FINAL WORK PLAN

Remedial Design Work Plan

General Electric Company Inc.
Fort Edward, New York

February 1, 2001

O'BRIEN & GERE
ENGINEERS, INC.

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1. Introduction

This Remedial Design Work Plan (RDWP) has been prepared to serve as a guide in implementing activities associated with the Remedial Design (RD) for the GE Fort Edward facility located in Fort Edward, New York. The site location plan is shown on Figure 1-1. The purpose of this RDWP is to specify the elements of work to be performed and the timing and sequence of these elements.

1.1. Site background

The GE Fort Edward facility is located approximately 800 feet east of the Hudson River between the Villages of Hudson Falls to the north, and Fort Edward to the south. The facility is approximately 32 acres and is bounded on the east by Broadway, on the south by Park Avenue, and on the west by the Delaware & Hudson Railroad/Allen Street as shown on Figure 1-2. As shown on Figure 1-2, an approximately 200 foot wide parcel located between Allen Street and the Hudson River is also owned by GE.

The Fort Edward plant has been in operation since 1942. Between 1942 and 1946 selsyn motors were manufactured for the U.S. Department of Defense; since 1946 the plant has produced small industrial capacitors. Operations related to capacitor production have included aluminum rolling, tin plating, capacitor recovery and salvage operations, polypropylene film manufacture, refining and blending of dielectric fluids, and quality control operations. Various cleaning operations to remove residues resulting from fabrication have also been conducted at the site. Among the products used in various operations were polychlorinated biphenyls (PCBs) (chlorinated and non-chlorinated), organic solvents, and kerosene. PCB use as a dielectric fluid at the site was discontinued in 1977. The plant has eliminated its use of organic solvents in recent years by modifying processes, installing new state-of-the-art processes, and implementing waste minimization programs.

Present facilities on the Fort Edward plant site consist of several buildings, a 1.8 million gallon concrete equalization basin located on the southwest corner of the property, and parking areas. The main manufacturing building, the largest building at the Fort Edward plant site, is comprised of several joined structures which were constructed over a span of 25 years. The second building, the former aluminum rolling mill (Bldg. 40), has also been expanded several times since its original construction in 1960. Smaller buildings on the site include a pump house, maintenance building, and the waste water treatment facility. Rolling mill operations were terminated in 1995 and assembly and testing operations from the Hudson Falls facility were moved to Building 40.

1.2. Previous remedial activities

Since 1976, numerous improvements and remedial actions (RAs) have been undertaken by GE at the Fort Edward facility to reduce the potential impact of the site on the surrounding community and the Hudson River. These actions include, but are not limited to, the following:

- PCBs abatement program was conducted pursuant to a 1976 Agreement with the State of New York.
- In accordance with New York State Department of Health (NYSDOH) Recommendations, GE paid for and caused installation of water mains and piping for households on Park Avenue, Stevens Lane, Ethan Allen Street and Putnam Avenue.
- NYSDEC-approved on-site and off-site remedial plans were implemented pursuant to Order on Consent #T032785.
- In 1988, shallow bedrock ground water recovery and treatment was initiated in wells GM-8DR and GM-11D. A plan to upgrade the bedrock ground water recovery system was approved by NYSDEC and implemented in 1990.
- Since 1984, dense non-aqueous phase (DNAPL) PCB oil has been recovered from the southeastern portion of facility. Approximately 1,300 gallons of PCB/water mixture was collected from well GM-27 between 1984 and 1990. Between 1990 and 1999, approximately 91 and 1010 additional gallons of PCB DNAPL has been collected from oil recovery wells ORW-1 and ORW-2, respectively.
- Since 1992, several upgrades to the Fort Edward plant waste water treatment facility have been implemented to reduce effluent loading to the Hudson River.
- With the approval of NYSDEC and NYSDOH, GE undertook a voluntary residential well sampling and public water supply connection program in the areas south, east and west of the Fort Edward facility in 1994. To date, 31 homes and businesses in the Town of Fort Edward have agreed to be connected to public water at no charge to the owners.

In addition to the improvements and RAs that have been undertaken by GE at the Fort Edward facility, the following interim remedial measures (IRMs) have also been conducted at the Fort Edward plant site:

- Installation of RW-1. As a means of mitigating the volatile organic compound (VOC) plume identified in 1983, a shallow ground water recovery well, RW-1, was installed in August 1983 as part of a NYSDEC-approved IRM. The well was located along Park Avenue in the southeast portion of the facility and the ground water was pumped to an on-site water treatment facility (air stripper). In December 1988, recovery well RW-1A was installed as a replacement for recovery well RW-1.

- Sealing of production wells. In 1995, former production wells PW-1 and PW-2 were permanently decommissioned by sealing the entire length of each borehole with a combination of cement-bentonite grout and bentonite chips.

- Outfall 004 diversion. Between 1994 and 1996, a temporary outfall diversion and ultimately a permanent outfall diversion was completed. The permanent 6-inch diameter outfall was relocated approximately 200 feet upstream of the original outfall 004, and involved installing new underground piping from the tie-in to the existing outfall pipeline to a new concrete headwall erected near the edge of the river (just above the high water level). Other activities performed during the outfall diversion project include the removal of the 30-inch diameter CMP outfall from the steep bank back to the elbow near the concrete headwall, and removal of the remaining pipe between the top of the bank and manhole MH-1. The results of the associated outfall investigations and IRMs are contained in a report entitled "Outfall 004 Investigation Report" (Dames & Moore 1994b).

- Former Outfall 004 Pipeline IRM (1996). In accordance with a NYSDEC-approved IRM work plan and the 1995 Consent Order, over 600 feet of the former Outfall 004 pipeline and pipe bedding was removed from the area west of Manhole #4 to the top of the steep bank above the Hudson River. Between January and May 1996, more than 4,100 tons of PCB contaminated material was removed and transported to the Toxic Substance Control Act (TSCA)-permitted landfill operated by Chemical Waste Management in Model City, New York. Details of the IRM are contained in the summary report and engineering certification submitted to the NYSDEC in July 1996 (O'Brien & Gere 1996b).

1.2.1. RCRA corrective action

The Fort Edward facility currently holds a 6 NYCRR Part 373 permit for storage of hazardous waste. The effective date of the permit is November 15, 1995. Module III of the permit outlines the corrective action requirements for solid waste management units (SWMUs) and areas of concern. As outlined in Module III, Order on Consent Index #A5-0316-94-06 provides for a Remedial Investigation and Feasibility Study of the site. Compliance with the Order on Consent fulfills GE's obligations to undertake RCRA corrective action under the Part 373 permit.

A total of 20 SWMUs and four other areas of concern were identified in the Remedial Investigation/Feasibility Study (RI/FS) work plan prepared by GE and approved by NYSDEC pursuant to Order on Consent #A5-0316-94-06. Subsequently, two additional areas of concern (Building 23 Former Carousel Vault and Building 30 Vault) were identified. This section provides a brief summary of the status of each SWMU and other areas of concern (AOCs) at the plant.

The following SWMUs and have been identified as not requiring further investigation or corrective action:

- SWMU #2 - Bay Storage Area (CS-2)
- SWMU #3 - Bldg. 31 Hazardous Waste Storage (CS-3)
- SWMU #4 - Oil House Storage Area (CS-4)
- SWMU #7 - TCE Still (WRU-1)
- SWMU #8 - 1,1,1-TCA Still (WRU-2)
- SWMU #9 - Waste TCE Storage Tank (ST-1)
- SWMU #17 - Waste Kerosene Tank (ST-6)
- SWMU #18 - Waste Kerosene Tank
- SWMU #19 - New Waste Kerosene Storage Area (ST-8)

The corrective action requirements for the following SWMUs were addressed through closure of the units, as described in the Closure Plan submitted on April 1, 1991 and approved by NYSDEC on January 7, 1992, and no additional action is required:

- SWMU #11 - PCB Railroad Storage Tank (ST-3)
- SWMU #13 - PCB Railroad Storage Tank (ST-5)

The following SWMUs and AOCs were addressed by the remediation conducted pursuant to Order on Consent Index T032785. These SWMUs continue to be addressed by the on-going remedial measures conducted at the facility. Remedial operation and maintenance activities related to the following SWMUs and AOCs will continue:

- SWMU #1 - Past Drum Storage Area
- SWMU #5 - Pyranol Unload Area (TS-1)
- SWMU #10 - PCB Railroad Storage Tank (ST-2)
- SWMU #12 - PCB Railroad Storage Tank (ST-4)
- SWMU #14 - Sanitary Leach Field (LF-1)
- Ground Water Contamination Area
- PCB Contaminated DNAPL Pools

In 1990, soils from beneath the following SWMUs were excavated and disposed off-site:

- SWMU #5 - Closed Pyranol Unload Area (TS-1)
- SWMU #10 - Former PCB Railroad Storage Tank (ST-2)
- SWMU #12 - Former PCB Railroad Storage Tank (ST-4)

Soil beneath the capacitor manufacturing building which is immediately adjacent to the above SWMUs was not characterized due to the inaccessibility of the soil. This includes the areas of the Building 30 Vault and the Building 23 Former Carousel Vault. However, the areas underneath the capacitor manufacturing building and Building 30 were investigated as part of the comprehensive site Remedial Investigation.

The following SWMUs and AOCs were also addressed pursuant to the comprehensive site RI/FS.

- Building 30 Vault and Building 23 Former Carousel Vault Areas
- SWMU #16 - Soil Disposal Area
- SWMU #20 - Industry Sewers
- Foil Mill Area
- Former Mineral Oil Tank Area

As outlined in Module III, integrity assessments of SWMU #6 (i.e., EQ Basin) and SWMU #15 (i.e., sanitary plant) were to be performed following the removal of residual sludges or settled solids from the units. A Wastewater Treatment Unit Structural Integrity Assessment Work Plan was submitted to NYSDEC on March 24, 1999 and was approved by NYSDEC in a letter dated June 1, 1999.

Integrity inspections of the wastewater treatment units were performed between June 4 and August 10, 1999 in accordance with the NYSDEC-approved work plan. Following completion of the integrity assessment of the wastewater treatment units, an Engineering Certification Report dated October 25, 1999 (O'Brien & Gere, 1999c) was submitted to NYSDEC on October 28, 1999.

NYSDEC notified GE via correspondence dated July 25, 2000 that no further immediate action is required for the wastewater treatment units (SWMU's #6 and #15).

1.3. Remedial investigation summary

Between July 1995 and January 1997, a Remedial Investigation (RI) was conducted at the GE Fort Edward facility pursuant to Order on Consent #A5-0316-94-06 between the NYSDEC and GE. Following completion of the Remedial Investigation scope of work, a Remedial Investigation Report was submitted to NYSDEC on January 20, 1997. A Feasibility Study (FS) was subsequently submitted to NYSDEC on January 31,

1997. The RI/FS was successful in meeting the objectives outlined in the RI/FS Work Plan. Based on the results of the RI/FS, the NYSDEC issued its Proposed Remedial Action Plan (PRAP) for the Fort Edward facility on February 22, 1999 and the Record of Decision (ROD) for the Fort Edward facility was issued by NYSDEC on January 28, 2000.

1.4. Remedial design objectives

On January 28, 2000, NYSDEC issued a ROD presenting the remediation goals and a selected remedy for operable units 3 and 4 at the site (NYSDEC, 2000). The remediation goals and selected remedy discussed in the remainder of this work plan are specific to Operable Unit 3 (OU-3), the main portion of the plant site as defined in NYSDEC's ROD. As presented in the ROD, the remediation goals for OU-3 are:

- Eliminate, to the extent practicable, ingestion of ground water affected by the site that does not attain NYSDEC Class GA Ambient Water Quality Criteria (AWQC)
- Eliminate, to the extent practicable, off-site migration of ground water that does not attain NYSDEC Class GA AWQC
- Eliminate, to the extent practicable, migration of light and dense NAPL through removal and hydraulic management.

The NYSDEC's ROD has selected hydraulic control with pre-treatment as the remedy for OU-3. According to the ROD, the major elements of the remedy for OU-3 are shown on Figure 1-2, and include the following:

- Continued operation of the ongoing remedial programs for Operable Units 1 and 2, and completion of any other ongoing RAs
- Perform an evaluation of the capacity of the existing wastewater treatment plant to handle the expected flows and meet discharge limits
- Expand existing ground water collection system by the addition of ground water recovery wells in the transition zone along the southeastern perimeter of the site
- Ground water collection and pretreatment from a ground water recovery trench near the Foil Mill
- Ground water recovery from the abandoned sewer
- DNAPL recovery from the southeastern portion of the plant site

- Removal and off-site disposal of all contaminated soils excavated during construction activities.

The ROD also requires institutional controls including future use restrictions and long-term monitoring to evaluate the effectiveness of the remedy. In addition, the ROD requires that the remedial program be reviewed every five years to ensure that the remedy continues to provide protection of human heath and the environment.

This RDWP performs the following functions:

- Establishes how elements of the project are organized to meet the overall project objectives

- Demonstrates appropriate links between work tasks associated with pre-design activities, RD and subsequent RA

- Demonstrates that individual components have been properly scoped, scheduled, and integrated in a manner consistent with the Order on Consent

- Documents that data will provide sufficient information to allow implementation of the RD and RA.

The following sections discuss the pre-design activities, components of the RD, and project schedule.

2. Pre-design activities

It is necessary to perform several pre-design investigation (PDI) activities to further characterize the site for purposes of completing the detailed remedial design (RD) and construction. The scope of the PDI has been identified and consists of Subtasks 2.1 through 2.6, as described below. For convenience in reviewing this work plan, individual pre-design subtasks have been summarized in table format and are described in detail in the write-ups that follow.

Table 2-1. *Summary of Pre-Design Investigations*

Subtask		Scope of Work	Subtask Output/Purpose
2.1	Ground Water Quality/ Treatability Evaluation	• Review existing ground water quality data generated during RI and subsequent annual sampling events. • Obtain additional water quality data under dynamic (i.e., pumping) conditions more representative of those that would be expected to be encountered during implementation of the remedy.	• Ground water quality evaluation to assess pre-treatment/treatment requirements and to evaluate impacts on treatment system.
2.2	Soil Boring Program	• Delineate current extent of DNAPL by installing additional DNAPL observation wells and completing soil borings both within and around the perimeter of the DNAPL zone. • Install a line of borings along alignment of collection trench near the Foil Mill.	• Subsurface information for design and construction of collection systems.
2.3	Transition Zone Pump Test	• Design and install test recovery well. • Install additional observation wells. • Conduct pump test. • Collect and analyze ground water samples. • Interpret pump test data	• Estimate drawdown and pumping rates needed to achieve hydraulic control on the southeast side of the plant. • Evaluate hydraulic and contaminant loadings on the treatment system.
2.4	Manhole 27/Abandoned Sewer Pump Test	• Pump sewer to temporary holding tank (i.e., sanitary sewer plant). • Collect and analyze ground water samples.	• Estimate of long term yield • Assess pre-treatment/treatment requirements.

2.5	Utilities Survey	• Review existing mapping • Contact local utilities • Coordinate with plant engineer	• Location of buried utilities • Availability of utilities
2.6	Site Survey	• Locate soil borings and wells installed under Subtask 2.2 and 2.3 and locate utilities identified under Subtask 2.5.	• Updated base map

Field activities associated with the PDI were performed in accordance with the NYSDEC-approved Sampling and Analysis Plan (SAP) and/or the RI/FS Work Plan and related documents [i.e., Health and Safety Plan, Field Sampling Plan (FSP), and Quality Assurance Project Plan (QAPP)] developed for use during the RI.

2.1. Ground water quality/treatability evaluation

As part of the remedial design, existing ground water quality data generated during the RI and subsequent annual sampling events will be reviewed to evaluate anticipated ground water influent characteristics. In addition, ground water samples were collected from the vicinity of each of the proposed ground water collection points (transition zone recovery wells, ground water collection trench, and Manhole 27) to further evaluate anticipated ground water influent characteristics. The samples were analyzed in the laboratory for the parameters listed below. The rationale for the parameters identified is also discussed below.

Table 2-2. *Ground Water Quality/Treatability Parameters and Rationale*

Parameter	Rationale
Volatile organic compounds (VOCs)	Establish design maximum influent concentration for each ground water collection point. Utilize results of VOCs analyses, with the design maximum flow rates established during the flow tests, to prepare VOCs loading balance. The VOCs loading balance will be used to size the low profile air stripper, evaluate the requirement (if any) for off-gas control, and evaluate impacts on existing treatment system.
Polychlorinated biphenyls (PCBs)	Establish design maximum influent concentration for each ground water collection point. Utilize results of PCB analyses, with the design maximum flow rates established during the flow tests, to prepare PCB loading balance. The PCB loading balance will be used to evaluate impacts on existing treatment system.
Oil and grease	Establish design maximum influent concentration of oil and grease present in the ground water. The presence of either would cause less efficient VOC removal by air stripping
Methyl blue alkaline substances (MBAS)	Establish design maximum influent concentration of surfactants (if any) present in the ground water. The presence of surfactants would cause less efficient VOC removal by air stripping, and would cause greater emulsification of oils and grease, also resulting in less efficient VOC removal by air stripping.

TAL metals (filtered and unfiltered)	Establish design maximum influent concentration for each ground water collection point. Utilize results of metals analyses, with the design maximum flow rates established during the flow tests, to prepare metals loading balance. The metals loading balance will be used to evaluate if the potential exists for fouling by metals downstream of the air stripper due to the likely rise in pH, and the potential impacts to the existing treatment system.
Microbiological examination	Perform a microscopic examination of the collected ground water to identify naturally occurring bacteria that may be present in the ground water and present a potential for fouling the ground water conveyance and treatment systems.
Hardness (as $CaCO_3$)	Establish background water chemistry to evaluate if the potential exists for fouling by metals precipitation in pumps, piping, and on GAC filters due to the likely rise in pH through the air stripper.
Alkalinity (as $CaCO_3$)	
Phenolphthalein alkalinity (as $CaCO_3$)	
Nitrate and Nitrite	
Phosphate	
Sulfate and Sulfide	
Magnesium	
Manganese	
Calcium	
Chloride	
Total dissolved solids (TDS)	
Total suspended solids (TSS)	
pH (tested in lab and field)	

In addition to the tests indicated above, measurements of dissolved oxygen, temperature, pH, and turbidity were recorded in the field. As discussed previously, sampling activities were coordinated with routine monitoring events currently performed by GE. Laboratory analyses were performed by Adirondack Environmental Services, Inc. under direct contract with GE.

Sample collection locations, frequencies and the analyses performed are summarized below:

<u>Ground Water Collection Trench</u>

In conjunction with the routine annual sampling event performed in accordance with the NYSDEC-approved SAP, ground water samples were collected from three monitoring wells located in the vicinity of the Foil Mill to evaluate anticipated ground water influent characteristics to the ground water collection trench and pre-treatment system proposed for the Foil Mill. The samples were collected from wells OBG-50, FM-6 and FM-11 on June 1 and 2, 2000. The samples were analyzed in the laboratory for each of the parameters listed above.

<u>Transition Zone Recovery Wells</u>

Ground water samples were collected during the transition zone pump test (described in Subtask 2.3) from the end of the discharge pipe to further evaluate anticipated ground water influent characteristics to the existing treatment system. Ground water samples were obtained for

VOC and PCB analyses at both the start and end of the pump test on September 27 and October 16, 2000, respectively. Additional samples were obtained at the end of the pump test for laboratory analyses for the additional parameters listed above.

Manhole 27/Abandoned Sewer Pump Test

Ground water samples were collected during the Manhole 27/abandoned sewer pump test (described in Subtask 2.4) from the end of the discharge pipe to evaluate the anticipated ground water influent characteristics to the existing treatment system and to evaluate the potential need for pre-treatment. Ground water samples were obtained for VOC and PCB analyses at both the start and end of the pump test on August 18 and September 7, 2000, respectively. Additional samples were obtained at the end of the pump test for laboratory analyses for the additional parameters listed above.

Existing Unconsolidated Unit Ground Water Collection System

To establish a baseline of the current ground water influent characteristics to the existing treatment system and to evaluate the impact on the influent characteristics that will result from mixing of ground water from multiple source areas, ground water samples were collected from the influent to the air stripper on June 7, 2000 for laboratory analyses for the parameters listed on Table 2. This sampling was coordinated with the routine quarterly SPDES sampling event so that VOC and PCB concentrations in the influent and effluent of the air stripper and each of the individual recovery wells can be compared.

2.2. Soil boring and DNAPL observation well installation program

To evaluate the current extent of DNAPLs in the southeast portion of the facility, additional soil borings and observation wells were installed within and around the DNAPL zone in the eastern portion of the parking lot. The DNAPL zone soil boring and observation well installation program were performed between July 31 and September 12, 2000.

2.2.1. Soil Boring Program

As shown on Figure 2-1, soil borings were performed at locations both around the perimeter and within the DNAPL pool to confirm the extent of DNAPL and, to develop a profile of the top of the low permeability glaciolacustrine clay layer within the DNAPL zone.

Three additional soil borings were also advanced along the alignment of the collection trench near the southern portion of the Foil Mill. The Foil Mill soil borings were completed on July 31, 2000 in accordance with this Work Plan. The rationale for these borings is to develop a profile along the collection trench, to show the depth of installation and materials likely to be encountered during excavation.

Soil borings were advanced to the top of the low permeability glaciolacustrine clay or till layer utilizing geotechnical and/or direct push drilling techniques. Soil samples were field screened using a photoionization detector and an unaided visual inspection of the samples for the presence of DNAPL were performed. Subsequent, examination of the fluorescence of the sample was performed in a dark area [e.g., an Ultraviolet light (UV) box, inside of a building, etc.] by scanning the sample with a UV light. The sample was left in the acetate liner or split-barrel sampler during the examination so that the sample interval of detected DNAPL, if any, could be determined.

2.2.2. Installation of additional observation wells

Following the completion of the soil borings at locations OW-3, OW-4, OW-5 and OW-6, new observation wells were installed within the DNAPL zone to confirm the current extent and thickness of mobile DNAPL. These wells will also serve as effectiveness monitoring locations during active DNAPL recovery activities.

Following the completion of the soil borings at locations TZOW-3, TZOW-4, TZOW-5 and TZOW-6, the borings were converted to transition zone observation wells. Transition zone observation wells TZOW-3, TZOW-4 and TZOW-5 were installed south and east of the DNAPL zone, to confirm the extent of mobile DNAPL and to provide sentinel wells to evaluate potential continuing DNAPL migration. These wells also provided hydraulic monitoring points for the transition zone pump test discussed in Section 2.3 of this work plan.

In addition, two transition zone observation wells (TZOW-1 and TZOW-2) were located within the anticipated cone of depression produced by the transition zone recovery well during the pump test. Based on an evaluation of the potential drawdown with distance that was anticipated to occur during the transition zone pumping test, the two new observation wells were located approximately 7.5 and 20 feet away from the new test recovery well. Well installation was performed using fluid rotary or drive and wash drilling techniques. Well construction, development, and handling of investigation derived materials was performed in accordance with the RI FSP. Installation of the new observation wells was performed in conjunction with the soil boring program described in Section 2.2.1.

Each of the new observation wells was constructed of 2-inch inside diameter (ID) flush-joint Schedule 40 polyvinyl chloride (PVC) riser pipe with either 0.010-inch or 0.020-inch slot well screen. Well screen slot size was based on the formation screened. In general, 0.010-inch slot well screen was used for those wells screened in the transition zone and 0.020-inch slot well screen was used for the wells screened in the glacio-deltaic sand and gravel unit. Well installation, construction, development, and handling of investigation derived materials was performed in accordance with the RI FSP. Each of the new observation wells was also installed with a five foot long sump grouted into the top of the low permeability silt and clay unit. The well screen/sump was installed such that the bottom of the slotted portion of the well screen was located as close to the sand or transition zone/silt and clay unit interface as practicable.

2.3. Transition zone pump test

To obtain an estimate of drawdown and pumping rates required to achieve hydraulic control within the transition zone on the southeast side of the plant, a constant-head pumping test was performed. A constant-head pumping test was used because it best simulates actual remedial conditions. The activities associated with the transition zone pump test included the following:

- Design and installation of test recovery well in the southeastern portion of the parking lot
- Installation of additional observation wells
- Development of the new test recovery well
- Performance of constant-head pumping test in the new test recovery well and observation of water levels in selected monitoring wells during the test
- Decontamination procedures
- Interpretation of pump test data
- Handling of investigation-derived materials.

2.3.1. Design and installation of test recovery well

To perform the constant-head pumping test, a new test recovery well (designated TZRW-1) was installed in the southeast parking lot between September 19 and 21, 2000. As shown on Figure 2-1, the transition zone recovery well was installed at a location within the known DNAPL zone to minimize the potential for enhancing mobile DNAPL migration further towards the property boundary.

The transition zone recovery well (TZRW-1) was installed entirely within the transition zone at a location east of oil recovery well ORW-2. TZRW-1 is constructed of 6-inch ID stainless steel riser pipe with approximately 9.5 feet of 0.010-inch slot stainless steel well screen. In addition, a five foot long sump was grouted into the top of the low permeability silt and clay unit. The well screen/sump was installed such that the bottom of the slotted portion of the well screen was located as close to the transition zone/silt and clay unit interface as practicable.

Recovery well design data was obtained during the soil boring program and, included determining the depth and thickness of the transition zone and collection of representative soil samples from the proposed screened interval for visual evaluation.

Installation of recovery well TZRW-1 was performed by advancing a 14-inch diameter borehole through the glaciodeltaic sand and gravel unit to the top of the transition zone unit utilizing hollow stem auger drilling techniques. The borehole was further advanced utilizing a 9⅞-inch diameter roller bit through the transition zone unit and five feet into the top of the underlying low permeability glaciolacustrine silt and clay unit utilizing fluid rotary drilling techniques. After setting the well, sand was introduced gradually inside the casing, and filled the 2-inch annular space between the screen and the borehole adjacent to the screen. The sand pack extended from the bottom of the well screen to approximately one foot above the top of the screen. The sand pack consisted of clean, graded, Morie #0 silica sand.

A bentonite pellet seal was placed above the sand pack to form a seal at least 2 feet thick. A thick cement-bentonite grout extends from the top of the bentonite pellet seal to the ground surface. The grout material consists of Type I Portland cement mixed with a granular bentonite. The grout mixture was prepared in accordance with ASTM D 5092-90, such that approximately 3 to 5 pounds of bentonite was mixed with 6 to 7 gallons of water per 94-pound sack of cement. The grout was introduced via a tremie pipe lowered to just above the top of the bentonite pellet seal. As the grout was pumped into the borehole, the tremie pipe was removed in sections so that the grout was pumped into the borehole at a level below the top of the grout seal as it was emplaced.

Following completion of the recovery well installation, the well was completed with a flush mounted well cover and locking cap.

2.3.2. Test recovery well development

The new test recovery well was developed to remove fine-grained materials which may have settled in the borehole during drilling, to reduce the turbidity of the ground water, and to increase the yield of the well. Development was completed between September 25 and 27, 2000. Ground water and sediments resulting from the well development was managed as described in Section 2.3.7 below.

The new test recovery well was developed utilizing the following procedure:

1) Following installation of the test recovery well, a one-hour pumping test was performed to establish the wells' pre-development specific capacity. This value served as a benchmark from which comparisons were later made. All water removed during this step and subsequent development steps was handled as discussed below in subtask 2.3.7.

2) Following the initial specific capacity test, 2 quarts of a dispersant polymer (NW-220 manufactured by U.S. Filter) was introduced to the well bore by tremie methods. The well was then surged for one hour so that the solution came into contact with the entire length of screen, the sand pack, and the natural formation.

3) The next day, the well will be surged for four hours, followed by surging and air lifting to remove fine-grained materials from the well. The development included each portion of the well screen. At the end of the second day, the well was pumped for one hour and the depth to water monitored. From this test, the well's specific capacity will be calculated again. Additional NW-220 was tremied into the well and the well surged for one hour to force the solution into the sand pack and surrounding formation.

4) On day three, the same procedures described in step 3 were performed.

At the completion of step 4, well development observations and the results of the specific capacity testing were evaluated to determine if additional development was necessary. Well development continued until the specific capacity of the well stabilized and the development fluid was relatively sand and clay-free as determined by the on-site geologist.

2.3.3. Constant-head pumping test

The constant-head pumping test was performed in transition zone test recovery well TZRW-1 between October 5 and 16, 2000. During the pumping test, TZRW-1 was equipped with a Hammerhead™ pump, manufactured by QED Environmental Systems Inc., which was used to maintain a "constant" head while evacuating ground water from the well.

Climatic data (i.e., temperature, precipitation and barometric pressure) will be obtained from the Glens Falls FAA Airport for the time period over which the pumping test was conducted. These data will be used to evaluate water level fluctuations potentially related to recharge or variations in barometric pressure. In addition, water level measurements were collected from existing monitoring wells GM-19 and OBG-80 to evaluate background water level fluctuations.

Prior to starting the pumping test, the existing shallow unconsolidated unit recovery well system was evaluated to determine if operation of these ground water recovery wells would result in ground water level fluctuations in the transition zone observation wells as a result of the pump cycling. This evaluation was performed by cycling the well pumps in recovery wells RW-5 and RW-6, while observing water levels in the adjacent transition zone monitoring wells (i.e., OBG-82 and OBG-63). Pressure transducers equipped with data loggers were installed in each of the monitoring and recovery wells for an approximate two hour period and then recovery wells RW-5 and RW-6 were turned off and allowed to recover for approximately 12 hours (i.e., overnight). The following morning the recovery well pumps were placed back into operation and the water level within the recovery well and transition zone monitoring well was observed for approximately 12 hours.

Table 2-3 identifies the monitoring wells that were monitored prior to, during, and immediately following the pump test. Well locations are shown in Figures 1-2 and 2-1.

Table 2-3. *Constant Head Pump Test Summary*

Well ID	Formation Screened
TZRW-1	Transition Zone
TZOW-1	Transition Zone
TZOW-2	Transition Zone
TZOW-3	Transition Zone
TZOW-4	Transition Zone
TZOW-5	Transition Zone
TZOW-6	Transition Zone
OBG-63	Transition Zone
OBG-64	Transition Zone
OBG-65	Transition Zone
OBG-66	Transition Zone
OBG-80	Transition Zone
OBG-81	Transition Zone
OBG-82	Transition Zone
GM-19	Glaciodeltaic S&G
GM-35	Glaciodeltaic S&G
ORW-2	Glaciodeltaic S&G/ Transition Zone

1. During the start of the pump test and during the recovery phase of the test, ground water measurements were obtained from TZRW-1 using a data logger and submersible pressure sensor as follows:

0 to 1 hour	every 5 minutes
1 to 24 hours	every 15 minutes
24 hours to end of test	every 30 minutes

During the constant-head pumping test, water level elevations and the pumping rate were monitored in TZRW-1. Ground water elevations were monitored using a submersible datalogger with a pressure sensor. The pumping rate was monitored using an in-line flow meter rated for the volume of ground water anticipated to be produced by the well. Initially, flow was monitored at 5-minute intervals for the first 30 minutes of the test. Flow rate monitoring then continued at reduced frequencies as shown below:

0 to 30 minutes	every 5 minutes
30-60 minutes	every 15 minutes
1 to 8 hours	every 30 minutes
8 hours to end of test	approximately every 4 hours

Additionally, the total volume of extracted ground water was monitored at the same frequency as the flow rate monitoring using the totalizer on the in-line flow meter.

As discussed in Subtask 2.1, to evaluate the chemical characteristics of extracted ground water, samples were collected from the end of the discharge pipe during the pump test for laboratory analyses. Details regarding the sample collection program are provided in Subtask 2.1.

Upon completing the pump test, the recovery phase was also monitored. During this phase, water level measurements were collected from the pumping well and from the wells monitored during the pumping test at the same frequencies as used during the pumping phase of the test (see Table 2-3). The recovery phase was monitored until the water level in the pumping well recovered approximately 90 percent of the observed drawdown.

2.3.4. Decontamination procedures

Decontamination of non-disposable equipment used during the drilling activities and while completing the other PDI activities was performed so that potential contaminants were not introduced into the borehole or transferred across the site. Decontamination procedures were performed in accordance with the NYSDEC-approved RI FSP.

2.3.5. Interpretation of pumping test data

The data obtained during the pump test will be interpreted to evaluate the hydraulic characteristics of the transition zone for subsequent use during the RD. Recovery well discharge rates, drawdown with distance data, and ground water recharge rates will be evaluated to estimate aquifer storage coefficients and the transmissivity of the transition zone. In addition, estimates of the bulk hydraulic conductivity of the transition zone will be obtained. The results of the pump test will be used to select the final number of recovery wells, the spacing of the wells, and the anticipated yield of the transition zone recovery well network.

The results of the pumping test data interpretation and a summary of the data developed during the PDI will be presented in the Preliminary Design Report.

2.3.6. 2-phase numerical model simulations

The NYSDEC's ROD has indicated that the remedial objective for the DNAPL pool is to remove mobile DNAPL so that the potential for further mobilization is reduced. The conceptual design for the DNAPL collection system utilizes two horizontal extraction wells to collect DNAPL. Under this scenario, either passive or active water flooding techniques could be utilized for DNAPL recovery.

Using the information developed during the RI/FS and the results of the PDI activities, a 2-phase flow numerical model will be utilized to design the final DNAPL recovery well system. Design considerations that will be evaluated using the 2-phase flow numerical model include:

- determining the final number of wells,
- establishing the configuration and spacing of the wells,
- verifying the effectiveness of using horizontal vs. vertical wells to recover mobile DNAPL from the leading edge of the mobile DNAPL pool,
- estimating DNAPL recovery rates,
- calculating ground water flow rates if active water flooding techniques are used, and
- evaluating the feasibility of using vertical transition zone recovery wells within the DNAPL zone to both collect DNAPL and to provide for hydraulic control of ground water within the transition zone.

To design the DNAPL collection system and to perform the numerical modeling, an evaluation of the variability of the chemical and physical characteristics of the DNAPL at the site, and an evaluation of the layering (i.e., K_h/K_v ratio) of the transition zone relative to DNAPL recovery using horizontal vs. vertical wells, will be required.

To evaluate the variability and to confirm previous measurements of chemical and physical characteristics of the DNAPL, five DNAPL samples will be collected and analyzed for chemical properties [VOCs and some semi-volatile organic compounds (SVOCs)] and physical characteristics (i.e., density, viscosity and interfacial tension).

To evaluate K_h/K_v ratio of the transition zone, shelby tube samples of transition zone materials were collected during the soil boring program and submitted to a laboratory for vertical permeability testing. The shelby tube samples were collected from soil boring TZOW-4 which is outside of the DNAPL zone.

In addition, estimates of bulk hydraulic conductivity were obtained by conducting slug/bail tests in the new transition zone wells and through the evaluation of the transition zone pump test data. Hydraulic conductivity testing was performed in accordance with the RI FSP.

A summary of the data developed during PDI activities will be presented in the Preliminary Design Report.

2.3.7. Handling of investigation-derived materials

The PDI activities produced investigation-derived materials (IDM), which required appropriate management. This IDM included the following:

- Drill cuttings
- Ground water resulting from drilling and development of the new wells
- Ground water resulting from the constant-head pump test
- Sediments which settled out of ground water produced during the above activities
- Decontamination fluids and sediments which settled out of such fluids
- Personnel protective equipment (PPE) and associated debris resulting from the execution of field activities.

These materials were managed in accordance with the procedures described in the RI FSP. However, due to the extended duration of the pump test, the larger quantities of water expected to be generated, and concerns related to chemical loadings to the existing waste water treatment facility, the pump test ground water was discharged directly to the on-site air stripper via the existing force main associated with the ground water recovery system for pretreatment and then to the wastewater treatment plant. In addition, the sump of the transition zone observation wells and the recovery well were monitored for DNAPL during the PDI phase of the project. DNAPL that was observed during well development activities, was collected and managed for disposal by GE in the same manner as the DNAPL collected from oil recovery well ORW-2.

2.4. Manhole 27/abandoned sewer pump test

To obtain an estimate of the long-term yield from the abandoned storm sewer and to assess potential pre-treatment/treatment requirements, a pump test was conducted between August 17 and September 8, 2000. The pump test was initiated by pumping the standing ground water and any additional ground water which infiltrated into the abandoned storm sewers to a temporary holding tank and subsequently, directly to the equalization basin utilizing a diaphragm pump which was temporarily installed in Manhole 27 via temporary plumbing connections. The digester/aeration basin of the sanitary plant, which is not currently being used, was used as the temporary holding tank.

During the pump test, the pumping rate from the abandoned storm sewer was monitored using an in-line flow meter rated for the volume of ground water anticipated to be produced. Initially, flow was monitored at 1-hour intervals for the first 4 hours of the test. Flow rate monitoring then continued at a reduced frequency, but not less than one reading every 4 hours. Additionally, the total volume of extracted ground water was monitored using the totalizer on the in-line flow meter.

In addition to monitoring flow rate and total volume of ground water recovered, water level measurements were collected from adjacent monitoring wells to determine the effect, if any, on overburden ground water levels in the vicinity of the abandoned storm sewers. Monitoring wells GM-22, OBG-8B, and F-2 were monitored using pressure transducers and associated data loggers. In addition, one background monitoring well (OBG-54) was also monitored throughout the duration of the test. Monitoring was initiated a minimum of 12 hours prior to the start of the pump test and continued through the recovery phase of the test.

As discussed in Subtask 2.1, to evaluate the chemical characteristics of extracted ground water, samples were collected from the end of the discharge pipe during the pump test for laboratory analyses. Details regarding the sample collection program are provided in Subtask 2.1.

Upon completing the pump test, the recovery phase was monitored. During this phase, water level measurements were collected from the wells monitored during the pumping test at the same frequencies as used during the pumping phase of the test. The recovery phase was monitored until the water level in the storm sewer recovered to 90 percent of the observed drawdown.

A summary of the data developed during the pump test will be presented in the Preliminary Design Report.

2.5. Utilities survey

The proposed remedy includes excavation to construct the ground water collection trench. To evaluate the presence of buried utilities, O'Brien & Gere reviewed available plant mapping and will incorporate the buried utilities shown on the available mapping into the design drawings. As appropriate, the plant mapping was reviewed with the plant engineer. O'Brien & Gere will also contact local utility companies via telephone to inquire about the presence of buried utilities and the availability of mapping showing the location of buried utilities. If buried utilities are identified and mapping is available, O'Brien & Gere will obtain this mapping for use in completion of the final design.

The selected remedy will also require power to operate pumps and other equipment associated with the ground water recovery and pretreatment systems. Telephone service may also be necessary to operate auto dialers associated with the ground water recovery and pretreatment system. GE was contacted regarding the availability of these services. The information provided by GE will be used during the design phase to specify equipment compatible with available site utilities.

2.6. Site survey

In conjunction with preparation of the RI, a detailed site survey was performed to delineate the location of monitoring wells, recovery wells, pertinent site features, and man-made structures. This map was updated during the course of the RI.

Following completion of PDI activities, a detailed site survey was again performed to delineate the locations of additional soil borings, observation wells and recovery wells installed during the pre-design phase, and site utilities identified during Subtask 2.5. The base map will be updated and serve as the existing site plan and base map for the RD.

3. Remedial design

The major design components of the selected remedy include the following:

- Perform an evaluation of the capacity of the existing wastewater treatment plant to handle the expected flows and meet discharge limits.

- Control the migration of contaminated groundwater and non-aqueous phase liquids (NAPLs) through expansion of the existing collection and treatment system.

- Remove and dispose of, off-site, all contaminated soils excavated during construction activities.

- Maintain and monitor the site.

- Review the remedial program every five years to ensure that the remedy continues to provide protection of human heath and the environment.

The selected remedy will control migration of ground water and NAPL through expansion of the existing ground water and DNAPL collection system. This expansion will result in collection of ground water from most of the existing recovery wells and will add ground water collection from the southeast corner of the facility, from areas west and south of the Foil Mill, and from the southwest corner of the facility, as described below. The water from the Foil Mill area will be pretreated prior to being pumped to the existing water treatment facility (WTF).

The conceptual plan presented in the ROD will be evaluated with respect to the ability to meet the remedial objectives based on the results of PDIs and subsequent engineering assessments. The deliverables resulting from RD activities include a RD Report documenting the design basis and supporting data, and a set of Contract Documents for construction. The Contract Documents will include requirements for bidding, general contract provisions, special provisions, and technical specifications detailing the conditions under which the work is to be conducted, the equipment to be incorporated into the work, and standards for acceptance of the work. The RD will be completed in two phases, Preliminary (30%) Design and the Final Design.

3.1. Manhole 27/abandoned sewer ground water collection system design

Based on the results of prior investigations, it is suspected that overburden ground water containing PCBs/VOCs may be entering the bedrock along the route of the abandoned 30-inch sewer in this area. Therefore, PCB/VOC concentrations in bedrock ground water may be reduced by collecting overburden ground water in the vicinity of this sewer.

It is proposed that the sewer be used as a ground water collection system. Former Manhole (MH) 27 will be utilized as a sump, and ground water entering the sewer will be pumped to the existing water treatment facility. As part of the Preliminary Design Report, an evaluation will be made as to whether the collection of bedrock ground water from GM-11D discontinued. The evaluation will determine if the discontinuation of pumping from GM-11D is appropriate and will evaluate if the integrity of the bedrock remedial program will be compromised by discontinuing pumping from GM-11D.

Based on observations made by O'Brien & Gere personnel during dye testing activities performed during the RI (O'Brien & Gere, 1997) and the results from the Manhole 27/abandoned sewer pump test, design flow rates to the treatment plant are estimated to range between 14 and 35 gallons per minute (gpm). An evaluation of the capacity of the existing wastewater treatment plant to handle the design flow rates will be performed during the preliminary design phase and the results of the evaluation will be summarized in the Preliminary Design Report.

3.2. Foil Mill ground water cutoff trench design

Ground water and LNAPL will be collected along the western and southern perimeter of the Foil Mill by installing an interception trench. Conceptually, this trench will be approximately 850 ft long and have an average depth of approximately 7 ft. The trench will be excavated down to a low permeability layer or within 2 to 3 ft of bedrock. A perforated pipe will be placed near the bottom of the trench and routed to a collection sump. The trench will be backfilled with permeable material, such as crushed stone.

The sump will be equipped with a skimmer capable of removing LNAPL (kerosene) which may accumulate. Water from the sump will be directed to an air stripper for pretreatment in order to reduce its VOC loading prior to entering the WTF. The effluent from the air stripper will be discharged to MH 4, and subsequently treated in the existing WTF.

Initially, water will be pumped from the interception trench at a rate that the existing WTF can accept (estimated 10 to 15 gpm) however the final flow rate will be based on the results of an evaluation of the hydraulic capacity of the wastewater treatment plant including an estimate of the volume of water obtained from the transition zone wells and from the sewer in the southwest corner of the facility. The existing WTF may be capable of handling higher hydraulic loading when the VOC loading is reduced by the air stripper. It may also be possible to achieve hydraulic control in the vicinity of the Foil Mill at a flow rate which is less than the 35 gpm estimated in the FS. Ground water level monitoring will be performed during system operation to identify the actual flow rate required to achieve hydraulic control in the Foil Mill area.

Based on these results and the performance of the WTF, additional action may be warranted. Pre-treatment system design will be based on the ground water characteristics previously identified from samples obtained from wells in vicinity of foil mill.

3.3. Transition Zone ground water recovery system design

The existing ground water collection system will continue to operate in the southeast portion of the facility at its present capacity. Additional transition zone wells will be installed in the southeast parking lot to provide hydraulic control of transition zone ground water in that portion of the site. The transition zone recovery wells will be screened entirely within the transition zone. Ground water will be pumped from these wells to the existing air stripper and treatment facility. Estimated flow from these wells will be determined based on the results of the constant-head pumping test performed during the PDI. A more accurate estimate of the number of wells, the drawdown, and pumping rates that will be required to achieve hydraulic control within the transition zone on the southeast side of the plant will be determined during the 2-phase numerical model simulations.

3.4. DNAPL collection system design

The NYSDEC's ROD has indicated that the remedial objective for the DNAPL pool is to remove mobile DNAPL so that the potential for further mobilization is reduced. The conceptual design for the DNAPL collection system utilizes two horizontal extraction wells to collect DNAPL. The horizontal wells will act as an underdrain system. Under this scenario, either passive or active water flooding techniques could be utilized for DNAPL recovery.

As discussed in Section 2.3.6, a 2-phase flow numerical model will be utilized to design the final DNAPL recovery well system.

3.5. Preliminary remedial design

The preliminary design will include a Preliminary Design Report and Preliminary Design Drawings.

Preliminary Design Report. A Preliminary Design Report will be prepared to document the basis of design. The report will present a summary of the data developed during the PDI activities, a discussion of the manner in which the proposed RA will address the requirements of the ROD along with a discussion of the results of pre-design studies to establish a frame work to support the proposed RD. The proposed system along with ground water modeling, data utilized, and calculations performed to establish the design parameters will be presented. In addition, hydraulic calculations regarding the ground water collection systems will be presented to establish size requirements for the associated storage and/or treatment systems.

The Preliminary Design Report will also present drafts of the following documents:

- Health and Safety Plan (HASP);
- Construction Quality Control/ Quality Assurance Plan (CQC/QAP);
- Site Operation and Maintenance Plan (O&M Plan);
- Site Management Plan

HASP. The minimum requirements for a HASP to be developed by the contractor for persons working at the site will be identified in the Preliminary Design Report. The contractor will be required to prepare and implement a HASP in accordance with at least these minimum requirements, the General Regulations found under 29 CFR 1910.120 for Hazardous Waste Operations and Emergency Response, and the citations adopted by reference.

Community Monitoring Requirements. The minimum requirements for protecting and monitoring the health and safety of persons residing in the vicinity of the site will also be discussed in the Preliminary Design Report. The HASP will be required to include administrative and engineering controls to minimize potential exposure to hazardous substances for persons living in the vicinity of the site.

CQC/QAP. A CQC/QAP will be prepared as part of the Preliminary Design Report. Quality control and quality assurance procedures and protocols to be implemented during construction will be outlined in this section, recognizing that detailed procedures and requirements will be presented in the technical specifications. The CQC/QAP section of the report will present the following.

- Responsibility and Authority – The responsibility and authority of organizations and key personnel involved in regulating, designing, and constructing the remedial system will be presented. Appropriate lines of communication between involved parties will be delineated.

- Construction Quality Assurance (CQA) Personnel Qualifications – The qualifications of the CQA officer and supporting CQA personnel will be presented in the CQA in terms of required training and experience. The CQA officer will be required to operate independently of the contractor.

- On-site Observation – The observations and tests that will be used to document that the construction meets the design criteria, plans and specifications will be detailed.

- Sampling and Testing Methods – Sampling and testing methods, frequencies, acceptance and rejection criteria, and corrective measures will be outlined, recognizing that detailed information will be presented in the technical specifications.

- Documentation – Reporting requirements for CQA activities will be described. These will include daily summary reports, data sheets, meeting minutes, photographs, record drawings, problem identification and corrective measure reports, and final documentation.

Site Operation, Maintenance and Monitoring Plan (OM&M Plan). A separate section of the report will be prepared which presents a conceptual description of operation, maintenance and monitoring activities to be undertaken after the NYSDEC has approved construction of the RD. This section will discuss operation and maintenance of site facilities, including the following:

- Physical site security
- Ground water collection system
- DNAPL collection system
- Ground water cutoff trench
- Ground water monitoring systems
- Site access.

A discussion of post-construction record keeping will also be included in this section of the report. This section of the report will be prepared in a general format, recognizing that a site specific OM&M Plan will be required following the completion of construction to reflect the as built conditions.

Site Management Plan (SMP). The SMP section of the report will describe the procedures that will be utilized during the RA to address institutional issues, including:

- Site access, including properties affected by the RA
- Site security
- Management and communication responsibilities
- Emergency and notification procedures
- Work zone definition
- Construction water management
- Waste management.

Preliminary Design Drawings and Technical Specifications. Preliminary design drawings will be developed to show existing site conditions, the location and profile of the ground water cutoff trench, the horizontal and vertical well system, and the location and profile of the ground water collection system. It is anticipated that the preliminary design drawings will include the following:

- Title Sheet
- Existing Site Plan
- Plans showing the ground water cutoff trench, and the ground water collection systems
- Ground water cutoff trench profile
- Ground water collection system profile
- Ground water collection system piping and instrumentation
- DNAPL collection system piping and instrumentation
- Pre-treatment system piping and instrumentation
- Maintenance and protection of traffic plan.

The drawings will be sufficiently detailed to convey the intent of the RD.

A list of technical specifications to be utilized in implementing the RD will also be prepared to include in the Preliminary Design Report.

Response to NYSDEC Comments. Copies of the preliminary design documents will be provided to the NYSDEC. It is assumed that a single consolidated round of comments will be received from the NYSDEC and that a single comment response letter to NYSDEC will be required prior finalization of the Preliminary RD. The response will be in the form a letter that lists each NYSDEC comment, followed by a discussion of how the comment will be addressed and incorporated, if appropriate, in the final design. The response will include an explanation of the reasons for proposing to exclude any comments from the final design.

3.6. Final design

Documents prepared during Final Design will bring the design to a 100% level of completion.

Final Remedial Design Report. The Preliminary Design Report will be updated to incorporate revisions to the design based on comments received from the NYSDEC and refinements made in progressing to a level commensurate with the completed design. The Final RD Report will present a detailed basis of design for site remedial systems.

Final Design Drawings and Technical Specifications. The Preliminary Design Drawings will be updated to a level commensurate with 100% completion based on comments received from NYSDEC and progress of the design from a 30% to 100% level of design.

Technical specifications will be prepared based on the list of specifications developed during preliminary design. The specifications will describe the requirements for the work to be constructed, the material and equipment to be incorporated into the work, and the standards for accepting the components of construction.

The specifications will also include provisions for overall site operations to deal with such issues as construction sequencing, preparation of a health and safety plan, equipment decontamination, and site security.

Response to NYSDEC Comments. The final design documents will be submitted to NYSDEC for review prior to finalization.

After obtaining a consolidated round of comments from the NYSDEC, and following resolution of these comments, agreed to changes will be incorporated into the final design documents. The documents will then be signed by a professional engineer licensed to practice in New York State.

3.7. Contract documents

GE, subject to NYSDEC approval, may elect to implement the RA as a series of sequential construction contracts. This approach has the advantage of allowing the sequence of construction to be optimized, taking advantage of the expertise of specialty contractors, and minimizing construction impacts to production operations at the Fort Edward Plant. Contract documents for the construction contracts will be developed utilizing the drawings and technical specifications from the NYSDEC-approved final design. Where appropriate, bidding provisions and forms, and general and special contract provisions will be incorporated to allow solicitation of competitive bids for construction.

4. Project schedule

The following schedule is presented to fulfill the following requirements of the remedial design for the GE Fort Edward facility.

- Submission of the RDWP to be incorporated into a new Order on Consent to be negotiated between NYSDEC and GE.
- Submission of a Final RD within 180 days after the effective date of the new Order on Consent between NYSDEC and GE.

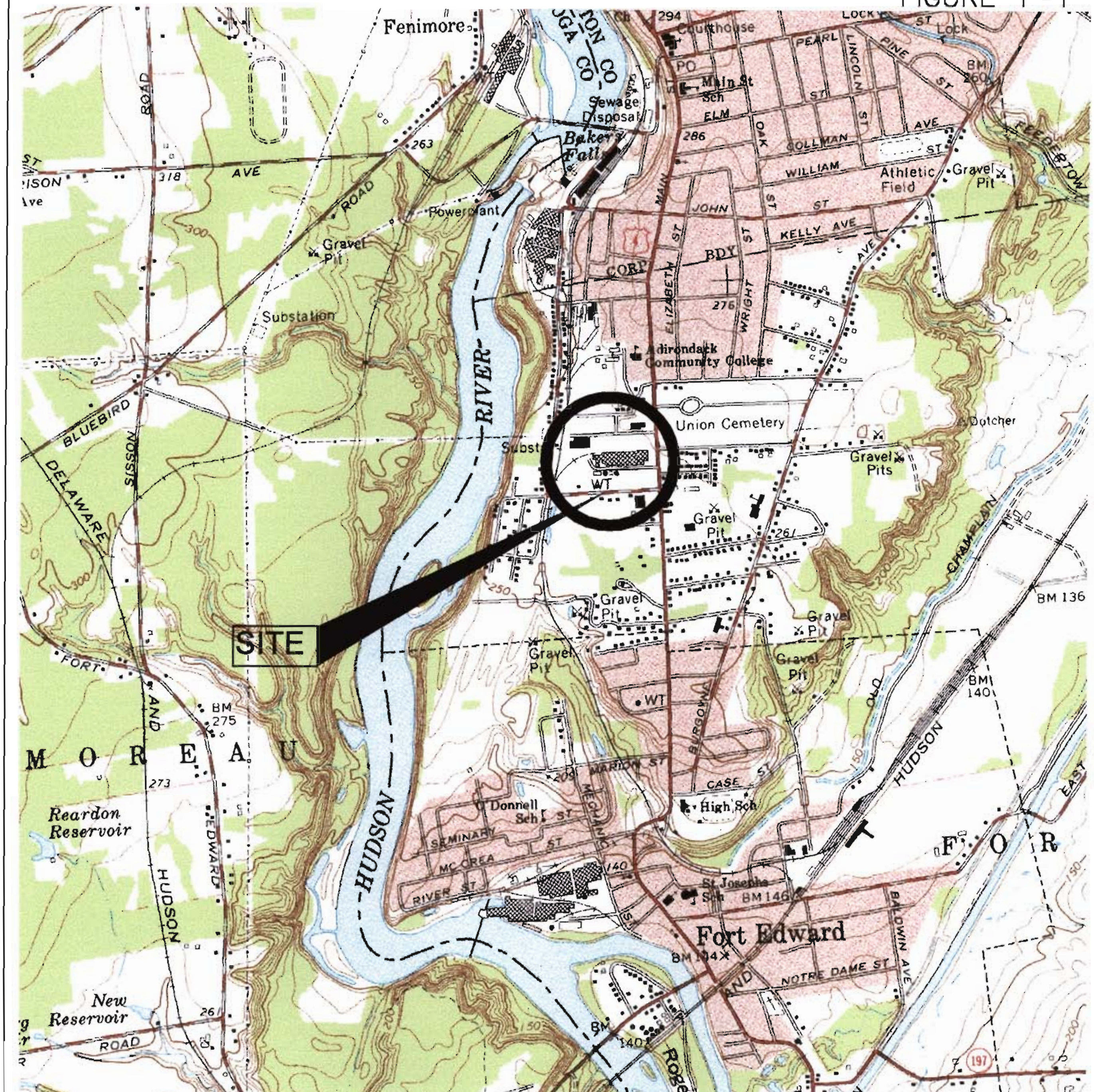
The submission of this RDWP accomplishes the first schedule requirement. The schedule included as Figure 4-1 demonstrates how the submission of the Final RD within 180 days of the effective date of the Order on Consent will be accomplished.

In preparing this schedule it has been assumed that PDI field work activities will be mostly complete prior to the effective date of the Order on Consent. Figure 4-1 shows that approximately 6 additional weeks will be required to complete the PDI. Approximately two weeks of this time will be spent in the field. The remaining time will be required to analyze collected DNAPL samples, evaluate the pump test data and to perform the numerical modeling.

The schedule shows initiation of the preliminary design occurring after completion of the field investigation activities. It is estimated that it will require approximately 13 weeks to complete the preliminary design. At that time, a meeting will be held with the NYSDEC to review the preliminary design. Following the resolution of issues resulting from that meeting, the design will be finalized and submitted for NYSDEC review and approval. One month has been allowed for NYSDEC review and approval of the final design.

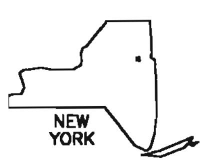
Concurrent with NYSDEC review of the final design, bid documents will be prepared.

FIGURE 1-1



ADAPTED FROM: USGS 7.5 MIN. quad., HUDSON FALLS, NEW YORK

GENERAL ELECTRIC COMPANY
FORT EDWARD, NEW YORK



QUADRANGLE LOCATION

SITE LOCATION MAP

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

SCALE: 1:24000

FILE NO. 26695
JANUARY 2001

O'BRIEN & GERE ENGINEERS INC.

DWG PATH: I:\ALBANY\PROJECTS\5731\26695\DWGS\GIS-DATA\SITE-LOCATION.DWG

PLOT DATE: 1-30-2001

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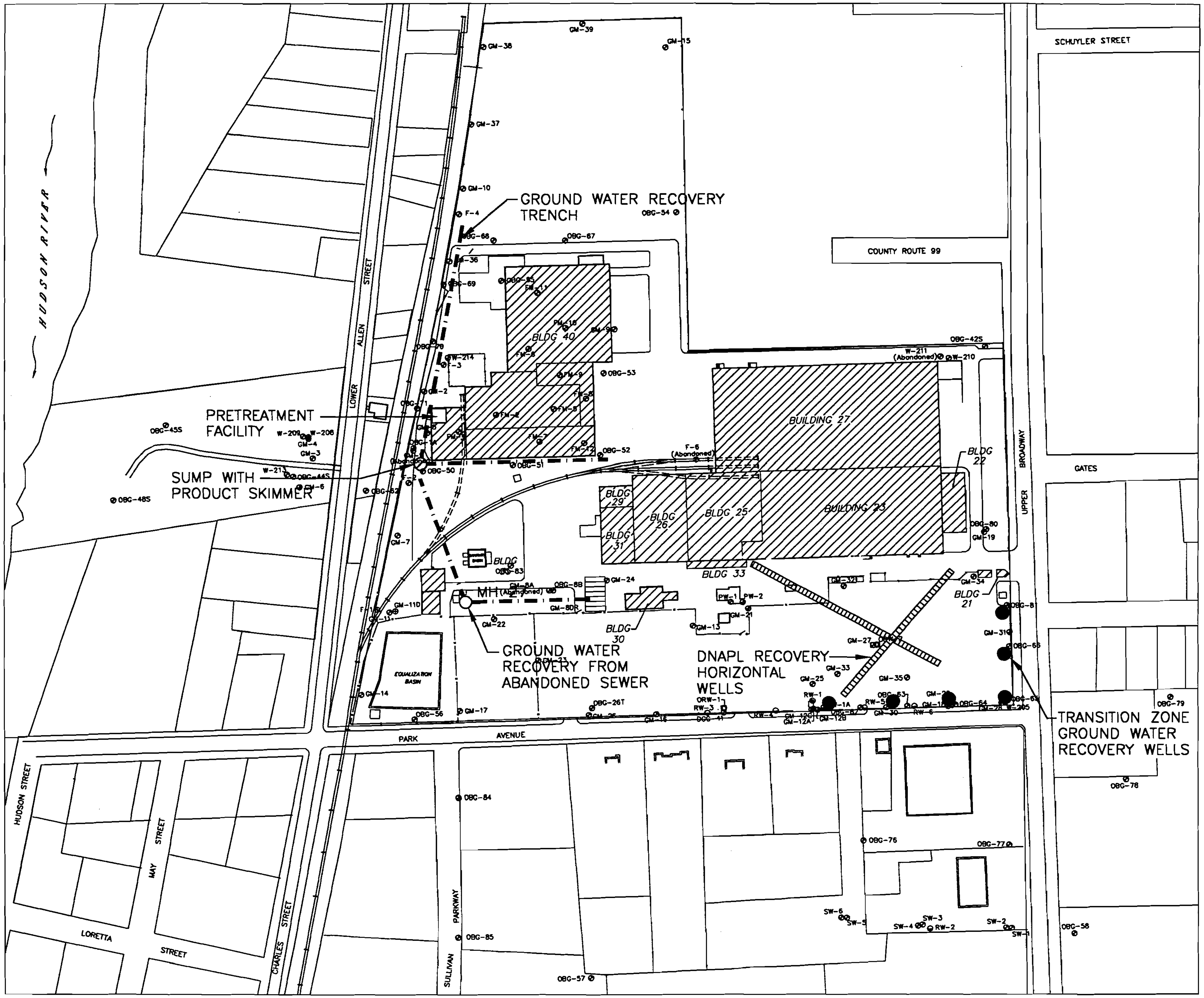

FIGURE 1-2

LEGEND

EXISTING FENCE

EXISTING BUILDING

PROPOSED GROUND WATER RECOVERY FROM ABANDONED SEWER

DNAPL RECOVERY HORIZONTAL WELL

PROPOSED TRANSITION ZONE RECOVERY WELL

PROPOSED GROUND WATER RECOVERY TRENCH

GENERAL ELECTRIC COMPANY
FORT EDWARD FACILITY
FORT EDWARD, NEW YORK

SITE PLAN

200 0 200
SCALE IN FEET

FILE NO. 26695

O'BRIEN & GERE ENGINEERS, INC.

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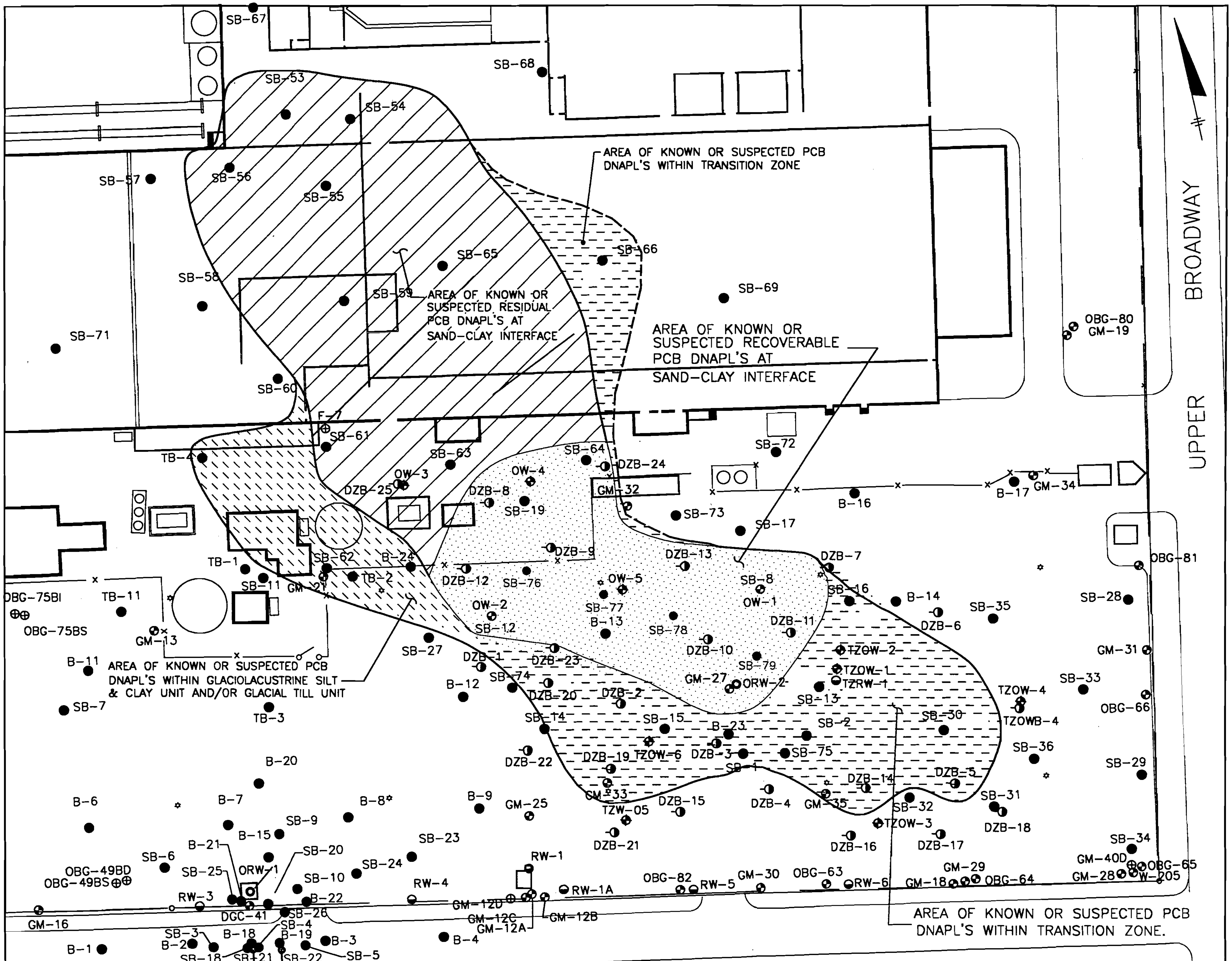

FIGURE 2-1

LEGEND

GM-31	MONITORING WELL LOCATION
RW-6	RECOVERY WELL LOCATION
GM-12D	BEDROCK MONITORING WELL
ORW-2	OIL RECOVERY WELL
TZOW-2	TRANSITION ZONE OBSERVATION WELL LOCATION
DZB-4	PRE-DESIGN INVESTIGATION SOIL BORING LOCATION
TZRW-1	TRANSITION ZONE RECOVERY WELL LOCATION
	LIGHT POLE
SB-28	SOIL BORING LOCATION

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SOIL BORING, OBSERVATION WELL AND TRANSITION ZONE RECOVERY WELL LOCATION MAP

60 0 60
SCALE IN FEET

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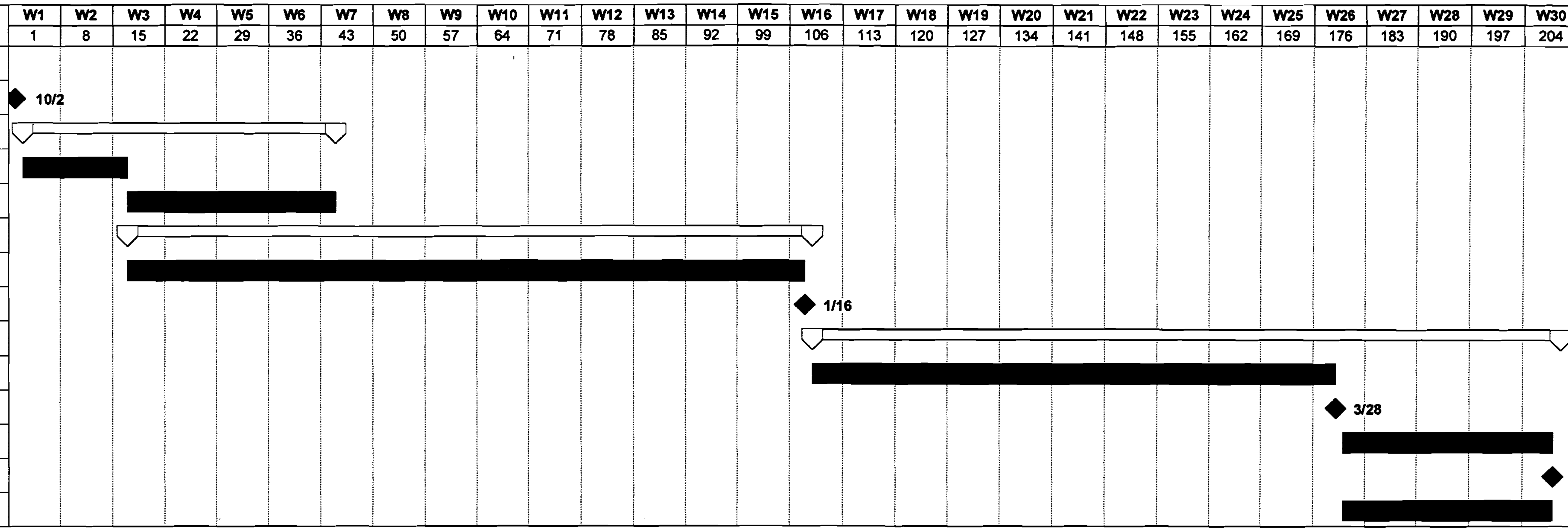
1-16-01

Figure 4-1
Project Schedule

ID	Task Name
1	**GE Fort Edward Remedial Design**
2	**Effective Date of Order on Consent**
3	**Pre-Design Investigation**
4	Field Investigation Activites
5	2-Phase Flow Numerical Modeling
6	**Preliminary Design**
7	Prepare Preliminary Design
8	Meeting with NYSDEC
9	**Final Design**
10	Prepare Final Design
11	Submit Final Design to NYSDEC
12	NYSDEC Review/Approval of Final Design
13	Recieve Final Design Approval
14	**Bidding Documents**



Project:
Date: 8/23/00

Task | Milestone | Rolled Up Task | Rolled Up Progress
Progress | Summary | Rolled Up Milestone