274	43.1744	445	-77.6279	43.1798	520	-77.6261	43.1872			
371	-77.6286	43.1746	446	-77.6277	43.1798	521	-77.6257	43.1872			
372	-77.6284	43.1746	447	-77.6287	43.1799	522	-77.6254	43.1872			
373	-77.6282	43.1746	448	-77.6285	43.1799	523	-77.6250	43.1872			
374	-77.6280	43.1746	449	-77.6283	43.1799	524	-77.6265	43.1875			

[1]Longitude and latitude are in North American Datum 1983 (NAD83)

Table 3-2
Phase 2 Surface Sediment Analytical Program

Parameter	Number of Samples	Container Type[1]	Minimum Volume	Preservation	Method[2]	Holding Time from Sample Date	Recommended Laboratory[3]
Grain Size	TBD	Glass	8 oz.	Cool to 4°C	ASTM Method D422	NA	TA
Total Organic Carbon	TBD	Glass	8 oz.	Cool to 4°C	Lloyd Khan	28 days	TA
Soot Carbon	TBD	Glass	8 oz.	Cool to 4°C	Gustafsson et. al. 1997	28 days	TA

[1]All glass jars must have Teflon-lined lids

[2]ASTM, (ed.) 2000a. E. 1391-94 Standard guide for collection, storage, containerization, and manipulation of sediments for toxicological testing, Vol. 11.04. American Society For Testing Materials, Conshohocken, PA. ASTM, (ed.) 2000b. D 3976 - 92 (Reapproved 2001) Standard practice for preparation of sediment samples for chemical analysis, Vol. 11.04. American Society for Testing Materials, Conshohocken, PA.

[3]TA - TestAmerica Laboratory, South Burlington, VT
NA - not applicable
TBD - To be determined

Figure 3-1: Genesee River sediment assessment approach outline depicting the major components and decision points for subsequent phases.