ROCKAWAY PARK FORMER MANUFACTURED GAS PLANT SITE
TECHNICAL SPECIFICATIONS
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PART 1 - GENERAL

1.1 Summary

The Rockaway Park Former MGP Site is located in Rockaway Park, Queens County, New York. The Site is situated to the north and east of Rockaway Freeway, to the west of Beach 108th Street; and, to the north and south of Beach Channel Drive. The property, owned by KeySpan, is approximately 9.8 acres in size.

The remnants of a former active KeySpan natural gas regulator station are located in the southeastern portion of the Site. KeySpan will be relocating the gas regulator station prior to commencement of the remedial construction in order to allow for the completion of remedial work. A vacated three-story office building and a one-story former workshop building is located in the north central portion of the Site. The buildings are slated for demolition by others in order to accommodate planned remedial construction activities.

An active Electric Substation abuts the northwest corner of the Site. Although not included in the remedial action, the remedial construction activities are to be completed in conformance with the operational requirements of the Substation.

Immediately north of the Site is a bulkhead area that is located between Beach Channel Drive and Beach Channel. The bulkhead area, owned by the City of New York, is connected to the Site by an underground tunnel that was used during former site operations as a delivery point for materials. Throughout the Technical Specifications the area located south of Beach Channel Drive and North of Rockaway Freeway will be referred to as the "on-site area"; the area located north of Beach Channel Drive and South of Beach Channel will be referred to as the "bulkhead area".

These Technical Specifications present the design (at a 95% level) elements associated with the installation of a Dense Non-aqueous phase liquid (DNAPL) migration barrier, shallow excavations required to remove source areas of contamination and the construction of a site wide cap to limit exposure pathways.

Two parallel subsurface DNAPL migration barriers will be installed at varying depths along the northern portion of the Site. The first barrier, located within the on-site area, will extend approximately 695 linear feet and will be installed at two different depths. The center section of the on-site barrier will extend to a depth of 120 feet below ground surface (bgs) and two flanking 50 foot bgs barriers will be installed on either side of the center section. This barrier is referred to as the "on-site barrier". The second barrier, located within the bulkhead area, will be installed within to a depth of 70 feet bgs and a

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linear distance of approximately 170 feet. This barrier is referred to as the bulkhead barrier.

The installation of the containment barriers will serve two purposes. First, both barriers will inhibit the migration of DNAPL to areas located downgradient of the Site, including Jamaica Bay. Second, the on-site barrier will allow DNAPL to be passively recovered via recovery wells to be installed upgradient and downgradient of the on-site barrier. Both the alignment of the DNAPL migration barriers and the locations of the DNAPL recovery wells are depicted on Design Drawing C-04.

The DNAPL migration barriers have been designed to minimize impacts to upgradient and side-gradient groundwater flows. Projected long-term effects on the groundwater underlying the Site from the installation of the barriers have been investigated through the development of a conceptual site-specific groundwater model. The results of this conceptual model indicate minimal effects on groundwater mounding behind the barriers.

Shallow soil excavation will occur to a depth of 8 feet bgs, which approximates the depth to the groundwater table. Based on the results of a supplemental environmental investigation, the area of shallow soil excavation was expanded from that proposed in the Remedial Design Work Plan (RDWP). The estimated volume of excavated soil is approximately 88,000 cubic yards. The extent of excavation is shown on Design Drawing C-04. Excavated material will be consolidated under a temporary enclosure(s) operated under negative air pressure to control the release of volatile emissions and odors and loaded onto transport vehicles for off-site disposal. The temporary fabric enclosure(s) will be equipped with a vapor management system (VMS) designed to both capture and treat airborne contaminants from within the enclosure to meet NYSDEC requirements. A Community Air Monitoring Program (CAMP) will be implemented by others both during the installation of the DNAPL migration barriers and during soil excavation.

The approach for the design of the Site remedy has been selected to promote its timely and efficient implementation. NYSDEC comments on the 50% to 75% RDR have been incorporated into this 95% RDR, which will be utilized to procure the remedial contractor. KeySpan has worked in conjunction with the remedial contractor to develop the design of the remedy into a 95% RDR submittal. NYSDEC comments from the review of the 95% RDR will be incorporated into a final remedial design. The final design, to be certified by a Professional Engineer licensed in the State of New York, will be issued to the NYSDEC in a Final Remedial Design Report (100% Design). Community officials and stakeholders will be contacted during the development of the remedial design for input on community related issues in order to determine the need for

measures to mitigate potential disruptions and perceived adverse impacts to the community.

These Technical Specifications present the 95% RDR elements associated with the implementation of the selected remedial action. The purpose of these Technical Specifications is to procure contractors who will partake in the subsequent development of the Final 95% design into a detailed construction level design (i.e. 100% design). The development of the remedial design will culminate in a 100% Remedial Design Report that will be submitted to the New York State Department of Environmental Conservation (NYSDEC) for review and approval. Not only will the procured contractors be involved with the subsequent development of the remedial design, they will also implement the remedial construction in accordance with the NYSDEC approved 100% Remedial Design Report and associated Design Drawings and Technical Specifications.

During the implementation of the remedial construction activities, KeySpan has procured the services of a construction manager (CM) to supervise the remedial construction activities and to ensure that the requirements of the Contract Documents are met. ARCADIS/BB&L has been retained by KeySpan to function as the CM for the Site.

1.2 Contractor Responsibilities

1.2.1 Remedial Contractor

Remedial Contractor – Referred to as the "Contractor" throughout these Technical Specifications. The Contractor shall be responsible for providing all union labor, supervision, materials, tools, equipment, transportation, permits, and insurance necessary to:

- Clear and prepare the Site and Bulkhead area (i.e. remove vegetation, implement soil erosion control measures, removal of existing fencing; temporary facilities, staging areas, complete surveys, management of existing utilities, establishment of decontamination pad(s), etc.) as necessary to implement the remedial construction activities;

- Locating and identifying the utilities around the perimeter of the Site and managing these utilities (i.e. cut and cap) as required to implement the planned remedial construction activities. During this work, the Contractor shall also locate the active underground 33 kV electrical transmission/distribution line that is located along the northern boundary of the Site using soft dig techniques while also adhering to the requirements of the Long Island Power Authority (LIPA);

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- Pre-trench along the planned alignments of the DNAPL migration barriers as detailed in the Technical Specifications and Design Drawings down to a depth of the existing groundwater table (i.e., 8 feet bgs);

- Remove subsurface obstructions that could potentially impede the installation of the DNAPL migration barriers;

- Expose and support active utilities that will be impacted by the alignment of the DNAPL migration barriers as per the requirements of the pertinent utility companies;

- Expose, remove and dispose of any decommissioned utilities or former industrial piping that may impact the installation of the DNAPL migration barriers;

- Install two DNAPL migration barriers consisting of a Waterloo® Barrier steel sheet pile system along the planned alignments as detailed on the Design Drawings and in the Technical Specifications;

- Perform necessary QA/QC to ensure that the containment barriers will have a low permeability;

- Install the DNAPL migration barriers such that the tip elevation is to the depth depicted on the Design Drawings;

- Provide verification of the termination depth of the DNAPL migration barriers;

- Install the DNAPL migration barriers such that the top of the barrier shall be 2 feet bgs to maintain a clear corridor for utilities; and

- Backfill and compact the trenched areas along the alignment of the DNAPL migration barriers;

- Install DNAPL Recovery Wells in the locations depicted on the Design Drawings;

- Implement dust and odor control measures that comply with the Generic Health and Safety Plan (HASP) and Community Air Monitoring Plan as directed by KeySpan and/or PS&SPC;

- Abandon existing environmental wells in accordance with NYSDEC regulations and procedures;

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- Protect and support existing environmental wells during remedial construction;
- Install support systems for soil excavation within the "Shallow Excavation Areas";
- Expose and support active utilities that will be impacted by the installation of the excavation support systems as per the requirements of the pertinent utility companies;
- Excavate source material to the depth of 8 feet bgs (which approximates the depth to the groundwater table) in the Shallow Excavation Areas depicted on the Design Drawings;
- Utilize a temporary fabric enclosure(s), equipped with a vapor management system (VMS) capable of at least six air exchanges per hour during remedial excavation activities as directed by KeySpan and/or PS&SPC;
- Remove encountered surface foundations within the Shallow Excavation Areas down to the existing groundwater table;
- Remove subsurface former industrial features encountered during excavation within the Shallow Excavation Areas to the extent practical;
- Construct a two foot thick site wide cap in the on-site area consisting of 18 inches of well graded sandy soil and six inches of crushed stone or gravel in accordance with the Design Drawings. The site wide cap will be underlain by a demarcation geotextile fabric;
- Within the Bulkhead Area, construct a two foot thick Site wide cap consisting of 18 inches of well graded sandy soil and six inches of topsoil capable of sustaining vegetation in accordance with the Design Drawings. The City of New York Parks and Recreation Department maintains the responsibility to perform all planting and seeding on the Bulkhead Area. The soil cap within the Bulkhead Area will be underlain by a demarcation geotextile fabric;
- During the construction of the Site wide cap, remove encountered foundations, tanks and other subsurface features to a depth of two feet bgs or as practical to facilitate the construction of the soil cap. Former industrial piping shall be removed to the Site boundary as directed by KeySpan, PS&SPC and/or the CM.

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The Contractor shall remove any piping/tank contents for on-site containerization and off-site disposal;

- Backfill and compact excavated areas with certified clean fill material;
- Manage and dispose of all Site generated wastes at a KeySpan approved disposal facility;
- Perform decontamination activities as required by the HASP;
- Perform Site restoration activities (both on-site and in the bulkhead area) as required by the Technical Specifications and as directed by KeySpan; and
- Provide all necessary project coordination with KeySpan, PS&SPC and the CM.

1.2.2 Construction Manager

Construction Manager – Referred to as the "CM" throughout these Technical Specifications. The CM shall be responsible for providing site management and coordination activities throughout the implementation of the remedial construction activities, including the following:

- Participating in the advancement of the remedial design submittals;
- Providing overall management and coordination of site remedial construction processes and activities;
- Tracking contractor schedule progress;
- Receipt, review and distribution of contract submittals, including both technical and administrative (i.e. pay applications, change orders, change notifications, etc.) submittals;
- Facilitating weekly on-site remedial construction progress meetings; and
- Coordinating communication between the Contractor, subcontractors, KeySpan and PS&SPC.

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1.2.3 Design Engineer

Design Engineer – The Design Engineer for this project is PS&SPC. PS&SPC is responsible for ensuring that the construction activities are being performed in accordance with the NYSDEC approved 100% Remedial Design Report and associated Design Drawings and Technical Specifications. Other responsibilities include the following:

- Reviewing design submittals provided by the Contractor;
- Providing support to the CM during the remedial construction activities;
- Ensuring that the requirements of the remedial design are being achieved during the construction activities;
- Documenting deviations from the remedial design that are approved by the on-site NYSDEC representative; and
- Preparing the remedial action summary report upon completion of the remedial construction activities.

1.2.4 All work is to be performed in compliance with the Technical Specifications and Design Drawings and in strict adherence to all applicable federal, state, and local laws, rules, regulations, and codes.

1.2.5 The Contractor shall complete the appropriate Bid Form based on the Draft 95% Remedial Design Report (RDR). Upon award of the contracts by KeySpan, the Contractor is required to partake in the development of the remedial design to a construction level design (i.e. 100% RDR).

1.2.6 Any changes to this proposed work or sequencing shall be determined during the development of the final remedial design (i.e. 100% RDR). However, changes shall be accepted only if they result in net reductions to the cost of the project either through material/equipment/labor cost reductions or through a reduction in the project duration. The Contractor will be responsible for supporting the remedial design as required by KeySpan and/or PS&SPC.

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1.3 Submittals

1.3.1 Remedial Contractor:

During the development of the remedial design, the Contractor shall provide the following submittals to KeySpan and PS&SPC:

- Amendments to the Generic Health and Safety Plan;
- Amendments to the Generic Construction Quality Assurance Project Plan;
- A detailed CPM construction schedule;
- Required health and safety training certifications and medical clearance for all project personnel;
- MSDS sheets for all materials brought on-site;
- List of subcontractor(s) to be used;
- Site preparation details including the implementation of soil erosion and sediment control measures;
- Methods for protection of work and property;
- Methods for support and protection of impacted utilities;
- Procedures for locating and identifying the utilities around the perimeter of the Site and managing these utilities (i.e. cut and cap) as required to implement the planned remedial construction activities;
- Procedures for locating the existing active underground 33 kV electrical transmission/distribution line that is located along the northern boundary of the Site using soft dig techniques;
- Sequencing of work for the implementation of the remedial construction activities;
- Proposed equipment, supplies, materials, labor and methodology for implementing the proposed remedial construction activities;
- Proposed staging areas for equipment and materials;
- Proposed equipment and personnel decontamination areas;
- Procedures for demolition and removal of subsurface foundations (i.e. former gas holder, industrial piping, foundations and tunnel entrance)
- Procedures to ensure work does not undermine the foundations of adjacent streets and property;
- Procedures for implementing construction activities in proximity to overhead and underground utilities;
- Design submittal for the temporary fabric enclosure(s) to be utilized for the remedial excavation activities, including the number of enclosures and sizing;

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- Manufacturer's specifications and details on the VMS system(s);
- Procedures for erection and relocation of the temporary fabric enclosure;
- Proposed trucking subcontractors to be utilized including the number of trucks per day;
- Proposed disposal facilities to be utilized during the remedial work;
- Side slope stabilization methods (i.e. benching, shoring, etc.) to be utilized for the pre-trenching for the migration barriers and remedial excavation areas;
- Methods for excavation support in proximity to overhead utilities without encroaching on the required setbacks;
- Methods for subsurface utility exposure (i.e. removing overburden soil), protection, and utility support;
- Sources for backfill material including required certifications and analytical data;
- Procedures for identifying and work with materials suspected of containing asbestos;
- Mitigation procedures to be implemented for limiting of vibration, noise and fugitive odors during remedial construction; and
- Methods for Site security.

1.4 Remedial Design Development

The remedial design for the project shall culminate in a 100% Remedial Design Report (RDR) submission to the NYSDEC. The approval of the final 100% RDR by the NYSDEC shall mark the conclusion of the remedial design effort for the project. At that point in time, the Contractor shall prepare to mobilize for the remedial construction based on the remedial construction schedule included with the NYSDEC approved 100% RDR.

1.5 References

The following references are applicable to the work specified herein:

1.5.1 International Building Code, New York Edition, 2000.

1.5.2 New York State Department of Transportation Standard Specifications, latest edition.

1.5.3 Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations Standards 29 CFR 1910.120 and 29 CFR 1926.

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1.5.4 Local ordinances for Queens County and the City of New York.

1.5.5 Soil Erosion and Sediment Control Measures as specified in "New York Guidelines for Urban Soil and Sediment Control".

1.5.6 DER-10 (Technical Guidance for Site Remediation and Investigation (December 2002)

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 Pre-Mobilization and Submittals

After final submission of the 100% RDR, the Contractor shall prepare for remedial construction. The Contractor will be responsible for providing KeySpan and/or PS&SPC with the required submittals as listed in the Technical Specifications.

3.2 Mobilization, Site Preparation and Temporary Facilities

As specified in the Technical Specifications, mobilization, site preparation, and temporary facilities to be provided by the Contractor shall include furnishing all union labor, supervision, materials, tools, equipment, transportation, permits, and insurance necessary to provide the following in order to safely complete the project:

3.1.1 Mobilization of all equipment, labor, and materials to implement the proposed remedial construction activities;

3.1.2 All necessary temporary utilities and connections necessary to bring utility to work (power, water and telephone service);

3.1.3 Site support facilities (trailers, security station, barricades, parking, etc.);

3.1.4 Equipment and material staging areas;

3.1.5 Personnel decontamination and hygiene facilities;

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3.1.6 Equipment decontamination facilities;

3.1.7 Establishing work zones as discussed in the Generic HASP and Technical Specifications;

3.1.8 Temporary structures/security fencing around the work zones;

3.1.9 Access control to the site, truck route and construction areas; and

3.1.10 Site Communications (radios).

3.3 Support and Protection of the Existing Facilities

Prior to intrusive activities, the Contractor shall identify and document the locations of all existing structures, adjacent structures and facilities, above and below ground utility lines, monitoring wells, foundations and any other features identified by KeySpan, PS&SPC and/or the CM.

The Contractor shall protect and support all identified Site features. The Contractor shall repair any damage to protected structures and features during construction operations in accordance with applicable regulations and as approved by KeySpan, PS&SPC and/or the CM.

All work must also be completed without negatively impacting the surrounding communities. If coordination is necessary with adjacent property owners, the Contractor shall work with KeySpan to make the proper arrangements with the property owners. All outside communication shall be directed through KeySpan.

3.4 Site Clearing and Preparation

The Site shall be cleared by the Contractor as needed and as specified in Section 02110 - Site Clearing and Preparation. Clearing shall include the removal of vegetation as required and any on-site debris within the limits of the Site as shown on the Design Drawings. Any site clearing other than shown or not specified requires prior written approval from KeySpan, PS&SPC and/or the CM.

Construction activities shall be carried out so as to minimize erosion and silting in accordance with Specification Section 2120, Soil Erosion and Sediment Control Requirements, and requirements of local and state authorities having jurisdiction.

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Prior to commencement of land disturbance activities, temporary soil erosion and sediment control measures shall be installed and maintained by the Contractor for remedial activities as specified in Section 02120 and as shown on the Design Drawings.

Remedial activities will be performed so as to limit the potential for fugitive odor and dust emissions. Dust control will consist of water spraying or approved equivalent in accordance to the New York Guidelines for Urban Soil and Sediment Control. Dust control (e.g., water spray) and odor suppression measures (e.g., Biosolve^{TM}) shall be proposed by the Contractor, prior to the commencement of remedial construction. The Contractor shall implement dust and odor control measures as required by the Community Air Monitoring Plan (CAMP) or as directed by KeySpan, PS&SPC, the NYSDEC or the CM.

Other Site preparation activities to be preformed by the Contractor shall include but not be limited to establishing site haul roads, establishing existing conditions by photo documentation or surveying, decommission or relocation of existing utilities, establishing staging and laydown areas and furnishing all temporary facilities required to facilitate the implementation of the remedial activities.

Perimeter air monitoring for odors and dust will be performed by others and will comply with the CAMP.

Perimeter Cut and Cap

The following describes the anticipated approach to be implemented by the Contractor when locating and managing the utilities around the perimeter of the Site. However during the development of the remedial design into the 95% RDR submittal, the Contractor shall provide a design submittal detailing the means and methods that will be implemented during this work. The design submittal will be reviewed by KeySpan, PS&SPC and the CM.

Utility Location:

The Contractor shall locate, identify and disconnect underground utilities and piping that may enter or exit the perimeter of the Site in preparation for remedial excavation activities. In preparation for this work, the Contractor shall review the subsurface obstruction survey prepared for the Site. In addition, the Contractor shall contact the New York City – One Call Center to field locate and mark off-site utilities along the Site perimeter. KeySpan will field locate its utilities along the Site perimeter to the extent feasible. The Contractor is responsible for coordinating with all other pertinent utility

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companies in locating and managing the utilities that will be impacted during the planned remedial construction activities.

Trenching:

The Contractor shall excavate a two to three foot wide trench (depending on width of backhoe bucket) along the perimeter of the Site. Excavation of overburden material from the trench will involve hand digging and heavy equipment as necessary. The Contractor shall manually excavate and probe the surface of the excavation prior to soils being removed by a backhoe. The depth of the manual probe will average six to ten inches. The amount of soil removed from the trench by the backhoe will not exceed the depth of the previous manual probe in order to minimize the chance of a premature line break. After completion of the probe, the next cut shall be removed by the backhoe. Alternatively, soft dig techniques (i.e., use of Vactor or Guzzler-type equipment) can be used to excavate the trench and expose subsurface utilities. Upon discovery of subsurface features, hand excavation methods or soft dig techniques will be employed to identify the feature. The final depth of the trench will be limited to the deepest utility/piping or to a maximum depth of the groundwater table (approximately 8 feet bgs) or as directed by KeySpan, PS&SPC, and/or the CM.

Trench Stabilization/Shoring:

Temporary shoring shall be utilized by the Contractor to stabilize the sides of trench facing the exterior of the Site. On the Site-side of the trench, the excavations shall be benched back by the Contractor as required to provide a stable excavation side slope. The benching of excavations shall meet the applicable OSHA sloping requirements. Alternately, trench boxes may be utilized if Site conditions preclude the use of benching.

Material Stockpiling:

Soil stockpiles will be staged immediately adjacent to the trench within the Site boundary on top of a plastic sheeting, tarps, or other similar barrier are to be laid over the existing grade for temporary placement of excavated soil. Such stockpiles shall not conflict with OSHA set-back requirements for trenches/excavations. Stockpiled soils and debris will be visually evaluated by KeySpan and the NYSDEC for the presence of source material. Soil and debris judged to contain source material (based on visual observation and field screening techniques) will be returned to the trench only within the designated Shallow Excavation Areas. The location of such soils will be documented for subsequent excavation and off-site disposal. All other soils containing source material are to be staged on plastic and covered for management as waste material for off-site disposal.

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Any additional soils required to backfill the trench outside of the Shallow Excavation Areas will consist of certified clean fill. All staged waste material will be prepared for off-site disposal at an approved facility.

Utility Breaking/Plugging:

When a utility line or piping is located, the Contractor (in consultation with KeySpan, PS&SPC, and the CM), will identify the utility/line. If the utility/line appears to be active, a representative from the pertinent utility company will be contacted to evaluate the line and terminate the service, if required.

For utilities/lines that are determined to be inactive, initial penetration of the utility/pipe will involve use of spark-proof drilling tools to create a small hole in the utility/pipe. Access to the interior of the line will allow initial screening of the internal atmosphere with field screening instruments to determine the potential for explosion. Once screening has identified acceptable conditions within the line, a non-sparking saw, such as a "Nibbler", or similar, shall be utilized to cut and remove a section of pipe.

Utility/piping sections that will be cut and removed for purposes of line breaking and capping shall be visually examined for presence of asbestos or asbestos containing material. If present, a subcontractor meeting Federal, New York State and New York City asbestos licensing and permitting requirements will be utilized to address the utility/pipe. In general, the following requirements will be met:

- Adequately wet the asbestos material during removal;
- After wetting and removal, seal the piping and any associated asbestos waste in leak-tight containers while wet, or place in leak-tight wrapping (i.e., double bagged or wrapped);
- Label the container/wrapped waste with OSHA warning labels;
- Mark the container/wrapped waste with the name of the waste generator (KeySpan) and site address; and
- Load the containers/wrapped waste into transportation vehicles with appropriate asbestos warning labeling (40 CFR 61.149 (d)).

At all times during removal, handling, packing and transport, the asbestos material must be kept wet and the standard of "no visible emissions" of asbestos will be met.

Any residual material which drains from the line shall be collected and segregated for characterization and off-site transportation and disposal. Plugging of the line will require

the mixing and placing of grout (hydraulic cement) into the open end of the cut line. Bentonite will be mixed with the soils being placed as backfill adjacent to the plugged lines.

Dewatering:

Utility lines/piping are anticipated to be located above the groundwater table elevation. However, it is possible that some lines may extend below the groundwater table. If required (i.e. to facilitate the installation of sheet piles or similar deep impact activity), the Contractor will temporarily dewater the trench to access and cut/cap the line. Localized dewatering will be performed using a positive displacement pump at a low point in the trench. Generated fluids will be containerized for off-site disposal.

Underground 33 kV Electrical Transmission/Distribution Line Location:

In addition to the active overhead 33 kV electrical transmission/distribution line that extends along the southern side of Beach Channel Drive, there is an active underground 33 kV electrical transmission/distribution line that is located along the northern boundary of the Site. During the perimeter utility cut and cap work, the Contractor will identify the exact location and depth of this utility in order to eliminate potential electric power reductions or losses.

It is anticipated that the Contractor will use soft dig techniques (i.e., use of Vactor or Guzzler-type equipment) to excavate test pits along the known alignment of the underground 33 kV electrical line. Once the test pits are excavated, the location and elevation of the 33 kV electrical line will be surveyed by a Professional Surveyor licensed in the State of New York. The survey data will be utilized by the Contractor in order to ensure that the required set back requirements are being maintained.

Existing Utility Poles:

The Contractor will protect and support existing on-site utility poles that are actively in service and are within the planned remedial work areas. The Contractor will protect and support the existing on-site utility poles that are to remain in place in accordance with the requirements of the pertinent utility company.

3.5 Decontamination Pads and Activities

The decontamination pad(s) shall consist of an area of suitable size for decontamination purposes underlain by crushed stone or sand and lined with an impermeable liner

conforming to the requirements of Section 01066 at a location agreed to by KeySpan and/or PS&SPC. The Contractor may utilize a pre-fabricated decontamination pad(s) as pre-approved by KeySpan, PS&SPC and/or the CM.

Decontamination activities by the Contractor shall include the removal of contaminated soil, debris and other miscellaneous materials (i.e. industrial piping, demolition debris, etc.), construction equipment and tools utilized within the Exclusion Zone using a high-pressure low volume steam cleaner. Physical/mechanical agitation (scraping with hand tools) of soil can be utilized to minimize wastewater generation only if approved by KeySpan and/or PS&SPC.

3.6 Pre-Trenching Along the DNAPL Migration Barrier Alignments

In order to manage subsurface obstructions and utilities, a trench will be excavated by the Contractor along the proposed alignment of the migration barriers. The trench will be excavated to a depth of eight feet bgs (or immediately above the groundwater table, whichever is encountered first). The width of the trench will allow for the top of the sheeting to be driven to a terminal depth of two feet bgs. Any obstructions, such as former foundations and construction debris, encountered during the pre-trenching activities that have the potential of hindering the installation of the migration barriers will be removed by the Contractor and staged on-site for off-site disposal.

All excavations shall be excavated and benched to comply with OSHA 1926 Subpart P requirements for excavation. In areas where space limitations restrict benching, the Contractor shall install a shoring system (i.e., sheet piling) to stabilize the excavation as required. During the development of the remedial design, the Contractor shall provide design details of the shoring system to be utilized for review and approval by KeySpan and/or PS&SPC.

In the event that soil containing source material is encountered during the pre-trenching activities, the soil will be removed by the Contractor. The soil will be staged on-site where KeySpan and the NYSDEC representatives will make the determination as to whether or not the soil will be disposed of off-site. This determination will be based on visual observations and field screening techniques (i.e. PID readings).

It is anticipated that the trench will be backfilled with either excavated soil (non-source material containing soil) or clean off-site material to within three feet of the ground surface. The migration barriers will then be driven to two feet bgs as described below. Final backfilling of the remaining 3 feet of the trench will occur during installation of the

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site wide cap. In the bulkhead area, the final 3 feet of the trench will be backfilled during the construction of the soil cap.

3.7 Installation of Waterloo Barrier® Steel Sheet Piling Wall

The subsurface migration barriers, consisting of a Waterloo Barrier® sheet pile system, will be installed along the proposed alignments as depicted on the Design Drawing Drawings. The barriers will consist of unmodified Waterloo Barrier® EZ95 steel sheeting. Both the top and bottom 5 feet of each steel sheet will be reinforced to improve driving mechanics. The sheeting will be installed in a manner consistent with the field demonstration program and with manufacturer's recommendations.

All sheeting will be driven using a high frequency vibratory hammer due to both the relative speed of installation and lower noise and vibration generation compared to use of an impact hammer. The center 120 foot depth section of the on-site barrier will likely be installed first followed by the two 50 foot depth sections. The bulkhead area barrier will be installed after the completion of the on-site barrier.

Following installation of the sheets, the interlocks will be properly flushed to remove soils/debris. The full length of the interlock channels between each of the installed sheets will be flushed with clean water to remove soil/debris. Flush water will be allowed to percolate onto the ground surface immediately adjacent to the installed sheets. If necessary, in instances where interlock obstructions can not be cleared by standard flushing, high-pressure jetting or other approved methods will be employed to clear obstructions within the interlocks.

Finally, the seams in the sheet piles will be sealed with WBS-301 joint sealants as defined in the Technical Specifications.

3.8 Shallow Excavations

As depicted on the Design Drawings, excavation activities within the shallow excavation areas will consist of removing observed source material to a depth of 8 feet bgs (which approximates the depth to the groundwater table). Assuming an excavation depth of 8 feet bgs, the estimated volume of material to be removed by the Contractor from the proposed shallow excavation areas is estimated to be 88,000 cubic yards (in place). In addition, excavation outside of the designated shallow excavation area will occur to a depth of two feet bgs in order to accommodate installation of the site wide soil cap. However, the excavation depth for the construction of the cap may be less in those areas

of the Site where the proposed grade is higher than the existing grade. All areas of the Site will contain a two foot thick cap consisting of imported clean materials.

With the exception of the excavation activities required to construct the site wide cap and with exceptions to the portions of the Site where overhead restrictions are present, all remedial excavation activities within the Shallow Excavation Areas will be conducted within a temporary fabric enclosure(s) to control the release of volatile emissions and odors. Excavated material will be consolidated and loaded onto transport vehicles for off-site disposal by the Contractor under a temporary enclosure(s). The fabric enclosure(s) will be re-located, as necessary, as the remedial excavation activities progress.

If source material is visually observed to extend beyond the excavation boundaries, then excavation activities will extend horizontally beyond the boundaries to the extent feasible. The maximum horizontal expansion of the Shallow Excavation Area will be limited to the Site boundaries as shown on the Design Drawings. Excavation that has the potential to undermine existing public rights-of-way (i.e., sidewalks, roadways, infrastructure beyond the Site perimeter) will not be implemented. KeySpan, PS&SPC and the NYSDEC representative will make the final determination as to whether or not encountered material is constituted to be source material. The determination for removal will be based upon a combination of visual observations and field screening techniques.

3.9 Removal of Former MGP Features Within the Shallow Excavation Areas

Former MGP features including foundations, piping, tanks and other industrial features encompass a substantial portion of the Site. The majority of these features are below grade but there are some that can be seen at grade. As depicted on the Design Drawings, the existence of these features is the result of the former MGP operations that have occurred at the Site.

Former MGP Features Containing Source Material:

Former MGP features within the planned remedial excavation areas (that potentially contain source material) will be removed to the extent practical. In order to facilitate the removal of encountered structures that potentially contain source material, the excavation will be deepened to the extent practical.

Encountered foundations and similar structures will be demolished utilizing a hoe ram attachment on an excavator, backhoe or equivalent. After demolition, the debris will be prepared and decontaminated, as necessary, to meet the acceptance criteria of the selected disposal or recycling facility. Preparation will consist of demolishing the surface slabs

into pieces that are manageable and meet facility acceptance criteria. Decontamination of concrete debris will consist of pressure washing using a high pressure, low volume power washer. In addition, physical/mechanical agitation (scraping with hand tools) of soil may be utilized to minimize wastewater generation. Generated decontamination fluids will be containerized on-site where it will be characterized for off-site disposal.

Subsurface piping that contains product or product residue or exhibits elevated PID readings will be removed to the extent practical. Piping that extends beyond the perimeter of the Site, including into the existing electrical substation, will have any residual product evacuated through the use of vacuum extraction, high pressure water/steam or equivalent method to the extent practical. The final method of product evacuation will be determined in the field and will be based on the size and condition of the encountered piping. The piping will then be cut, capped and abandoned in place.

Former MGP Features Not Containing Source Material:

Former MGP features within the planned remedial excavation areas (that do not potentially contain source material) will be removed only to the planned excavation depth (i.e., 8 feet bgs). These features will be broken up in place as previously described and either re-used on-site as backfill material or disposed off-site as construction debris.

3.10 Construction of Site Wide Cap

In order to limit exposure pathways, a site wide cap consisting of 18 inches of well graded sandy soil topped with six inches of gravel will be constructed across the entire on-site area. The site wide cap will also be underlain with a geotextile fabric to serve as a demarcation barrier. In on-site areas outside of the Shallow Excavation Area, the top two feet of soil will be excavated where required to facilitate the construction of the cap. However, the excavation depth for the construction of the cap may be less in the areas of the Site where the proposed grade is higher than the existing grade. All areas of the Site will contain a two foot thick cap consisting of imported clean materials.

Within the Bulkhead Area, the existing topography is level with the sidewalk along Beach Channel Drive before sloping downward several feet toward the Channel. The Contractor shall remove the upper two feet from this plateau area and construct the soil cap. In addition, the Contractor shall extend the cap up to the existing steel sheet pile bulkhead. The Contractor will backfill the existing low lying areas of the Bulkhead Area to within two feet below the final finished grade and conduct all required excavations needed to establish the sub-grade for the soil cap. The Contractor shall extend and construct the soil cap in these areas up to the final finished grade. The cap within the

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Bulkhead Area will consist of a minimum of 18 inches of well graded sandy soil topped with six inches of topsoil capable of sustaining vegetation. The City of New York Parks and Recreation Department maintains the responsibility to perform all planting and seeding on the Bulkhead Area.

The remedial construction activities (i.e. pre-trenching, installation of migration barrier, and construction of the soil cap) within the bulkhead area shall be performed by the Contractor in a consecutive manner so as to minimize the total construction duration within this area.

On-Site Grading:

As depicted on the Design Drawings, the proposed grading plan for the on-site area includes a gradual slope from the perimeter of the on-site area toward the center of the Site. The intent of the grading plan is to contain the majority of rainwater runoff on-site and to minimize the amount of rainwater runoff leaving the on-site area. Currently, there are no provisions in the remedial design for the construction of on-site drainage systems (i.e., catch basins, drains, etc.) that would connect to the existing off-site storm water drainage system. The grading plan has been designed to promote rainwater runoff toward the center of the Site where it would be allowed to percolate into the subsurface soils. In order to enhance the percolation rate for on-site storm water runoff, the top layer of the site wide cap will consist of gravel. The Contractor shall tie in and match existing grades around the perimeter of the Site.

Proposed Bulkhead Area Grading:

As depicted on the Design Drawings, the proposed grading plan in the Bulkhead Area will include a gradual slope from the southern extent of the Bulkhead Area near Beach Channel Drive toward the north to the existing steel sheet pile bulkhead. Once the Bulkhead Area is graded to the finished elevations, the area will be vegetated to minimize the potential for erosion.

3.11 Noise Mitigation Measures

The Contractor shall implement noise mitigation measures during the implementation of the planned remedial construction measures. These measures shall consist of working within the defined working areas, strategically locating equipment away from receptors (i.e., blowers for VMS, etc.), utilizing sound attenuators on equipment, placement of sound attenuating barriers or panels around stationary equipment, driving single sheets

SECTION 01010
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for the Waterloo Barrier® sheet pile system, etc. The Contractor shall propose the noise mitigation measures to be implemented during the development of the design.

3.12 Contract Requirements

The Contractor is advised that the work will be performed on a known contaminated site. The Contractor shall refer to Section 01065 regarding the Generic Health and Safety Plan (HASP). The Contractor shall comply with the requirements of this plan, along with the site specific amendments prepared by each, taking precautions as necessary to protect the public and work force personnel from potential hazards. The Contractor shall utilize personnel with approved OSHA certified training and medical clearance as specified in Section 01065 and the HASP.

For any work performed in close proximity to commercial properties, utilities or any other third party property, the Contractor shall utilize every precaution to protect the property, utility lines, trees, walls and other structures and related appurtenances from damage. Any damage that the Contractor may cause directly or indirectly shall be repaired or replaced in kind in a prompt manner as directed by KeySpan, PS&SPC and/or the CM at no additional cost to KeySpan.

The Contractor shall take all measures required to minimize adverse impacts from execution of the work on commercial and residential properties adjacent to the Site and shall not interfere with their operations and uses. The Contractor shall coordinate road and/or sidewalk closures, as necessary, with the City of New York prior to initiating work.

3.13 Contractor's Use of Premises

The Contractor shall use designated areas of the Site for storage. The Contractor shall identify storage, lay down and material handling facilities and locations with their bid submittal. These areas will be detailed in the Contractor's Understanding of Construction Practices.

3.14 Other Requirements

The Contractor is notified that representatives of regulatory agencies from New York State, the City of New York and other local civic organizations may be on-site to observe and inspect the work. Communications with non-regulatory agency personnel shall be directed to KeySpan or their designee.

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The Site entry gates shall be maintained closed at all times. The Contractor is notified as to the high sensitivity of this project and the need to properly manage the work area to ensure it is maintained in a clean and orderly condition at all times. Additionally, Site related hazards are to be monitored and controlled in order to prevent the risk of exposure to members of the community.

The Contractor will not conduct any work activities on the Site outside of the permitted working hours (Monday through Friday, 7:00 am to 5:00 pm) without advance approval.

Transport trucks may only access the Site for delivery and off-site transport between the hours of 9:00 AM and 2:00 PM, Monday through Friday.

It is the responsibility of the Contractor to call for a utility survey and to immediately notify KeySpan, PS&SPC and/or the CM of underground utilities when construction, excavation, or other work may affect such utilities.

The Contractor shall comply with all the requirements of the permits, which have been obtained by the Contractor and KeySpan.

END OF SECTION

SECTION 01011
SITE DESCRIPTION

PART 1 - GENERAL

1.1 Site Description

The Rockaway Park Former Manufactured Gas Plant (MGP) Site (Site) is located in an area of Rockaway Park, New York within Queens County. The Site consists of two areas; the "on-site area" which is owned by KeySpan, is approximately 9.8 acres in size and the bulkhead area which is owned by the City of New York and is approximately 0.7 acres in size. The area surrounding the property is a relatively flat, densely populated commercial zone with Jamaica Bay located adjacent to the site on the northerly boundary.

An active KeySpan natural gas regulator station was formerly located in the southeastern portion of the Site. KeySpan has relocated the gas regulator station off-site in order to allow for the planned remedial construction activities to be implemented. An active electric substation is located in the northwestern portion of the Site and will remain operational during the duration of the remedial construction activities. No remedial construction activities are planned within the electric substation area.

A vacated three-story office building and a one-story former workshop building was formerly located in the northern central portion of the Site. The buildings have been demolished in March 2007 in order to accommodate the installation of the Waterloo Barrier® Steel Sheet Pile system.

In the Technical Specifications, the on-site area refers to the portion of the Site located to the south of Beach Channel Drive. The bulkhead area refers to the strip of land located to the north of Beach Channel Drive and to the south of Jamaica Bay that was created during the 1920's when Beach Channel Drive was constructed. The on-site area and the bulkhead area are connected through an existing subsurface tunnel that runs underneath Beach Channel Drive and is mostly filled with various materials and debris.

1.2 Adjacent Properties to the Rockaway Park Site

Properties immediately abutting the former MGP include the following:

- *North – Beach Channel Drive*. North of Beach Channel Drive is a New York City owned strip of land encompassing approximately 0.6 acres (bulkhead area, considered part of the former MGP site), further to the north is Jamaica Bay.
- *East – Beach 108th Street*. East of Beach 108th Street is a New York City sewage treatment plant.
- *South – Rockaway Freeway.* South of Rockaway Freeway are the Metropolitan Transit Authority (MTA) subway tracks and a rail yard. Further to the south is a residential area of Rockaway Park.

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- *West – Rockaway Freeway.* West of Rockaway Freeway are properties occupied by auto service and retail businesses.

1.3 Rockaway Park History

Operations at the Site began in the late 1870s. The MGP plant was initially operated by Rockaway Electric Light Company, Town of Hempstead Gas and Electric Company and later by the Queensboro Gas and Electric Company from the late 1870s to 1926. In 1926, Queensboro Gas and Electric Company became a subsidiary of the Long Island Lighting Company (LILCO). LILCO operated the MGP plant from 1926 to approximately 1958 when most of the facilities were demolished. In 1998, KeySpan Corporation acquired the Site through a merger of LILCO and the Brooklyn Union Gas Company.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 Summary

1.1.1 Measurement and payment, as summarized in the bid form, constitutes all of the pay items for the completion of the work by the Contractor. No direct or separate payment will be made for providing miscellaneous temporary or accessory work, services, Subcontractor's field offices, layout surveys, job signs, sanitary requirements, testing, safety devices, water supplies, power, managing traffic, bonds, insurance, and all other requirements of the Technical Specifications unless directed or approved by KeySpan and/or PS&SPC. Compensation for all such services, items and materials shall be included in the prices stipulated for the lump sum and unit pay items listed herein.

1.1.2 The estimated quantities for the unit bid prices shall be verified by the Contractor in the field. The nature and the limits encountered below the surface of the ground and the limits of contaminated materials are based on previous Site investigations and reviews of historical Site drawings. The scope of work and quantities detailed within this section of the Technical Specifications are based on information presented in the Record of Decision and the Remedial Design Work Plan. KeySpan reserves the right to increase or decrease any quantity or to eliminate any line item as a result of actual conditions encountered during the performance of the Work, as KeySpan and PS&SPC may deem necessary. The Contractor will not be entitled to any adjustment in a unit bid price. The Contractor agrees to accept the aforesaid unit bid prices for use in computation of the value of work performed for progress payments as complete and total compensation. The estimated quantities on the Bid Form are for bidding purposes only. Contractor shall verify the actual quantities in the field.

1.1.3 Contractor shall submit an hourly labor rate breakdown to include all dues and insurance without profit and overhead for each of the union trades and management supervision.

1.1.4 Contractor shall also submit a list of equipment to be utilized with corresponding rates. Specify if equipment is a rented or owned.

1.1.5 The rates on the Contractor Bid Form should be based on performing the specified work in Level D Personal Protective Equipment (PPE).

1.1.6 Contractor shall be aware of the completion dates and adhere to the Project Schedule.

SECTION 01025
MEASUREMENT AND PAYMENT

1.1.7 The attached Bid Price Form includes a section for additional pricing if required during the implementation of the remedial work. The potential additional work includes dewatering during the removal of subsurface obstructions along the alignment of the migrations barriers, field modifications of the Waterloo® Barrier system, and performing remedial work utilizing Level C and Level B PPE.

1.2 Submittals

1.2.1 Schedule of Values

The Contractor shall prepare and submit a schedule of values in accordance with Section 01026.

1.2.2 Monthly Invoices

As Bid Items are completed, the Contractor shall submit an invoice for the completed work item as detailed within Part 3, Execution.

1.2.3 Bid Form

Contractor to submit copy of Attached Bid Price Form, located at the end of this Section, signed and sealed with a Company Seal by a Company Officer.

PART 2 - PRODUCTS

Not Used

PART 3 – EXECUTION

Basis of Payment: The items listed below shall be paid on a lump sum or unit price basis upon receipt of a duly executed invoice with detailed support documentation. Payment shall not be made unless all the proper support documentation has been submitted and approved by KeySpan, the Construction Manager (CM) and/or PS&SPC.

3.1 Design Support for the 95% and 100% Remedial Design Reports

Due to the nature of the remedial construction, the Contractor shall be awarded the remedial work based on the Draft 95% Remedial Design Report, Design Drawings and the Technical Specifications. The Contractor will become an integral team member

during the development and advancement of the remedial design. In order to complete the final design, the Contractor shall work with KeySpan and PS&SPC to complete the 95% and 100% RDR submittals. As detailed in the Technical Specifications, the Contractor shall provide the required information to be incorporated into the remedial design. This Bid Item includes providing design submittals as required by the Technical Specifications to support the development of the remedial design and providing KeySpan and PS&SPC with design submittals in AutoCAD format (Version 2004 or most recent). This Bid Item shall include design support up to when the 100% RDR is approved by the NYSDEC. The Contractor shall provide a price for this support as detailed on the Bid Price Form.

Basis of Payment – This item shall be paid on a unit rate basis as detailed on the Bid Price Form and upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan.

3.2 Design Support Meetings for the 100% Remedial Design Report

During the development of the remedial design, the Contractor shall attend meetings at the Site in support of the remedial design development. The Contractor shall provide a price for this support as detailed on the Bid Price Form.

Basis of Payment - This item shall be paid on a unit rate basis as detailed on the Bid Price Form and upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan.

3.3 Pre-Mobilization and Submittals

Method of Measurement - Measurement shall be based upon the preparation, submission, and resubmission of all required submittals specified under Sections 01330, 01400, 01500, and 01720 of these Technical Specifications.

Basis of Payment - This item shall be paid on a lump sum basis upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan, PS&SPC, and/or the CM.

3.4 Mobilization & Temporary Site Facilities

Method of Measurement - Measurement shall be based upon the completion of the work specified under Section 01500 of the Technical Specifications. This Bid Item includes, but is not limited to, selection of staging areas for materials and equipment; decontamination areas; support areas; and mobilization of supervision, labor, and equipment needed to implement the remedial work. In addition, this Bid Item includes

establishing all temporary facilities (i.e., electrical, water, communications, etc.) that would be required to perform the remedial work, equipment maintenance and support, etc.

Basis of Payment - This item shall be paid on a lump sum basis upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan, PS&SPC and the CM.

3.5 Site Clearing and Preparation

Method of Measurement - Measurement shall be based upon the completion of the work specified under Section 01500 and Section 02110 of the Technical Specifications. This Bid Item includes establishing on-site traffic routes, clearing and grubbing of work areas, temporary removal of on-site fencing, implementation of soil erosion and sediment control measures, establishing existing conditions by photo/video documentation, establishing decontamination areas, temporary decommission or relocation of existing utilities, protection and support of existing utilities, and furnishing all temporary facilities required to facilitate the implementation of the remedial activities. This Bid Item shall include locating and identifying the utilities around the perimeter of the Site and managing those utilities (i.e., perimeter cut and cap) as required to implement the planned remedial construction activities. This Bid Item shall also include locating the active underground 33 kV electrical transmission/distribution line that is located along the northern boundary of the Site using soft dig techniques while also adhering to the requirements of the Long Island Power Authority (LIPA).

Basis of Payment – Site clearing and preparation activities shall be paid on a lump sum basis upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan, PS&SPC, and the CM. The perimeter utility cut and cap and underground 33 kV electrical line location activities shall be paid on a unit price basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice.

3.6 Decontamination Pad(s)

Method of Measurement - Measurement shall be based upon constructing (or providing pre-fabricated pads) and maintaining the decontamination pads and associated equipment specified within Section 01066 of the Technical Specifications.

Basis of Payment - This item shall be paid on a lump sum basis upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan, PS&SPC and the CM.

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MEASUREMENT AND PAYMENT

3.7 Decontamination Activities

Method of Measurement - Measurement shall be based upon performing the necessary decontamination of all personnel, heavy equipment, shoring, tools and other equipment used by the Contractor to complete the work and as specified within Sections 01066 and 01780 of the Technical Specifications and to the satisfaction of KeySpan, PS&SPC and/or the CM. This Bid Item also includes on-site containerization and handling of generated decontamination fluids, proper disposal of all Site generated decontamination fluids, removal of all equipment and materials and the decontamination of any components that are to be salvaged for reuse by the Contractor.

Basis of Payment - This item shall be paid on a lump sum basis upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan, PS&SPC and/or the CM.

3.8 Surveying Activities

Method of Measurement – Measurement shall be based upon providing all labor, material, equipment, incidentals, and supervision necessary to perform a pre-remedial survey of the Site; establish work limits, establish and maintain horizontal and vertical survey controls and establishing work limits; establishing the extent of excavation activities (both horizontally and vertically); verifying quantities in the field, establishing the locations and elevations of utilities, and preparing and submitting as-built drawings. A Professional Surveyor licensed in the State of New York shall conduct all the required surveying as specified within Sections 01050 and 01720.

Basis of Payment - This item shall be paid on a lump sum basis upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan, PS&SPC and/or the CM.

3.9 Abandonment of Existing Environmental Wells

Method of Measurement – Measurement shall be based upon providing all labor, material, equipment, incidentals, and supervision necessary to perform the abandonment of existing environmental wells MW-01, MW-05S, MW-05I, MW-06I, MW-07S, MW-07I, MW-07D, MW-07D2, MW-09I, MW-09D, MW-09D2, MW-12S, MW-12I, MW-12D, MW-12D2, MW-13S, MW-13I, MW-13D, MW-13D2, MW-15I, MW-15D, MW-18I, MW-18D, MW-A, PZ-01, PZ-02, PZ-03, PZ-04, PZ-05, and PZ-08 by a New York licensed driller in accordance with the New York State Department of Environmental Conservation (NYSDEC) Region 1-Water Unit Specifications for Abandoning Wells and Boreholes in Unconsolidated Materials as specified within Section 02610.

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This Bid Item shall also include the protection and support of existing environmental wells that are located within the Site and may be adversely impacted by the planned remedial construction activities. Measurement shall be based upon satisfactorily protecting and supporting existing environmental wells MW-02, MW-03, MW-08S, MW-08I, MW-08D, MW-08D2, MW-10S, MW-10I, MW-14S, MW-14I, MW-14D, MW-14D2, PZ-06. The Contractor shall propose how the environmental wells are to be protected and supported during the development of the remedial design. If required by KeySpan, PS&SPC, and/or the CM, this Bid Item will also include restoring the filter pack around the well screen, replacement of damaged portions of each well, and replacement of the well stickup or concrete well pad, and re-surveying.

Basis of Payment – The bid item for environmental well abandonment shall be paid on a per well basis upon receipt of a duly executed invoice and as confirmed by certified surveys (if required by KeySpan). For bidding purposes only, the estimated number of environmental wells that require abandonment by a New York licensed driller is 30 existing wells as listed above. The Contractor is to verify the number of existing environmental wells to be abandoned in the field. The bid item for the protection and support of existing environmental wells shall be paid on a per well basis upon receipt of a duly executed invoice and as confirmed by certified surveys (if required by KeySpan). For bidding purposes only, the estimated number of environmental wells to be protected by the Contractor is 13 existing wells as listed above. The Contractor is to verify the number of existing environmental wells to be protected and supported in the field.

3.10 Pre-Trenching up to 8 Feet Along DNAPL Barrier Alignments

Method of Measurement – Measurement shall be based upon all labor, material, equipment, incidentals, and supervision necessary to perform the excavation along the proposed alignment of the DNAPL migration barriers down to the existing groundwater table (i.e., 8 feet bgs). The Contractor may need to expand the trenching to facilitate removal of subsurface obstructions. This Bid Item shall also include removal, handling, segregation, and staging of soils and materials determined to contain source material. KeySpan and/or PS&SPC, in consultation with the NYSDEC, shall make the final determination as to whether or not soil and materials are deemed to contain source material. This determination shall be based on visual observations and field screening techniques (i.e., PID monitoring). The costs associated with expanding the trench to facilitate removal of subsurface obstructions or to pursue source material outside the Shallow Excavation Area shall be paid on the unit cost basis provided on Bid Item No. 3.14 (Excavation of Shallow Excavation Areas) of the Bid Price Form. This Bid Item shall also include benching in accordance with OSHA standards and as approved by KeySpan, PS&SPC and/or the CM.

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Basis of Payment – The Bid Item shall be paid on a linear foot basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice and as confirmed by certified surveys. The Contractor is to verify the trenching quantity in the field by certified surveys (i.e., survey prepared by a Professional Surveyor licensed in the State of New York) of the installed DNAPL migration barriers.

3.11 Installation of Waterloo Barrier® Sheet Pile System

Method of Measurement: Measurement shall be based on providing all labor, material, equipment, and incidentals required to install the Waterloo Barrier® system. The containment barrier shall be installed according to the Waterloo Barrier® manufacturer requirements, the Design Drawings, the Technical Specifications and the previously completed field demonstration program. A QA/QC representative(s) shall be present during the installation of the Waterloo Barrier® system. In addition, this Bid Item shall include the design and construction of utility penetrations through the barrier. This Bid Item shall include utilizing a sheeting rack system and adhering to the installation procedures as detailed in Section 02261. This Bid Item shall also include all welding, splicing, and reinforcements that are required in order to install the Waterloo Barrier® system to the design depths.

Basis of Payment: Installation of the Waterloo Barrier® system shall be paid on a square foot basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice. The Contractor is to verify the area in the field using certified surveys (i.e., survey prepared by a Professional Surveyor licensed in the State of New York) and will be paid only for quantity installed as agreed upon by KeySpan, PS&SPC and/or the CM.

3.12 Joint Flushing of Waterloo Barrier® Sheet Pile System

Method of Measurement: Measurement shall be based on providing all labor, material, equipment, supervision and incidentals required to flush the connections between the Waterloo Barrier® system sheet pile joints to their terminal depth. The flushing of the joints shall be in accordance with Waterloo Barrier® recommended procedures. A Waterloo Barrier® QA/QC representative shall be present during the joint flushing operations.

Basis of Payment: The flushing of the joints shall be paid on a linear foot of joint basis as detailed on the Bid Form upon receipt and approval of a duly executed invoice. The Contractor is to verify the area in the field using certified surveys and will be paid only for areas with joints that are flushed as agreed upon by KeySpan, PS&SPC and/or the CM.

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3.13 Joint Grouting of Waterloo Barrier® Sheet Pile System

Method of Measurement: Measurement shall be based on providing all labor, material, equipment, supervision and incidentals required to grout the interlocks of the Waterloo Barrier® system to their terminal depths. The material and procedures used in the grouting operation shall be in accordance with Waterloo Barrier® recommended procedures. A Waterloo Barrier® QA/QC representative shall be present during the joint grouting operations.

Basis of Payment: The grouting of the joints shall be paid on a linear foot of joint basis as detailed on the Bid Form upon the receipt and approval of a duly executed invoice. The Contractor is to verify the area in the field using certified surveys and will be paid only for areas with joints that are grouted as agreed upon by KeySpan, PS&SPC and/or the CM.

3.14 Excavation of Shallow Excavation Areas

Method of Measurement - Measurement shall be based upon performing the base scope excavation of materials within the Shallow Excavation Areas down to a depth of 8 feet bgs (which approximates the depth to groundwater) as depicted on the Design Drawings and as specified within Sections 02111 and 02300 of the Technical Specifications. This Bid Item includes the excavation of materials from the Shallow Excavation Areas; all equipment necessary to perform the excavation of material from the designated excavation areas; removing, sorting and stockpiling soil, miscellaneous asphalt, masonry, former industrial piping, foundations, tanks, drywells, and other debris; dust and odor control; and material handling and loading of disposal vehicles or containers for transportation off-site.

Basis of Payment – The bid item for remedial excavation shall be paid on an in-place cubic yard basis upon receipt and approval of a duly executed invoice and as confirmed by certified surveys. For bidding purposes only, the estimated in-place amount to be removed is approximately 88,000 cubic yards. This estimated quantity does not include volume associated with excavation benching. The Contractor is to verify volumes in the field by a Professional Surveyor licensed in the State of New York and will be paid only for quantities removed. Actual volumes to be based on field measurements as agreed upon by KeySpan, PS&SPC and/or the CM. The bid item for removal of former MGP features (i.e. foundations, tanks, drywells, etc.) shall be paid on a per ton basis and shall only include those features which cannot be removed by conventional excavation equipment.

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This Bid Item shall also include a pay item for re-using Former MGP Features (not containing source material) on-site as backfill material. This Bid Item shall include handling, backfilling, and compacting, all necessary pre-conditioning or preparation work to use the material as backfill. An allowance has been provided in the Bid Price Form to address costs associated with required sampling and laboratory analyses. The allowance includes labor, material, equipment, incidentals, supervision and subcontractor costs necessary to conduct the sampling and analyses.

3.15 Installation of Sheet Piling to Support Shallow Excavation Areas

Method of Measurement - Measurement shall be based upon performing the base scope shoring to support the remedial excavation areas that cannot be benched back due to space limitations as specified in Section 02260 and as depicted on the Design Drawings. This Bid Item includes providing all labor, material, equipment, services, incidentals, and supervision necessary to supply, install, maintain, and remove the temporary shoring system required to stabilize the remedial excavations within the Shallow Excavation Areas as depicted on the Design Drawings. This Bid Item shall also include the removal of surface and subsurface obstructions that may impede the installation of this shoring system. The design of the shoring system shall be signed and sealed by a Professional Engineer licensed in the State of New York.

Basis of Payment - This item shall be paid on a unit price basis upon receipt and approval of a duly executed invoice. The Contractor is to verify the quantity in the field by a Professional Surveyor licensed in the State of New York and will be paid only for quantities installed. Actual quantities to be based on field measurements as agreed upon by KeySpan, PS&SPC and/or the CM.

3.16 Benching of Excavations within Shallow Excavation Areas

Method of Measurement - Measurement shall be based upon the benching of the remedial excavation areas in locations where there are no space limitations as depicted on the Design Drawings. This Bid Item includes providing all labor, material, equipment, services, incidentals, and supervision required for benching necessary to stabilize the remedial excavations within the Shallow Excavation Areas as depicted on the Design Drawings. This Bid Item shall also include benching the excavations within the Shallow Excavation Areas in accordance with OSHA and/or as approved by KeySpan and/or PS&SPC. The material removed during the excavation benching shall be placed back into the excavation unless determined to be unsuitable by KeySpan, PS&SPC, the CM and/or the NYSDEC.

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Basis of Payment - This item shall be paid on a unit price basis upon receipt and approval of a duly executed invoice. The Contractor is to verify the in–place quantity in the field by a Professional Surveyor licensed in the State of New York and will be paid only for the in-place quantity removed.

3.17 Protection and Support of Excavation Areas in Proximity to Overhead Utilities

Method of Measurement - Measurement shall be based upon performing the base scope protection and support (i.e., trench boxes, timber lagging, etc.) of areas outside the Shallow Excavation Areas in proximity to existing overhead utilities in which steel sheeting cannot be installed due to mandated setbacks. These areas are identified to be along the northern and southeastern extent of the Shallow Excavation Area. This Bid Item includes providing all labor, material, equipment, services, incidentals, and supervision necessary to supply, install, maintain, and remove the temporary protection and support system required to stabilize the areas outside the Shallow Excavation Areas in proximity to existing overhead utilities as depicted on the Design Drawings. The design of the protection and support system shall be signed and sealed by a Professional Engineer licensed in the State of New York.

Basis of Payment - This item shall be paid on a unit price basis upon receipt and approval of a duly executed invoice. For bidding purposes only, the approximate length of the areas outside the Shallow Excavation Areas in proximity to overhead utilities and that require protection and support is 520 feet. The Contractor is to verify the quantity in the field by a Professional Surveyor licensed in the State of New York and will be paid only for quantities installed. Actual quantities to be based on field measurements as agreed upon by KeySpan, PS&SPC and/or the CM.

3.18 Fabric Enclosure(s) for Shallow Excavation Areas

Method of Measurement – Measurement shall be based on providing all labor, materials, equipment, and incidentals required for supplying, erecting, maintaining, and dismantling fabric enclosure(s) and vapor management system(s) as specified under Section 13120 of the Technical Specifications. The design of the fabric enclosure(s) and vapor management system(s) shall be signed and sealed by a Professional Engineer licensed in the State of New York. The dimensions and number of fabric enclosure(s) shall be proposed by the Contractor and will require review and approval by KeySpan and/or PS&SPC. This Bid Item shall also include obtaining any required building permits or approvals. This Bid Item shall include conducting require field testing for the enclosure's anchorage system. This Bid Item shall include satisfactory start up and testing of the vapor management system(s), ongoing monitoring and maintenance, necessary change

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out of filter media, removal and disposal of filter media, and final removal of the vapor management system(s) as approved by KeySpan, PS&SPC and/or the CM.

Basis of Payment - This item shall be paid on a lump sum basis upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan, PS&SPC and/or the CM.

3.19 Relocation of Fabric Enclosure(s) during Remedial Excavations

Method of Measurement – Measurement shall be based on providing all labor, materials, equipment, and incidentals required to relocate the fabric enclosure(s) from one area of the Site to the other, if necessary, during the remedial excavation activities. This Bid Item shall include relocation of the vapor management system(s) and other associated equipment. The design of each fabric enclosure shall include the ability to relocate the structure within the Site limits. The fabric enclosure(s) shall be relocated in accordance with the manufacturer's recommendations/instructions and the Contractor shall be responsible for any damages incurred during the relocation process. The design of the fabric enclosure(s) and vapor management system(s) referenced in item 3.18 above shall account for the planned number and methods of relocation. No standby time shall be granted during the relocation of the fabric enclosures. Each fabric enclosure's vapor management system and related appurtenances shall also be relocated in accordance with manufacturer's recommendations/instructions.

Basis of Payment - This item shall be paid on a lump sum price basis upon receipt and approval of a duly executed invoice as detailed on the Bid Price Form. The Contractor will be paid only for actual enclosure relocations performed as agreed upon by KeySpan, PS&SPC and/or the CM.

3.20 Material Costs for Backfill within Shallow Excavation Areas

Method of Measurement - Measurement shall be based on providing all labor, material, equipment, incidentals, and supervision necessary to provide backfill to the Site from an off-site NYSDOT-approved source or other KeySpan-approved sources, as approved by the NYSDEC. This Bid Item shall be based on a per ton basis and shall include providing the required documentation and analytical data as detailed in the Technical Specifications.

Basis of Payment – The base item shall be paid on a unit rate basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice and delivery tickets. Contractor is to verify quantity in the field using delivery tickets and will be paid only for

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actual tonnage brought on-site. Actual quantities to be based on delivery tickets as agreed upon by KeySpan, PS&SPC and/or the CM.

3.21 Backfilling and Compaction of Shallow Excavation Areas

Method of Measurement - Measurement shall be based on providing all labor, material, equipment, incidentals, and supervision necessary to backfill the Shallow Excavation Areas to specified grades. This Bid Item shall be based on an in-place compacted volume and shall include handling, backfilling the excavations and compaction in accordance with the Contract Documents. This Bid Item shall also include backfilling and compacting excavated on-site soils to be used as backfill and all required sampling and laboratory analytical costs.

Basis of Payment – The base item shall be paid on a unit rate basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice. The Contractor is to verify the quantity in the field by a Professional Surveyor licensed in the State of New York and will be paid only for quantity backfilled and compacted as agreed upon by KeySpan, PS&SPC and/or the CM.

3.22 Backfilling and Compaction of Pre-Trenching Along DNAPL Barrier Alignments

Method of Measurement - Measurement shall be based on providing all labor, material, equipment, incidentals, and supervision necessary to backfill and compact the excavations along the proposed alignment of the DNAPL migration barriers. This Bid Item shall include all equipment and materials necessary for backfilling and compacting the excavations as specified in Section 02300. In the event that removed soil is deemed unacceptable for re-use by KeySpan, PS&SPC, the CM and/or NYSDEC, this Bid Item shall include backfilling and compacting the pre-trench areas with supplemental off-site approved material brought to the Site. If required, the costs associated backfilling and compaction of the excavations along the DNAPL migration barrier alignment with off-site material will be paid on the unit cost basis provided on Bid Item No. 3.21 (Backfilling and Compaction of Shallow Excavation Areas) of the Bid Price Form.

Basis of Payment – The base item shall be paid on an in-place compacted unit rate basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice. Contractor is to verify quantity in the field using certified surveys (i.e., survey prepared by a Professional Surveyor licensed in the State of New York) of the installed DNAPL migration barriers as agreed upon by KeySpan, PS&SPC and/or the CM.

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3.23 Construction of Site Wide Cap in the On-Site Area

Method of Measurement - Measurement shall be based providing all equipment, materials, and labor necessary to construct the site wide cap as specified in the Contract Documents. This Bid Item shall also include performing the base scope excavation of the materials outside of the Shallow Excavation Areas down to 2 feet bgs as depicted on the Design Drawings and as specified within Section 02300 of the Technical Specifications to facilitate construction of the site wide cap. In addition, this Bid Item shall include installation of a geotextile demarcation liner in accordance with manufacturer's instructions and as specified in the Contract Documents. This Bid Item shall include constructing the site wide cap using the specified material to the planned finished grades as specified in the Contract Documents. This Bid Item includes all equipment necessary to perform the excavation of material from outside of the Shallow Excavation Areas; removing, sorting and stockpiling soil, miscellaneous asphalt, masonry, former industrial piping and other debris; dust and odor control; and material handling and loading of disposal vehicles or containers for transportation off-site. This Bid Item shall include removal of subsurface features to a depth of 2 feet bgs to facilitate the construction of the site wide cap.

Basis of Payment – The bid item shall be paid on an in-place cubic yard basis for excavation, an installed square yard basis for the geotextile demarcation fabric, and on a per ton compacted basis for the sandy soil and gravel as specified on the Bid Price Form and upon receipt and approval of a duly executed invoice and delivery tickets. The Contractor is to verify the excavation quantities in the field by a Professional Surveyor licensed in the State of New York and will be paid only for quantities removed. Backfill quantities shall be based on delivery tickets. All quantities shall be agreed upon by KeySpan, PS&SPC and/or the CM.

3.24 Construction of Soil Cap in the Bulkhead Area

Method of Measurement - Measurement shall be based providing all equipment, materials, and labor necessary to construct the soil cap within the Bulkhead Area as specified in the Contract Documents. This Bid Item shall include performing the base scope excavation of the materials within the plateau area down to 2 feet bgs as depicted on the Design Drawings and as specified within Section 02300 of the Technical Specifications to facilitate construction of the soil cap. This Bid Item includes all equipment necessary to perform the excavation of material from the designated excavation areas; removing, sorting and stockpiling soil, miscellaneous asphalt, masonry, former industrial piping and other debris; dust and odor control; and material handling and loading of disposal vehicles or containers for transportation off-site. This Bid Item shall include removal of subsurface features to a depth of 2 feet bgs to facilitate the

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construction of the soil cap. In addition, this Bid Item shall include installation of a geotextile demarcation liner in accordance with manufacturer's instructions and as specified in the Contract Documents. This Bid Item shall also include constructing the soil cap using the specified material to the planned finished grades as specified in the Contract Documents.

Basis of Payment – The bid item shall be paid on an in-place cubic yard basis for excavation, an installed square yard basis for the geotextile demarcation fabric, a per ton compacted basis for the sandy soil and gravel, a lump sum basis for the vegetation as specified on the Bid Price Form and upon receipt and approval of a duly executed invoice and delivery tickets. The Contractor is to verify the excavation quantities in the field by a Professional Surveyor licensed in the State of New York and will be paid only for quantities removed. Backfill quantities shall be based on delivery tickets. All quantities shall be agreed upon by KeySpan, PS&SPC and/or the CM.

3.25 Installation of DNAPL Recovery Wells

Method of Measurement – Measurement shall be based upon providing all labor, material, equipment, incidentals, and supervision necessary to install DNAPL recovery wells as depicted on the Design Drawings and as specified by the Technical Specifications by a New York licensed well driller in accordance with New York State Department of Environmental Conservation (NYSDEC) requirements. The proposed DNAPL recovery wells are RW-01A, RW-01B, RW-02A, RW-02B, RW-03, RW-04A, RW-04B, RW-05A, RW-05B, RW-05C, RW-06A, RW-06B, RW-07A, RW-07B, RW-08A, RW-08B, RW-09, RW-10, RW-11, RW-12A, RW-12B, RW-13A, RW-13B, RW-14A, RW-14B, RW-15A, RW-15B, RW-16A, RW-16B, RW-17A, and RW-17B.

Basis of Payment – The bid item shall be paid on a per well basis upon receipt of a duly executed invoice and as confirmed by certified surveys (if required by KeySpan). For bidding purposes only, the estimated number of DNAPL recovery wells to be installed by a New York licensed well driller is 8 wells.

3.26 Noise and Vibration Mitigation Measures

Method of Measurement – An allowance has been provided on the Bid Price Form to address potential noise and vibration mitigation measures that may be required by KeySpan and/or the NYSDEC. The allowance includes labor, material, equipment, incidentals, and supervision necessary to implement and maintain any required noise/vibration mitigation measures.

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Basis of Payment – The item shall be paid upon receipt and approval of a duly executed invoice and as approved by KeySpan. Only those mitigation measures approved in advance by KeySpan shall be eligible for payment under the allowance. Should these mitigation measures be not required (either fully or partially), this Bid Item shall not be paid by KeySpan.

3.27 Site Restoration and Demobilization

Method of Measurement – Measurement shall be based on providing all labor, materials, equipment, and incidentals required to restore the Site as detailed in Section 01780 of the Technical Specifications. This Bid Item includes final site grading, replacement of chain link fencing and gates and all other restoration activities as required by KeySpan and/or PS&SPC. In addition, this Bid Item shall be based upon removal of all personnel, equipment and materials from the Site in accordance with Section 01780 of the Technical Specifications.

Basis of Payment - This item shall be paid on a lump sum basis upon receipt and approval of a duly executed invoice. The Contractor shall provide a schedule of values for this Bid Item for review and approval by KeySpan, PS&SPC and/or the CM.

3.28 Contractor Standby Time

In the event delays in construction or temporary work stoppages occur for reasons beyond the Contractor's control, the Contractor shall be compensated for lost production in accordance with the unit hourly rate indicated on the attached Bid Price Form. This Bid Item shall not include standby time due to the Contractor's equipment malfunction or breakdown, equipment unavailability, material unavailability, failure to provide sufficient transport vehicles, labor unavailability, and all other causes not the direct fault of KeySpan, PS&SPC and/or the CM. The Contractor shall notify KeySpan, PS&SPC and/or the CM of when standby time has occurred or if possible, prior to the occurrence of standby. Payment basis for standby time shall be based on a daily written sign-off between the Contractor and KeySpan, PS&SPC and/or the CM. Standby time operations shall occur on weekdays (excluding normal holidays) during normal working hours and shall not exceed 8 hours in a 24-hour period of time. Unit cost shall be inclusive of all labor and equipment (as determined by KeySpan, PS&SPC and/or the CM). Payment will be based on actual number of hours (including pro-rated costs for partial stand-by hours) as agreed between the Contractor and KeySpan, PS&SPC and/or the CM. The Contractor shall not charge standby time for project delays resulting from improper coordination with the pertinent parties involved with this project.

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Basis of Payment - This item shall be paid on an hourly basis upon receipt and approval of a duly executed invoice. For bidding purposes only, the estimated standby time is 60 hours. The actual amount of standby time (if any) will be determined during construction.

3.29 Disposal of Generated Wastes

Method of Measurement – Measurement shall be based on providing all labor, materials, equipment, and incidentals required to provide all Transportation and Disposal (T&D) services for generated wastes during the implementation of the proposed remedial construction activities. This Bid Item shall include conducting all waste characterization sampling in accordance with the acceptance criteria for each of the approved disposal facilities proposed for use. This Bid Item shall include providing sufficient number of transport vehicles or containers adequately sized to support the proposed remedial construction activities on a daily basis, management of transport vehicles or containers (e.g., access, queuing, sequencing, timely arrival/departure). Transport vehicles shall not be allowed to queue within public right-of-ways and streets. This Bid Item shall also include implementing required odor control for the transport vehicles or containers for on-site and off-site transportation, conducting all necessary sampling for waste characterization (excluding in-situ sampling), all associated laboratory analytical costs, conducting all necessary coordination with KeySpan, PS&SPC and/or the CM and performing any pre-conditioning or preparation of wastes necessary to assure acceptance by the approved off-site disposal facility. This Bid Item shall also include management and transportation of generated wastes (in accordance with all applicable Federal, State and Local regulatory requirements) to the approved disposal facility, management of all documentation (i.e., manifests, Bills of Lading, Certificates of Destruction, etc.), and providing a completion letter report summarizing the above documentation for inclusion into the project file. The Contractor shall provide a credit to KeySpan for any recyclable material that is generated during the remedial construction activities and is of monetary value.

Basis of Payment – For off-site disposal of solid wastes, off-site disposal of liquid wastes, off-site disposal of construction and demolition debris, receipt of all certificates of destruction by KeySpan and/or PS&SPC, and off-site disposal of trash and other un-impacted solid wastes, these items shall be paid on a unit cost basis as detailed on the Bid Price Form. This unit price shall include disposal of solid wastes to the approved disposal facilities.

3.30 Field Modifications to Waterloo Barrier® Sheet Pile Wall (If Necessary)

Method of Measurement – Measurement shall be based on providing all labor, material, equipment, supervision and incidentals required to modify the Waterloo Barrier® system

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in the field. Such modifications shall be at the direction of KeySpan, PS&SPC and/or the CM with the concurrence of the NYSDEC.

Basis of Payment: The bid item shall be paid on a per sheet basis upon receipt and approval of a duly executed invoice. For bidding purposes only, the estimated number of Waterloo Barrier® system sheets that require modification is approximately 100 sheets. Actual quantities to be based on field measurements as agreed upon by KeySpan and PS&SPC.

3.31 In-Situ Waste Characterization (Optional)

Method of Payment - Measurement shall be based on providing all labor, materials, equipment, laboratory analysis and incidentals required to characterize waste materials in-place to meet disposal facility acceptance requirements.

Basis of Payment: This item shall be paid on a unit cost basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice and agreed upon by KeySpan, PS&SPC and the CM.

3.32 Armoring of Side Slope within Bulkhead Area (If Necessary)

Method of Payment - Measurement shall be based on providing all labor, materials, equipment, and incidentals required to armor the side slope within the Bulkhead Area with riprap stone and geotextile fabric. This Bid Item shall include excavation of the side slope to facilitate the armoring, the placement of geotextile fabric, and the placement of riprap stone. As detailed on Design Drawing C-04B, the armoring shall be placed in between the top of the slope and the bottom of the slope with an additional two foot extension at the base.

Basis of Payment – If selected by KeySpan, the Bid Item shall be paid on a lump sum basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice and agreed upon by KeySpan, PS&SPC, and the CM.

3.33 Dewatering Operations for Remedial Excavation (If Necessary)

Method of Measurement - Measurement shall be based on providing all labor, materials, equipment, and incidentals required for performing limited dewatering required during the remedial excavation activities as specified in Section 02240 of the Technical Specifications. This Bid Item shall include dewatering equipment and hoses, equipment operation, and on-site containerization of the dewatering volume.

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Basis of Payment - The Bid Item shall be paid on a unit basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice and as confirmed by actual containerized quantities.

3.34 Off-Site Disposal of Dewatering Fluids (If Necessary)

Method of Measurement - Measurement shall be based on providing all labor, materials, equipment, and incidentals required to provide all Transportation and Disposal (T&D) services for generated dewatering liquids (if required) during the implementation of the proposed remedial construction activities in accordance with the Technical Specifications.

Basis of Payment - The Bid Item shall be paid on a unit basis as detailed on the Bid Price Form upon receipt and approval of a duly executed invoice and as confirmed by actual containerized quantities as agreed upon by KeySpan, PS&SPC, and the CM.

3.35 Level C PPE Upgrade Daily Rate (If Necessary)

The unit rates provided by the Contractor on the Bid Price Form shall include performing the specified work in Level D personal protective equipment (PPE). Should the Contractor personnel be required by KeySpan and/or PS&SPC (in accordance with the HASP) to upgrade to Level C PPE in order to perform the remedial work, the Contractor would be paid for the total additional cost for work in Level C PPE on a daily basis. This daily rate shall include all personal protective equipment, support equipment, additional personnel (if needed), HASP revisions, and any increases in task durations caused by the PPE upgrade. KeySpan, PS&SPC and/or the CM reserve the right to terminate the work without further obligation in the event that an upgrade to Level C is necessary.

Basis of Payment - The Bid Item shall be paid on a total additional cost for work in Level C PPE on a daily basis as applied to the intrusive bid items included on the Bid Price as agreed upon by KeySpan, PS&SPC, and the CM upon receipt and approval of a duly executed invoice. Actual days in which the upgrade to Level C PPE is required shall be determined in the field.

3.36 Level B PPE Upgrade Daily Rate (If Necessary)

The unit rates provided by the Contractor on the Bid Price Form shall include performing the specified work in Level D personal protective equipment (PPE). Should the Contractor personnel be required by KeySpan and/or PS&SPC (in accordance with the HASP) to upgrade to Level B PPE in order to perform the remedial work, the Contractor would be paid for the total additional cost for work in Level B PPE on a daily basis. This

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daily rate shall include all personal protective equipment, support equipment, additional personnel (if needed), HASP revisions, and any increases in task durations caused by the PPE upgrade. KeySpan, PS&SPC and/or the CM reserve the right to terminate the work without further obligation in the event that an upgrade to Level B is necessary.

Basis of Payment - The Bid Item shall be paid on a total additional cost for work in Level B PPE on a daily basis as applied to the intrusive bid items included on the Bid Price as agreed upon by KeySpan, PS&SPC, and the CM upon receipt and approval of a duly executed invoice. Actual days in which the upgrade to Level B PPE is required shall be determined in the field.

Rockaway Park Former Manufactured Gas Plant Site
BID PRICE FORM

COMPANY NAME:	
COMPANY REPRESENTATIVE:	
REPRESENTATIVE'S SIGNATURE	
DATE:	

BID PRICING

Bid Item	Description of Item[1]	Unit	Quantity[2]	Base Unit Price	Base Bid Amount	Alternate Unit Price	Alternate Bid Amount
3.1	Design Support for 95% and 100% RDR Submittals • Administrative Personnel • Drafting Personnel • Design Personnel • Project Manager • Senior Technical Support • Expenses	 HR HR HR HR HR LS	 30 55 55 25 10 -				
3.2	Design Support Meetings for 100% RDR • Design Personnel • Project Manager • Senior Technical Support • Expenses	 HR HR HR LS	 36 36 12 -				
3.3	Pre-Mobilization and Submittals	LS	-	-		-	
3.4	Mobilization & Temporary Site Facilities	LS	-	-		-	
3.5	Site Clearing and Preparation	LS	-	-		-	
3.5A	Perimeter Cut and Cap	Day	30				

Bid Item	Description of Item[1]	Unit	Quantity[2]	Base Unit Price	Base Bid Amount	Alternate Unit Price	Alternate Bid Amount
3.5B	Locating 33 kV Underground Utility	Day	2				
3.6	Decontamination Pad(s)	LS	-	-		-	
3.7	Decontamination Activities	LS	-	-		-	
3.8	Surveying Activities	LS	-	-		-	
3.9	Abandonment of Existing Environmental Wells						
3.9A	Abandonment of Existing Shallow Environmental Wells	Each	12				
3.9B	Abandonment of Existing Intermediate Environmental Wells	Each	8				
3.9C	Abandonment of Existing Deep Environmental Wells	Each	10				
3.9D	Protection of Existing Environmental Wells	Each	13				
3.10	Pre-Trenching up to 8 Feet bgs Along DNAPL Barrier Alignments	LF	865				
3.11	Installation of Waterloo Barrier® System	SF	65,000				
3.12	Joint Flushing of Waterloo Barrier® System	LF	32,500				
3.13	Joint Grouting of Waterloo Barrier® System	LF	32,500				
3.14	Excavation of Shallow Excavation Areas	CY	88,000				
3.14A	Removal of Former MGP Features	Ton	50,000				
3.14B	Re-use of Former MGP Features as Backfill Material	Ton	20,000				
3.14C	Sampling & Analytical Costs for Re-using MGP Features On-site	Allowance		-	$10,000	-	$10,000

Bid Item	Description of Item[1]	Unit	Quantity[2]	Base Unit Price	Base Bid Amount	Alternate Unit Price	Alternate Bid Amount
3.15	Installation of Sheet Piling to Support Shallow Excavation Areas	SF	18,900				
3.16	Benching of Excavations within Shallow Excavation Areas	CY	3,825				
3.17	Protection and Support of Excavation Areas in Proximity to Overhead Utilities	LF	520				
3.18	Fabric Enclosure(s) for Shallow Excavation Areas	LS	-	-		-	
3.19	Relocation of Fabric Enclosure(s) during Remedial Excavations	LS	-	-		-	
3.20	Material Costs for Backfill Within Shallow Excavation Areas	Ton	132,000				
3.21	Backfilling and Compaction of Shallow Excavation Areas	CY	88,000				
3.21A	Backfilling and Compaction of Excavated On-site Soils	CY	22,000				
3.21B	Sampling & Analytical Costs for Re-using Excavated Soils as Backfill	Allowance		-	$10,000	-	$10,000
3.22	Backfilling and Compaction of Pre-Trenching Along DNAPL Barrier Alignments	LF	865				
3.23	Construction of Site Wide Cap (Within On-Site Area)						
3.23A	Excavation for Construction of Site Wide Cap (Outside Remedial Excavation Areas)	CY	9,870				

Bid Item	Description of Item[1]	Unit	Quantity[2]	Base Unit Price	Base Bid Amount	Alternate Unit Price	Alternate Bid Amount
3.23B	Installation of Geotextile Demarcation Fabric	SY	47,200				
3.23C	Material Costs for Sandy Soil	Ton	10,590				
3.23D	Backfilling and Compacting Sandy Soil	Ton	10,590				
3.23E	Material Cost for Gravel Top Layer	Ton	10,800				
3.23F	Backfilling and Compacting Gravel Top Layer	Ton	10,800				
3.24	Construction of Soil Cap in the Bulkhead Area						
3.24A	Excavation for Construction of Soil Cap within Bulkhead Area	CY	800				
3.24B	Installation of Geotextile Demarcation Fabric within Bulkhead Area	SY	3,600				
3.24C	Material Costs for Sandy Soil for Soil Cap within Bulkhead Area	Ton	2,500				
3.24D	Backfilling and Compacting Sandy Soil for Construction of Soil Cap within Bulkhead Area	Ton	2,500				
3.24E	Material Costs for Top Soil for Soil Cap within Bulkhead Area	Ton	820				
3.24F	Backfilling and Compacting Topsoil Layer for Construction of Soil Cap within Bulkhead Area	Ton	820				
3.24G	Bulkhead Area Vegetation	LS	-	-		-	
3.25	Installation of DNAPL Recovery Wells	Each	31				
3.26	Noise and Vibration Mitigation Measures	Allowance		$50,000	$50,000	$50,000	$50,000
3.27	Site Restoration and Demobilization	LS	-	-		-	

Bid Item	Description of Item[1]	Unit	Quantity[2]	Base Unit Price	Base Bid Amount	Alternate Unit Price	Alternate Bid Amount
3.28	Contractor Standby Time	HR	60				
3.29	Disposal of Generated Wastes						
3.29A	Off-site Disposal of Impacted Soils	Ton	148,000				
3.29B	Off-site Disposal of Impacted Materials (i.e. timber piles, railroad ties, root balls, etc.)	Ton	5,000				
3.29C	Off-site Disposal of Decontamination Fluids	Gal	20,000				
3.29D	Off-Site Disposal of Construction and Demolition Debris	Ton	30,000				
3.29E	Off-Site Disposal of Trash and Other Un-Impacted Wastes	Ton	3,000				

1 = Refer to previous sections for a detailed description of each bid item.
2 = Estimated quantities for bidding purposes only.

ADDITIONAL PRICING (IF WORK IS NECESSARY)					
Bid Item	**Description of Item***	**Unit of Measure**	**Estimated Quantity****	**Unit Price**	**Price**
3.30	Field Modifications to Waterloo Barrier® System	Per Sheet	100		
3.31	Waste Characterization Samples (In-Situ Characterization)	Each	200		
3.32	Armoring of Side Slope within Bulkhead Area	LS	-	-	
3.33	Dewatering Operations for Remedial Excavation	Gallon	10,000		
3.34	Off-site Disposal of Dewatering Fluids	Gallon	10,000		
3.35	Level C PPE Upgrade	Day	60		
3.36	Level B PPE Upgrade	Day	20		
3.37	Performance Bond	LS	1		

* = Refer to previous sections for a detailed description of each bid item.
** = Estimated quantity for bidding purposes only.

Abbreviations:
HR – Hours; LS – Lump Sum; CY – Cubic Yard; LF – Linear Feet; SF – Square Feet; LF – Linear Feet; SY – Square Yard.

END OF SECTION

SECTION 01026
SCHEDULE OF VALUES

PART 1 – GENERAL

1.1 Summary

This section includes the description and requirements of the Schedule of Values.

1.2 Description

The Schedule of Values is an itemized list that establishes the value or cost of each work component. It may, if necessary, be used as the basis for preparing progress payments and may be used as a basis for negotiations concerning additional work or credits which may arise during the development of this design into the subsequent 100% design. During the development of the remedial design, requirements and other input may be provided and incorporated into the remedial design. Quantities and unit prices shall be included in the schedule.

1.3 Preparation

1.3.1 The schedule shall show breakdown of labor, materials, equipment and other costs used in preparation of the Bid on a Pay-Item by Pay-Item basis as specified on the Contractor Bid Forms.

1.3.2 The cost shall be in sufficient detail to indicate separate amounts for each Pay Item.

1.3.3 Insurance, temporary facilities and job mobilization will be included. However, these items will be included for payment at a rate spread equally over the entire length of the construction portion of the project.

1.3.4 Use the Contract Bid Form as basis for the schedule format and identify each item with number and title in the Table of Contents. List sub-items of major products or systems as appropriate.

1.3.5 The Contractor shall specify anticipated worker classification, crew size, labor rates, work effort (hours), materials, and equipment needed to complete the elements included in the Schedule of Values

1.3.6 The Contractor will provide support values with data that will substantiate their correctness.

SECTION 01026
SCHEDULE OF VALUES

1.3.7 The sum of the individual values shown on the Schedule of Values must equal the total Contract Price.

1.3.8 Each item, excluding Design Support for 100% RDR Submission, shall include a directly proportional amount of the overhead and profit.

1.3.9 The schedule shall show the purchase and delivery costs for materials and equipment that the Contractor anticipates he shall request payment for prior to their installation.

1.4 Submittals

1.4.1 The Contractor shall submit the Schedule of Values with the bid documents.

1.4.2 The Contractor shall update the Schedule of Values in accordance with the above requirements for each approved change to the Contract.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01050
FIELD ENGINEERING FOR CONSTRUCTION PHASE

PART 1 – GENERAL

1.1 Summary

1.1.1 The Contractor shall provide all materials, items, operations or methods specified, listed or scheduled on the Design Drawings and Technical Specifications including all materials, labor, equipment and incidentals necessary and required to conduct proper surveys required to stake and layout the work.

1.1.2 All surveys shall be prepared and certified by a Professional Surveyor licensed in the State of New York and procured by the Contractor.

1.2 Related Sections

Section 01010	Summary of Work
Section 01720	Project Record Documents

1.3 Quality Control

All surveys, layouts and related work shall be performed under the supervision of and signed by a Professional Surveyor licensed in the State of New York.

1.4 Submittals

1.4.1 The name, address, telephone number, and New York registration number of the Professional Surveyor shall be submitted to KeySpan, PS&SPC and/or the CM for review and approval.

1.4.2 A certificate signed by the Surveyor certifying that elevations and locations of constructed features are in conformance with Contract Documents including any approved Field Change Request (FCR).

1.4.3 Any non-conformance shall be documented by a Field Change Request form (see 1.4.5 below) and is subject to review and acceptance by KeySpan, PS&SPC and/or the CM prior to final disposition (i.e., payment, corrective actions, etc.).

1.4.4 The Contractor, for review and approval by KeySpan, PS&SPC and/or the CM, a detailed Field Change Request form and procedure that will be used to document changes and non-conformances of the Contract Documents.

SECTION 01050
FIELD ENGINEERING FOR CONSTRUCTION PHASE

1.4.5 The Contractor shall submit a detailed "Request for Information" (RFI) to KeySpan, PS&SPC, and the CM that will be used to document requested clarifications or additional information to the Contract Documents.

1.4.6 The Contractor shall submit required design submittals to KeySpan, PS&SPC, and the CM using transmittal letters that specify the design submittal being transmitted, references a submittal numbering convention for tracking purposes, and lists the following actions to be taken by PS&SPC:

- No Approval Required
- Approval Required
- Response Required
- Revised and Resubmitted as Noted
- For Information Only

1.4.7 During construction, the Contractor shall submit a draft Field Change Request form documenting any and all changes, non-conformances and deviations from the Design Drawings and Technical Specifications. The Contractor shall not proceed with any work on an alleged change until the change is approved by KeySpan, PS&SPC and/or the CM except in case of emergency that is endangering life and property. Failure to do so shall result in not being compensated for additional work. The Contractor shall submit a written FCR no later than 48 hours of finding the changed condition.

1.5 Project Record Documents

1.5.1 The Contractor shall maintain on-site for review by KeySpan and/or PS&SPC, a complete, accurate log documenting any and all approved changes and control of survey work as it progresses.

1.5.2 Upon completion of the work, the Contractor shall submit Record Documents to the Field Engineer under the provisions of Section 01720 – Project Record Documents.

PART 2 – PRODUCTS

2.1 Materials

2.1.1 The Contractor shall provide all materials as required to properly perform the surveys, including, but not limited to, instruments, tapes, rods, measures, mounts

SECTION 01050
FIELD ENGINEERING FOR CONSTRUCTION PHASE

and tripods, stakes and hubs, nails, ribbons, other reference markers, and all else as required. All materials shall be of professional quality.

2.1.2 All lasers, transits, and other instruments shall be calibrated and maintained (according to standard survey practices and the manufactures specifications) for accuracy throughout the execution of the work. Calibration certificates shall be submitted to KeySpan and/or PS&SPC prior to the use of any instruments.

PART 3 – EXECUTION

3.1 General

3.1.1 The Contractor shall exercise extreme care during the execution of all phrases of the work to eliminate any disturbance to existing property and to the landscape in the areas surrounding the work site.

3.2 Inspection

3.2.1 The Contractor and shall verify with KeySpan and/or PS&SPC locations of site reference and survey control points prior to starting work. The Contractor shall promptly notify KeySpan, PS&SPC and/or the CM of any discrepancies discovered. The Contractor shall also verify layouts periodically during construction.

3.3 Survey Reference Points

3.3.1 The Contractor shall protect survey control points as shown on the Design Drawings prior to starting site work and preserve permanent reference points during construction. The Contractor shall not relocate site reference points without prior written approval from KeySpan, PS&SPC and/or the CM.

3.3.2 The Contractor shall promptly report to KeySpan, PS&SPC and/or the CM the loss, damage, or destruction of any reference point or relocation required because of changes in grades or other reasons. The Contractor shall replace dislocated survey control points based on original survey control at no additional cost to KeySpan, PS&SPC or the CM. Replacement of dislocated survey control points shall be performed by the previously accepted New York licensed Professional Surveyor who first performed the survey work.

SECTION 01050
FIELD ENGINEERING FOR CONSTRUCTION PHASE

3.4 Survey Requirements

3.4.1 The Contractor shall reference survey and site reference points to the provided control monuments and record locations of survey control points, with horizontal and vertical data, on Project Record Documents.

3.4.2 The Contractor shall establish lines and levels, locate and lay-out by instrumentation and similar appropriate means. If it becomes necessary to remove a grade marker for construction operations, the grade lines shall be maintained parallel and extending also at least one grade marker adjacent on each side.

3.4.3 The Contractor shall, with their own forces, obtain working or construction lines or grades as needed.

3.4.4 The Contractor shall furnish all materials and accessories (i.e., grade markers, stakes, pins, spikes, etc.) required for the proper location of grade points and lines.

3.4.5 All marks provided shall be carefully preserved and, if destroyed or removed without acceptance by KeySpan, PS&SPC and/or the CM, shall be reset at the Contractor's expense.

3.4.6 The cost of laying out the lines and grades, or marking other measurements required for an item of work will be considered as having been included in the unit or lump sum pricing for the item of work.

3.4.7 All work not performed with the methods and equipment as submitted by the Contractor and approved by KeySpan, PS&SPC and/or the CM shall be removed and replaced by the Contractor at his/her own expense unless instructed otherwise by KeySpan, PS&SPC and/or the CM.

3.4.8 It shall be the responsibility of the Contractor to keep KeySpan, PS&SPC and/or the CM informed of the times and places at which the Contractor intends to work in order for KeySpan, PS&SPC and/or the CM to have an ample opportunity to furnish and/or verify the lines and elevations with a minimum of inconvenience to or delay to the Contractor.

3.4.9 The Contractor shall have the actual locations of subsurface utility lines, such as storm water, gas, sanitary pipes, electrical conduit, etc. marked by the utility locating service prior to conducting any intrusive work.

SECTION 01050
FIELD ENGINEERING FOR CONSTRUCTION PHASE

3.4.10 The Contractor shall have the actual locations of subsurface utility lines, such as storm water, gas, sanitary pipes, electrical conduit, etc. encountered during construction surveyed and marked for the duration of the construction. The survey locations for the subsurface utility lines shall be documented in the Project Record Documents.

END OF SECTION

SECTION 01055
RESIDENT ENGINEERING SERVICES

PART 1 - GENERAL

1.1 Summary

1.1.1 The Contractor shall maintain a Resident Engineer at the Site at all times when work is being performed under this Contract. The Resident Engineer's primary responsibility is overall quality control for the work performed on site.

1.1.2 The Resident Engineer shall have a minimum of 5 years related remedial construction experience. The qualifications of the Resident Engineer shall be submitted to KeySpan, PS&SPC and/or the CM for acceptance during the bid phase. The Resident Engineer may also serve as the Contractor's Quality Control Engineer.

1.1.3 The Resident Engineer shall observe and inspect all work performed under the provisions of this Contract.

1.1.4 All technical work performed by the Contractor shall be under the direction and supervision of their respective Resident Engineer.

1.2 Related Sections

Section 01010	Summary of Work
Section 01050	Field Engineering
Section 01700	Execution Requirements
Section 01720	Project Record Documents

1.3 Quality Control

The Resident Engineer shall certify that all work performed under his direction is in accordance with applicable Technical Specifications, Design Drawings, Waterloo Barrier® Manufacturers QA/QC Standards and other Contract Documents.

1.4 Submittals

All final submittals required in this Contract shall be reviewed and approved by KeySpan, PS&SPC and/or the CM.

SECTION 01055
RESIDENT ENGINEERING SERVICES

1.5 Non-conformances

The Contractor shall submit a Field Change Request (FCR) Form documenting any and all proposed changes to the design and/or specifications, drawings, etc. for review and acceptance by KeySpan, PS&SPC and/or the CM. Prior to beginning construction, the Contractor shall submit, for review and approval to KeySpan, PS&SPC and/or the CM, a FCR template that shall be used as the basis for all future FCRs.

1.6 Request for Information

The Contractor shall submit a detailed "Request for Information" (RFI) to KeySpan, PS&SPC, and the CM that will be used to document requested clarifications or additional information to the Contract Documents. Prior to beginning construction, the Contractor shall submit, for review and approval to KeySpan, PS&SPC and/or the CM, a RFI template that shall be used as the basis for all future RFIs.

1.7 Design Submittals

The Contractor shall submit required design submittals to KeySpan, PS&SPC, and the CM using transmittal letters that specify the design submittal being transmitted, references a submittal numbering convention for tracking purposes, and lists the following actions to be taken by PS&SPC:

- No Approval Required
- Approval Required
- Response Required
- Revised and Resubmitted as Noted
- For Information Only

Prior to beginning construction, the Contractor shall submit, for review and approval to KeySpan, PS&SPC and/or the CM, a design submittal transmittal template that shall be used as the basis for all future design submittals.

PART 2 - PRODUCTS

Not Used

SECTION 01055
RESIDENT ENGINEERING SERVICES

PART 3 - EXECUTION

3.1 General

3.1.1 Each Resident Engineer shall be the Contractor's employee with overall responsibility to ensure and certify that work is completed in accordance with applicable Design Drawings, Technical Specifications, Manufacturers Specifications and other Contract Documents.

3.1.2 KeySpan, PS&SPC and/or the CM shall have the right of acceptance and rejection of any personnel assigned by the Contractor to perform as the Resident Engineer.

3.1.3 Any non-conformance or deviation from the Contract Documents shall be documented by a Field Change Request form and subject to review and acceptance by KeySpan, PS&SPC and/or the CM. The Contractor shall not proceed with any work on an alleged change until the change is approved, except in the case of an emergency endangering life and property. Failure to do so may result in forfeiture of compensation for the work performed.

3.1.4 Upon completion of work, the Contractor shall submit Record Documents to KeySpan, PS&SPC and/or the CM under the provisions of Section 01720 - Project Record Documents.

END OF SECTION

SECTION 01056
PROTECTION OF THE WORK AND PROPERTY

PART 1 - GENERAL

1.1 Summary

This section includes precautions and programs to protect the work, on-site facilities and all public and private property from damage.

The Contractor shall meet the substantive requirements of the pertinent utility companies with regard to support and protection of any existing utilities impacted by the proposed remedial construction activities.

An active electric substation is located in the northwest corner of the Site. This substation provides electrical service to the Rockaways. In addition, there are overhead distribution and transmission lines that extend along Beach 108th Street and along Beach Channel Drive. The Contractor shall use extreme care during the implementation of the remedial construction activities so as not to damage or interfere with these utilities. The minimum setbacks from these overhead lines for all equipment and personnel are as follows:

- 15 feet for the 33 kV overhead electrical lines;
- 10 feet for the 13 kV overhead electrical lines; and
- 5.5 feet for the insulated 33 kV overhead electrical line.

In addition to overhead utilities, there are underground utilities that exist in proximity to the work areas. The Contractor shall use extreme care during the implementation of the remedial construction activities so as not to damage or interfere with these underground utilities and shall support and protect these utilities as required. In addition, there are two electrical manholes that exist on the eastern portion of the Site near Beach 108th Street. These electrical manholes and associated electrical conduit have been abandoned by KeySpan in place. KeySpan has de-energized this electrical conduit just beyond the property line. Should the electrical manholes and conduit be encountered within the planned remedial construction activities, the Contractor shall remove the structures.

In addition to the active overhead 33 kV electrical transmission/distribution line that extends along the southern side of Beach Channel Drive, there is an active underground 33 kV electrical transmission/distribution line that is located along the northern boundary of the Site. During the perimeter utility cut and cap work, the Contractor will identify the exact location and depth of this utility in order to eliminate potential electric power reductions or losses.

SECTION 01056
PROTECTION OF THE WORK AND PROPERTY

It is anticipated that the Contractor will use soft dig techniques (i.e., use of Vactor or Guzzler-type equipment) to excavate test pits along the known alignment of the underground 33 kV electrical line. Once the test pits are excavated, the location and elevation of the 33 kV electrical line will be surveyed by a Professional Surveyor licensed in the State of New York. The survey data will be utilized by the Contractor in order to ensure that the required set back requirements are being maintained.

No remedial work that can potentially interrupt (i.e. installation of the DNAPL migration barrier, etc.), interfere with or damage the overhead electrical utilities shall be performed by the Contractor during peak summer months (i.e., June 1st to September 1st).

1.2 Related Sections

Section 01010	Summary of Work
Section 01500	Temporary Site Facilities, Controls/Pre-Mobilization & Mobilization
Section 01540	Site Security
Section 01732	Selective Demolition
Section 02110	Site Clearing and Preparation
Section 02120	Soil Erosion & Control
Section 02260	Excavation Support & Protection
Section 02300	Earthwork & Backfill

1.3 Identification

1.3.1 Prior to intrusive activities, the Contractor shall identify and field mark-out all existing site structures, including but not limited to buildings, underground structures, streets, above and below ground utility lines, and monitoring wells/piezometers.

1.3.2 The Contractor shall repair any damage to protected structures and utilities during construction operations in accordance with the pertinent New York State, New York City, and utility authorities and as directed by KeySpan and/or PS&SPC.

1.3.3 Prior to intrusive activities, the Contractor shall contact the New York Underground Utilities Service and KeySpan for an official mark out of utilities at and in the immediate vicinity of the Site.

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PROTECTION OF THE WORK AND PROPERTY

1.3.4 The Contractor shall take adequate photographs or video of surrounding structures, including buildings, fences, monitoring wells, and utility lines, prior to starting the work to provide a basis for existing conditions.

1.3.5 Prior to the implementation of the proposed remedial construction activities, PS&SPC shall conduct a property conditions assessment (PCA) of nearby structures and buildings. Copies of the PCAs will be provided to the Contractor for review and acknowledgement and shall serve as a baseline of existing conditions.

1.3.6 The Contractor will be required to coordinate with the appropriate utility authorities with regards to managing (i.e. temporary disconnecting, relocating, etc.) existing utilities during the implementation of the remedial construction activities.

1.4 Submittals

The Contractor shall submit to KeySpan and/or PS&SPC for review and approval, all procedures that deviate from those outlined in, or are required pursuant to this Specification.

During the development of the remedial design, the Contractor shall provide the means and methods in which the remedial construction activities in proximity to the overhead utilities will be implemented without encroaching on the mandated minimum setbacks.

In addition, during the development of the remedial design, the Contractor shall provide the means and methods in which the perimeter utility management (i.e. perimeter cut and cap) will be implemented.

1.5 Project Record Documents

The actual locations of underground and aboveground utility lines, such as storm, sanitary lines, water, cable, electrical conduit, electrical panels, etc. encountered during construction shall be surveyed and recorded in the Project Record Documents by the Contractor as described in Section 01732.

1.6 Protection of Work

1.6.1 In order to prevent damage, injury or loss, the Contractor's actions shall include, but not be limited to, the following:

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PROTECTION OF THE WORK AND PROPERTY

a. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that will not unduly interfere with the progress of the work or the work of any other subcontractor.
b. Provide suitable storage facilities in accordance with manufacturer's recommendations for all materials which are subject to damage by exposure to weather, theft, breakage or otherwise.
c. Frequent clean up of all refuse, rubbish, scrap materials, and debris caused by site operations, so that the area of the work shall present a safe, orderly and workmanlike appearance at all times.
d. Provide barricades and fences around openings, excavations, and other hazardous areas in accordance with applicable requirements and OSHA regulations.
e. Housekeeping is paramount. Failure to comply with these provisions could result in stoppage of work until they are met. Any costs incurred due to this work stoppage shall be borne by the Contractor.

1.6.2 The Contractor shall receive written consent from the property owners, KeySpan, PS&SPC and/or the CM, prior to entering or occupying (with personnel, tools, materials or equipment) privately owned land except on easements or other access agreements previously obtained by KeySpan.

1.6.3 Following completion of the work, damages to curbs, monuments, overhead utilities, subsurface utilities, or other property caused by the Contractor shall be repaired immediately and to the satisfaction of KeySpan, PS&SPC, the CM, and/or the pertinent utility company. The costs for these repairs will be borne solely by the Contractor, as determined by KeySpan, PS&SPC and/or the CM. The Contractor may take photographs or videos to document damage, which existed prior to construction. Such photographs and/or videos shall be submitted to KeySpan, PS&SPC and/or the CM prior to construction.

1.6.4 The Contractor shall submit to KeySpan and PS&SPC lists of damages to property that existed prior to construction or construction-related activity. The lists shall be submitted in the sequence with the construction progress and shall be submitted sufficiently in advance for KeySpan, PS&SPC and/or the CM to verify the damages. The lists shall include the following information:

a. Location of damage;
b. Nature of damage; and
c. Extent of damage.

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PROTECTION OF THE WORK AND PROPERTY

1.6.5 The Contractor shall immediately notify KeySpan, PS&SPC and/or the CM of any and all claims and complaints arising as a result of the work. The Contractor shall provide assistance to KeySpan, PS&SPC and/or the CM, as required, to resolve all claims and complaints.

1.7 Vibration Monitoring for Sensitive Structures/Receptors

The Contractor shall perform the remedial construction in a manner that will limit the potential for adverse impacts due to vibrations. PS&SPC will be conducting vibration monitoring during the installation of the shoring system for the planned Shallow Excavation Areas, for construction of the DNAPL migration barriers and any other construction that can result in excess vibrations. The vibration monitoring will be biased to the potential sensitive receptors which include the elevated MTA subway tracks, the electrical substation, the sewer treatment plant, and adjacent business and residential structures.

A vibration criterion of 0.5 inches per second (in/sec) peak particle velocity (PPV) has been proposed as the applicable threshold criteria for ground-borne vibration. If the Contractor exceeds the 0.5 inches per second criteria, the work shall be stopped at no expense to KeySpan until an adequate solution can be found.

1.8 Regulatory Requirements

The Contractor shall notify all affected or potentially affected utility companies, agencies, authorities, KeySpan, PS&SPC and/or the CM, etc. at least 72 hours (or as directed) prior to the commencement of the remedial work and shall comply with their requirements.

1.9 Barricades and Warning Signals

Where work is performed on or adjacent to any roadway, right-of-way, or public place, the Contractor shall furnish and erect barricades, fences, lights, warning signs, and danger signals as required and shall take other precautionary measures for the protection of persons or property and of the work. Barricades shall be visible at night.

1.10 Protection of Existing Utilities and Structures

1.10.1 General Underground Utilities: Underground utilities are defined to be, but are not limited to: sewer, water, storm water, gas, cable, other piping, electrical

SECTION 01056
PROTECTION OF THE WORK AND PROPERTY

conduits, etc. Underground structures known to KeySpan and/or PS&SPC are shown on the Design Drawings. This information is shown for the assistance of the Contractor in accordance with the best information available, but is not guaranteed to be correct or complete. The Contractor is to field verify all underground structures indicated on Design Drawings. The Contractor shall verify the location of underground utilities with the appropriate agencies. After verifying the location, the Contractor shall use hand digging to expose the utility. If it is an active utility, the Contractor shall support and protect the utility to prevent damage and to prevent interruption to the services that the utility provides. The Contractor shall be liable for damages to an active utility and is responsible to have it repaired promptly.

Necessary changes in the location of the proposed remedial activities may be made by KeySpan and/or PS&SPC and/or the CM to avoid unanticipated underground structures.
If permanent relocation of an underground structure or other subsurface facility is required and is not otherwise provided for in the Contract Documents, KeySpan, PS&SPC and/or the CM will direct the Contractor in writing to perform the necessary work.

1.10.2 Coordination: The Contractor shall coordinate with the utility company who owns the utility during the performance of the work to determine which electrical and gas lines or other utilities, presented on the Design Drawings, reference drawings, utility mark-up and encountered in the field, are active and which may be abandoned.

1.10.3 General Surface Structures: Surface structures are defined as all existing structures and other facilities at or above the ground surface. Surface structures include, but are not limited to, monitoring wells, piezometers, utility poles (including anchors and support cables), fire hydrants, electrical panels, curbs, piles, fencing, foundations and all other facilities that are visible above the ground surface.

1.10.4 Existing Electrical Substation: An active electric substation is located in the northwestern portion of the Site and will remain operational during the duration of the remedial construction activities. The Contractor shall not cause any disturbances or trips to the electrical substation operations. The Contractor shall be responsible for all damage and expense for any direct or indirect damages to the electrical substation or disturbances or trips of its operations.

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PROTECTION OF THE WORK AND PROPERTY

1.10.5 Existing Utility Poles: The Contractor will protect and support existing on-site utility poles that are actively in service and are within the planned remedial work areas. The Contractor will protect and support the existing on-site utility poles that are to remain in place in accordance with the requirements of the pertinent utility company.

1.10.6 Protection of Underground and Surface Structures: The identified underground utilities (active or inactive) within or adjacent to the areas where remedial activities will be performed shall be sustained in place and protected from direct or indirect damage. Such sustaining and supporting shall be done carefully and as directed by the party owning the structure or utility. Before proceeding with the work, the Contractor shall satisfy KeySpan, PS&SPC and/or the CM that the methods and procedures to be used have been approved by the owning party.

The Contractor shall be responsible for all damage and expense for direct or indirect damage caused during the remedial construction activities. The Contractor shall immediately repair all damage caused by their work to the satisfaction of KeySpan, PS&SPC and/or the CM.

The Contractor shall flag, barricade or otherwise suitably protect existing buildings, above and below ground facilities, and public roadways during construction operations.

The Contractor shall prevent interruption of existing utility service to occupied or active facilities, except when authorized in writing by authorities having jurisdiction and except where existing utilities will be temporarily disconnected by the owner.

1.10.5 All other existing surface facilities, including but not limited to fencing, guard rails, posts, guard cables, signs, poles, markers, and curbs which are temporarily removed to facilitate the performance of the work shall be replaced and restored to their original condition at the Contractor's expense.

PART 2 - PRODUCTS
Not Used
PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 01065
HEALTH AND SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 Summary

The Contractor shall be responsible for providing all personnel, facilities, equipment and materials to protect all on-site workers from physical injury and adverse health effects due to exposure to site hazards. All on-site personnel shall comply with the requirements of the Health and Safety Plan (HASP).

A Community Air Monitoring Plan shall be implemented by KeySpan (or assigned designee) that will provide real-time monitoring for total volatile organic compounds (TVOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area. Based on the results of the CAMP, the Contractor shall implement odor and dust control measures as directed by KeySpan, PS&SPC and/or the CM based on the results of the CAMP.

1.2 Submittals

1.2.1 A Generic Health and Safety Plan has been prepared to address worker health and safety for all remedial actions to be performed at the Former Rockaway Park MGP Site. The Generic Health and Safety Plan, entitled "Generic Health and Safety Plan (HASP), KeySpan Corporation Rockaway Park Former Manufactured Gas Plant (MGP) Site and Associated Off-Site Areas", dated April 2006 is included as an Attachment to these Specifications. The Generic Health and Safety Plan has been prepared to address worker safety issues and well as community impacts based on projected activities to be performed at the Site.

Amendments to the Generic Health and Safety Plan to reflect specialized work shall be prepared by the Contractor for incorporation into the Generic HASP.

PART 2 - PRODUCTS

Not used

PART 3- EXECUTION

Not used

END OF SECTION

SECTION 01066
EQUIPMENT AND MATERIAL DECONTAMINATION

PART 1 – GENERAL

1.1 Summary

This Section outlines the requirements for cleaning all tools, equipment, and any recycled materials, that were either utilized within or excavated from the Exclusion Zone.

1.2 Related Sections

Section 01066	Equipment and Material Decontamination
Section 01700	Execution Requirements
Section 01780	Demobilization
Section 02260	Excavation Support and Protection
Section 02300	Earthwork & Backfill

PART 2 – PRODUCTS

2.1 Steam Cleaner

2.1.1 The steam cleaner utilized by the Contractor shall be a high-pressure low volume unit from an industry-recognized manufacturer.

2.1.2 Miscellaneous tools such as shovels and brushes shall be available.

2.1.3 Cleaning agents such as non-phosphate detergents shall also be available for use as necessary.

2.2 Decontamination Pad Material

The Contractor shall provide a decontamination pad(s) that consists of an area of suitable size for the decontamination of vehicles and equipment as they exit the site onto adjoining property either public or private. The pad shall be underlain by crushed stone or sand and lined with an impermeable liner conforming with the requirements of this Section, at a location agreed to by KeySpan, PS&SPC and/or the CM. The decontamination pad(s) can be pre-fabricated but will require the approval from KeySpan, PS&SPC and/or the CM.

SECTION 01066
EQUIPMENT AND MATERIAL DECONTAMINATION

PART 3 – EXECUTION

3.1 Decontamination Pad

3.1.1 Each decontamination pad shall be constructed to accommodate the anticipated construction equipment at the approved location. The area shall be returned to its previous condition upon completion of the work.

3.1.2 Each decontamination pad shall be lined with an impermeable layer capable of supporting the equipment to be decontaminated. The impermeable layer will be underlain by stone dust or sand, to prevent puncturing the liner, and will be graded to allow for the collection of decontamination fluids via a collection sump or equivalent method. The decontamination pad shall be bermed to prevent storm water run-on. When not in use, the decontamination pad shall be covered with a waterproof cover to prevent the collection of precipitation.

3.1.3 Each decontamination pad shall be graded for easy entrance and exit to vehicles and equipment.

3.1.4 Wood planks may be placed over the impermeable liner at the Contractor's discretion to provide a traveling surface for vehicle wheels and equipment tracks.

3.1.5 Each decontamination pad shall be of sufficient size to handle the largest piece of Contractor's equipment. The Contractor shall utilize side shields to prevent overspray outside the limits of the pad.

3.1.6 A pre-fabricated decontamination pad can be mobilized to the site and utilized by the Contractor provided that it meets the requirements of the Technical Specifications and approved by KeySpan and/or PS&SPC.

3.1.7 Each decontamination pad shall be inspected on a daily basis and after a major storm event.

3.2 Decontamination

3.2.1 Cleaning procedures by the Contractor shall include the removal of contaminated soil, debris and other miscellaneous materials from all construction equipment and tools utilized within the Exclusion Zone and recyclable remnant structure and piping encountered from the Site using a high-pressure low volume steam cleaner.

SECTION 01066
EQUIPMENT AND MATERIAL DECONTAMINATION

Physical/mechanical agitation (scraping with hand tools) of soil can be utilized to minimize wastewater generation.

3.2.2 Special attention shall be made to the removal of contaminated soils and materials from the under carriages of all equipment. Industrial grade, non-phosphate detergents may be utilized in the pressure washer, followed by clean water rinse.

3.2.3 All wash and rinse water generated during the decontamination procedures shall be collected daily by the Contractor and stored in closed top USDOT Specification 55-gallon drums or in frac tanks. The Contractor shall supply empty 55-gallon drums and frac tanks as required. Decontamination pad(s) shall be covered when not in use so as to minimize the accumulation of precipitation.

3.2.4 All equipment and material decontamination procedures shall be carried out on the decontamination pad.

3.2.5 The collection sump shall be purged at the end of each work day and as required, and/or following a rainfall event.

3.3 Inspection and Documentation

3.3.1 KeySpan, PS&SPC and/or the CM shall oversee all cleaning operations. KeySpan, PS&SPC and/or the CM shall make the final determination as to whether or not a piece of equipment, tool, or bulk recyclable remnant structure or pipe being removed from the Site has been properly decontaminated. Inspection forms may be completed by KeySpan, PS&SPC and/or the CM during the decontamination activities.

3.3.2 The Contractor shall maintain properly completed inspection forms on-site.

3.3.3 Precipitation that collects in the decontamination pad shall be collected and managed as rinsate.

3.4 Waste Management

3.4.1 Liquid and solid wastes generated during decontamination procedures will be stored in appropriate covered containers by the Contractor at a location approved by KeySpan, PS&SPC and/or the CM.

SECTION 01066
EQUIPMENT AND MATERIAL DECONTAMINATION

3.4.2 Sections of the decontamination pad that have been exposed to Site contaminants during remedial construction, will be cut up by the Contractor and placed in appropriate containers. Sections that have not been exposed to Site contaminants may be disposed of as non-hazardous waste if approved by KeySpan, PS&SPC and/or the CM.

3.4.3 The Contractor shall dispose of hazardous and non-hazardous wastes generated during the project. The Contractor will containerize the hazardous and non-hazardous waste, relocate the containers as required, and transport generated wastes off-site to a KeySpan approved disposal facilities.

END OF SECTION

SECTION 01070
DEFINITIONS, CODES AND ABBREVIATIONS

PART 1 – GENERAL

1.1 Summary

1.1.1 This section lists and defines items, abbreviations, codes, terms and symbols used in the Contract Documents.

1.1.2 Abbreviations may be similar but have different meanings. If clarification is required, KeySpan, PS&SPC and/or the CM shall be consulted.

1.2 Definitions

1.2.1 Contract Documents:

Documents consisting of the Design Drawings, Technical Specifications, and Remedial Design Report in which the implementation of the proposed remedial work is based upon.

1.2.2 Design Drawings:

Drawings included with the Contract Documents that the Contractor shall use as a guide during the remedial construction work.

1.2.3 Technical Specifications:

Specifications included with the Contract Documents that the Contractor shall use as a guide during the remedial construction work.

1.2.4 Owner:

KeySpan Corporation (KeySpan)

1.2.5 Owner's Design Engineer:

Paulus, Sokolowski and Sartor Engineering, PC (PS&SPC)

SECTION 01070
DEFINITIONS, CODES AND ABBREVIATIONS

1.2.6 Contractor:

The party contracted directly with KeySpan to furnish and perform the work in accordance with the Contract Documents.

1.2.7 Contractor Representatives:

Construction Superintendent:
A representative assigned the duties and responsibilities of managing the construction activities for the Contractor as specified herein.

Resident Engineer:
A representative assigned the duties and responsibilities of providing technical assistance and quality control for the Construction Superintendent during the construction activities in accordance with the Technical Specifications, including Section 01055. May also act as Quality Control Engineer in accordance with Section 01400.

Site Safety Officer (SSO):
A representative assigned the duties and responsibilities of providing Health and Safety monitoring of construction activities as specified herein, including Section 01065.

Competent Person:
A person who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, incompliant, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. The construction superintendent can serve as a competent person in some instances if approved by the KeySpan, PS&SPC and/or the CM.

1.2.8 Subcontractors

Any individual, firm or corporation contracted directly with the Contractor or any other Subcontractor for the performance of the work at the Site (e.g., Electrician, Land Surveyor, Well Driller, Pile Driving Contractor, etc.).

SECTION 01070
DEFINITIONS, CODES AND ABBREVIATIONS

1.2.9 Contract

All project work covered by the Contract documents including Commercial Terms and Conditions, Technical Specifications, and Design Drawings.

1.2.10 State

State of New York

1.3 Codes and Standards

1.3.1 Comply with the requirements and recommendations of all stated reference standards, except when they are modified by the Contract Documents, or when applicable laws, ordinances, rules, regulations or codes establish more stringent standards. The latest version of all noted standards shall apply to this work, unless otherwise specified. Reference standards include, but are not necessarily limited to, the following:

AASHTO	American Association of State Highway and Transportation Officials
AIHA	American Industrial Hygiene Association
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
AREMA	American Railroad Engineering and Maintenance of Way Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CFR	Code of Federal Regulations
NBS	National Bureau of Standards
NEC	National Electric Code
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
OSHA	United States Occupational Safety and Health Administration
UL	Underwriters Laboratories, Inc.

SECTION 01070
DEFINITIONS, CODES AND ABBREVIATIONS

1.4 Abbreviations

Ac.	Acre
BZ	Breathing Zone
cu.	Cubic
C.F.	cubic feet
C.Y.	cubic yards
^{o}C	degrees Centigrade
^{O}F	degrees Fahrenheit
Dwg.	Drawing
el. or elev.	Elevation
ft.	feet
gal.	Gallons
gpm	gallons per minute
HASP	Health and Safety Plan
L.F.	linear feet
max.	maximum
min.	minutes or minimum
NYSDOT	New York State Department of Transportation
NYSDEC	New York State Department of Environmental Conservation
N.T.S.	not to scale
ppm	parts per million
psi	pounds per square inch
%	percent
PAMP	Perimeter Air Monitoring Plan
QA	Quality Assurance
QC	Quality Control
RFP	Request for Proposal
SDWA	Safe Drinking Water Act
SESCP	Soil Erosion and Sediment Control Plan
S.F.	square feet
S.Y.	square yards
SSO	Site Safety Officer
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
Company	KeySpan Corporation

SECTION 01070
DEFINITIONS, CODES AND ABBREVIATIONS

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01140
WORK RESTRICTIONS

PART – 1 GENERAL

1.1 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this Section.

1.2 Use of Premises

All work shall be performed during hours specified by local, county, and/or state agencies. All other work shall be performed during normal KeySpan working hours (Monday-Friday 7:00 a.m. – 5:00 p.m.). The Contractor shall notify KeySpan, PS&SPC and/or the CM, at least one week in advance, if the Contractor requires a deviation from the normal working hours. KeySpan shall not be responsible for extra costs associated with the Contractor's expenses/fees for work outside the normal work hours in order to meet scheduled deadlines/constraints.

1.2.1 Use of Site: Limit the use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.

a. Limits: Confine constructions operations to areas indicated on the Design Drawings.
b. Work Area Access: The Contractor will interact with KeySpan, PS&SPC and/or the CM for arranging access to the work areas and to designate areas for decontamination, parking, materials and equipment storage, contaminated waste storage and other operations as needed in support of the remedial work.
c. Owner Occupancy: Allow for Owner occupancy of the Site.
d. Roadways, Driveways and Entrances: Keep roadways, driveways and entrances serving premises clear and available to KeySpan, KeySpan's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
e. Schedule deliveries to minimize use of driveways and entrances.
f. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
g. Access for both vehicles and personnel, to the Site shall be as depicted o the Design Drawings.

SECTION 01140
WORK RESTRICTIONS

1.3 Restrictions in Working in Proximity to Overhead Utilities

There are overhead distribution and transmission lines that run along Beach 108th Street and along Beach Channel Drive. The Contractor shall use extreme care during the implementation of the remedial construction activities so as not to damage or interfere with these utilities. The minimum setbacks from these overhead lines for all equipment and personnel are as follows:

- 15 feet for the 33 kV overhead electrical lines;
- 10 feet for the 13 kV overhead electrical lines; and
- 5.5 feet for the insulated 33 kV overhead electrical line.

No remedial work that can potentially interrupt, damage or interfere with the overhead electrical utilities shall be performed by the Contractor during peak summer months (i.e., June 1st to September 1st) unless otherwise approved in writing by KeySpan.

1.4 Time Restrictions for Transport Vehicles

Transport trucks may only access the Site for delivery and off-site transport between the hours of 9:00 AM and 2:00 PM, Monday through Friday.

1.5 Occupancy Requirements

Full Owner Occupancy: KeySpan, PS&SPC and the CM will occupy the Site during the entire construction period. The Contractor shall cooperate with KeySpan, PS&SPC and the CM during the construction operations to minimize conflicts and facilitate KeySpan's usage of the Site. The Contractor shall perform the remedial work so as not to interfere with KeySpan's operations.

PART 2 - PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01201
PRE-CONSTRUCTION CONFERENCE

PART 1 – GENERAL

1.1 Pre-construction Conference

1.1.1 Prior to the commencement of the remedial construction activities, the Contractor shall coordinate with KeySpan, PS&SPC and the CM for attendance at a Pre-Construction Conference. The purpose of this conference is to review required submittals and the procedures for submission to KeySpan, PS&SPC and the CM.

1.1.2 The Contractor's Baseline Schedule will be discussed during the Pre-Construction Conference. Particular attention will be paid to the initial start-up period as well as activities that will require coordination between Contractor, KeySpan, PS&SPC, and the CM. Quewstions concerning the administrative requirements outlined during the Pre-Construction Conference or any other aspect of the project may also be addressed.

1.2 Meeting Minutes

The CM will be responsible for recording the minutes of the conferences and will include any significant proceedings and decisions. The CM will provide the minutes of the conference to KeySpan, PS&SPC, and the Contractor for review and approval. Upon review and approval by these parties, copies of the minutes shall be distributed by the CM to each participant in the conference and to parties affected by decisions made at the conference.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01202
PROJECT PROGRESS MEETING

PART 1 – GENERAL

1.1 Summary

1.1.1 This section describes the general requirements for the convening of the Project Progress Meetings that are necessary during execution of the construction work.

1.1.2 Additional meetings may be called by KeySpan, PS&SPC, the CM, NYSDEC, or the Contractor, during any stage of this project when it is deemed necessary to raise any significant questions, establish new guidelines, introduce a new aspect to the project, or any other items that will affect the progress or performance of the work.

1.1.3 Meetings and conferences may take place at the Site or some other location that is satisfactory to KeySpan, PS&SPC, the CM or the Contractor.

1.1.4 All expenses associated with attending the meetings, except those that are incurred by KeySpan, PS&SPC and the CM shall be borne by the Contractor.

1.2 Attendance

The following is a suggested list of personnel for the project progress meetings:

- KeySpan
- PS&SPC's Project Engineer;
- PS&SPC's Project Manager;
- The CM's Project Manager;
- The CM's On-Site Representative;
- Contractor's Project Manager;
- Contractor's Construction Superintendent;
- Contractor's Resident Engineer;
- Contractor's Safety Representative;
- Subcontractors as appropriate to the agenda;
- Others as requested by KeySpan and/or PS&SPC; and
- A representative from the NYSDEC.

1.3 Meeting Minutes

The CM will be responsible for recording the minutes of meetings and will include any significant proceedings and decisions. The CM will provide the minutes of the meetings

SECTION 01202
PROJECT PROGRESS MEETING

to KeySpan, PS&SPC and the Contractor for review and approval. Once approved, copies of the minutes shall be distributed to each participant in the meeting and to parties affected by decisions made at the meeting. Deviations or clarifications to the meeting minutes shall be made in writing subject to acceptance and approval by KeySpan, PS&SPC and/or the CM.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

3.1 General

The Contractor shall schedule and administer progress meetings at minimum of once per week and such additional meetings as required, and if requested by KeySpan, PS&SPC and/or the CM.

3.2 Meeting Requirements

The Contractor shall administer the following general requirements for the progress meetings:

- Make physical arrangements for meetings; and
- Provide updated CPM project schedule.

3.3 Suggested Agenda

The following is a suggested agenda for progress meetings:

- Review of minutes of previous meeting;
- Review of work progress since previous meeting;
- Coordination issues between the Contractor and its subcontractors;
- Field observations, problems, conflicts;
- Problems which impede construction schedule and proposed corrective actions;
- Review of off-site delivery schedules;
- Corrective measures and procedures to regain projected schedule;
- Revisions to construction schedule;
- Progress during succeeding work period;
- Coordination of schedules;
- Review submittal schedules; expedite as required;

SECTION 01202
PROJECT PROGRESS MEETING

- Maintenance of quality and safety standards;
- Pending changes and substitutions;
- Review proposed changes for effect on construction and on completion date, and effect on other contracts of the projects; and
- Other business.

END OF SECTION

SECTION 01203
PROJECT COORDINATION

PART 1 – GENERAL

1.1 Summary

1.1.1 This section includes information on coordination between the Contractor, Subcontractors, KeySpan, PS&SPC and the CM.

1.2 Coordination

1.2.1 The Contractor shall coordinate, supervise, direct and cooperate fully with the site subcontractors, manufacturers, fabricators, suppliers, distributors, installers and testing agencies whose services, materials or equipment are required to ensure the completion of the work.

1.2.2 The Contractor shall provide a full-time capable and experienced Construction Superintendent, Resident QA/QC Engineer, Competent Person(s) and safety representative for the duration of the remedial construction activities at the Site. These individuals shall be totally responsible for the execution of the work as representatives of the Contractor and shall coordinate all activities with KeySpan, PS&SPC and the CM. If qualified, the Construction Superintendent can act as a Competent Person.

1.2.3 The Contractor shall function as the Prime Contractor for the remedial construction activities at the Site. As such, the Contractor shall be responsible for the management and coordination of remedial construction activities at the Site. This shall include coordinating work schedules and sequencing with all Site contractors and subcontractors.

1.2.4 As appropriate, the Contractor or their subcontractors shall provide qualified supervisory personnel for specialty aspects of the work, including but not limited to, utility disconnection/relocation, sheetpile driving, excavation shoring and the installation of Waterloo® Barrier system. The list of subcontractors and personnel shall be provided by the Contractor for review and approval by KeySpan, PS&SPC and/or the CM.

1.2.5 The Contractor is required to provide all necessary coordination with the pertinent utility companies and governmental entities regarding the implementation of the proposed remedial construction activities.

SECTION 01203
PROJECT COORDINATION

1.2.6 The Contractor shall coordinate arrangements for storage of materials for all contractors and subcontractors during execution of the work, affording them without compensation, reasonable use of facilities under his/her control as necessary for the performance of their work. The Contractor shall have no claim against KeySpan, PS&SPC or the CM for delay caused by conflicts with their subcontractors, utility service companies, KeySpan, PS&SPC or the CM employees which may be operating at the Site.

1.2.7 The Contractor shall minimize direct communications with members of the public and other interested parties (excluding regulatory agency personnel). Direct communication with these entities is the sole responsibility of KeySpan.

1.2.8 The Contractor shall also coordinate their work with the work of each of its subcontractors to comply with the project schedule.

1.2.9 The Contractor shall participate in all project coordination or progress meetings to comply with the project schedule.

1.2.10 The Contractor shall transmit written instructions to all concerned suppliers and subcontractors, with copies to KeySpan, PS&SPC and the CM, reporting all conflicts and discrepancies.

1.2.11 The Contractor and its subcontractors shall display all permits in a prominent location.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01250
CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 Summary

This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.2 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, and KeySpan M-300 Specifications, apply to this Section.

1.3 Minor Changes on Work

KeySpan, PS&SPC and/or the CM may issue the Contractor supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 KeySpan and PS&SPC Initiated Proposal Requests

1.4.1 KeySpan and/or PS&SPC will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Design Drawings and Technical Specifications.

1.4.2 Proposal Requests issued by KeySpan, PS&SPC and/or the CM are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

1.4.3 Within 10 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

1.4.4 Include a list of quantities for products required or eliminated and unit costs with the total amount of purchases and credits to be made. If requested, furnish a certified survey data to substantiate quantities.

SECTION 01250
CONTRACT MODIFICATION PROCEDURES

1.4.5 Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

1.4.6 For Change Order proposals, use standard forms.

1.5 Contractor-Initiated Proposals:

1.5.1 Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a detailed request which shall include labor rates, equipment rates, material costs, etc. for a change to KeySpan, PS&SPC and/or the CM.

1.5.2 The Contractor shall include a statement outlining reasons for the change and the effect of the change on the Work. A complete description of the proposed change shall be provided. An indication of the effect of the proposed change on the Contract Sum and the Contract Time shall be provided.

1.5.3 A list of quantities of products required or eliminated and unit costs shall be provided, with the total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

1.5.4 Applicable taxes, delivery charges, equipment rental, and amounts of trade discounts shall be indicated.

1.5.5 An updated Contractor's Construction CPM Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship shall be provided. Use available total float before requesting an extension of the Contract Time.

1.5.6 Proposal Request Form: Refer to KeySpan M-300 Specifications.

1.6 Change Order Procedures

Change order requests shall documented in accordance with the requirements of the KeySpan M-300 Specifications or with the procedures set forth by KeySpan Purchasing.

SECTION 01250
CONTRACT MODIFICATION PROCEDURES

1.7 Construction Change Directive

1.7.1 KeySpan, PS&SPC and/or the CM may issue a Construction Change Directive which instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1.7.2 Construction Change Directive contains a complete description of change in the Work. It also designates the method to be followed to determine change in the Contract Sum or the Contract Time.

1.7.3 Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1.7.4 After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS

Not Used

Part 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01290
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 Summary

This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions, KeySpan M-300 Specifications and other Division 1 Specification Sections, apply to this Section.

Related Sections include the following:

Section 01025	Measurement and Payment
Section 01026	Schedule of Values
Section 01770	Closeout Procedures

1.3 Applications for Payment

1.3.1 Each Application for Payment shall be consistent with previous applications for payments, as reviewed and approved by the CM and paid for by KeySpan.

1.3.2 Application Preparation: Submit invoice executed by a person authorized to sign legal documents on behalf of Contractor. KeySpan will return incomplete applications without action.

a. Include amounts of Change Orders and Construction Change Directives issued for the invoices work item.

1.3.3 Transmittal: Submit three (3) signed original copies of each Application for Payment to KeySpan by a method ensuring receipt by KeySpan within 24 hours. One copy shall include waivers of lien and similar attachments if required.

a. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

SECTION 01290
PAYMENT PROCEDURES

1.3.4 Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

a. List of subcontractors.
b. Schedule of Values.
c. Construction Schedule (preliminary if not final).
d. Products list.
e. Schedule of unit prices, where applicable.
f. Submittals Schedule (preliminary if not final).
g. List of Contractor's principal consultants.
h. Copies of applicable permits.
i. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
j. Initial progress report.
k. Report of Preconstruction Conference.
l. Certificates of insurance and insurance policies (Before Mobilization).
m. Performance and payment bonds (Before Mobilization).
n. Data needed to acquire Company's insurance.
o. Initial settlement survey and damage report if required.

1.3.5 Application for Payment at Completion: After KeySpan issues the Certificate of Substantial Completion or equivalent the Contractor shall submit an Application for Payment showing 100 percent completion for the portion of the Work claimed as complete unless otherwise agreed to in writing by KeySpan.

a. Include documentation required by Section 01770, Closeout Procedures, supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

1.3.6 Final Payment Application: Submit final Application for Payment with lien releases and all remaining supporting documentation if not previously submitted and accepted, including, but not limited, to the following:

a. Evidence of completion of Project closeout requirements.
b. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
c. Updated final statement, accounting for final changes to the Contract Sum.
d. Evidence that claims have been settled.

SECTION 01290
PAYMENT PROCEDURES

e. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when KeySpan took possession of and assumed responsibility for corresponding elements of the Work.

1.4 Damages

The Contractor shall be held responsible for all damages that may occur to work, or to the persons or property by reason of the nature of the work or from elements, or by reason of inadequate protection of the work, or from any carelessness on the part of the Contractor or on the part of his employees or subcontractors. KeySpan shall withhold payments on the work until all suits or claims for damages sustained on or by reason of this work will have been settled by the Contractor.

The construction and final completion of this work shall be guaranteed by the Contractor as specified herein. Any damages that may be done to the work or part thereof, by the elements or otherwise, during its construction, shall be made good by the Contractor.

1.5 Default of Contract

If at any time the work under this contract is abandoned or neglected, or any part thereof is unnecessarily delayed by the Contractor, or if the Contractor implements the work without due diligence, or with an insufficient force to complete the work in the time specified herein, then KeySpan may declare the Contractor in default, may employ other parties to complete the work, use such material as may be procured at the aforesaid work and may procure all other material necessary for the completion of the work called for in this contract. The expense incurred by KeySpan in such procedure shall be deducted from any moneys due the Contractor. The Contractor or their Surety Company will pay the amount of the excess to KeySpan on notice from KeySpan.

PART 2 – PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 01320
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1.1 Summary

This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

- Construction Schedule.
- Daily construction reports.
- Field condition reports.

1.2 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, and KeySpan M-300 Specifications, apply to this Section.

1.2.1 Related Sections include the following:

Section 01290	Payment Procedures
Section 01330	Submittal Procedures
Section 01400	Construction Quality Requirements
Section 01770	Closeout Procedures

1.3 Submittals

1.3.1 The Contractor shall submit three printed copies of a Critical Path Method (CPM) schedule; the prints shall be large enough to display all project information and timelines. The initial submission shall demonstrate the Contractor's baseline schedule, each subsequent submission shall compare the job progress with the baseline, and comments should be made regarding any variances that exist. The Contractor shall provide the submitted schedules via electronic media, for review by KeySpan, PS&SPC and/or the CM.

1.3.2 Daily Construction Reports: Submit two copies at weekly intervals.

1.3.3 Field Condition Reports: Submit two copies at time of discovery of differing conditions.

SECTION 01320
CONSTRUCTION PROGRESS DOCUMENTATION

1.4 Coordination

1.4.1 The Contractor shall coordinate the preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

a. The Contractor shall coordinate its Construction Schedule with the Schedule of Values, list of subcontractors, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
b. Secure time commitments for performing critical elements of the Work from parties involved.
c. Coordinate each construction activity in a network with other activities and schedule them in proper sequence.

PART 2 – PRODUCTS

2.1 Construction Schedule, General

2.1.1 Time Frame: Extend schedule from date established for **the Notice of Award** to date of **Final Completion**.

a. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

2.1.2 Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

a. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by KeySpan and/or PS&SPC.
b. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 30 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, storage and delivery.
c. Submittal Review Time: Include review and (re)submittal times indicated in Section 01330 - Submittal Procedures, in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.

SECTION 01320
CONSTRUCTION PROGRESS DOCUMENTATION

d. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for KeySpan's administrative procedures necessary for certification of Substantial Completion.

2.1.3 Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

a. Phasing: Arrange list of activities on schedule by phase.
b. Work under More Than One Contract: Include a separate activity for each contract.
c. Products Ordered in Advance: Include a separate activity for each product. Include anticipated delivery date.
d. Work Restrictions: Show the effect of the following items on the schedule:
   - Coordination with existing site operations.
   - Uninterruptible services.
   - Use of premises restrictions.
   - Provisions for future construction.
   - Seasonal variations.
   - Environmental control.

2.2 Reports

2.2.1 Daily Construction Reports: The Contractor shall prepare a daily construction report recording the following information concerning events at Project site:

a. List of subcontractors at Project site.
b. Count of personnel at Project site.
c. High and low temperatures and general weather conditions.
d. Accidents and near-misses.
e. Work performed with estimated pay quantities;
f. Meetings and significant decisions.
g. Material and equipment deliveries
h. Unusual events (refer to special reports).
i. Stoppages, delays, shortages, and losses.
j. Meter readings and similar recordings.
k. Emergency procedures.
l. Orders and requests of authorities having jurisdiction.
m. Change orders received and implemented.
n. Construction change directives received.

SECTION 01320
CONSTRUCTION PROGRESS DOCUMENTATION

o. Services connected and disconnected.
p. Equipment or system tests and startups.
q. Partial completions and occupancies.
r. Substantial completions authorized.

2.2.2 Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, the Contractor shall prepare a detailed report. The report shall include a detailed description of the differing conditions, together with recommendations for amending the Contract Documents.

PART 3 – EXECUTION

3.1 Construction Schedule

3.1.1 Construction Schedule Updating: At weekly intervals the Contractor shall update the project schedule to reflect actual construction progress and activities. The Contractor shall issue a copy of the construction schedule (in hard copy and electronic format) to KeySpan, PS&SPC and/or the CM at least one week before each regularly scheduled progress meeting.

a. The Contractor is to revise the construction schedule immediately after each meeting or other activity where revisions have been recognized or made. The Contractor shall issue the updated project schedule concurrently with the report of each such meeting.
b. The Contractor shall include a report with an updated project schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
c. As the Work progresses, the Contractor is to indicate Actual Completion percentage for each activity.

3.1.2 Distribution: The project schedule shall require review and approval by KeySpan, PS&SPC and/or the CM. The Contractor shall distribute copies of the approved project schedule to KeySpan, PS&SPC, the CM, and/or NYSDEC, separate contractors, testing and inspecting agencies, and other parties identified by the Contractor with a need-to-know schedule responsibility.

END OF SECTION

SECTION 01330
SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 Summary

This section outlines the administrative and procedural requirements for Contract submittals.

1.1.1 All submittals requiring KeySpan and/or PS&SPC review and approval shall include calculations, construction drawings, shop drawings, plans, reports, records, photographs, diagrams and details where applicable to facilitate the review by KeySpan and/or PS&SPC.

The Contractor shall conform to the following requirements regarding submittals:

a. Number of Copies: Submit six (6) copies of each submittal, unless otherwise indicated. KeySpan, PS&SPC and/or the CM will not return copies.
b. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and Certifications shall be signed by an officer, or other individual, authorized to sign documents on behalf of that entity. Submittals requiring preparation by an engineer shall be signed and sealed by a Professional Engineer licensed to practice engineering in the State of New York.
c. Test and Inspection Reports: Comply with requirements in Section 01400, Construction Quality Requirements.

1.1.2 During the development of the remedial design, the Contractor shall provide submittals to KeySpan, PS&SPC and/or the CM, some of which will be incorporated into the 100% design submittal to the NYSDEC. Some of the anticipated submittals requiring KeySpan, PS&SPC and/or the CM review and approval include, but are not limited to:

The Contractor shall provide the following:

- Amendments to the Generic Health and Safety Plan;
- Amendments to the Generic Construction Quality Assurance Project Plan;
- A detailed CPM construction schedule;
- Required health and safety training certifications and medical clearance for all project personnel;
- MSDS sheets for all materials brought on-site;

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SUBMITTAL PROCEDURES

- List of subcontractor(s) to be used;
- Site preparation details including the implementation of soil erosion and sediment control measures;
- Methods for protection of work and property;
- Methods for support and protection of impacted utilities;
- Sequencing of work for the implementation of the remedial construction activities;
- Proposed equipment, supplies, materials, labor and methodology for implementing the proposed remedial construction activities;
- Proposed staging areas for equipment and materials;
- Proposed equipment and personnel decontamination areas;
- Procedures for demolition and removal of subsurface foundations (i.e. former gas holder, industrial piping, foundations and tunnel entrance)
- Procedures to ensure work does not undermine the foundations of adjacent streets and property;
- Procedures for implementing construction activities in proximity to overhead and underground utilities;
- Design submittal for the temporary fabric enclosure(s) to be utilized for the remedial excavation activities, including the number of enclosures and sizing;
- Manufacturer's specifications and details on the VMS system(s);
- Procedures for erection and relocation of the temporary fabric enclosure;
- Proposed trucking subcontractors to be utilized including the number of trucks per day;
- Proposed disposal facilities to be utilized during the remedial work;
- Side slope stabilization methods (i.e. benching, shoring, etc.) to be utilized for the pre-trenching for the migration barriers and remedial excavation areas;
- Methods for excavation support in proximity to overhead utilities without encroaching on the required setbacks;
- Methods for subsurface utility exposure (i.e. removing overburden soil), protection, and utility support;
- Sources for backfill material including required certifications and analytical data;
- Procedures for identifying and work with materials suspected of containing asbestos;
- Mitigation procedures to be implemented for limiting of vibration, noise and fugitive odors during remedial construction; and
- Methods for Site security.

SECTION 01330
SUBMITTAL PROCEDURES

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

3.1 Scheduling

Drawings on component items forming a system or that are interrelated shall be scheduled and submitted concurrently. Certification to be submitted with the pertinent drawings shall be so scheduled. Adequate time shall be allowed for review and acceptance and possible re-submittal of any items subject to acceptance, as there will be no delay damages or time extensions allowed for time lost in late submittals or re-submittals for such items.

3.2 Submittal Process

The Contractor shall submit all items listed on the Design Drawings and listed or specified in the other sections of these Technical Specifications. A preliminary list is provided in this section. KeySpan, PS&SPC and/or the CM may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same used in the Contract Documents. Each submittal shall be complete and in sufficient detail for ready determination of compliance with the contract requirements.

3.3 Submittal Review

KeySpan and/or PS & SPC will return each Submittal with one of the following classifications:

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SUBMITTAL PROCEDURES

Submittal Review Classification	Description
APPROVED	Contractor may proceed with the work. Resubmittal not required.
APPROVED AS NOTED	Contractor may proceed with the work subject to the comments, notes and/or conditions provided for the Submittal. Resubmittal not required unless otherwise indicated.
REVISE AND RESUBMIT	Contractor may not proceed with the work. Resubmittal required for identified items.
REJECTED	Contractor may not proceed with the work. Submittal is substantially unresponsive, and not in conformance with the Contract Documents. Resubmittal required.
FOR INFORMATION ONLY	This is an acknowledgement that the Submittal has been received. The Submittal is strictly for information purposes and does not require Approval.

3.4 Certificates of Compliance

Any certificates required for demonstrating proof of compliance of materials with the requirements of the Design Drawings and Technical Specifications shall be executed in three (3) copies. Each certificate shall be signed by an official authorized to certify on behalf of the manufacturing or testing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and data or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports, as necessary, submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certifications shall not be construed as relieving the Contractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specified requirements.

3.5 Permits

The Contractor shall obtain all required local, state, and federal permits, not previously obtained by KeySpan and/or PS&SPC, prior to construction.

END OF SECTION

SECTION 1400
CONSTRUCTION QUALITY CONTROL

PART 1 – GENERAL

1.1 Summary

This Section covers the general Construction Quality Assurance/ Quality Control (QA/QC) requirements for control of the equipment, material, and services supplied by the Contractor during construction.

1.1.1 The Contractor shall be responsible for quality control and shall establish and maintain an effective quality control system in compliance with the contract. The quality control system shall consist of plans, procedures and the organization necessary to produce an end product that complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

1.1.2 Activities affecting quality shall be accomplished under controlled conditions. Controlled conditions include the use of appropriate equipment; suitable environmental conditions for accomplishing the activity, such as adequate cleanliness; adequate laboratory facilities; and assurance that all prerequisites for the given activity have been satisfied.

1.1.3 Prior to the initiation of the remedial work, the Contractor shall review Design Drawings, Technical Specifications, 100% RDR, applicable codes, standards and other contract documents to assure proper knowledge of the contract requirements. Any inconsistencies in the above shall be immediately brought to the attention of KeySpan, PS&SPC and/or the CM.

1.1.4 Quality control testing shall include all the tests listed in the Technical Specifications along with field inspection of the work.

1.1.5 The Contractor shall deliver materials to the Site in the approved manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to approved samples. Certifications from the manufacturer for materials shall be included with the shipment.

SECTION 1400
CONSTRUCTION QUALITY CONTROL

1.1.6 The Contractor shall store materials in accordance with manufacturer's recommendations, under cover (if appropriate) in a clean, dry, above-ground location. The Contractor shall remove materials which are damaged or otherwise not suitable for installation from the Site and replace with acceptable materials.

1.2 Related Sections

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.3 Submittals

1.3.1 The Contractor shall prepare and submit (via the CM) to KeySpan and/or PS&SPC for review and approval, amendments to the Construction Quality Assurance Project Plan (CQAPP). The CQAPP shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. Construction will be permitted to begin only after acceptance of the CQAPP by KeySpan and/or PS&SPC.

A Generic CQAPP has been prepared and is contained as an attachment to these Technical Specifications. The Contractor will review this Generic CQAPP and develop amendments to the Generic CQAPP for review and acceptance by KeySpan and PS&SPC. The proposed amendments to the Generic CQAPP may be more stringent than the Generic CQAPP.

1.3.2 The amendments to the CQAPP shall include procedures for controlling activities related to inspection, testing and documentation, including those of Contractor's suppliers and laboratories, as necessary.

1.3.3 The amendments to the CQAPP shall also include the following:

a. Control, verification and acceptance testing procedures for each specific test, to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test.
b. Procedures for tracking inspections, verification, and acceptance tests including documentation.
c. Procedures for tracking construction deficiencies for identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

SECTION 1400
CONSTRUCTION QUALITY CONTROL

1.4 Quality Control/Quality Assurance Engineer

1.4.1 The Resident Engineer shall be responsible for management of QC/QA activities in the field. All other personnel performing QC/QA functions, employed by either the Contractor or its subcontractors shall report to their respective Resident Engineer.

1.4.2 The Resident Engineer or his designee shall be physically on-site whenever the work is in progress.

1.4.3 The Resident Engineer shall possess adequate experience, skill, and training to be knowledgeable about the QC/QA work specified in the CQAPP and be capable of implementing the CQAPP.

PART 2 – PRODUCTS

Not used

PART 3 – EXECUTION

3.1 Inspection

3.1.1 The Contractor shall implement the CQAPP for inspection of construction methods and materials. These inspections shall be performed to verify compliance with the Contract Documents.

3.1.2 The Contractor shall establish a program for inspection of activities affecting quality and shall include all construction activities. The quality of the products of the Contractor's and suppliers must also meet requirements of the contract. Inspections shall be performed to verify compliance to documented instructions, drawings, procedures and specifications.

3.2 Tests

3.2.1 All testing procedures shall incorporate or reference the requirements contained in the Technical Specifications and Design Drawings. Test procedures shall also be in conformance with reference standards.

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CONSTRUCTION QUALITY CONTROL

3.2.2 The CQAPP shall state the types of testing equipment to be utilized.

3.2.3 All testing equipment shall be calibrated and maintained as required by the manufacturer and/or applicable standards.

3.3 Errors and Omissions

3.3.1 The work shall be done and completed in a thorough, workmanlike manner, notwithstanding any omission in the Contract Documents.

3.3.2 It shall be the responsibility of the Contractor to call the attention of KeySpan and/or PS&SPC (via the CM) any apparent errors or omissions and request instructions in writing before proceeding with the work.

3.3.3 KeySpan and/or PS&SPC may, by appropriate written instructions, correct errors and omissions, and supply instructions, which shall be as binding upon the Contractor as though contained in the original Contract Documents. All written instructions from KeySpan or PS&SPC will be provided to the Contractor by the CM.

3.4 Records

3.4.1 Sufficient records shall be prepared as the work is performed to furnish documentary evidence that QC/QA testing was performed in accordance with the approved CQAPP. These records shall be submitted (via the CM) to KeySpan and/or PS&SPC for review as they become available.

3.4.2 The records shall include, but not be limited to, the results of reviews, inspections, tests, and audits. The records shall also include, but not be limited to, the procedures, equipment used, date, name of the inspector, results, inspections, and corrective measures. These records shall be maintained in an identifiable, meaningful, and organized manner.

3.4.3 The Contractor shall maintain current records of QC/QA operations, activities and tests performed by suppliers and subcontractors.

3.4.4 Records shall be stored on-site and shall be readily retrievable.

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CONSTRUCTION QUALITY CONTROL

3.5 Authority of the Company's Engineer or Designee

3.5.1 KeySpan, PS&SPC and/or the CM may observe all work done and inspect materials and equipment furnished and perform additional testing as required. Such observation may extend to all or any part of the work and to the preparation, fabrication or manufacture of the materials and equipment to be used.

3.5.2 The Contractor will keep KeySpan, PS&SPC and/or the CM informed as to the progress of the work and the manner in which it is being done.

3.5.3 KeySpan, PS&SPC and/or the CM will call the Contractor's attention to any non-conformance with the Contract Documents.

3.5.4 KeySpan, PS&SPC and/or the CM may reject defective materials, equipment, or work that does not meet the requirements of the Contract Documents.

3.5.5 The Contractor shall facilitate and allow KeySpan, PS&SPC or the CM to perform any Quality Assurance (QA) testing.

3.5.6 The Contractor shall notify and give KeySpan, PS&SPC and/or the CM sufficient time to inspect any work that will be made inaccessible by future construction. If notification and inspection is not conducted, the Contractor shall remove, at their own cost, elements that will allow for proper inspection.

END OF SECTION

SECTION 01420
REFERENCES

PART 1 – GENERAL

1.1 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Technical Specification Sections, apply to this Section.

1.2 Definitions

General: Basic Contract definitions are included in the Conditions of the Contract.

1.2.1 "Approved": When used to convey KeySpan's, PS&SPC's or the CM's action on the Contractor's submittals, applications, and requests, "approved" is limited to Contractor's duties and responsibilities as stated in the Conditions of the Contract.

1.2.2 "Directed": A command or instruction by KeySpan, PS&SPC and/or the CM. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

1.2.3 "Indicated": Requirements expressed by graphic representations or in written form on Design Drawings, in Technical Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

1.2.4 "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

1.2.5 "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

1.2.6 "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

1.2.7 "Provide": Furnish and install, complete and ready for the intended use.

1.2.8 "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

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a. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.

1.2.9 "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.2.10 "Site": Space available for performing construction activities. The extent of Site is shown on Design Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 Industry Standards

1.3.1 Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents.

1.3.2 Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

1.3.3 Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to KeySpan, PS&SPC and/or the CM for a decision before proceeding.

a. KeySpan, PS&SPC and/or the CM shall approve any increase in payable quantities prior to installation; failure to obtain approval may result in non-payment for additional quantities

1.3.4 Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents

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REFERENCES

a. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.

1.3.5 Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in the Technical Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	 (800) 872-2253 (202) 272-5434
CFR	Code of Federal Regulations Available from Government Printing Office www.access.gpo.gov/nara/cfr	 (888) 293-6498 (202) 512-1530
CRD	Handbook for Concrete and Cement Available from Army Corps of Engineers Waterways Experiment Station www.wes.army.mil	 (601) 634-2355
DOD	Department of Defense Specifications and Standards Available from Defense Automated Printing Service www.astimage.daps.dla.mil/online	 (215) 697-6257
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Defense Automated Printing Service www.astimage.daps.dla.mil/online	 (215) 697-6257
	Available from General Services Administration www.fss.gsa.gov/pub/fed-specs.cfm	(202) 619-8925
	Available from National Institute of Building Sciences www.nibs.org	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	

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MILSPEC	Military Specification and Standards Available from Defense Automated Printing Service www.astimage.daps.dla.mil/online	 (215) 697-6257
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	 (800) 872-2253 (202) 272-5434

1.4 Abbreviations and Acronyms

1.4.1 Industry Organizations: Where abbreviations and acronyms are used in the Technical Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

1.4.2 Industry Organizations: Where abbreviations and acronyms are used in the Technical Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.aashto.org	(202) 624-5800
ACI	American Concrete Institute/ACI International www.aci-int.org	(248) 848-3700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300

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REFERENCES

AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
API	American Petroleum Institute www.api.org	(202) 682-8000
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (212) 591-7722
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
CCFSS	Center for Cold-Formed Steel Structures www.umr.edu/~ccfss	(573) 341-4471
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137

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REFERENCES

CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(800) 463-6727 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
FM	Factory Mutual System (See FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAS	International Approval Services (See CSA)	
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613

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NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(281) 228-6200
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(414) 248-9094
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	International Electrical Testing Association www.netaworld.org	(303) 697-8441
NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSA	National Stone Association (See NSSGA)	
NSSGA	National Stone, Sand & Gravel Association (Formerly: NSA - National Stone Association) www.nssga.org	(800) 342-1415 (703) 525-8788
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (508) 230-3516
PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400
SAE	SAE International www.sae.org	(724) 776-4841

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SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPI/SPFD	Society of the Plastics Industry (The) Spray Polyurethane Foam Division (See SPFA)	
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWRI	Sealant, Waterproofing, and Restoration Institute www.swrionline.org	(816) 472-7974
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
UL	Underwriters Laboratories Inc. www.ul.com	(800) 704-4050 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCMA	Window Covering Manufacturers Association	(212) 297-2122

1.4.3 Code Agencies: Where abbreviations and acronyms are used in the Technical Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

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BOCA	BOCA International, Inc. www.bocai.org	(708) 799-2300
CABO	Council of American Building Officials (See ICC)	
IAPMO	International Association of Plumbing and Mechanical Officials (The) www.iapmo.org	(909) 595-8449
ICBO	International Conference of Building Officials www.icbo.org	(800) 284-4406 (562) 699-0541
ICC	International Code Council, Inc. (Formerly: CABO - Council of American Building Officials) www.intlcode.org	(703) 931-4533
SBCCI	Southern Building Code Congress International, Inc. www.sbcci.org	(205) 591-1853

1.4.4 Federal Government Agencies: Where abbreviations and acronyms are used in the Technical Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-0990
DOC	Department of Commerce www.doc.gov	(202) 482-2000
EPA	Environmental Protection Agency www.epa.gov	(202) 260-2090
FAA	Federal Aviation Administration www.faa.gov	(202) 366-4000
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration	(202) 708-5082

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	www.gsa.gov	
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley Laboratory (See LBNL)	
LBNL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-5605
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Building Service (See GSA)	
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
TRB	Transportation Research Board www.nas.edu/trb	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

1.4.5 State Government Agencies: Where abbreviations and acronyms are used in the Technical Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web-site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

NYSDEC	New York State Department of Environmental Conservation NYSDEC Spill Hotline www.dec.state.ny.us	(516) 402-9564 (800) 457-7362

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USACE	United States Army Corp of Engineers http://www.usace.army.mil	(202) 761-5856
NYDOH	New York Department of Health http://www.health.state.ny.us	(800) 458-1158

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 01500
TEMPORARY SITE FACILITIES AND CONTROLS / PRE-MOBILIZATION AND MOBILZATION

PART 1- GENERAL

1.1 Summary

1.1.1 Work under this section includes furnishing, installing, operating and maintaining the temporary facilities and utilities by the Contractor required for the completion of the remedial construction. The requirements for pre-mobilization submittals and site mobilization are also addressed under this section.

1.1.2 Temporary Facilities for the work may include but are not necessary limited to:
- a. Equipment Storage;
- b. Decontamination Facilities;
- c. Health and Safety Equipment Storage;
- d. Stockpiling and Material Storage Areas;
- e. Fences and Barriers; and
- f. All other temporary facilities required to perform the work.

1.1.3 Temporary Utilities for the work include but are not necessary limited to::
- a. Electricity and Lighting;
- b. Telephone Service;
- c. Water Supply;
- d. Decontamination Water Generation Handling; and
- e. Sanitary Facilities.

1.1.4 The work shall consist of the mobilization of the Contractor personnel, equipment and materials necessary to perform the scope of work in accordance with the Contract Documents. It shall include transportation of personnel, equipment, and operating supplies to the Site. The work also includes the establishment of office trailers, all necessary temporary facilities and utilities, installation of temporary fences and gates, soil erosion and sediment control (SESC) measures, and other necessary facilities at the Site required for the proper performance of the remedial construction in accordance with the Technical Specifications and Design Drawings.

1.1.5 The Contractor shall establish office trailers at the Site to be used by personnel throughout the duration of the project. The following office trailers shall be established by the Contractor:

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- Office trailers to be used by the Contractor (number and sizes to be determined and proposed by Contractor);
- One office trailer for KeySpan (minimum size of 12' x 50');
- One office trailer for PS&SPC and the CM (minimum size of 12' x 50'); and
- One office trailer for NYSDEC (minimum size of 8' x 20').

1.1.6 The Contractor shall supply, provide and maintain all personal equipment, insurance, materials, fabrication, installation, and delivery of services as specified in this section for complete and proper site mobilization.

1.2 Related Sections

Section 01050	Field Engineering
Section 01056	Protection of the Work and Property
Section 01065	Health and Safety Requirements
Section 01066	Equipment and Material Decontamination
Section 01780	Demobilization
Section 02110	Site Clearing and Preparation
Section 02120	Soil Erosion and Sediment Control Requirements

1.3 Submittals

1.3.1 During the subsequent development of the remedial design for the Site, the Contractor shall provide KeySpan and/or PS&SPC (via the CM) the means and methods in which the proposed remedial construction activities will be implemented. KeySpan and PS&SPC will incorporate this input into the 100% RDR.

The Contractor shall provide the following:

- Amendments to the Generic Health and Safety Plan;
- Amendments to the Generic Construction Quality Assurance Project Plan;
- A detailed CPM construction schedule;
- Required health and safety training certifications and medical clearance for all project personnel;
- MSDS sheets for all materials brought on-site;

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- List of subcontractor(s) to be used;
- Site preparation details including the implementation of soil erosion and sediment control measures;
- Methods for protection of work and property;
- Methods for support and protection of impacted utilities;
- Sequencing of work for the implementation of the remedial construction activities;
- Proposed equipment, supplies, materials, labor and methodology for implementing the proposed remedial construction activities;
- Proposed staging areas for equipment and materials;
- Proposed equipment and personnel decontamination areas;
- Procedures for demolition and removal of subsurface foundations (i.e. former gas holder, industrial piping, foundations and tunnel entrance)
- Procedures to ensure work does not undermine the foundations of adjacent streets and property;
- Procedures for implementing construction activities in proximity to overhead and underground utilities;
- Design submittal for the temporary fabric enclosure(s) to be utilized for the remedial excavation activities, including the number of enclosures and sizing;
- Manufacturer's specifications and details on the VMS system(s);
- Procedures for erection and relocation of the temporary fabric enclosure;
- Methods for installing the migration barrier in proximity to the overhead utilities.
- Proposed trucking subcontractors to be utilized including the number of trucks per day;
- Proposed disposal facilities to be utilized during the remedial work;
- Side slope stabilization methods (i.e. benching, shoring, etc.) to be utilized for the pre-trenching for the migration barriers and remedial excavation areas;
- Methods for excavation support in proximity to overhead utilities without encroaching on the required setbacks;
- Methods for subsurface utility exposure (i.e. removing overburden soil), protection, and utility support;
- Sources for backfill material including required certifications and analytical data;

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- Procedures for identifying and work with materials suspected of containing asbestos;
- Mitigation procedures to be implemented for limiting of vibration, noise and fugitive odors during remedial construction; and
- Methods for Site security.

1.3.2 Prior to commencement of intrusive field activities, a utility search and identification shall be conducted by the Contractor, and all potential conflicts shall be resolved. Existing data for the work area shall be utilized where available and confirmed by the site occupant. A utility locating service for the region will be utilized and markouts completed in accordance with good construction practices and regulations. When all utilities have been verified and confirmed, intrusive activities may be initiated.

1.3.3 The following information shall be submitted by the Contractor to KeySpan, PS&SPC and/or the CM for review and approval prior to delivery and installation at the Site:

a. Trailers - materials of construction, size, number and site placement.
b. Electricity supply and lighting - source point, layout locations, fixtures and materials.
c. Water supply, contaminated wash water handling and sanitary facilities – source point, layout locations, fixtures, materials and methods of disposal.
d. Stockpiling and storage areas - layout, locations, source and documentation of materials and construction details.
e. Pre-fabricated decontamination pads if utilized.
f. A site plan showing trailers, electrical layout, equipment, facilities, support zone, decontamination reduction zone, exclusion zone, decontamination facilities and any other feature deemed necessary for the Contractor.

1.4 Requirements of Regulatory Agencies

1.4.1 All on-site personnel will have the requisite 1910.120 Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Training as well as site-specific training prior to any remedial activity.

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1.4.2 Electricity and lighting shall be in accordance with Federal, State and local regulations as well as local utility company requirements. All work shall be performed by a licensed electrician in accordance with the National Electric Code.

1.4.3 Sanitary facilities, and disposal of sanitary wastes, shall be in accordance with State and local regulations.

1.4.4 The Contractor shall be responsible to apply, obtain and pay for all permits as required for temporary facilities and utilities from local agencies.

1.5 Location

1.5.1 All specified facilities shall be located on site within the Support Zone as designated by KeySpan, PS&SPC and/or the CM with the exception of the emergency medical and decontamination facilities, which shall be located within the Contamination Reduction Zone.

1.5.2 The security, communications, and equipment storage areas may be contained within the same or separate structures, at the Contractor's option.

1.6 Responsibility

1.6.1 The Contractor shall be responsible for the operation, maintenance and removal of all equipment and systems to assure that necessary services are provided without disruption.

1.6.2 The Contractor shall be responsible for all electrical charges including source connection, installation, service charges and shut-off.

1.6.3 The Contractor shall be responsible for all telephone charges including installation, service charges and discontinuance.

PART 2- PRODUCTS

2.1 Materials

2.1.1 The Contractor shall furnish all materials required to complete the work described in this Section.

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2.2 Equipment

2.2.1 The Contractor shall furnish all equipment required to complete the work described in this Section.

PART 3- EXECUTION

3.1 General

3.1.1 The Contractor shall be responsible for designing, furnishing, installing, and maintaining all temporary site facilities and utilities required for the performance of work.

3.1.2 The Contractor is responsible to specify the Union labor or agreements that apply to the work. The Contractor is responsible for the various labor agreements and including that cost within their bid prices.

3.2 Remedial Design Support

3.2.1 During the subsequent development of the remedial design for the Site, the Contractor shall provide the means and methods in which the proposed remedial construction activities will be implemented. KeySpan and PS&SPC will incorporate this input into the 100% RDR. During the development of the final remedial design, the Contractor shall support the design and provide at a minimum those submittals specified in Section 1.3 of this section and throughout the Technical Specifications.

3.2.2 The Contractor shall submit all required plans and designs in accordance with Section 01330 Submittals.

3.3 Pre-Mobilization

3.3.1 The Contractor shall provide all submittals specified within the Technical Specifications and Section 1.3 of this section

3.3.2 The Contractor shall be responsible for Utility Search and Identification as detailed in Section 1330, Submittals.

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3.4 Mobilization

3.4.1 Mobilization shall commence upon receipt and approval of all required documentation to KeySpan, PS&SPC and/or the CM as outlined in the Technical Specifications.

3.4.2 All work shall be performed by competent, trained Union workmen, skilled in the field to which they are to work.

3.4.3 Staging areas for materials, construction equipment and excavated material, decontamination areas, and support areas will be identified prior to performing work and shall require the approval of KeySpan, PS&SPC and/or the CM. All equipment will be clean prior to arrival on the job site.

3.4.4 The Contractor shall construct, improve, and maintain access roads and site roads during construction as required for operations or when requested for by KeySpan, PS&SPC and/or the CM.

3.4.5 Mobilization shall also include the furnishing, installation, and maintenance of all temporary site facilities and utilities in accordance with requirements of this section.

3.4.6 The Contractor shall provide an equipment decontamination pad(s) in accordance with Section 01066 - Equipment & Material Decontamination and requirements of this Section.

3.5 Monitoring

3.5.1 KeySpan, PS&SPC and/or the CM will monitor all work as mobilization proceeds to document conformance with the requirements of the Contract Documents.

3.6 Electricity and Lighting

3.6.1 All temporary electric service required throughout Site shall be provided by the Contractor. It shall be the responsibility of the Contractor to coordinate electric service installation with KeySpan, PS&SPC and/or the CM.

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3.6.2 The Contractor is responsible for extending electrical service to the site facilities. It shall be the responsibility of the Contractor to ascertain site power requirements and inform KeySpan, PS&SPC, and/or the CM of such requirements in advance.

3.6.3 Service shall be brought to immediate work areas of the Site, as required, by construction-type power cords. Distribution boxes and circuit wiring shall be provided, if required, to meet the required power needs. All electrical service shall meet the substantive requirements of applicable building codes.

3.7 Telephone Service

3.7.1 The Contractor shall make all arrangements with the telephone company and pay all costs for providing telephone services as specified herein and for any additional requirements.

3.8 Water System

3.8.1 The Contractor shall determine the site water requirements and provide adequate water from accepted sources.

3.8.2 Non-potable site water may be stored in holding tanks and distribution piping or by tank trucks or any combination thereof.

3.8.3 A high-pressure steam-cleaning system shall be provided for equipment and vehicles use, after the mud and/or dirt has been cleaned from the equipment. The Contractor shall be responsible to collect the wastewater resulting from the cleaning of the equipment and pump to containers (i.e., Frac/Baker Tanks, drums, etc.) for disposal. The collected wastewater shall be managed in accordance with the requirements of the Technical Specifications.

3.8.4 The Contractor shall also ensure that the available water source on-site is adequate to implement and apply odor suppression measures as required by KeySpan, PS&SPC, or the CM during the implementation of the planned remedial construction activities. The Contractor shall modify or enhance the available water supply as required to facilitate the implementation of the odor suppression and dust control measures at no additional cost to KeySpan, PS&SPC, or the CM.

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3.9 Decontamination Water

3.9.1 Water from personnel and equipment decontamination activities shall be collected and then properly managed and containerized.

3.10 Sanitary Waste System

3.10.1 The Contractor shall provide suitably enclosed chemical or self-contained toilets shall be provided for the use of the persons employed on the work. Toilets shall be located near the work site and secluded from observation insofar as possible. Toilets shall be serviced at regular intervals, and kept clean and supplied throughout the course of the work.

3.11 Facility Requirements

3.11.1 Prior to installation of offices and sheds, the Contractor shall consult with KeySpan, PS&SPC and/or the CM in regard to requirements, locations, access, and related facilities. The Contractor shall be responsible to obtain necessary permits and/or approvals for use and occupancy of these facilities. All trailers other than storage sheds shall be provided with the following minimum requirements:

a. Grounded Lighting - Lighting shall be electric, non-glare type producing a minimum illumination level of 50 foot-candles measured at desk height.
b. Heating and Cooling - Heating and cooling shall be capable of maintaining ambient temperatures within the trailer of approximately 70°F.
c. Potable bottled water.
d. Fire Protection - Fire extinguishers shall be non-toxic dry chemical type, UL approved for Class A, 8 and C fires (minimum rating of 2A, 108, 10C).
e. Telephone Service - Provide minimum of two telephone lines for use by KeySpan/PS&SPC and NYSDEC use.
f. Offices - Coordinate with KeySpan, PS&SPC and the CM as to the extent of offices, furniture (desks, chairs), conference table and chairs for KeySpan, PS&SPC, the CM and NYSDEC representatives. At a minimum, each of the office trailers to be used by KeySpan, PS&SPC, the CM, and the NYSDEC shall include the following:

- Built-in desks

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- Built-in overhead shelves;
- Built-in plan table;
- High speed DSL internet access with two jacks;
- Adjustable office chairs with swivels;
- Fireproof file cabinets;
- Folding chairs (only for the PS&SPC and CM trailer);
- Folding conference tables (only for the PS&SPC and CM trailer);
- Coffee machine (only for the PS&SPC and CM trailer);
- Microwave oven (only for the PS&SPC and CM trailer);
- Medium size compact refrigerator (only for the PS&SPC and CM trailer);
- Plain paper fax machines; and
- 1 floor standing copier and scanner capable of 11" x 17" copying and scanning (only for the PS&SPC and CM trailer).

3.11.2 Facilities shall be structurally sound and weather-tight, with floors raised above ground and open to allow free circulation of air.

3.11.3 All trailers and equipment supplied by the Contractor shall be removed from the site at the close of construction.

3.12 Personnel Decontamination

3.12.1 An area shall be provided for personnel decontamination. Refer to Section 01065 - Health and Safety Requirements.

3.13 Health and Safety Equipment Storage

3.13.1 A partitioned health and safety equipment storage area shall be provided and shall have access through a lockable door. Sufficient shelving shall be installed for storage and inventory control of small items.

3.14 Temporary Utility Installation

3.14.1 The Contractor shall engage appropriate local utility companies to install temporary service or to connect to existing service. Where utility company provides only part of the service, the Contractor shall provide the remainder with

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matching, compatible materials and equipment. The Contractor shall comply with utility company recommendations.

a. The Contractor shall arrange with the utility company and KeySpan for time when service can be interrupted, if necessary, to make connections for temporary services.

b. The Contractor shall provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.

3.14.2 Water Service (If Required): The Contractor shall install water service and distribution piping in sizes and pressures adequate for construction. Sterilize temporary water piping before use.

3.14.3 Sanitary Facilities (If Required): The Contractor shall provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

a. Disposable Supplies: Provide toilet tissue, soap, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
b. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy.
c. Wash Facilities: Install wash facilities supplied with water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled. Provide eyewash stations and similar facilities for convenience, safety, and sanitation of personnel.
d. Drinking-Water Facilities: Provide bottled-water, drinking-water units. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F.
e. Locate toilets and drinking-water fixtures so personnel need not walk more than 200 feet to facilities from work area.

3.14.4 Heating and Cooling: The Contractor shall provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures

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or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.

3.14.5 Ventilation and Humidity Control: The Contractor shall provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

3.14.6 Electric Power Service: The Contractor shall provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

a. Install electric power service underground, unless overhead service must be used.
b. Install power distribution wiring overhead and rise vertically where least exposed to damage.
c. Connect temporary service to KeySpan's existing power source, as directed by KeySpan.

3.14.7 Electric Power Service: Use of KeySpan's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to KeySpan.

3.14.8 Electric Distribution: The Contractor shall provide receptacle outlets adequate for connection of power tools and equipment.

a. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
b. Provide warning signs at power outlets other than 110 to 120 V.
c. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades or other traffic areas.

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d. Provide metal conduit enclosures or boxes for wiring devices.
e. Provide 4-gang outlets, spaced so 100-foot extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.

3.14.9 Lighting: The Contractor shall provide temporary lighting with local switching that provides adequate illumination for construction operations.

a. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
b. Provide one 100-W incandescent lamp per 500 sq. ft., uniformly distributed, for general lighting, or equivalent illumination.
c. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.

3.14.10 Telephone Service: The Contractor shall provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities.

a. Provide additional telephone lines for the following:
   - In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
   - Provide a dedicated telephone line for each facsimile machine and computer with modem in each field office.
   - Provide a separate telephone line for KeySpan/PS&SPC and NYSDEC use.

b. At each telephone, post a list of important telephone numbers.
   - Police and fire departments.
   - Ambulance service.
   - KeySpan's office.
   - PS&SPC's home office.
   - The CM's home office.
   - Utility contacts.
   - Principal Contractors' field and home offices.
   - Subcontractor's field and home offices.

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c. Provide an answering machine on Contractor's superintendent telephone.

d. Furnish Contractor superintendent with portable two-way radios or a cellular telephone for use when away from field office.

3.15 Support Facilities Installation

3.15.1 General: The Contractor shall comply with the following:

a. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
b. Maintain support facilities until near substantial completion.

3.15.2 Waste Disposal Facilities: Utilize waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label any hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section 01700 - Execution Requirements for progress cleaning requirements.

3.16 Security and Protection Facilities Installation

3.16.1 Environmental Protection: The Contractor shall provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near the Site.

3.16.2 Stormwater Control: The Contractor shall provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains.

3.16.3 Tree and Plant Protection: The Contractor shall install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage as designated by KeySpan, PS&SPC and/or the CM. Protect tree root systems from damage, flooding, and erosion.

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3.16.4 The Contractor shall maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide KeySpan, PS&SPC and the CM with one set of keys each.

3.16.5 Temporary Fire Protection: The Contractor shall install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

a. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above. Field Offices: Use a Class A stored-pressure water-type extinguishers. Other Locations: Use a Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
b. Store combustible materials in containers in fire-safe locations.
c. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
d. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
e. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at the Site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.17 Fencing

The Contractor shall furnish, install and maintain temporary fences and around the Site during the duration of the project.

END OF SECTION

SECTION 01540
SITE SECURITY

PART 1 - GENERAL

1.1 Summary

The Site is currently a secure area and maintaining security during the remedial activities is paramount. The Contractor shall maintain a list of all employees, subcontractors, and any other personal that enter the Site. All Contractor's personnel including subcontractors must have a photo identification available upon request at all times and must coordinate with the security guard at the main gate with regard to sign in/sign out procedures.

The Contractor shall employ uniformed, security personnel at the site during non-working hours, including weekends and holidays. Security personnel shall be provided by an independent third-party entity. These personnel do not need medical monitoring or OSHA training, provided they not enter any Contamination Reduction Zone.

This section describes the minimum security measures and equipment to be used by the Contractor for the Site.

1.1.1 The Contractor shall be responsible for maintaining site security at all times throughout the duration of the contract.

1.1.2 No claim shall be made against KeySpan, PS&SPC and/or the CM for damage resulting from trespass or loss of Contractor's equipment.

1.1.3 The Contractor shall make good all damage to property of KeySpan, PS&SPC and/or the CM arising from failure to provide adequate security.

1.1.4 If existing fencing or barriers are breached or removed for purposes of construction, the Contractor shall notify KeySpan, PS&SPC and/or the CM immediately and provide and maintain temporary security fencing in a manner satisfactory to KeySpan, PS&SPC and/or the CM.

1.1.5 The Contractor shall maintain a security program throughout construction. The security program shall be submitted (via the CM) to KeySpan and/or PS&SPC prior to mobilization.

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SITE SECURITY

1.1.6 The Contractor shall restrict entrance of persons and vehicles into the Site and existing facilities. The Contractor shall allow entrance to the Site only to authorized persons with proper photo identification.

1.2 Related Sections

Section 01065	Health and Safety Requirements
Section 01330	Submittal Procedures
Section 01500	Temporary Site Facilities, Controls/Pre-Mobilization & Mobilization
Section 01780	Demobilization

1.3 Submittals

The Contractor shall prepare and submit (via the CM) for approval, to KeySpan and PS&SPC, a plan identifying the components of the Site Security Program prior to mobilization.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 Security Program

The site security program shall address as a minimum, the following:

3.1.1 Roles and responsibilities of site personnel involved with Site Security; Description of proposed daily security operations;

3.1.2 Method and frequency for conducting security checks;

3.1.3 Sign in/sign out procedures;

3.1.4 Location of security station;

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SITE SECURITY

3.1.5 Description of how a breach of security will be handled. A breach of security shall include, but not be limited to, unauthorized personnel located on the site working area, unauthorized personnel attempting to gain access to the site working area, broken fences and unlocked gates, and unauthorized personnel on the hazardous work zones;

3.1.6 Communications; and

3.1.7 List of personnel to be contacted in case of emergency.

3.2 Personnel

3.2.1 The Contractor shall assign responsibilities of site personnel, as defined in the security program, for site security.

3.3 Site Security

3.3.1 The Contractor shall be responsible for insuring that personnel performing security duties have complied with the requirements for personnel as defined in Section 01065 - Health and Safety Requirements, including training and medical monitoring.

3.3.2 The Contractor shall insure that all gaps in all fences are closed to provide security of the active work areas.

3.3.3 The Contractor shall be responsible for maintaining a log of all security incidents. This log shall be furnished to KeySpan, PS&SPC and/or the CM upon request.

3.4 Entrance Control

3.4.1 The Contractor shall coordinate with security personnel regarding site security and conform to KeySpan's existing site security requirements during the implementation of the remedial activities.

3.4.2 Control of all persons, equipment, and vehicles entering and leaving the Site shall be provided by the Contractor in coordination with KeySpan's requirements.

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SITE SECURITY

3.4.3 The Contractor shall require each person to have available proper photo identification.

3.4.4 The Contractor shall maintain a list of persons authorized for Site entry and submit a copy of the list to KeySpan, PS&SPC and/or the CM.

3.4.5 The Contractor shall require all personnel and visitors having access to the Site to sign in and sign out, and shall keep a record of all site access. A log of all visitors shall be maintained in coordination with KeySpan's existing security requirements.

3.4.6 Site visitors shall not be permitted to enter active work areas unless authorized by KeySpan, PS&SPC and/or the CM.

3.4.7 Vehicular access shall be restricted to authorized vehicles only. KeySpan, PS&SPC and/or the CM reserve the right to search all Contractor vehicles.

3.4.8 Personal vehicles shall not be authorized to enter the active hazardous areas on site.

3.5 Security Station

3.5.1 The Contractor shall provide an area designated for security operations. This area that may be part of Contractor's offices, or a separate enclosure and shall contain, as a minimum, the following equipment:

a. One independent telephone line and telephone;
b. A minimum of two portable two-way radios for the Contractor, two portable two-way radios for KeySpan, PS&SPC, and the CM and one base radio station. All sets shall be capable of transmitting to and receiving from any other set, at any point within the project boundary. All portable units shall be rechargeable, and shall be capable of operating continuously without recharge for eight hours.

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SITE SECURITY

3.6 Security Fence

The existing chain link fence may be used as part of the security fence with approval by KeySpan, PS&SPC and/or the CM. The Contractor may use additional security fencing for localized security measures with approval by KeySpan, PS&SPC and/or the CM.

END OF SECTION

SECTION 01610
STORAGE OF MATERIALS

PART 1 - GENERAL

1.1 Summary

This section includes storage and protection of materials in accordance with manufacturer's recommendations and the requirements of the Technical Specifications.

1.2 Storage of Materials

1.2.1 The Contractor shall make all arrangements and provisions necessary for the storage of materials and equipment. All construction equipment and materials to be incorporated into the work shall be placed in a location so as not to damage any part of the work or existing facilities, and will be stored at a sufficiently safe distance from any contaminated location or material, covered against the weather, and elevated. The method and duration of the storage of wastes and materials shall be approved by KeySpan, PS&SPC and/or the CM prior to the actual storage. The Contractor shall provide free access at all times to all parts of the work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neat and stored compactly in locations that will not cause inconvenience to KeySpan, PS&SPC, the CM, other Contractors, public travel, adjoining property, tenants and occupants. The Contractor shall arrange storage in a manner to provide easy access for inspection.

1.2.2 Areas available on-site for storage of material and equipment shall be approved by KeySpan, PS&SPC and/or the CM.

1.2.3 KeySpan, PS&SPC and/or the CM reserve the option to require the Contractor to vacate an assigned storage area and designate another storage area of equivalent size for use by the Contractor.

1.2.4 Materials and equipment that are to become the property of KeySpan shall be stored to facilitate their inspection and ensure preservation of the quality and fitness of the work, including proper protection against damage by freezing, moisture and sun.

1.2.5 Private property shall not be used for storage purposes without the written permission of KeySpan, PS&SPC and/or the CM or other person in possession or control of such premises.

1.2.6 The Contractor shall be fully responsible for loss or damage of stored materials and equipment.

SECTION 01610
STORAGE OF MATERIALS

1.3 Covered Storage

1.3.1 The Contractor shall provide tie down covers with a slope to prevent the accumulation of water on the covers or tarps of staged materials.

1.3.2 The Contractor shall store materials on elevated platforms (e.g., wood blocking or pallets), as required.

1.4 Maintenance of Storage

1.4.1 The Contractor shall maintain a periodic system of inspection of stored products on a scheduled basis to ensure that:

a. The physical state of the storage facilities is adequate to provide the required conditions; and
b. Products exposed to elements are not adversely affected.

1.4.2 Prior to and after a severe weather event, the Contractor is required to inspect staged materials, tie down systems, and tarp to ensure that material is protected from the elements.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01700
EXECUTION REQUIREMENTS

PART 1- GENERAL

1.1 Summary

1.1.1 This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

a. Construction layout;
b. Field engineering and surveying;
c. Management of utilities;
d. General installation of products;
e. Coordination of KeySpan-installed products;
f. Progress Cleaning;
g. Starting and adjusting;
h. Protection of installed construction; and
i. Correction of the Work.

1.1.2 Perimeter Cut and Cap

The following describes the anticipated approach to be implemented by the Contractor when locating and managing the utilities around the perimeter of the Site. However during the development of the remedial design into the 95% RDR submittal, the Contractor shall provide a design submittal detailing the means and methods that will be implemented during this work. The design submittal will be reviewed by KeySpan, PS&SPC and the CM.

Utility Location:

The Contractor shall locate, identify and disconnect underground utilities and piping that may enter or exit the perimeter of the Site in preparation for remedial excavation activities. In preparation for this work, the Contractor shall review the subsurface obstruction survey prepared for the Site. In addition, the Contractor shall contact the New York City – One Call Center to field locate and mark off-site utilities along the Site perimeter. KeySpan will field locate its utilities along the Site perimeter to the extent feasible. The Contractor is responsible for coordinating with all other pertinent utility companies in locating and managing the utilities that will be impacted during the planned remedial construction activities.

SECTION 01700
EXECUTION REQUIREMENTS

Trenching:

The Contractor shall excavate a two to three foot wide trench (depending on width of backhoe bucket) along the perimeter of the Site. Excavation of overburden material from the trench will involve hand digging and heavy equipment as necessary. The Contractor shall manually excavate and probe the surface of the excavation prior to soils being removed by a backhoe. The depth of the manual probe will average six to ten inches. The amount of soil removed from the trench by the backhoe will not exceed the depth of the previous manual probe in order to minimize the chance of a premature line break. After completion of the probe, the next cut shall be removed by the backhoe. Alternatively, soft dig techniques (i.e., use of Vactor or Guzzler-type equipment) can be used to excavate the trench and expose subsurface utilities. Upon discovery of subsurface features, hand excavation methods or soft dig techniques will be employed to identify the feature. The final depth of the trench will be limited to the deepest utility/piping or to a maximum depth of the groundwater table (approximately 8 feet bgs) or as directed by KeySpan, PS&SPC, and/or the CM.

Trench Stabilization/Shoring:

Temporary shoring shall be utilized by the Contractor to stabilize the sides of trench facing the exterior of the Site. On the Site-side of the trench, the excavations shall be benched back by the Contractor as required to provide a stable excavation side slope. The benching of excavations shall meet the applicable OSHA sloping requirements. Alternately, trench boxes may be utilized if Site conditions preclude the use of benching.

Material Stockpiling:

Soil stockpiles will be staged immediately adjacent to the trench within the Site boundary on top of a plastic sheeting, tarps, or other similar barrier are to be laid over the existing grade for temporary placement of excavated soil. Such stockpiles shall not conflict with OSHA set-back requirements for trenches/excavations. Stockpiled soils and debris will be visually evaluated by KeySpan and the NYSDEC for the presence of source material. Soil and debris judged to contain source material (based on visual observation and field screening techniques) will be returned to the trench only within the designated Shallow Excavation Areas. The location of such soils will be documented for subsequent excavation and off-site disposal. All other soils containing source material are to be staged on plastic and covered for management as waste material for off-site disposal. Any additional soils required to backfill the trench outside of the

SECTION 01700
EXECUTION REQUIREMENTS

Shallow Excavation Areas will consist of certified clean fill. All staged waste material will be prepared for off-site disposal at an approved facility.

Utility Breaking/Plugging:

When a utility line or piping is located, the Contractor (in consultation with KeySpan, PS&SPC, and the CM), will identify the utility/line. If the utility/line appears to be active, a representative from the pertinent utility company will be contacted to evaluate the line and terminate the service, if required.

For utilities/lines that are determined to be inactive, initial penetration of the utility/pipe will involve use of spark-proof drilling tools to create a small hole in the utility/pipe. Access to the interior of the line will allow initial screening of the internal atmosphere with field screening instruments to determine the potential for explosion. Once screening has identified acceptable conditions within the line, a non-sparking saw, such as a "Nibbler", or similar, shall be utilized to cut and remove a section of pipe.

Utility/piping sections that will be cut and removed for purposes of line breaking and capping shall be visually examined for presence of asbestos or asbestos containing material. If present, a subcontractor meeting Federal, New York State and New York City asbestos licensing and permitting requirements will be utilized to address the utility/pipe. In general, the following requirements will be met:

- Adequately wet the asbestos material during removal;
- After wetting and removal, seal the piping and any associated asbestos waste in leak-tight containers while wet, or place in leak-tight wrapping (i.e., double bagged or wrapped);
- Label the container/wrapped waste with OSHA warning labels;
- Mark the container/wrapped waste with the name of the waste generator (KeySpan) and site address; and
- Load the containers/wrapped waste into transportation vehicles with appropriate asbestos warning labeling (40 CFR 61.149 (d)).

At all times during removal, handling, packing and transport, the asbestos material must be kept wet and the standard of "no visible emissions" of asbestos will be met.

Any residual material which drains from the line shall be collected and segregated for characterization and off-site transportation and disposal. Plugging of the line will require the mixing and placing of grout (hydraulic cement) into the open end

of the cut line. Bentonite will be mixed with the soils being placed as backfill adjacent to the plugged lines.

Dewatering:

Utility lines/piping are anticipated to be located above the groundwater table elevation. However, it is possible that some lines may extend below the groundwater table. If required (i.e. to facilitate the installation of sheet piles or similar deep impact activity), the Contractor will temporarily dewater the trench to access and cut/cap the line. Localized dewatering will be performed using a positive displacement pump at a low point in the trench. Generated fluids will be containerized for off-site disposal.

Underground 33 kV Electrical Transmission/Distribution Line Location:

In addition to the active overhead 33 kV electrical transmission/distribution line that extends along the southern side of Beach Channel Drive, there is an active underground 33 kV electrical transmission/distribution line that is located along the northern boundary of the Site. During the perimeter utility cut and cap work, the Contractor will identify the exact location and depth of this utility in order to eliminate potential electric power reductions or losses.

It is anticipated that the Contractor will use soft dig techniques (i.e., use of Vactor or Guzzler-type equipment) to excavate test pits along the known alignment of the underground 33 kV electrical line. Once the test pits are excavated, the location and elevation of the 33 kV electrical line will be surveyed by a Professional Surveyor licensed in the State of New York. The survey data will be utilized by the Contractor in order to ensure that the required set back requirements are being maintained.

Existing Utility Poles:

The Contractor will protect and support existing on-site utility poles that are actively in service and are within the planned remedial work areas. The Contractor will protect and support the existing on-site utility poles that are to remain in place in accordance with the requirements of the pertinent utility company.

1.1.3 Pre-Trenching Activities

In order to manage subsurface obstructions and utilities, a trench will be excavated by the Contractor along the proposed alignment of the migration

barriers. The trench will be excavated to a depth of 8 feet below grade (or above immediately above the groundwater table, whichever is encountered first). The width of the trench will allow for the top of the sheeting to be driven to a terminal depth of 2 feet bgs. Any obstructions such as former foundations and construction debris encountered during the pre-trenching activities that have the potential of hindering the installation of the migration barrier will be removed by the Contractor and staged on-site for off-site disposal.

In the event that soil containing source material is encountered during the pre-trenching activities, the soil will be removed by the Contractor. The soil will be staged on-site where KeySpan, PS&SPC and the NYSDEC representatives will make the determination as to whether or not the soil will be disposed of off-site. This determination will be based on visual observation and field screening techniques (i.e. PID readings).

It is anticipated that the trench will be backfilled with either excavated soil (non-source material containing soil) or clean off-site material to within 3 feet of the ground surface. The migration barrier will then be driven to 2 feet below ground surface as described below. Final backfilling of the remaining 3 feet of the trench will occur during installation of the site wide cap. In the bulkhead area, the final 3 feet of the trench will be backfilled upon completion of the migration barrier installation and the construction of the soil cap.

1.1.4 Installation of the Migration Barrier

The subsurface migration barrier, consisting of a Waterloo Barrier® sheet pile system, will be installed along the proposed alignment as depicted on the Design Drawing Drawings. The barrier will consist of Waterloo Barrier® EZ95 steel sheeting. Both the top and bottom 5 feet of each steel sheet will be reinforced to improve driving mechanics. The sheeting will be installed in a manner consistent with the field demonstration program and with manufacturer's recommendations.

All sheeting will be driven using a high frequency vibratory hammer due to both the relative speed of installation and lower noise and vibration generation compared to use of an impact hammer. The center 120 foot depth section of the on-site barrier will likely be installed first followed by the two 50 foot depth sections. The bulkhead area barrier will be installed after the completion of the on-site barrier.

Following installation of the sheets, the interlocks will be properly flushed to remove soils/debris. The full length of the interlock channels between each of the

installed sheets will be flushed with clean water to remove soil/debris. Flush water will be allowed to percolate onto the ground surface immediately adjacent to the installed sheets. If necessary, in instances where interlock obstructions can not be cleared by standard flushing, high-pressure jetting will be employed to clear obstructions within the interlocks.

Finally, the seams in the sheet piles will be sealed with WBS-301 joint sealants as defined in the Technical Specifications.

1.1.5 Shallow Excavation Areas

As depicted on the Design Drawings, excavation activities within the shallow excavation areas will consist of removing observed source material to a depth of 8 feet bgs (which approximates the depth to the groundwater table). Assuming an excavation depth of 8 feet bgs, the estimated volume of material to be removed by the Contractor from the proposed shallow excavation areas is estimated to be 88,000 cubic yards (in place). In addition, excavation outside of the designated shallow excavation area will occur to a depth of two feet bgs in order to accommodate installation of the site wide soil cap. However, the excavation depth for the construction of the cap may be less in those areas of the Site where the proposed grade is higher than the existing grade. All areas of the Site will contain a two foot thick cap consisting of imported clean materials.

With the exception of the excavation activities required to construct the site wide cap and with exceptions to the portions of the Site where overhead restrictions are present, all remedial excavation activities within the Shallow Excavation Areas will be conducted within a temporary fabric enclosure(s) to control the release of volatile emissions and odors. The fabric enclosure(s) will be re-located, as necessary, as the remedial excavation activities progress.

If source material is visually observed to extend beyond the excavation boundaries, then excavation activities will extend horizontally beyond the boundaries to the extent feasible. The maximum horizontal expansion of the Shallow Excavation Area will be limited to the Site boundaries as shown on the Design Drawings. Excavation that has the potential to undermine existing public rights-of-way (i.e., sidewalks, roadways, infrastructure beyond the Site perimeter) will not be implemented. KeySpan, PS&SPC and the NYSDEC representative will make the final determination as to whether or not encountered material is constituted to be source material. The determination for removal will be based upon a combination of visual observations and field screening techniques.

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Former MGP features within the planned remedial excavation areas (that potentially contain source material) will be removed to the extent practical. In order to facilitate the removal of encountered structures that potentially contain source material, the excavation will be deepened to the extent practical.

Encountered foundations and similar structures will be demolished utilizing a hoe ram attachment on an excavator, backhoe or equivalent. After demolition, the debris will be prepared and decontaminated, as necessary, to meet the acceptance criteria of the selected disposal or recycling facility. Preparation will consist of demolishing the surface slabs into pieces that are manageable and meet facility acceptance criteria. Decontamination of concrete debris will consist of pressure washing using a high pressure, low volume power washer. In addition, physical/mechanical agitation (scraping with hand tools) of soil may be utilized to minimize wastewater generation. Generated decontamination fluids will be containerized on-site where it will be characterized for off-site disposal.

Subsurface piping that contains product or product residue or exhibits elevated PID readings will be removed to the extent practical. Piping that extends beyond the perimeter of the Site, including into the existing electrical substation, will have any residual product evacuated through the use of vacuum extraction, high pressure water/steam or equivalent method to the extent practical. The final method of product evacuation will be determined in the field and will be based on the size and condition of the encountered piping. The piping will then be cut, capped and abandoned in place.

Former MGP features within the planned remedial excavation areas (that do not potentially contain source material) will be removed only to the planned excavation depth (i.e., 8 feet bgs). These features will be broken up in place as previously described and either re-used on-site as backfill material or disposed off-site as construction debris.

1.1.6 Site Wide Soil Cap

In order to limit exposure pathways, a site wide cap consisting of 18 inches of well graded sandy soil topped with six inches of gravel will be constructed across the entire on-site area. The site wide cap will also be underlain with a geotextile fabric to serve as a demarcation barrier. In on-site areas outside of the Shallow Excavation Area, the top two feet of soil will be excavated where required to facilitate the construction of the cap. However, the excavation depth for the construction of the cap may be less in the areas of the Site where the proposed grade is higher than the existing grade. All areas of the Site will contain a two foot thick cap consisting of imported clean materials.

SECTION 01700
EXECUTION REQUIREMENTS

Within the Bulkhead Area, the existing topography is level with the sidewalk along Beach Channel Drive before sloping downward several feet toward the Channel. The remedial design includes removing the upper two feet from this plateau area to facilitate construction of the two foot cap. The cap within the Bulkhead Area will consist of a minimum of 18 inches of well graded sandy soil topped with six inches of topsoil capable of sustaining vegetation. All planting and seeding within the Bulkhead Area is the responsibility of the City of New York Parks and Recreation Department.

1.2 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Technical Specification Sections, apply to this Section.

1.2.1 Related Sections include the following:

Section 01330	Submittal Procedures.
Section 01770	Closeout Procedures.

1.3 Submittals

1.3.1 The Contractor will submit the qualifications of their respective Resident Engineer to demonstrate their capabilities and experience. This should include a list of completed projects with project names and addresses, names and addresses of architects and owners, and other pertinent information.

1.3.2 The Contractor or its subcontractor will submit certificates, signed by their Resident Engineer, certifying that the locations and elevations of the mitigation barrier comply with contract requirements.

1.3.3 The Contractor shall submit surveys of the final location and elevations (i.e. As-builts) of the migration barrier as well as all utilities that were managed during the installation of the migration barrier. The surveys shall be prepared by a Professional Surveyor licensed in the State of New York procured by the Contractor.

1.3.4 The Contractor shall submit mitigation measures to be implemented during construction activities if remedial construction causes vibration impacts, excessive noise, or fugitive dust and odor that are detrimental to surrounding areas, including but not limited to, the existing electrical substation, the sewer

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EXECUTION REQUIREMENTS

treatment plant, the elevated MTA subway tracks and adjacent business and residential structures.

1.4 Quality Assurance

1.4.1 A Professional Land Surveyor licensed in the State of New York and who is experienced in providing land-surveying will be utilized to confirm final placement of all contract work.

PART 2- PRODUCTS

Not Used

PART 3- EXECUTION

3.1 Examination

3.1.1 The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the proposed remedial work.

a. Before construction, verify the location and points of connection of utility services.

3.1.2 The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

a. Before construction, the Contractor is to verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas lines, and water service piping and underground electrical and communication services.
b. The Contractor is to furnish location data for work related to Project that must be performed by public utilities serving the Project.

3.1.3 The Contractor will examine substrates, areas, and conditions, with the necessary subcontractors or installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations in the project record documents.

SECTION 01700
EXECUTION REQUIREMENTS

a. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 Preparation

3.2.1 The Contractor will furnish information to KeySpan and the appropriate owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordination will be with the authorities having jurisdiction.

3.2.2 Utilities serving facilities occupied by KeySpan or others will not be interrupted unless permitted under the following conditions and then only after arranging to provide temporary utility services according to the utility jurisdiction.

a. Notify KeySpan, PS&SPC and/or the CM not less than 5 days in advance of proposed utility interruptions.

b. Do not proceed with utility interruptions without KeySpan, PS&SPC and/or the CM written permission.

3.2.3 Field Measurements will be taken as required to fit the Work properly. Re-check measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements, before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

3.2.4 The Waterloo Barrier® Steel Sheet Piles lengths shall be field verified prior to installation. The Contractor or it's subcontractor shall mark measurement intervals on the sheet to aid the record keeping process during the installation of the sheets

.

3.2.5 The Contractor or its subcontractor shall perform a visual survey of the Waterloo Barrier® Steel Sheet Piles prior to installation, particular attention shall be paid to pile thickness, linearity inspection, surface conditions, condition of male and female joint and inspections of the foot plates.

3.2.6 The Contractor shall verify all space requirements and dimensions of items depicted on the Design Drawings.

3.2.7 Immediately on discovery of the need for clarification of the Contract Documents, the Contractor shall submit (via the CM) a Request for Information (RFI) to

SECTION 01700
EXECUTION REQUIREMENTS

KeySpan and/or PS&SPC. The Contractor shall include a detailed description of problem(s) encountered, together with recommendations for modifying the Contract Documents.

3.3 Construction Layout

3.3.1 Before proceeding to lay out the Work, the Contractor shall verify layout information shown on Design Drawings, in relation to the property survey and existing benchmarks. If any discrepancies are discovered, the Contractor shall promptly notify KeySpan, PS&SPC and/or the CM.

3.3.2 A Professional Land Surveyor licensed in the state of New York and procured by the Contractor will lay out the Work using accepted surveying practices.

3.3.3 Establish benchmarks and control points to set lines as needed to locate each element of the Project.

3.3.4 Establish dimensions within tolerances indicated. Do not scale Design Drawings to obtain required dimensions.

3.3.5 Inform installers of lines and levels to which they must comply.

3.3.6 Check the location, level and plumb, of every major element, as the Work progresses.

3.3.7 Notify KeySpan, PS&SPC and/or the CM when deviations from required lines and levels exceed allowable tolerances.

3.3.8 Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

3.3.9 Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

3.3.10 Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.3.11 Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments

SECTION 01700
EXECUTION REQUIREMENTS

and tapes used. The log should be kept with the Project Record Documents and be available for review by KeySpan, PS&SPC and/or the CM.

3.4 Field Engineering

3.4.1 The Contractor will identify existing benchmarks, control points, and property corners.

3.4.2 The licensed surveyor procured by the Contractor will locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

3.4.3 The Contractor shall not change or relocate existing benchmarks or control points without prior written approval of KeySpan, PS&SPC and/or the CM. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to KeySpan, PS&SPC and/or the CM before proceeding.

3.4.4 Replace lost or destroyed permanent benchmarks and control points promptly. Replacements should be based on the original survey control points.

3.4.5 Establish and maintain a minimum of three (3) permanent benchmarks on the Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

3.4.6 Record benchmark locations, with horizontal and vertical data, with Project Record Documents.

3.4.7 Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

3.4.8 Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.4.9 On completion of the various phases of the remedial work, the Contractor's procured surveyor shall prepare the required certified surveys to be signed by a Professional Surveyor Licensed in the State of New York showing dimensions, locations, angles, and elevations of the remedial work.

SECTION 01700
EXECUTION REQUIREMENTS

3.5 Installation

3.5.1 Prior to the commencement of work, the Contractor will locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

3.5.2 The Contractor will make vertical work plumb and make horizontal work level.

3.5.3 Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3.5.4 The Contractor shall comply with manufacturer's written instructions and recommendations for installing products in indicated applications.

3.5.5 Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

3.5.6 During the installation of the Waterloo Barrier® system, the Contactor's QA/QC representative shall document sheet pile identification, driving records recording driving rates and the driving depth.

3.5.7 After installation of the Waterloo Barrier® Steel sheet piles, the alignment of each pile shall be recorded by the Contractor or its subcontractor using a digital inclinometer along two axes.

3.5.8 The Contractor will take care not to use tools or equipment that may produce harmful noise levels.

3.5.9 Provide anchors and fasteners as required to anchor each component securely in place. Ensure components are accurately located and aligned with other portions of the Work.

3.5.10 The Contractor should, whenever practical, use products, cleaners, and installation materials that are not considered hazardous.

3.6 Progress Cleaning

3.6.1 The Contractor will clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one subcontractor has worked. Enforce requirements strictly. The Contractor shall dispose of materials lawfully.

SECTION 01700
EXECUTION REQUIREMENTS

3.6.2 The Contractor shall comply with the requirements in NFPA 241 for removal of combustible waste materials and debris.

3.6.3 The Contractor shall containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

3.6.4 The Project site should be maintained free of waste materials and debris.

3.6.5 Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

3.6.6 Remove liquid spills promptly. Notify the KeySpan, PS&SPC and/or the CM immediately if the spill involves hazardous materials.

3.6.7 Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

3.6.8 Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

3.7 Starting and Adjusting

3.7.1 Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

3.7.2 Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

3.7.3 Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.7.4 Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 01400 - Construction Quality Requirements.

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EXECUTION REQUIREMENTS

3.8 Work Limitations

3.8.1 Vibration, noise, and settlement (if required) monitoring shall be conducted by PS&SPC during the implementation of the remedial construction activities. A vibration criterion of 0.5 inches per second (in/sec) peak particle velocity (PPV) shall be established as the action level at the locations of adjacent off-site structures during the remedial construction activities. During the remedial construction, should this vibration action level be exceeded at the locations of these adjacent structures, the Contractor shall implement vibration mitigation measures as approved by KeySpan and/or PS&SPC. The Contractor shall propose the methods and procedures to be implemented for vibration and noise mitigation measures if required.

3.8.2 Remedial construction activities shall be performed so as to limit the potential for adverse impacts due to noise. Noise monitoring, by PS&SPC, will be conducted during site activities including but not limited to, pile driving, demolition, and excavation. Noise levels that exceed OSHA standards shall require mitigation.

3.8.3 All remedial work shall be performed by the Contractor such that the generation of odors shall be minimized. The Contractor shall implement dust control or odor control measures should the any remedial construction activity exceed the action levels established by the HASP and the CAMP.

3.9 Correction of the Work

3.9.1 Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

3.9.2 Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

3.9.3 Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 Summary

This section covers the requirements for maintenance and submittal of project record documents.

1.2 Related Sections

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections and KeySpan M-300 Specifications, apply to this Section.

Section 01050	Field Engineering for Construction Phase
Section 01055	Resident Engineering Services
Section 01780	Demobilization

1.3 Maintenance of Documents

1.3.1 Records: The Contractor shall maintain at the Site, for KeySpan, PS&SPC, CM, or NYSDEC review, one record copy of:

1. Approved Health and Safety Plan
2. Final Remedial Design Report
3. Approved Schedule
4. Construction Quality Assurance Project Plan
5. Construction Schedule and Progress Record;
6. The Technical Specifications, Design Drawings and other components of the Contract Documents;
7. Community Air Monitoring Program Data including weekly charts;
8. Addenda and Modifications;
9. Change Orders and Other Modifications to the Contract;
10. Field Changes and Non-conformance Reports;
11. Surveying drawings and information;
12. Manufacturer's Certificates;
13. Daily Work Activity Summary Reports, including:
    - Reports on any Emergency Response Actions Test Records

SECTION 01720
PROJECT RECORD DOCUMENTS

- Records of all Site Work
- Chain-of-Custody Documents
- Reports on all Spill Incidents

14. Quality Assurance Records; and
15. All other Construction Documents, Reports or Records.

1.3.2 Record Storage: Record Documents shall be stored in the Contractor's Field Office apart from documents used for construction. The Contractor shall provide files, racks, and secure storage for Project Record Documents.

1.3.3 Project Record Maintenance: Project Record Documents are to be maintained in a clean, dry and legible condition and not used for construction purposes.

1.3.4 Inspection: The Contractor shall keep Project Record Documents and samples available for inspection by KeySpan, PS&SPC and/or the CM.

1.4 Recording

1.4.1 Working Drawings: The Contractor is to verify that the existing topographic survey of the Site represents the existing conditions. Information shall include horizontal and vertical extents of the alignment of the Waterloo Barrier® mitigation barrier, locations of managed utilities, and all other items as directed by KeySpan, PS&SPC and/or the CM. The Contractor shall be provided an electronic copy of the base map to be used to electronically document the information required. The Contractor shall submit the drawings both electronically (AutoCAD format) and in hard copy form to KeySpan and/or PS&SPC along with the other Project Record Documents. Layering for the construction drawings shall be in accordance with the NYSDEC Mapping Standards.

1.4.2 Acceptance: Information shall be recorded concurrently with construction progress. No work shall be concealed or covered in a manner that would prevent inspection until required information is recorded and accepted by KeySpan, PS&SPC and/or the CM.

1.4.3 Shop Drawings: The Contractor shall submit four (4) copies of all Working Drawings and Shop Drawings. Working Drawings and Shop Drawings shall be legibly marked and each item of actual construction recorded including:

SECTION 01720
PROJECT RECORD DOCUMENTS

1. Measured depths of elements of construction in relation to survey datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Field changes of dimension and detail.
4. Changes made by modifications.
5. Details not on original Design Drawings.
6. References to related shop drawings and modifications.

1.4.4 Specifications: Specifications shall be legibly marked and each item of actual construction recorded including:

1. Manufacturer, trade name, and catalog number of each product actually installed, particularly optional items and substitute items.
2. Changes made by Addenda and Modifications.

1.4.5 Certifications: The Contractor shall maintain manufacturer's certifications, inspection certifications and field test records required by the Technical Specifications.

1.5 Submittals

1.5.1 Final Acceptance: Record documents shall be delivered at Final Acceptance under provisions of the Technical Specifications. All as-built surveys shall be signed and sealed by a Professional Surveyor licensed in the State of New York. Record documents shall be transmitted with cover letter in triplicate, listing:

1. Date;
2. Project title and number;
3. Contractor's name, address, and telephone number;
4. Number and title of each Record Document; and
5. Signature of Contractor or authorized representative.

Documents must be submitted to and accepted by KeySpan, PS&SPC and/or the CM at completion of work as a condition of final payment.

SECTION 01720
PROJECT RECORD DOCUMENTS

1.5.2 Submittals Ownership

All submittals shall become the property of KeySpan once delivered.

PART 1 - PRODUCTS

Not Used

PART 2 - EXECUTION

Not Used

END OF SECTION

SECTION 01732
SELECTIVE DEMOLITION

PART 1 – GENERAL

1.1 Summary

This Section includes the following:

a. Demolition and removal of selected site elements (foundations, gas holders, etc) as depicted on the Design Drawings and in the Technical Specifications.
b. Demolition and removal of the on-site concrete tunnel entrance leading to the bulkhead area.
c. Demolition of subsurface former industrial features (i.e. piping, tanks, etc) encountered during the excavation of the Shallow Excavation Areas and constituted to be source materials.
d. Demolition of site elements that will impede the installation of the DNAPL Migration Barrier
e. Repair procedures for selective demolition operations

1.2 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Technical Specification Sections, apply to this Section.

Related Sections include the following:

Section 01010	Summary of Work
Section 01140	Work Restrictions
Section 01320	Construction Progress Documentation
Section 01400	Construction Quality Requirements
Section 01500	Temporary Site Facilities and Controls/ Pre-Mobilization and Mobilization
Section 02110	Site Clearing and Preparation
Section 02111	Excavation and Handling of Contaminated Material
Section 02261	Waterloo Barrier® System

SECTION 01732
SELECTIVE DEMOLITION

1.3 Definitions

1.3.1 Remove: Detach items from existing construction and legally dispose of them off-site.

1.3.2 Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3.3 Remove and Re-install: Detach items from existing construction, prepare them for reuse, and re-install them where indicated.

1.3.4 Remove and Replace: Detach items from existing construction, and legally dispose of them offsite, replace existing construction with new construction as specified by controlling authorities.

1.4 Materials Ownership

Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain KeySpan's property, demolished materials shall be cleaned, decontaminated and removed from Site by the Contractor as per the Technical Specifications.

Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to KeySpan that may be encountered during demolition remain KeySpan's property. The Contractor shall carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to KeySpan.

The Contractor shall credit KeySpan the monetary value of any excavated material that is recycled (e.g. metal) as agreed upon by KeySpan and the CM.

1.5 Submittals

1.5.1 Qualification Data: Selective demolition will be included as part of the proposed remedial activities for the Site. The Contractor shall demonstrate their capabilities and experience with similar demolition operations.

1.5.2 Proposed Dust-Control Measures: During the development of the remedial design, the Contractor shall specify the proposed dust control measures to be

SECTION 01732
SELECTIVE DEMOLITION

implemented during the remedial construction activities. The Contractor shall also identify alternate dust control measures in the event that the initially proposed measures are determined to be inadequate by KeySpan, PS&SPC, and/or the CM.

1.5.3 Schedule of Selective Demolition Activities: During the development of the remedial design, the Contractor shall submit a sequencing plan and schedule for those selective demolition activities that can be foreseen. The plan shall include the following:

a. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure KeySpan's on-site operations are uninterrupted unless approved by KeySpan.
b. Interruption of utility services.
c. Coordination for shutoff, capping, and continuation of utility services.
d. Plans for protecting existing utilities.
e. Locations of temporary partitions and means of egress.

1.5.4 Inventory: After selective demolition is complete, the Contractor shall submit a list of items that have been removed and salvaged.

1.5.5 Predemolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. The Contractor shall submit before the Work begins.

1.5.6 Disposal Records: The Contractor shall submit (via the CM) all copies of waste disposal records and supporting documentation to KeySpan and/or PS&SPC.

1.6 Quality Assurance

1.6.1 Demolition Firm Qualifications (if not performed by Contractor): An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

1.6.2 Resident Engineer Qualifications: Experience must comply with Section 01400 - Construction Quality Requirements.

1.6.3 Regulatory Requirements: Comply with governing State NYSDEC and Federal USEPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction and the Contracted disposal facility.

SECTION 01732
SELECTIVE DEMOLITION

1.6.4 Standards: Demolition activities shall comply with ANSI A10.6 and NFPA 241.

1.6.5 Pre-Demolition Conference: The Contractor will conduct a conference at the Site to review methods and procedures related to selective demolition including, but not limited to, the following:

a. Inspection and discussion of conditions of construction to be selectively demolished.
b. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
c. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

1.7 Project Conditions

1.7.1 Selective demolition will be conducted so as not to interfere with KeySpan operations. At least 1-week notice will be given to KeySpan for activities that will affect its operations.

1.7.2 Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

1.7.3 KeySpan and/or PS&SPC assume no responsibility for condition of areas to be selectively demolished. Conditions existing at time of inspection for bidding purpose will be maintained by KeySpan as far as practical.

1.7.5 The Contractor shall maintain fire-protection facilities during selective demolition operations as directed by KeySpan and/or PS&SPC.

PART 2 - PRODUCTS

Not used

SECTION 01732
SELECTIVE DEMOLITION

PART 3 - EXECUTION

3.1 Examination

3.1.1 Verify that those utilities indicated to be demolished have been disconnected and capped.

3.1.2 Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

3.1.3 Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

3.1.4 When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to KeySpan and/or PS&SPC.

3.1.5 Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 Utility Services

3.2.1 Existing Utilities: Maintain selected utility services to remain and protect them against damage during selective demolition operations. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by KeySpan and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to KeySpan and to authorities having jurisdiction.

a. Provide at least 1-week notice to KeySpan, PS&SPC and/or the CM if shutdown of service is required during changeover.

3.2.2 Utility Requirements: Locate, identify, disconnect, and seal or cap indicated utilities serving areas to be selectively demolished.

a. The Contractor shall coordinate with utility companies regarding temporary shutting off and disconnecting/relocating utilities.

SECTION 01732
SELECTIVE DEMOLITION

b. If the utility companies require services to be relocated, or removed and reestablished, the Contractor shall provide temporary utilities that bypass area of selective demolition and that maintain continuity of service.

3.3 Preparation

3.3.1 Dangerous Materials: The Contractor shall drain, purge, or otherwise remove, collect, containerize, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations in accordance with applicable local, state, and federal rules and regulations. All materials recovered from piping and structures shall be collected and shall not enter the environment (soil, groundwater, surface waters).

3.3.2 Asbestos Containing Materials: In the event that the Contractor encounters or suspects the presence of asbestos containing material (ACM) while engaged in the performance of the remedial work, the Contractor is required to conform with the requirements of KeySpan M-300 Specifications, New York City, state, and federal regulations.

3.3.3 Site Access and Temporary Controls: The Contractor shall conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

a. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from KeySpan and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

b. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

c. Protect existing site improvements, appurtenances, and landscaping to remain.

d. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

3.3.4 Temporary Facilities: The Contractor shall provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

SECTION 01732
SELECTIVE DEMOLITION

a. Provide protection to ensure safe passage of people around selective demolition area.

b. Provide temporary weather protection, during interval between selective demolitions.

3.3.5 Temporary Shoring: The Contractor shall provide and maintain shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished and adjacent structures.

a. Strengthen or add new supports when required during progress of selective demolition.

3.4 Pollution Control

3.4.1 Dust Control: The Contractor shall use water mist, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations and the applicable provisions of the Generic Health and Safety Plan to be prepared by the Contractor.

3.4.2 Disposal of Non-Contaminated Material: The Contractor shall manage and collect general debris (non-contaminated) for off site disposal.

3.4.3 Disposal of Materials for Recycling: The Contractor shall handle all materials as per Section 01066 – Equipment and Material Decontamination. After the material has been properly characterized and contained the Contractor shall dispose of the material as per the Technical Specifications to a regulated and KeySpan approved facility.

3.4.4 Cleaning: The Contractor shall clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. The Contractor shall return adjacent areas to condition existing before selective demolition operations began.

3.5 Selective Demolition

3.5.1 General: The Contactor shall demolish and remove existing construction only to the extent required. Use methods required to complete the Work within limitations of governing regulations and as follows:

SECTION 01732
SELECTIVE DEMOLITION

a. Cutting torches can be used if approved by KeySpan, PS&SPC and/or the CM. If hot work is approved then maintain fire watch, appropriate shields and curtains, and portable fire-suppression devices during flame-cutting operations.

b. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

c. Dispose of demolished items and materials promptly in accordance with scope of work.

3.5.2 Existing Facilities: Comply with KeySpan requirements for using other building facilities during selective demolition operations.

3.5.3 Concrete, Reinforcing Steel, and Utility Penetrations: As designated by KeySpan and the pertinent utility companies, all concrete, reinforcing steel and utility penetrations shall be removed in accordance with the Contract Documents. The various materials shall be screened and segregated as necessary and any impacted materials shall be decontaminated in order to meet the acceptance criteria of the selected disposal facility.

As designated by KeySpan, all concrete, reinforcing steel and utility penetrations shall be removed by the Contractor in accordance with the Contract Documents. The various materials shall be screened and segregated as necessary and any impacted materials shall be decontaminated in order to meet the acceptance criteria of the selected disposal facility.

3.6 Disposal of Demolished Materials

3.6.1 General: The Contractor shall promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

3.6.2 Disposal: Disposal of general trash and rubbish will be the responsibility of the Contractor. Disposal of these materials is to be performed in accordance with local and state regulations.

END OF SECTION

SECTION 1770
CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 Summary

1.1.1 This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

a. Inspection
b. Project Record Documents
c. Operation and maintenance manuals
d. Warranties
e. Final cleaning

1.2 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Technical Specification Sections and KeySpan M-300 Specifications, apply to this Section.

Related Sections include the following:

Section 01290	Payment Procedures.
Section 01320	Construction Progress Documentation
Section 01700	Execution Requirements
Section 01720	Project Record Documents

1.3 Substantial Completion

1.3.1 Preliminary Procedures

Before requesting inspection for determining date of Substantial Completion, the Contractor shall complete the following. List items below that are incomplete in request.

a. Obtain a list of items to be completed and corrected (punch list), as prepared by KeySpan, PS&SPC and/or the CM;
b. Prepare an estimate of the value of items on the list, and reasons why the work is not complete.
c. Advise KeySpan, PS&SPC and/or the CM of pending insurance changeover requirements.

SECTION 1770
CLOSEOUT PROCEDURES

d. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
e. Obtain and submit releases permitting KeySpan, PS&SPC and/or the CM unrestricted use of the work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
f. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographs and photographic negatives, damage or settlement surveys, property surveys, and similar final record information.
g. Deliver tools, spare parts, extra materials, and similar items to location designated by KeySpan, PS&SPC and/or the CM. Label with manufacturer's name and model number where applicable.
h. Make final changeover of permanent locks and deliver keys to KeySpan and/or PS&SPC. Advise KeySpan, PS&SPC's and/or the CM's personnel of changeover in security provisions.
i. Complete startup testing of systems as required.
j. The Contractor shall terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
k. The Contractor shall advise KeySpan, PS&SPC and/or the CM of changeover in heat and other utilities.

1.3.2 Inspection

The Contractor shall submit a written request for inspection for substantial completion. On receipt of request, KeySpan, PS&SPC and/or the CM will either proceed with inspection or notify the Contractor of unfulfilled requirements. KeySpan, PS&SPC and/or the CM will prepare a Letter of Substantial Completion after inspection or will notify the Contractor of items, on the Contractor's list or additional items identified by the KeySpan, PS&SPC and/or the CM that must be completed or corrected before certificate will be issued.

a. Reinspection: Request reinspection when the work identified in previous inspections as incomplete is completed or corrected.
b. Results of complete inspection will form the basis of requirements for final completion.

SECTION 1770
CLOSEOUT PROCEDURES

1.4 Final Completion

1.4.1 Preliminary Procedures

Before requesting final inspection for determining date of final completion, the Contractor shall complete the following:

a. Submit a final Application for Payment according to Division 1 Section 01290 - Payment Procedures.
b. Submit certified copy of the KeySpan, PS&SPC's and/or the CM's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by KeySpan, PS&SPC and/or the CM. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
c. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

1.4.2 Inspection

The Contractor shall submit a written request for final inspection for acceptance. On receipt of request, KeySpan, PS&SPC and/or the CM will either proceed with inspection or notify the Contractor of unfulfilled requirements. KeySpan, PS&SPC and/or the CM will prepare a final Certificate for Payment after inspection or will notify the Contractor of construction that must be completed or corrected before certificate will be issued.

a. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 List of Incomplete Items (Punch List)

1.5.1 Preparation: KeySpan, PS&SPC and/or the CM shall present to the Contractor a punch list of work items to be completed in accordance with the Contract Documents. The list will include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by the Contractor that are outside the limits of construction.

a. The list will be organized by each space and area in sequential order.
b. The list will include the following information at the top of each page:

SECTION 1770
CLOSEOUT PROCEDURES

- Project name.
- Date.
- Name of Company.
- Name of Contractor.
- Page number.

1.6 Project Record Documents

1.6.1 Project Record Documents shall not be used for construction purposes. The Contractor shall protect the Project Record Documents from deterioration and loss. The Contractor shall provide access to Project Record Documents for KeySpan, PS&SPC's and/or the CM's reference during normal working hours.

1.6.2 Record Drawings

The Contractor shall maintain and submit one set of blue or black-line white prints of Contract Drawings and Shop Drawings.

a. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity that obtained record data, whether individual or entity is subcontractor or similar entity, to prepare the marked-up Record Prints.
   - Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
   - Accurately record information in an understandable drawing technique.
   - Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
   - Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.

b. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
c. Mark important additional information that was either shown schematically or omitted from original Design Drawings.
d. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.

SECTION 1770
CLOSEOUT PROCEDURES

e. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

1.6.3 Record Specifications

Submit one copy of Project's Technical Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Technical Specifications, addenda, and contract modifications.

a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
b. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
c. Note related Change Orders and Record Drawings, where applicable.

1.6.4 Record Product Data

Submit one copy of Project's Technical Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Technical Specifications, addenda, and contract modifications.

a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
b. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
c. Note related Change Orders and Record Drawings, where applicable.

1.6.5 Miscellaneous Record Submittals

Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

SECTION 1770
CLOSEOUT PROCEDURES

1.7 Warranties

1.7.1 Submittal Time: Submit written warranties on request of KeySpan, PS&SPC and/or the CM for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

PART 2 – PRODUCTS

None

PART 3 – EXECUTION

None

END OF SECTION

SECTION 01780
DEMOBILIZATION

PART 1 - GENERAL

1.1 Summary

This section covers the requirements for final cleaning, inspection and other procedures necessary for contract closeout.

1.2 Scope

The work shall consist of cleaning of all equipment, cleaning the Site, inspection, and administrative provisions for final acceptance in accordance with the Contract Documents.

1.3 Related Sections

Related work which is specified in other sections of the Technical Specifications includes, but is not limited to, the following:

Section 01330	Submittal Procedures
Section 01720	Project Record Documents
Section 01770	Closeout Procedures
Section 02120	Soil Erosion and Sediment Control Requirements

1.4 Submittals

The Contractor shall submit, in the manner and within the time limit set forth in the Contract Documents, Project Record Documents under the provisions of Section 01720 - Project Record Documents, and application for final payment in accordance with the Contract Documents.

PART 2 - PRODUCTS

Not Used

SECTION 01780
DEMOBILIZATION

PART 3 - EXECUTION

3.1 Cleaning

3.1.1 Final Cleaning: The final cleaning to be performed by the Contractor shall include the following:

- Transport of all containerized soil waste removed under this contract to the approved disposal facility;
- Cleaning and removal of all of the Contractor's construction equipment and materials; and
- Collection and management of all the Contractor generated material including decontamination water and equipment on the Site for which cleaning is inappropriate.

3.1.2 Equipment Cleaning: Equipment cleaning shall consist of degreasing (if required) followed by high-pressure water and/or steam cleaning supplemented by detergents or solvents as appropriate in accordance with Section 01066 - Equipment and Material Decontamination.

3.1.3 Tools Cleaning: Tools and items for which cleaning is difficult or impossible to verify shall remain on Site, until for subsequent sampling and analytical testing, packing and disposal by the Contractor at an approved disposal facility. (Examples of such items are wire, rope, lumber, personal protective equipment and apparel.)

3.1.4 Temporary Facilities: Cleaning of the temporary facilities located within the Support Zone shall be limited to cleaning in accordance with Section 01066 - Equipment and Material Decontamination.

3.1.5 Final Inspection: Prior to removal from site, all cleaned equipment and material shall be inspected and accepted by the Site Safety Officer, KeySpan, PS&SPC and/or the CM.

3.1.6 Certification: Certification of cleaning shall be attested to by the Site Safety Officer.

SECTION 01780
DEMOBILIZATION

A copy of each cleaning certificate shall be provided to KeySpan. The original certificate will be maintained at the Site Safety Officer's office.

The work has to be successfully completed and approved by KeySpan, PS&SPC and/or the CM prior to demobilization of equipment.

3.2 Cleaning the Project Site

3.2.1 The cleaning work performed by the Contractor shall include the following:

- Repair of any erosion or runoff related damage;
- Grading and restoration, as required, of all areas used by the Contractor;
- Removal of all materials such as excess construction material, wood, debris and any other foreign material; and,
- Removal of all construction equipment.

3.3 Administrative Provision

3.3.1 Substantial Completion:

Prior to substantial completion, KeySpan, PS&SPC and/or the CM shall present to the Contractor a punch list of work items to be completed in accordance with the Contract Documents.

When the Contractor considers the work on the punch list to be substantially complete, he shall submit written notice with a list of items to be completed or corrected, and the estimated dates of the completion or correction. Should inspection by KeySpan, PS&SPC and/or the CM find the work is not substantially complete, the Contractor will be notified in writing, listing observed deficiencies. The Contractor shall remedy the deficiencies and send a new written notice of substantial completion. This procedure shall continue until such time when KeySpan, PS&SPC and/or the CM are satisfied with such repairs and corrections.

When KeySpan, PS&SPC and/or the CM finds the work to be substantially complete, a Certificate of Substantial Completion will be prepared with a list of deficiencies that require timely correction and/or non construction deficiencies in accordance with the latest revision of the General Terms and Contract Conditions.

SECTION 01780
DEMOBILIZATION

3.3.2 Final Acceptance:

When the Contractor considers the work to be complete, he shall submit to KeySpan, PS&SPC and/or the CM a written certification that:

1. Contract Documents have been reviewed.
2. Work has been inspected for compliance with Contract Documents.
3. Work has been completed in accordance with Contract Documents, and deficiencies listed with Certificate of Substantial Completion have been corrected.
4. All construction equipment, excess construction material, debris and other foreign material has been removed.
5. Work is complete and ready for final inspection.

The Contractor shall also submit the following materials:

1. Permit closeouts.
2. Waste disposal manifests and other T&D documentation.
3. Project Record Documents including, but not limited to, as-built survey(s).

Should KeySpan, PS&SPC's and/or the CM's inspection find work incomplete, the Contractor will be notified, immediately, in writing listing observed deficiencies. The Contractor shall remedy the deficiencies and send a second certification of final completion. This procedure shall continue until such time when KeySpan, PS&SPC and/or the CM are satisfied with such repairs and corrections.

When all work is complete, KeySpan, PS&SPC and/or the CM will review the closeout submittals, and a Final Acceptance Certificate will be issued to the Contractor.

When the Contractor and/or receives the Final Acceptance Certificate, he shall submit his final invoice for final payment.

3.4 Guarantee

3.4.1 The Contractor shall guarantee, for one year from the date of final payment, the backfill installation as specified in Section 02300 Earthwork and Backfill. The Contractor, at no additional cost to KeySpan, PS&SPC and/or the CM, shall

SECTION 01780
DEMOBILIZATION

correct defective work that results in a backfill settlement of 2" or more. Failure of the Contractor to correct such defects within a reasonable time after being notified to do so shall permit KeySpan to cause such defects to be corrected and charge the Contractor the cost of corrections.

3.4.2 The Contractor or its subcontractor shall guarantee for one year the performance of the Waterloo Barrier® system, from deficiency and permeability. The Contractor or its subcontractor at no additional cost to KeySpan, PS&SPC and/or the CM shall correct the deficiency. If the Contractor or its subcontractor fails to correct the problems in a reasonable amount of time KeySpan shall correct the issue and charge the Contractor the cost for of these corrections.

END OF SECTION

SECTION 02110
SITE CLEARING AND PREPARATION

PART 1- GENERAL

1.1 Summary of Work

1.1.1 The Contractor shall prepare the Site as required to facilitate the remedial construction activities.

1.1.2 Site Clearing and preparation activities for the remedial construction include but are not limited to:

a. Installation of the Soil Erosion and Sediment Control (SESC) Measures outlined in Section 02120;
b. Mobilization, establishment of temporary site facilities and utilities;
c. Location and delineation of existing aboveground and underground utilities, Site structures and other Site features;
d. Construction or installation of decontamination pad(s) and facilities as required in the Contract Documents;
e. Clearing and grubbing of the Site as required for implementation of the remedial construction; and
f. Improvement and construction of Site roads and construction entrances as required and approved by KeySpan.

1.2 Related Sections

Section 01056	Protection of the Work and Property
Section 01065	Health and Safety Requirements
Section 01066	Equipment and Material Decontamination
Section 01140	Work Restrictions
Section 01500	Temporary Site Facilities and Controls and Mobilization
Section 01732	Selective Demolition
Section 02120	Soil Erosion and Sediment Control Requirements

1.3 Quality Assurance

1.3.1 The Contractor shall coordinate site clearing and preparation work with KeySpan, PS&SPC, the CM, and utility company(s) as appropriate.

1.3.2 The Contractor shall protect work and property in accordance with the Technical Specifications and the Design Drawings.

SECTION 02110
SITE CLEARING AND PREPARATION

1.3.3 Materials shall be staged in only KeySpan, PS&SPC and the CM approved staging locations. Stockpiles must be kept neat and compact. Contaminated material shall be segregated from unclassified or clean material until proper characterization can occur. All staged material shall be covered with tarps and plastic lined with a residual berm.

1.3.4 Stripped or excavated material suitable for reuse may be stockpiled on-site. Stripped or excavated material not suitable for reuse shall be removed promptly. If material available on-site is not of sufficient quality or quantity, off-site material shall be procured and stockpiled on–site.

1.3.5 Stockpiled material shall be placed in a manner to minimize infiltration of water into the material. Stockpiles shall be covered during periods of inactivity or rainfall. The Contractor shall take measures to collect and properly dispose of any rainwater that comes into contract with contaminated material.

PART 2 – PRODUCTS

2.1 Materials

2.1.1 Contractor shall furnish all materials required to complete the work of this section.

2.2 Equipment

2.2.1 Contractor shall furnish all equipment required to complete the work of this Section.

PART 3 – EXECUTION

3.1 Clearing

3.1.1 Contractor shall clear all debris, rubble, and vegetation from the work areas and in any other areas which will be used by the Contractor for construction support as approved by KeySpan, PS&SPC and/or the CM.

3.1.2 Subsurface obstructions or protrusions within the work area shall be removed as necessary for the implementation of the remedial construction activities.

SECTION 02110
SITE CLEARING AND PREPARATION

3.1.3 The Contractor shall coordinate with all applicable utility companies regarding managing utilities impacted by the proposed remedial activities. The Contractor shall meet all the requirements imposed by the utility companies including but not limited to: supporting and/or protecting existing utilities, coordinating with utility companies regarding disconnecting or relocating existing utilities, backfilling and compacting excavation areas as required, and conducting necessary vibration and settlement monitoring.

3.2 Grading

3.2.1 Contractor shall grade the work area, as necessary, to facilitate the implementation of the proposed remedial construction activities.

3.2.2 Contractor shall limit grading activities to the work area, as needed.

3.3 Debris Removal

3.3.1 Contractor shall remove debris within the limits of work area, handle, screen and characterize the debris as necessary.

3.3.2 Contractor shall remove debris (i.e. subsurface foundations, boulders, etc.) within the proposed alignment of the containment barrier and the remedial excavation areas. The Contractor shall also conduct all handling, segregating and screening activities that are necessary to facilitate off-site disposal. All removed obstructions shall be staged in areas of the Site approved by KeySpan, PS&SPC and/or the CM.

3.3.3 Contaminated materials must be segregated from non-contaminated materials and prepared, as necessary, for disposal at an off-site facility approved by KeySpan and/or PS&SPC.

3.3.4 The Contractor shall be responsible for transportation and disposal of all generated wastes at an off-site properly licensed and permitted disposal facility approved by KeySpan. The facility and means of transport shall in accordance with Section 02111 – Waste Management and Handling of Contaminated Media.

3.3.5 The Contractor shall take measures to ensure contaminated materials are covered from precipitation. Any rainwater that comes in contact with contaminated materials shall be properly containerized and disposed off-site as directed by KeySpan, PS&SPC and/or the CM.

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SITE CLEARING AND PREPARATION

3.4 Dust Control

3.4.1 The Contractor shall utilize dust control measures, as necessary, to prevent dust from leaving the Site in accordance with Section 02120.

3.5 Odor Suppression

3.5.1 The Contractor shall utilize odor suppression measures, as necessary, to prevent odors from leaving the work areas in accordance with the HASP and as directed by KeySpan, PS&SPC and/or the CM.

3.6 Perimeter Cut and Cap

Utility Location:

The Contractor shall locate, identify and disconnect underground utilities and piping that may enter or exit the perimeter of the Site in preparation for remedial excavation activities. In preparation for this work, the Contractor shall review the subsurface obstruction survey prepared for the Site. In addition, the Contractor shall contact the New York City – One Call Center to field locate and mark off-site utilities along the Site perimeter. KeySpan will field locate its utilities along the Site perimeter to the extent feasible. The Contractor is responsible for coordinating with all other pertinent utility companies in locating and managing the utilities that will be impacted during the planned remedial construction activities.

Trenching:

The Contractor shall excavate a two to three foot wide trench (depending on width of backhoe bucket) along the perimeter of the Site. Excavation of overburden material from the trench will involve hand digging and heavy equipment as necessary. The Contractor shall manually excavate and probe the surface of the excavation prior to soils being removed by a backhoe. The depth of the manual probe will average six to ten inches. The amount of soil removed from the trench by the backhoe will not exceed the depth of the previous manual probe in order to minimize the chance of a premature line break. After completion of the probe, the next cut shall be removed by the backhoe. Alternatively, soft dig techniques (i.e., use of Vactor or Guzzler-type equipment) can be used to excavate the trench and expose subsurface utilities. Upon discovery of subsurface features, hand excavation methods or soft dig techniques will be employed to identify the feature. The final depth of the trench will be limited to the deepest utility/piping or to a maximum

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SITE CLEARING AND PREPARATION

depth of the groundwater table (approximately 8 feet bgs) or as directed by KeySpan, PS&SPC, and/or the CM.

Trench Stabilization/Shoring:

Temporary shoring shall be utilized by the Contractor to stabilize the sides of trench facing the exterior of the Site. On the Site-side of the trench, the excavations shall be benched back by the Contractor as required to provide a stable excavation side slope. The benching of excavations shall meet the applicable OSHA sloping requirements. Alternately, trench boxes may be utilized if Site conditions preclude the use of benching.

Material Stockpiling:

Soil stockpiles will be staged immediately adjacent to the trench within the Site boundary on top of a plastic sheeting, tarps, or other similar barrier are to be laid over the existing grade for temporary placement of excavated soil. Such stockpiles shall not conflict with OSHA set-back requirements for trenches/excavations. Stockpiled soils and debris will be visually evaluated by KeySpan and the NYSDEC for the presence of source material. Soil and debris judged to contain source material (based on visual observation and field screening techniques) will be returned to the trench only within the designated Shallow Excavation Areas. The location of such soils will be documented for subsequent excavation and off-site disposal. All other soils containing source material are to be staged on plastic and covered for management as waste material for off-site disposal. Any additional soils required to backfill the trench outside of the Shallow Excavation Areas will consist of certified clean fill. All staged waste material will be prepared for off-site disposal at an approved facility.

Utility Breaking/Plugging:

When a utility line or piping is located, the Contractor (in consultation with KeySpan, PS&SPC, and the CM), will identify the utility/line. If the utility/line appears to be active, a representative from the pertinent utility company will be contacted to evaluate the line and terminate the service, if required.

For utilities/lines that are determined to be inactive, initial penetration of the utility/pipe will involve use of spark-proof drilling tools to create a small hole in the utility/pipe. Access to the interior of the line will allow initial screening of the internal atmosphere with field screening instruments to determine the potential for explosion. Once screening has identified acceptable conditions within the line, a non-sparking saw, such as a "Nibbler", or similar, shall be utilized to cut and remove a section of pipe.

SECTION 02110
SITE CLEARING AND PREPARATION

Utility/piping sections that will be cut and removed for purposes of line breaking and capping shall be visually examined for presence of asbestos or asbestos containing material. If present, a subcontractor meeting Federal, New York State and New York City asbestos licensing and permitting requirements will be utilized to address the utility/pipe. In general, the following requirements will be met:

- Adequately wet the asbestos material during removal;
- After wetting and removal, seal the piping and any associated asbestos waste in leak-tight containers while wet, or place in leak-tight wrapping (i.e., double bagged or wrapped);
- Label the container/wrapped waste with OSHA warning labels;
- Mark the container/wrapped waste with the name of the waste generator (KeySpan) and site address; and
- Load the containers/wrapped waste into transportation vehicles with appropriate asbestos warning labeling (40 CFR 61.149 (d)).

At all times during removal, handling, packing and transport, the asbestos material must be kept wet and the standard of "no visible emissions" of asbestos will be met.

Any residual material which drains from the line shall be collected and segregated for characterization and off-site transportation and disposal. Plugging of the line will require the mixing and placing of grout (hydraulic cement) into the open end of the cut line. Bentonite will be mixed with the soils being placed as backfill adjacent to the plugged lines.

Dewatering:

Utility lines/piping are anticipated to be located above the groundwater table elevation. However, it is possible that some lines may extend below the groundwater table. If required (i.e. to facilitate the installation of sheet piles or similar deep impact activity), the Contractor will temporarily dewater the trench to access and cut/cap the line. Localized dewatering will be performed using a positive displacement pump at a low point in the trench. Generated fluids will be containerized for off-site disposal.

Underground 33 kV Electrical Transmission/Distribution Line Location:

In addition to the active overhead 33 kV electrical transmission/distribution line that extends along the southern side of Beach Channel Drive, there is an active underground 33 kV electrical transmission/distribution line that is located along the northern boundary of the Site. During the perimeter utility cut and cap work, the Contractor will identify the

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exact location and depth of this utility in order to eliminate potential electric power reductions or losses.

It is anticipated that the Contractor will use soft dig techniques (i.e., use of Vactor or Guzzler-type equipment) to excavate test pits along the known alignment of the underground 33 kV electrical line. Once the test pits are excavated, the location and elevation of the 33 kV electrical line will be surveyed by a Professional Surveyor licensed in the State of New York. The survey data will be utilized by the Contractor in order to ensure that the required set back requirements are being maintained.

Existing Utility Poles:

The Contractor will protect and support existing on-site utility poles that are actively in service and are within the planned remedial work areas. The Contractor will protect and support the existing on-site utility poles that are to remain in place in accordance with the requirements of the pertinent utility company.

END OF SECTION

SECTION 02111
WASTE MANAGEMENT AND HANDLING OF CONTAMINATED MATERIAL

PART 1 - GENERAL

1.1 Summary

This Section specifies the requirements for the management, handling, storage, characterization and off-site disposal of contaminated material and remediation derived wastes (RDW).

1.2 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Technical Specification Sections, apply to this Section.

1.3 Definitions

Contaminated material is defined as material impacted with site contaminants. KeySpan, PS&SPC and/or NYSDEC shall make the determination whether or not material is determined to be impacted with site contaminants.

1.4 Submittals

Prior to commencement of the remedial construction, the Contractor shall establish, to the satisfaction of KeySpan, PS&SPC, the CM and New York State Department of Conservation (NYSDEC), how contaminated material will be handled, managed, containerized, staged, characterized and disposed of at approved off-site disposal facilities. The Contractor shall provide this input during the development of the final remedial design. All proposed disposal facilities require the approval of KeySpan. During the development of the remedial design, the Contractor will develop a methodology to detail how cross-contamination between contaminated material and clean material will be minimized and shall describe how contaminated soils will be staged and segregated.

1.5 Remediation Derived Wastes

The types of waste to be expected include, but are not limited to, the following:

- Impacted soils generated from the implementation of the proposed remedial construction activities;

SECTION 02111
WASTE MANAGEMENT AND HANDLING OF CONTAMINATED MATERIAL

- Construction concrete and debris generated by the implementation of the remedial construction activities;
- Liquid wastes generated by the implementation of the remedial construction activities;
- Spent personal protective equipment (PPE) including plastic overboots, gloves, Tyvek coveralls, etc.; and
- Standard refuse (municipal) trash generated in support of the field operations.

1.6 Off-Site Disposal Facilities

The Contractor shall identify and propose appropriate disposal facilities for approval by KeySpan. For each proposed disposal facility, identify the facility's locations, capacity, type of wastes permitted to receive and their treatment/destruction method. In addition, the Contractor shall provide copies of each proposed facility's current Federal or State permits. The Contractor shall utilize disposal facilities that are currently approved by KeySpan. These facilities include, but are not limited to, Casie Protank located in Vineland, New Jersey; Clean Earth of Delaware located in New Castle, Delaware, Clean Earth of Philadelphia located in Philadelphia, Pennsylvania, Environmental Soil Management (ESMI) of New Jersey located in Keasbey, New Jersey, and ESMI of New York located in Fort Edward, New York and Clean Waters of New York located in Staten Island, New York. The Contractor may propose alternative facilities for review and approval by KeySpan. For any disposal facility not currently approved for use by KeySpan, the Contractor shall bear the burden of proof that the facility(ies) are adequate and sufficient for KeySpan's needs. If requested, the Contractor shall provide additional information to support their selection. No remediaton derived wastes shall be transported to any facility that has not received KeySpan approval.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

The Contractor is responsible to provide all labor, equipment, testing and materials needed to legally dispose of all Remedial Derived Waste (RDW). This work may include but will not be limited to:

- Conducting all necessary coordination with KeySpan, PS&SPC and the CM;
- Providing sufficient number of transport vehicles or containers adequately sized to support the proposed remedial construction activities on a daily basis;

SECTION 02111
WASTE MANAGEMENT AND HANDLING OF CONTAMINATED MATERIAL

- Providing all labor, equipment materials, transportation, disposal charges, testing and any other activities necessary to dispose of remediation derived wastes (RDW), including any pre-conditioning of the wastes necessary to assure acceptance by the disposal facility;
- Management of remediation derived wastes (RDW) and associated containers or transport vehicles;
- Preparation of transport vehicles as necessary to eliminate problems associated with odor or dust generation;
- Management of the arrival and departure of transport vehicles to ensure no delays with the implementation of the proposed remedial construction;
- Inspection of all transport vehicles removing waste from the Site to ensure that the haulers are properly permitted;
- Characterization of the RDW in accordance with the acceptance criteria of the approved off-site disposal facilities;
- Preparation of all paperwork (i.e., manifests, Bills of Lading, etc.) to document the off-site disposal of the RDW;
- Constructing a decontamination pad(s) and provide inspection and decontamination, as necessary, to prevent tracking of liquids and solids off-site;
- Transportation of the RDW to properly permitted off-site disposal facilities, pre-approved by KeySpan, in a manner consistent with all applicable Federal, State and Local regulatory requirements;
- Providing of all manifests, Bills of Lading, weigh tickets, Certificates of Destruction and all other documentation regarding the off-site disposal of the RDW; and,
- Furnishing a completion letter report including all of the above provisions for inclusion into the project file.

3.1 Excavation

A. Excavation of contaminated soils, as detailed in Section 02300 of the Technical Specifications, shall be performed in a manner that will eliminate spills and the potential for contaminated material to be mixed with uncontaminated material.

3.2 Waste Management

A. All wastes generated from the implementation of the remedial construction activities as described in these Technical Specifications and the Contract Documents and as shown on the Design Drawings shall be placed by the Contractor in containers provided by the Contractor.

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WASTE MANAGEMENT AND HANDLING OF CONTAMINATED MATERIAL

B. The Contractor will ensure that a suitable number and type of container(s) are on-site at all times to so as not to impede the progress of the work. The Contractor will select the proper containers for each type of waste as approved by KeySpan, PS&SPC and/or the CM

C. Roll-off units used to containerize contaminated material shall be watertight. A cover shall be placed over the units to prevent precipitation from contacting the stored material. The units shall be placed in locations approved by KeySpan, PS&SPC and/or the CM. Liquid which collects inside the roll-off units shall be removed and stored in accordance with the Technical Specifications.

D. Liquid collected from the implementation of the remedial actions, removed from other containers or generated from decontamination operations shall be containerized in approved tanks or drums.

3.3 Waste Characterization

Waste characterization sampling for generated and staged materials shall be collected by the Contractor. The Contractor shall perform all waste characterization sampling and transportation and disposal of materials off-site. In addition, the Contractor will prepare the containerized materials to be transported off-site, as necessary, to meet the acceptance criteria of the selected disposal facility. All analytical testing shall be performed at a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory, under proper chain-of-custody procedures.

The Contractor will characterize RDW according to the requirements of the selected approved disposal facility.

3.4 Waste Transportation

The Contractor will contract with properly licensed solid waste haulers. All selected haulers must have the necessary number of vehicles with a valid NYSDEC Part 364 Permit to accommodate project requirements without causing schedule delays. KeySpan, PS&SPC and the CM shall not be held responsible for any delays or stoppages associated with removal of RDW from the Site.

The Contractor will ensure that all transport vehicles are properly loaded and secured and do not exceed permitted weights. All vehicles must be properly covered, secured, and decontaminated prior to leaving the site. In addition, the Contractor shall prepare the

transport vehicles as necessary to prevent adverse impacts to the off-site communities. Transport vehicles shall not be allowed to queue within public rights-of-way and streets. The transport vehicle preparation activities shall consist of spraying odor suppression foam on the loaded materials, lining the transport vehicles to prevent leakages, and covering the loaded vehicles (with plastic sheeting and tarps) as required by KeySpan, PS&SPC and/or the CM. KeySpan, PS&SPC and/or the CM shall make the final determination whether or not transport vehicles are acceptable to off-site travel.

Transport trucks may only access the site for delivery and off-site transport between the hours of 9:00 AM and 2:00 PM, Monday through Friday.

3.5 Disposal Documentation

The Contractor shall manage all disposal documentation including but not limited to all necessary manifests, bill-of-ladings, weight tickets, and Certificates of Destruction.

The Contractor will complete and submit necessary waste profiles to disposal facility(ies) for acceptance using analytical results from the waste characterization activities. The Contractor will then prepare waste profiles for proposed off-site disposal facilities. Confirm acceptance of waste types and forms with the disposal facilities and advise KeySpan as to any restrictions imposed by disposal facility operating hours.

All shipping manifests or bills-of-lading will be prepared by the Contractor and signed by KeySpan or its designee.

The Contractor will manage all disposal paperwork and prepare and supply all necessary manifests or bills-of-lading and provide them to KeySpan. The Contractor will manage all weight tickets and Certificates of Destruction. On a weekly basis and at project completion, a summary report containing daily truck activity, tonnage removed by waste type, completed manifests, weight tickets and Certificates of Destruction will be prepared by the Contractor for submission (via the CM) to KeySpan and PS&SPC.

END OF SECTION

SECTION 02120
SOIL EROSION AND SEDIMENT CONTROL REQUIREMENTS

PART 1 - GENERAL

1.1 Summary

The work under this section shall consist of furnishing all labor, equipment and materials for providing soil erosion and sediment control (SESC) measures in accordance with the Technical Specifications, Design Drawings and local and state ordinances.

1.2 Related Sections

Section 01500	Temporary Site Facilities and Controls/Pre-Mobilization and Mobilization
Section 02110	Site Clearing and Preparation
Section 02300	Earthwork and Backfill

1.3 Submittals

During the development of the remedial design, the Contractor shall submit (via the CM) to KeySpan and PS&SPC a detailed plan of the Soil Erosion and Sediment Control (SESC) measures to be implemented at the Site. The SESC Plan shall be prepared in accordance with the requirements of the New York Guidelines for Urban Erosion and Sediment Control. The SESC Plan shall be submitted to the NYSDEC for review and approval as part of the final 100% RDR submittal.

1.4 Reference Standards

1.4.1 The "New York Guidelines for Urban Erosion and Sediment Control Manual", latest edition.

1.5 Quality Assurance

1.5.1 The Contractor shall implement soil erosion and sediment control measures prior to the commencement of intrusive remedial activities.

1.5.2 The Contractor on a daily basis and following a significant weather event shall inspect all SESC measures for compliance with the approved SESC plans. The Contractor shall repair and maintain the approved SESC measures in good working order until completion of the work.

SECTION 02120
SOIL EROSION AND SEDIMENT CONTROL REQUIREMENTS

1.6 Environmental Requirements

1.6.1 The Contractor shall protect adjacent properties (including the existing electrical substation located in the northwest corner of the site) and water resources from soil erosion and sediment damage throughout construction.

1.6.2 The Contractor shall provide adequate provisions for surface water retention and drainage and for the protection of exposed surface soils.

1.6.3 The Contractor shall take care when using hydrant or other significant water source to ensure that any spillage is adequately controlled and directed towards a lawful outlet or stored for disposal.

PART 2 - PRODUCTS

2.1 Materials

2.1.1 The Contractor shall, at a minimum, use the following control measures to prevent soil erosion:

a. Perimeter silt fence and/or hay bales;
b. Mulching;
c. Erosion blankets; and,
d. All other controls described and/or required by the appropriate local soil erosion and sediment control jurisdiction.

2.2 Equipment

2.2.1 The Contractor shall furnish all equipment required to complete the work of this Section.

PART 3 - EXECUTION

3.1 Preparation

3.1.1 The Contractor shall:

1. Review site conditions;
2. Review the scope of work as it applies to site conditions; and
3. Notify KeySpan, PS&SPC and/or the CM of any changes that may require revisions to the provisions of this Section.

SECTION 02120
SOIL EROSION AND SEDIMENT CONTROL REQUIREMENTS

3.2 SESC Implementation

3.2.1 The Contractor shall install silt fencing and/or hay bales along the perimeter of the work area prior to initial site disturbance as depicted on the Design Drawings.

3.2.2 During the course of construction, the Contractor shall install and maintain temporary erosion control measures as directed by KeySpan, PS&SPC and/or the CM to control soil erosion. The Contractor shall respond to any maintenance or additional work directed by KeySpan, PS&SPC and/or the CM within 24-hours of notification.

3.2.3 The Contractor shall pay specific attention to erosion control measures during work adjacent to storm drain inlets and other receptors.

3.2.4 The soil erosion control measures shall be maintained until completion of the work unless otherwise directed by KeySpan, PS&SPC and/or the CM.

3.2.5 The Contractor shall provide temporary stabilization of exposed areas and staged materials (as needed) to prevent erosion and soil loss into off-site areas.

3.2.6 The Contractor shall install SESC measures, as necessary, to all disturbed areas and to prevent erosion of the soil material.

3.2.7 The Contractor shall be responsible for correcting any damage done by inadequate or ill-maintained SESC measures. The repairs shall comply with all local regulations, Contract Drawings, and Technical Specifications.

3.2.8 After final completion of the project and when authorized by KeySpan, PS&SPC and/or the CM all SESC measures shall be removed and disposed off-site by the Contractor at a disposal facility approved by KeySpan.

END OF SECTION

SECTION 02240
DEWATERING (IF REQUIRED)

PART 1- GENERAL

1.1 Summary

Dewatering is not anticipated to be required for the majority of the remedial construction activities. However, localized dewatering may be required to remove existing structures (containing source material) that extend beyond the planned excavation boundaries to the extent practical. In addition, localized dewatering may be required to remove obstructions (i.e. foundations, etc.) along the alignment of the DNAPL migration barriers and excavation support sheet piles to the extent practical.

Should dewatering be required, the Contractor shall containerize the generated water as approved by KeySpan, PS&SPC, and the CM. Discharging dewatering fluids from the excavation areas to the ground surface will not be permitted.

1.2 Related Documents

Drawings and general provisions of the Contract, including Specification Sections, apply to this Section.

1.3 Related Sections

Section 01500	Temporary Site Facilities and Controls/ Pre-Mobilization and Mobilization
Section 01732	Selective Demolition
Section 02111	Excavation and Handling of Contaminated Materials
Section 02300	Earthwork and Backfill
Section 02260	Excavation Support and Protection

1.4 Performance Requirements

The Contractor shall design, provide, test, operate, monitor, and maintain a dewatering system of sufficient scope, size, and capacity to remove excess water from the excavations and allow construction to proceed on dry, stable subgrades.

1.4.1 Work includes removing dewatering system when no longer needed.

SECTION 02240
DEWATERING (IF REQUIRED)

1.4.2 Maintain dewatering operations to ensure erosion is controlled, stability of excavations and constructed slopes is maintained, and flooding of excavation and damage to structures are prevented.

1.4.3 Prevent surface water from entering excavations by grading, dikes, or other means.

1.4.4 Do not allow water to accumulate in excavations or trenches. Remove water from all excavations as directed by KeySpan, PS&SPC and/or the CM to prevent softening of foundation bottoms, undercutting footings, and soils changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suctions and discharge piping systems, and other system components necessary to convey the water away from the site.

1.4.5 All generated water shall be containerized unless otherwise approved by KeySpan, PS&SPC, the CM and/or NYSDEC.

1.5 Submittals

During the development of the final remedial design, the Contractor shall provide detailed methodology for dewatering if required for removal of source material and existing structures visually observed to extend beyond the planned excavation boundaries and for removal of obstructions along the alignment of the DNAPL migration barrier. The Contractor shall detail the method of dewatering, specifications for equipment to be utilized and the procedures to containerize and dispose of the generated water.

1.6 Quality assurance

1.6.1 The Contractor shall comply with water disposal requirements of authorities having jurisdiction, and with the Technical Specifications Section 02111.

1.6.2 A competent person, as defined by the Occupational Health and Safety Administration, shall be present during dewatering activities to ensure the integrity of the trench. If the dewatering activities impact the trench immediate steps shall be taken by the Contractor to make the trench safe for work.

1.6.3 KeySpan and/or PS&SPC are not responsible for extra costs associated with reshoring of the trench due to dewatering or lost time during the repairs.

SECTION 02240
DEWATERING (IF REQUIRED)

1.7 Project Conditions

1.7.1 Project Site Information: A geotechnical soil boring program was performed as a pre-remedial design activity. The soil boring logs for this program are included as Attachment H. The opinions expressed in the soil boring logs represent interpretations of the subsoil conditions, tests, and results of analyses conducted by the geotechnical engineer.

1.7.2 The Contractor shall perform additional test borings and conduct other exploratory operations as is deemed necessary.

PART 2- PRODUCTS

Not Used

PART 3- EXECUTION

3.1 Preparation

3.1.1 Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

3.1.2 Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.

3.1.3 Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.1.4 Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

SECTION 02240
DEWATERING (IF REQUIRED)

3.1.5 Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from KeySpan, PS&SPC and/or the CM and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways, if required by governing regulations.

3.2 Installation

3.2.1 Before excavation below ground-water level, place system into operation to lower water to specified levels and then operate it continuously until is no longer required.

3.2.2 Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of excavations.

3.2.3 Do not permit open-sump pumping that leads to loss of fines, soil piping, sub grade softening, and slope instability.

3.2.4 Reduce hydrostatic head in water-bearing strata below sub grade elevations of excavations.

3.2.5 Maintain piezometric water level a minimum of 24 inches (600mm) below surface of excavation or as approved by KeySpan and/or PS&SPC.

3.2.6 The Contractor shall containerize all generated dewatering fluids as approved by KeySpan, PS&SPC and/or the CM. Should KeySpan determine that the containerized fluids require off-site disposal, the Contractor shall perform waste characterization sampling as required by the approved disposal facility.

3.2.7 Provide standby equipment on-site and available for immediate operation, to maintain dewatering on a continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and soils at no additional expense to KeySpan, PS&SPC and/or the CM.

3.2.8 Remove dewatering system from Site on completion of dewatering.

3.2.9 The Contractor shall promptly repair damages to adjacent facilities caused by dewatering operations.

SECTION 02240
DEWATERING (IF REQUIRED)

3.3 Discharge of Dewatering Fluid

3.3.1 Contractor shall comply with all requirements of the approved dewatering permit (if one is obtained).

3.3.2 The Contractor shall keep monitoring and data records for ongoing dewatering activities as specified by KeySpan, PS&SPC and/or the CM.

3.3.3 Contractor shall be required for performing all monitoring and completing all reports as required by KeySpan, PS&SPC and/or the CM.

END OF SECTION

SECTION 02260
EXCAVATION SUPPORT AND PROTECTION

PART 1- GENERAL

1.1 Summary

1.1.1 This Section includes all work, materials and labor required to support the excavation areas that are part of the proposed remedial construction activities. All excavations shall be supported as approved by KeySpan, PS&SPC and/or the CM and applicable city, state, and federal regulations.

1.2 Related Documents

Design Drawings and general provisions of the Contract Documents, including General and Supplementary Conditions and Technical Specification Sections, apply to this Section.

Related Sections include the following:

Section 01500	Temporary Site Facilities and Controls/Pre-Mobilization and Mobilization
Section 02110	Site Clearing and Preparation
Section 02120	Erosion and Sediment Control Requirements
Section 02240	Dewatering
Section 02300	Earthwork and Backfill

1.3 Performance Requirements

1.3.1 Furnish, install, monitor, and maintain excavation/trench supports and protection systems, capable of supporting the excavation sidewalls, and able to resist soil and hydrostatic pressure and superimposed/construction loads.

a. Provide detail on the method of support for the excavation areas which will be incorporated into the development of the remedial design.

b. Prevent surface water from entering excavations by grading, dikes, or other means.

SECTION 02260
EXCAVATION SUPPORT AND PROTECTION

c. The Contractor shall install, as required, an excavation support and protection systems without damaging existing work, structures, pavements, and other improvements adjacent to excavation. The Contractor shall install a shoring system that will extend to a depth below the excavation/trench bottom that ensures a stable excavation bottom and sidewalls at all times during the project and eliminates heaving or subsidence of the adjacent existing ground surface.

1.4 Submittals

1.4.1 Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems.

1.4.2 The Contractor shall submit proposed excavation support design and installation procedures for remedial excavation areas in proximity to existing overhead utilities;

1.4.3 The Contractor shall submit the excavation support design and installation procedures for the pre-trenching along the alignment of the DNAPL migrations barriers;

1.4.4 The Contractor shall submit a plan for vibration and noise mitigation procedures that may require implementation during the remedial construction activities if directed by KeySpan, PS&SPC and/or the CM.

1.5 Project Conditions

1.5.1 The Contractor shall not interrupt utilities unless permitted in writing by KeySpan, PS&SPC and/or the CM and then only after arranging to provide temporary utility services, if required, according to requirements indicated.

1.5.2 Site characterization reports have been prepared for this Project and are available for information only. The opinions expressed in these reports are those of others and represent interpretations of previous investigations. KeySpan, PS&SPC nor the CM shall be responsible for interpretations or conclusions drawn from this data.

1.5.3 The Contactor shall survey adjacent structures and improvements, employing a qualified Professional Surveyor licensed in the State of New York to establish

exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify KeySpan, PS&SPC and/or the CM if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent structures.

1.5.4 The Contractor shall survey the location of the adjacent facilities or utilities. Clearly stake out in field and record all elevations before any work or mobilization of equipment takes place.

1.5.5 The Contractor shall perform the remedial construction activities so as to limit the potential for adverse impact due to vibrations. Vibration, noise, and settlement (if required) monitoring shall be conducted by PS&SPC during the implementation of the remedial construction activities. A vibration criterion of 0.5 inches per second (in/sec) peak particle velocity (PPV) shall be established as the action level at the locations of adjacent off-site structures during the remedial construction activities. During the remedial construction, should this vibration action level be exceeded at the locations of these adjacent structures, the Contractor shall implement vibration mitigation measures as approved by KeySpan. The Contractor's Site Management Plan shall include provisions for the implementation of vibration and noise mitigation measures if required.

1.5.6 The Contractor is responsible for following all OSHA requirements for excavation support and protection. These include but are not limited to, the height allowed of unsupported trenches, requirements of excavation inspection, monitoring of air quality and requirements of proper safety procedures within the trench or excavation.

PART 2- PRODUCTS

2.1 Materials

2.1.1 The Contractor shall provide materials that are either new or in serviceable condition. Should KeySpan, PS&SPC and/or the CM determine that materials are not in an acceptable condition they shall be replaced at no additional cost to KeySpan, PS&SPC or the CM.

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2.1.2 Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/ A 992M.

2.1.3 Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.

2.1.4 Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of 3 inches.

2.1.5 Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

2.1.6 Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

PART 3- EXECUTION

3.1 Preparation

3.1.1 Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

a. Shore, support, and protect utilities encountered.
b. Support and protect all active facilities.

3.1.2 Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from KeySpan, PS&SPC and/or the CM and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

3.1.3 Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces is not impeded.

3.1.4 The Contractor shall have a competent person inspect excavation support and protection systems daily (or following a weather event) during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

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3.1.5 Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 Soldier Beams and Lagging

3.2.1 Install steel soldier beams before starting excavation. Space soldier beams at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

3.2.2 Install wood lagging within flanges of soldier beams as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

3.2.3 Install walls horizontally at centers indicated and secure to soldier beams.

3.3 Standard Sheet Piling

3.3.1 Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Limit vertical offset of adjacent sheet piling to 60 inches (1500 mm). Accurately align exposed faces of sheet piling to vary not more than 1:120 out of vertical alignment.

3.4 Tiebacks (If Required)

3.4.1 Tiebacks: Drill for, install, grout, and tension tiebacks into position. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

a. Test loading shall be observed by a qualified New York licensed professional engineer responsible for design of excavation support and protection system.

b. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

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3.5 Bracing (If Required)

3.5.1 Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

a. Do not place bracing where it will be cast into or included in permanent concrete work, unless otherwise approved by the engineer.

b. Install internal bracing, if required, to prevent spreading or distortion of braced frames.

c. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 Removal and Repairs

3.6.1 Leave excavation support and protection systems permanently in place only as directed by KeySpan, PS&SPC and/or the CM. Otherwise, support and protection systems shall be removed and decontaminated as directed by KeySpan, PS&SPC and/or the CM.

3.6.2 As directed by KeySpan, PS&SPC and/or the CM, remove excavation support and protection systems when construction is complete and has progressed sufficiently to support excavation and bear soil and hydrostatic pressures and as specified and approved by the Contractor's Resident Engineer. Remove in stages to avoid disturbing underlying soils or demolition or damaging structures, pavements, facilities, and utilities.

3.6.3 Repair or replace, as approved by KeySpan, PS&SPC and/or the CM, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION

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WATERLOO BARRIER® SYSTEM
STEEL SHEET PILING WITH SEALED INTERLOCK SYSTEM

PART 1- GENERAL

1.1 Description of Work

Two parallel subsurface DNAPL migration barriers are planned to be installed at varying depths along the northern portion of the Site. The first barrier, located immediately south of Beach Channel Drive, extends to within 15 feet of the eastern edge of the existing Electric Substation to within 15 feet of the eastern corner of the Site at the intersection of Beach 108th Street and Beach Channel Drive for a total of approximately 695 linear feet. This migration barrier, known as the on-site barrier, will be installed at two different depths. The center section of the on-site barrier will extend to a depth of 120 feet bgs for a linear distance of approximately 250 feet. Two flanking 50 foot bgs barriers will be installed on either side of the center section of the on-site barrier for a total linear distance of approximately 445 feet. The second migration barrier, known as the bulkhead area barrier, will be installed within the bulkhead area to a depth of 70 feet bgs and a linear distance of approximately 170 feet. The alignment of the migration barriers are depicted on the Design Drawings. The installation of the migration barriers will serve two purposes. First, both barriers will inhibit the migration of DNAPL to areas located downgradient of the Site, including Jamaica Bay. Second, the on-site barrier will allow DNAPL to be passively recovered via recovery wells to be installed upgradient and immediately downgradient of the on-site migration barrier.

The migration barrier locations and configurations were selected based on the results of the conceptual groundwater flow modeling conducted as part of the pre-design activities as well as limitations imposed by the existing LIPA overhead electric transmission/distribution lines. As presently configured, the migration barrier is expected to have little to no effect on groundwater elevations outside the immediate area of concern. Given the geology, site access constraints, and desire to minimize short-term impacts on the surrounding community, the migration barrier is currently proposed to be constructed utilizing steel sheeting with sealed interlocks. Based on the results of the completed field demonstration program, the steel sheeting with sealed interlock system will consist of the Waterloo Barrier® system.

1.2 Description Approach

The subsurface migration barrier, consisting of a Waterloo Barrier® sheet pile system, will be installed by the Contractor or its subcontractor along the proposed alignment as depicted on the Design Drawing Drawings. The barrier will consist of unmodified Waterloo Barrier® EZ95 steel

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sheeting. Both the top and bottom 5 feet of each steel sheet will be reinforced to improve driving mechanics. The sheeting will be installed by the Contractor or its subcontractor in a manner consistent with the field demonstration program and with manufacturer's recommendations.

All sheeting will be driven by Contractor or its subcontractor using a high frequency vibratory hammer due to both the relative speed of installation and lower noise and vibration generation compared to use of an impact hammer. The center 120 foot depth section of the on-site barrier will likely be installed first followed by the two 50 foot depth sections. The bulkhead area barrier will be installed after the completion of the on-site barrier or as approved by KeySpan.

The Waterloo Barrier® sheet pile system shall be installed by the Contractor using proper installation procedures in accordance with applicable OSHA guidelines and regulations.

Due to the proximity of the overhead electrical service lines that extend along Beach 108th Street and along Beach Channel Drive, the Contractor shall use extreme care during the installation of the DNAPL migration barriers so as not to damage or interfere with these utilities. The minimum setbacks from these overhead lines for all equipment and personnel are as follows:

- 15 feet for the 33 kV overhead electrical lines;
- 10 feet for the 13 kV overhead electrical lines; and
- 5.5 feet for the insulated 33 kV overhead electrical line.

In addition to maintaining the required setbacks from the overhead electrical lines, the Contractor shall adhere to the following requirements when installing each Waterloo Barrier® sheet pile along the specified alignment of the on-site DNAPL migration barrier:

- All sheet piles shall be temporarily staged on the south side of the DNAPL migration barrier alignment and all sheet piles are to be lifted from the ground surface at that location;
- All sheeting will be driven using an ABI Mobilram TM18/22B or equivalent installation system. This system is ideal for vibration free sheet piling. The Contractor will install the sheet piles in manner consistent with the manufacturer's recommendations.

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- The tracks of the installation equipment used to install the Waterloo Barrier® sheet piles shall be parallel to the DNAPL migration barrier alignment at all times during the installation process;

- Once the installation equipment system lifts a sheet pile off of the ground, each Waterloo Barrier® sheet pile shall remain attached to the equipment at all times until the sheet pile is installed; and

- A racking system or driving template shall be used during the driving of the Waterloo Barrier® sheet piles to ensure proper alignment and verticality. The racking system will also minimize the potential for movement during sheet pile positioning, threading, or welding. During the development of the remedial design, the Contractor shall provide a design submittal for the racking system for review and approval by KeySpan and PS&SPC.

Following installation of the sheets, the interlocks will be properly flushed by Contractor or its subcontractor to remove soils/debris. The full length of the interlock channels between each of the installed sheets will be flushed by Contractor or its subcontractor with clean water to remove soil/debris. Flush water will be allowed to percolate onto the ground surface immediately adjacent to the installed sheets. If necessary, in instances where interlock obstructions can not be cleared by standard flushing, high-pressure jetting will be employed by Contractor or its subcontractor to clear obstructions within the interlocks.

Finally, the seams in the sheet piles will be sealed by Contractor or its subcontractor with WBS-301 joint sealants as defined in the Technical Specifications.

1.3 Summary

This section specifies the requirements for furnishing all methods, means, materials, labor, supervision, insurance and equipment and for performing all operations to install the Waterloo Barrier® steel sheet pile systems as detailed on the Design Drawings.

1.4 Reference Standards

1.4.1 American Society for Testing and Materials (ASTM):

1. A 328 – Standard Specification for Steel Sheet Piling.

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2. A 572 – High Strength Low Alloy Columbium-Vanadium Steels of Structural Quality.

1.4.2 American Welding Society (AWS): D1.1 – Structural Welding Code.

1.4.3 Design Drawings depicting sections of the Waterloo Barrier® are provided in the Contract Documents.

1.5 Submittals

1.5.1 During the development of the remedial design, the Contractor shall provide the following details with regard to the Waterloo Barrier® system:

a) Final sequence of DNAPL migration barrier installation.
b) Estimated durations for the installation of each segment of the DNAPL migration barrier.
c) Qualifications for the subcontracted pile driving contractor procured to install the Waterloo Barrier® system.
d) Detailed approach as to how the Waterloo Barrier® system will be installed including proposed equipment to be used, splicing requirements, quality control and assurance measures, and joint preparation prior to sealing.
e) A plan depicting the crane locations and material picks during the installation of the migration barriers.
f) Design for reinforced sheet piles, to be used to improve driving capabilities.
g) Plan for mitigation of vibrations and noise caused by the installation of the Waterloo Barrier® system.
h) Proposed welding procedures.
i) Proposed methods to verify termination depth and alignment of parallel Waterloo Barrier® systems.
j) Certification of the License Agreement with Waterloo Barrier Inc. for the provision of quality control services for the sheet pile installation and joint sealing.
k) Mill test documentation for the piling to be used on the project.

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1.6 Coordination

1.6.1 Notify KeySpan, PS&SPC and/or the CM at least 5 working days prior to beginning pile driving operations at any location. This will not relieve Contractor or its subcontractor of the responsibilities for performing the work in accordance with these Technical Specifications and the Contract Documents.

1.6.2 The Contractor shall coordinate with the pertinent utility companies regarding protecting and supporting utilities impacted by the remedial construction activities.

1.6.3 Contractor or its subcontractor shall endeavor to flush and grout the sheet interlocks as soon as practical after the installation to avoid any unnecessary obstructions.

1.6.4 The Contractor shall minimize direct communications with members of the public and other interested parties (excluding regulatory agency personnel). Direct communication with these entities is the sole responsibility of KeySpan.

1.7 Quality Assurance/Quality Control

1.7.1 The Quality Assurance/Quality Control (QA/QC) program and joint sealing operations shall be implemented by Contractor or its subcontractor.

1.7.2 Horizontal Alignment: The maximum permissible horizontal tolerance in pile driving shall be a deviation of not more than 150mm (6 inches) from the plan location indicated on the Design Drawings.

1.7.3 The installed alignment and top elevations of the containment barrier shall be surveyed by a Professional Surveyor licensed in the State of New York.

PART 2- PRODUCTS

2.1 Sheet Piles

2.1.1 WEZ95 sheet piles will be used for the Waterloo Barrier® system. The EZ95 sheets shall be manufactured by Canadian Metal Rolling Mills (CMRM) or approved equivalent, and will be supplied in custom rolled or custom cut lengths as

specified by the final Design Drawings and Technical Specifications. The sheets will be driven to the depths depicted on the Design Drawings. Contractor or its subcontractor shall be responsible for verifying the termination depth of each sheet in the Waterloo Barrier® system.

2.1.2 The subsurface DNAPL migration barriers consisting of a Waterloo Barrier® sheet pile system will be installed along the proposed parallel alignment depicted on the Design Drawings.

2.1.3 The top and bottom five feet of the Waterloo Barrier® sheets shall be reinforced with a 3/8" stiffener plate to improve driving mechanics, as depicted in the Design Drawings.

2.1.4 The 120 foot sections Waterloo Barrier® sheets shall be composed of two 60 foot sections spliced together with a 24" x 6" x 3/8" splice plate on both sides, as depicted in the Design Drawings.

2.1.5 All sheeting will be driven using a high frequency vibratory hammer due to both the relative speed of installation and lower noise and vibration generation compared to use of an impact hammer.

2.1.6 Following installation of the sheets, the interlocks will be properly flushed to remove soils/debris. The full length of the interlock channels between each of the installed sheets will be flushed with clean water to remove soil/debris. Flush water will be allowed to percolate into the ground surface immediately adjacent to the installed sheets. If necessary, in instances where interlock obstructions can not be cleared by standard flushing, high-pressure jetting will be employed to clear obstructions within the interlocks.

2.1.7 The seams in the sheet piles will be sealed with WBS-301 joint sealants defined in the Technical Specifications. The joint sealant shall be tested for permeability at a frequency of 1 test per 500 linear feet of sheet piles installed. Permeability samples shall be taken prior to injecting the sealant in the joints. KeySpan may request additional permeability testing of the joint sealants to verify the results. Contractor or its subcontractor will provide the labor, equipment, materials, and services to assist in testing and inspection.

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2.1.8 A foot plate shall be welded to the base of each female joint of the sealable sheet piling to prevent soil from entering the joint as the pile is driven into the subsurface. The Contractor will be responsible for all cutting and patching of the sheet piles and attachment of the foot plates. The Contractor shall make the necessary arrangements to assure that attachment of the foot plates does not delay the installation of the Waterloo Barrier® system.

2.1.9 Section Properties of non-modified WEZ95 Piling:

	Imperial	**Metric**
Thickness:	0.375 in.	9.50 mm
Nominal Width:	25 in.	635 mm
Section Area:	14.9 $in.^2$	96.2 cm^2
Weight:	50.5 lbs./lineal ft.	75.2 kg/lineal m
Moment of Inertia:	134 $in.^4$/wall ft.	18300 cm^4/wall m
Radius of Gyration:	4.33 in.	110 mm
Section Modulus:	24.9 $in.^3$/wall ft.	1340 cm^3/wall m

2.1.10 Waterloo Barrier® Sealant Materials: The material used to seal the sheet pile wall shall be WBS 301 supplied and installed by the Contractor or its subcontractor in accordance with the Contractor Documents, and shall be compatible with the Waterloo Barrier® system.

PART 3- EXECUTION

3.1 Sheet Pile Installation

3.1.1 Prior to installation of the sheet piles for the Waterloo Barrier® system, the Contractor or its subcontractor shall perform a visual inspection to ensure:

a) Pile Thickness: Verify the thickness of the sheet pile;
b) Linearity Inspection: Ensure that the piles have not been bent, bowed or damaged during transport to the Site;
c) Surface Condition: Inspect the surface of the piles for defects and/or deformations;
d) Sheet Pile Length: Measure each sheet pile to confirm the specified length;
e) Pile Markings: Mark each sheet pile with one-foot graduations to assist in the recording of driving logs during the installation of the piles.

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f) Foot Plate Inspection: Visually inspect each foot plate for proper installation;

The Contractor or its subcontractor shall perform the inspections with a KeySpan and/or PS&SPC representative. Any deficiencies in a sheet pile shall be photographed, documented and visibly marked with a large X to ensure the sheet pile is not installed. The Contractor shall be responsible for all cost and schedule impacts associated with installation of a sheet pile that does not confirm to the above criteria.

The Contractor shall replace and repair the deficient sheet pile. If a repair of the sheet pile is proposed, the Contractor shall notify KeySpan, PS&SPC and/or the CM of how the sheet will be field modified for review and approval. KeySpan, PS&SPC and/or the CM shall make the final determination as to whether a sheet pile can be installed or requires replacement.

3.1.2 Installation Depth: The Waterloo Barrier® system shall be installed to the design depths depicted on the Design Drawings. The Contractor shall be responsible for verifying the termination depth of all sheet piles. The top elevation of the Waterloo Barrier® system will be established two feet below the existing ground surface.

3.1.3 During installation of the sheet piles, the Contractor shall:

3.1.3.1 Lift in a manner which will not cause excessive bending stresses;
3.1.3.2 Avoid damaging sheet piles during the handling or installing operations;
3.1.3.3 The joint of each sheet pile shall be visually inspected by the Contractor or its subcontractor prior to installation. Any foreign material shall be removed, and damaged joints and/or sheet piles shall be rejected;
3.1.3.4 Replace or repair sheet piles which are damaged during installation; and
3.1.3.5 During the handling and lifting of each sheet pile, the Contractor or its subcontractor shall not endanger any overhead utilities.

3.1.4 Any changes to this proposed work sequencing shall be determined during the development of the remedial design. However, changes shall be accepted only if they result in net reductions to the cost of the project either through material/equipment/labor costs or through a reduction in the project duration. The Contractor will be responsible for supporting the remedial design as required by KeySpan, PS&SPC and/or the CM.

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3.1.5 Location and Tolerances:

a) The Contractor or its subcontractor shall drive sheet piles vertically plum and in a correct alignment so that the top of the sheet piles are installed on a straight line to ensure proper interlocking throughout the entire alignment of the containment barrier.
b) Sheet pile locations on the Design Drawings are approximate and will be field verified and located as approved by KeySpan, PS&SPC and/or the CM.
c) Deviation in the horizontal alignment shall not exceed 10 degrees at each joint.
d) The maximum permissible vertical tolerance (plumbness) in the sheet pile installation shall not be greater than a deviation of 1/5 inch per 1 foot vertical. The integrity of the interlock between adjacent piles shall be verified by flushing the joint. Joint inspection and flushing shall be performed by the Contractor's Quality Assurance/Quality Control Technician and as approved by KeySpan, PS&SPC and/or the CM.

3.1.6 The Contractor or its subcontractor shall use suitable templates to ensure alignment and plumbness during driving as approved by KeySpan, PS&SPC and/or the CM.

3.1.7 Crane Operations: Due to the heavy volume of vehicular traffic in close proximity to the Site, the Contractor shall take special precautions during sheet pile installation to ensure the safety of Site workers and the general public as described below:

3.1.7.1 The Contractor shall be responsible for the positioning of the crane and for preparing the ground surface in which the crane will be positioned on. The Contractor shall repair any damage caused by positioning, moving, lifting, assembly or disassembly of the crane. The Contractor shall utilize crane mats or approved equivalent to protect existing surfaces proposed not be disturbed (i.e. asphalt, concrete, etc.) during the remedial work. The Contractor shall submit a plan, for review and approval by KeySpan and PS&SPC, depicting the crane locations during movement of sheets, installation, and demobilization.

3.1.7.2 The Contractor shall install sheet piles with an appropriately specified vibratory hammer as approved by KeySpan and/or PS&SPC. The

proposed equipment to be used and the method for installation will be provided by the Contractor and will require approval by KeySpan and/or PS&SPC during the development of the remedial design. The Contractor shall ensure that no damage will occur to the sheets piles during the installation.

3.1.8 Pile Installation:

a) During installation, the Contractor shall prevent and correct any tendency of the sheet piles to bend, twist, or rotate, or to pull out of interlock. The integrity of each sheet pile and interlocked joint shall be maintained during and after driving.
b) Working from the start location, the Contractor will install the sheet piling with the smaller (male) joint leading and thread the larger (female) joint with attached foot plate on to the installed male joint to form the sealable cavity (as depicted on the Design Drawings). The Contractor will ensure that the enlarged female joint is not driven to an elevation lower than the previously installed male joint in order to prevent obstructions from entering the sealable cavity.
c) The top of each sheet pile shall be within 1 inch of the specified elevation. Manipulation of sheet piles to force them into position will not be permitted. The Contractor shall check the sheet piles for heave. Sheet piles found to have heaved shall be re-driven, at the Contractor's expense, to the required top elevation. Where required, the Contractor shall trim sheet piling to specified design elevations as required by KeySpan and/or PS&SPC. Costs associated with sheet pile trimming are to be included in the sheet pile installation pricing provided by the Contractor.
d) Sheet piling damaged or driven outside the specified tolerances shall be replaced. Any sheet pile damaged during installation shall be immediately pulled and replaced, at the Contractor's expense.
e) All sheet piles shall be driven to the design depth. Sheet pile driving will be considered complete when the sheet piling has been installed to the design depth.
f) Once the sheet piling has been installed, the Contractor's Quality Control Technician shall confirm that the sealable cavity is open for the full length and free of obstructions. This work will include providing the necessary labor, equipment, and materials to vibrate the sheet piling while the Quality Control Technician flushes the sealable cavity of the problem joints, and/or removing

and replacing sheet piling damaged during driving at no additional cost to KeySpan, PS&SPC and/or the CM.

g) The Contractor shall pull any sheet piles that are known to have pulled out of the interlock or are suspected of having tip or interlock damage, as determined by the Quality Control Technician and KeySpan/PS&SPC, for visual inspection before proceeding further.
h) Splicing is permitted if shown on the Design Drawings or as approved by KeySpan and/or PS&SPC.
i) The Contractor shall make splices using a full penetration weld or as otherwise directed by KeySpan, PS&SPC and/or the CM for structural purposes.

3.2 Joint Sealing

3.2.1 All sheet pile joints are to be sealed. Joint sealing shall be completed by the Contractor.

3.2.2 Joint sealing shall not be performed within 100 feet of the sheet pile installation operation or until a satisfactory joint inspection is achieved.

3.2.3 A tremie hose or tube for pressure injection of the sealant shall be inserted into the sealable cavity. When the tube has reached the bottom of the hole, the sealant injection will begin. The hose shall be withdrawn progressively up the hole as the sealant fills the space below. Keep tremie nozzle at least 1 foot below the rising surface of sealant.

3.3 Records

The Contractor's QA/QC Technicians will document the following information and provide it (via the CM) to KeySpan and/or PS&SPC in report format upon completion of the barrier wall installation:

3.3.1 Provide accurate records of each sheet pile driven. Submitted records shall include the following information:

a) Pile identification number.
b) Date and time of driving.
c) Elevation of top of pile.
d) Length of sheet pile in the ground when driving is complete.
e) Driving logs showing the time to install each foot of each sheet pile.

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f) Detailed remarks concerning alignment, obstructions, etc.
g) Plumbness records of each sheet pile installed.
h) Joint flushing records for each joint installed.

3.3.2 Mark a waterproof identification number that is clearly visible on each sheet pile, within 2 feet from the top and bottom of the pile.

3.3.3 Spray paint all sheet piles rejected form the work for any reason, at the time of rejection, with the letter "X" within 3 feet of both ends.

3.3.4 Provide accurate sealant installation records. Submitted records shall include the following information:

a) Joint identification number.
b) Date and time of sealing operation.
c) A complete list of the equipment used during the installation.
d) Volume of sealant required to seal each joint.

3.4 Rejection

3.4.1 If rejected from the work because of deviation from location, plumbness requirements, excessive bending, twisting, pulling out of interlock, or other reasons, take suitable corrective action at no additional cost to KeySpan, PS&SPC and/or the CM. Suitable action includes extracting, furnishing, and driving of replacement sheet piles, so that all sheet piles installed meet the requirements of the Technical Specifications and Design Drawings.

3.5 Subsurface Obstructions

Geotechnical records are included in Attachments. The Contractor shall review this geotechnical data and determine if the Waterloo Barrier® system can be installed to the design depths. In addition, the Contractor shall pre-trench along the proposed alignment of the containment barrier to manage subsurface utilities and to remove subsurface obstructions. Should the Contractor encounter a subsurface obstruction during the installation of the sheet piling for the Waterloo Barrier® system that precludes driving the sheet pile to the proposed design depth, the Contractor shall consult with KeySpan, PS&SPC and/or the CM to confirm the presence of the subsurface obstruction. As approved by KeySpan, PS&SPC and/or the CM, additional pre-trenching may be undertaken or the alignment of

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the containment barrier may be slightly modified to go around the subsurface obstruction to the extent practical as determined by field conditions. The re-alignment of the sheet piling shall be included with the pricing detailed in Section 01025 – Measurement and Payment of the Technical Specifications.

3.6 Certification

The Contractor shall provide a written certification stating that the bulk hydraulic conductivity of the Waterloo Barrier® system will be equal to or less than $1x10^{-5}$ cm/sec for up to one year after completion of the containment barrier installation.

END OF SECTION

SECTION 02300
EARTHWORK AND BACKFILL

PART 1 - GENERAL

1.1 Summary

This Section includes the excavation and backfilling activities related to pre-trenching along the proposed alignment of the subsurface barriers and to the remedial excavations within the Shallow Excavation Areas in accordance with the Design Drawings and Technical Specifications.

All subsurface features encountered during pre-trenching shall be removed by the Contractor in order to accomplish installation of the subsurface barriers. Any subsurface former industrial features (i.e., piping, tanks, etc.) encountered during pre-trenching activities (above the existing groundwater table) and determined to contain source materials as determined by KeySpan and/or PS&SPC will be removed in their entirety, to the extent practical.

The subsurface former industrial piping may have insulation or wrapping consisting of Asbestos Containing Material (ACM). If industrial piping or other features are determined to consist of ACM, the Contractor shall abate the ACM in accordance with New York City, New York State and federal regulations. In addition, the Contractor shall properly dispose of the ACM in accordance with applicable regulations and with the approval of KeySpan and/or PS&SPC.

1.2 Related Sections

Section 01320	Construction Progress Documentation
Section 01500	Temporary Site Facilities and Controls/ Pre-Mobilization and Mobilization
Section 01732	Selective Demolition
Section 02110	Site Clearing and Preparation
Section 02120	Soil Erosion and Sediment Control
Section 02240	Dewatering
Section 02111	Excavation and Handling of Contaminated Material
Section 02260	Excavation Support and Protection
Section 02261	Waterloo Barrier® Steel Sheet Piling
Section 13120	Fabric Enclosures

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EARTHWORK AND BACKFILL

1.3 Unit Prices

A. Unit prices for earthwork are included in Section 01025 Measurement and Payment of the Technical Specifications.

1.4 Definitions

A. Backfill: Soil material used to fill an excavation to grade.

B. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation beyond those indicated in the Contract Documents shall only be conducted as authorized by KeySpan and/or PS&SPC.

2. Unauthorized Excavation: Excavation below elevation indicated in the Contract Documents and/or beyond indicated lines and dimensions without direction by KeySpan and/or PS&SPC. Unauthorized excavation, as well as unauthorized remedial work, shall not be paid by the KeySpan.

D. Fill: Soil materials used to raise existing grades.

E. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above, at or below the ground surface.

F. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

G. On-Site: Site area located south of Beach Channel Drive

H. Bulkhead Area: Site area located north of Beach Channel Drive

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cubic yard for bulk excavation or that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting.

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J. Top-Soil: Engineered surficial backfill to facilitate vegetative growth in excavation areas.

1.5 Submittals

A. Product Data: Certifications for fill materials.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with the Technical Specifications.

C. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finished surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

D. During the development of the Final Remedial Design Report (RDR) the Contractor shall provide, for review and approval to KeySpan and PS&SPC, a plan indicating the means, methods, sequencing, equipment, supplies, materials, staging areas, procedures for demolition, slope stabilization methods, subsurface utility exposure, and any other requirements referenced in the Technical Specifications. Reference to the plan providing the information for the Final RDR shall be referred to as the Remedial Plan within this Specification.

1.6 Project Conditions

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by KeySpan or others unless authorized by KeySpan, PS&SPC and/or the CM and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify KeySpan, PS&SPC and/or the CM not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without KeySpan's, PS&SPC's and/or the CM's written approval.

3. Contact Utility Locator services or other appropriate authorities and have them mark out existing utilities prior to excavation.

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B. After consultation with the appropriate utility companies, either remove deactivated utilities from the work area, or arrange with the utility companies to relocate the lines away from the work zone until completion of the remedial work.

PART 2 - PRODUCTS

2.1 Backfill Materials

2.1.1 General

Contractor shall provide facility name, owner name and street address of fill source to KeySpan and/or PS&S for inclusion in the Remedial Plan. Final approvals of fill source will be at the discretion of KeySpan and/or PS&SPC. Cost for sampling and providing analytical results shall be included in the Contractor's base bid.

All off-site backfill materials utilized as part of remedial construction activities will be obtained from either clean sources approved by the New York State Department of Transportation (NYSDOT) or other KeySpan approved sources, as approved by the NYSDEC, identified during the design process. A representative confirmatory sample will be collected from each off-site source of sandy soil and topsoil backfill materials at a rate of one per every 5,000 yds^3. The sample will be analyzed at a New York State Department of Health (NYSDOH)-certified Environmental Laboratory Accreditation Program (ELAP)-approved laboratory for total volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), organic pesticides/herbicides, polychlorinated biphenyls (PCBs) and Target Analyte List (TAL) parameters. Alternatively, when sources of backfill are greater than 10,000 yds^3, the sampling frequency can be reduced to one per 10,000 yds^3. The analytical results of these samples will be submitted to NYSDEC to obtain written authorization to use the backfill materials. As per discussions with the NYSDEC, stone and gravel backfill materials will not be subject to these analytical requirements.

The Contractor shall provide (via the CM) a gradation submittal for all backfill material to be used on-site for review and approval by KeySpan and PS&SPC prior to delivery. In addition, a quality control sample shall be collected by the Contractor at a frequency of every 2,500 tons delivered. A geotechnical analysis shall be conducted on the sample by a certified laboratory for sieve analysis. The results of the sieve analysis shall be provided (via the CM) to KeySpan and PS&SPC for review and approval.

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KeySpan, PS&SPC and/or the CM may inspect each fill source upon request. The Contractor shall make all necessary arrangements to accommodate KeySpan, PS&SPC and/or the CM at no additional cost to KeySpan.

The Contractor shall be responsible for collection and delivery of the samples to the certified laboratory approved by KeySpan as well as all associated costs.

2.1.2 Backfill Material (Well-Graded Sandy Soil)

Certified clean fill will be delivered on-site by the Contractor as approved by KeySpan and/or PS&SPC. The backfill material shall consist of clean naturally occurring or blended soil and aggregate mix conforming to the following gradation:

Sieve Size	Percent Passing
2”	100%
3/4 inch	70% - 100%
No. 4	30% - 80%
No. 50	10% - 35%
No. 200	5% - 12%

If backfill material meeting the gradation requirement is not commercially available, the Contractor shall propose an alternate for review and approval by KeySpan and PS&SPC. The backfill material shall be substantially free of shale and soft, poor durability particles and free of debris (i.e. glass, brick, plastics, rubber). Transfer facilities cannot be used as a source for backfill material.

2.1.3 Topsoil

A six inch topsoil layer shall be included with the soil cover within the bulkhead area. This layer is intended to facilitate the growth of vegetation. In general, the topsoil shall conform to the following requirements:

- Topsoil shall have at least 2 percent by weight of fine textured stable organic material and no greater than 6 percent. Muck soil shall not be considered topsoil.
- Topsoil shall have not less than 20 percent fine textured material (passing the No. 200 sieve) and not more than 15 percent clay.
- The pH of the topsoil shall be between 5.5 and 6.5.
- Topsoil shall not be treated with soil sterilants or herbicides. Topsoil treated with soil sterilants or herbicides shall be so identified.

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- Topsoil shall be relatively free of stones and other materials over 1½ inch in diameter, trash, noxious weeds such as nutsedge and quackgrass, and will have less than 10 percent gravel by volume.
- Topsoil containing soluble salts greater than 500 ppm shall not be used.

2.1.4 Gravel Layer

The site wide cap within the on-site area shall include a crushed gravel or stone cover. The six inches of gravel will be a crushed gravel or crushed stone with a New York State Department of Transportation (NYSDOT) Standard Specifications for Coarse Aggregate size designation Type 2 (or approved equivalent). This NYSDOT designation includes the following designation:

Sieve Size	Percent Passing
1.5”	100%
1 inch	90% - 100%
1/2 inch	0% - 15%

If gravel material meeting this gradation requirement is not commercially available at the time of remedial construction, the Contractor will propose an alternative for review and approval by KeySpan, PS&SPC and the NYSDEC.

2.2 Geotextile

The geotextile fabric shall be installed as depicted on the Design Drawings and in accordance with Manufacturer’s recommendations.

2.3 Accessories

A. Warning Tape: When identifying underground utilities, the Contractor shall utilize acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility. The warning tapes used by the Contractor shall be colored as follows:

1. Red: Electric.

2. Yellow: Gas, oil, steam, and dangerous materials.

3. Orange: Telephone and other communications.

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4. Blue: Water systems.

5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 Preparation

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Prepare subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 - Section 02110 - Site Clearing and Preparation.

C. Protect and maintain soil erosion and sedimentation controls, which are specified in Division 2 - Section 02120 - Soil Erosion and Sediment Control Requirements, during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 Dewatering

3.2.1 With the possible exceptions of removing subsurface obstructions along the alignment of the DNAPL migration barriers and during the removal of former MGP-related structures during the implementation of the excavation activities in the Shallow Excavation Area and to construct the Site-Wide Cap, no dewatering is anticipated to be required during the remedial activities at the Site.

3.2.2 The depth to groundwater is approximately eight (8) feet below the ground surface.

3.2.3 Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

3.2.4 Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.

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3.2.5 The liquids generated from the dewatering activities will be containerized for off-site disposal.

3.3 Explosives

A. Explosives: Do not use explosives.

3.4 Excavation, General

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. All excavated materials will be handled as per Section 02111 – Excavation and Handling of Contaminated Material.

2. If a rock larger then twenty-four inches (24") in diameter is found in the area of pre-trenching, the Contractor shall consult with KeySpan and/or PS&SPC to determine if the rock is an isolated incident or if the obstruction will pose problems with the installation of the containment barrier.

3.5 Excavation, Specific

3.5.1 Pre-Trenching Along the DNAPL Migration Barrier Alignments

In order to manage subsurface obstructions and utilities, a trench will be excavated by the Contractor along the proposed alignment of the migration barriers. The trench will be excavated to a depth of 8 feet bgs (or above immediately above the groundwater table, whichever is encountered first). The width of the trench will allow for the top of the sheeting to be driven to a terminal depth of 2 feet bgs. Any obstructions such as former foundations and construction debris encountered during the pre-trenching activities that have the potential of hindering the installation of the migration barrier will be removed by the Contractor and staged on-site for off-site disposal.

All excavations shall be excavated and benched by the Contractor to comply with OSHA 1926 Subpart P requirements for excavations. In areas where space limitations restrict benching, the Contractor shall install a shoring system (e.g., sheet piling) to stabilize the

excavation as required. During the development of the remedial design, the Contractor shall provide design details of the shoring system to be utilized for review and approval by KeySpan and/or PS&SPC.

In the event that soil containing source material is encountered during the pre-trenching activities, the soil will be removed by the Contractor. The soil will be staged on-site where KeySpan, PS&SPC and the NYSDEC representatives will make the determination as to whether or not the soil contains source material. This determination will be based on visual observation and field screening techniques (i.e. PID readings).

It is anticipated that the trench will be backfilled with either excavated soil (non-source material containing soil) or clean off-site material to within 3 feet of the ground surface. The migration barrier will then be driven to 2 feet bgs. Final backfilling of the remaining 3 feet of the trench will occur during installation of the environmental site wide cap. In the bulkhead area, the final 3 feet of the trench will be backfilled during the subsequent installation of the soil cap.

3.5.2 Shallow Area Excavations

As depicted on the Design Drawings, excavation activities within the shallow excavation areas will consist of removing observed source material to a depth of 8 feet bgs (which approximates the depth to the groundwater table). Assuming an excavation depth of 8 feet bgs, the estimated volume of material to be removed by the Contractor from the proposed shallow excavation areas is estimated to be 88,000 cubic yards (in place). In addition, excavation outside of the designated shallow excavation area will occur to a depth of two feet bgs in order to accommodate installation of the site wide cap. However, the excavation depth for the construction of the cap may be less in those areas of the Site where the proposed grade is higher than the existing grade. All areas of the Site will contain a two foot thick cap consisting of imported clean materials.

With the exception of the excavation activities required to construct the site wide cap and with exceptions to the portions of the Site where overhead restrictions are present, all remedial excavation activities within the Shallow Excavation Areas will be conducted within a temporary fabric enclosure(s) to control the release of volatile emissions and odors. Excavated material will be consolidated and loaded onto transport vehicles for off-site disposal by the Contractor under a temporary enclosure(s). The fabric enclosure(s) will be re-located, as necessary, as the remedial excavation activities progress.

If source material is visually observed to extend beyond the excavation boundaries, then excavation activities will extend horizontally beyond the boundaries to the extent feasi-

ble. The maximum horizontal expansion of the Shallow Excavation Area will be limited to the Site boundaries as shown on the Design Drawings. Excavation that has the potential to undermine existing public rights-of-way (i.e., sidewalks, roadways, infrastructure beyond the Site perimeter) will not be implemented. KeySpan, PS&SPC and the NYSDEC representative will make the final determination as to whether or not encountered material is constituted to be source material. The determination for removal will be based upon a combination of visual observations and field screening techniques.

3.5.3 Removal of Former MPG Features Within the Shallow Excavation Areas

Former MGP features including foundations, piping, tanks and other industrial features encompass a substantial portion of the Site. The majority of these features are below grade but there are some that can be seen at grade. As depicted on the Design Drawings, the existence of these features is the result of the former MGP operations that have occurred at the Site.

Former MGP Features Containing Source Material:

Former MGP features within the planned remedial excavation areas (that potentially contain source material) will be removed to the extent practical. In order to facilitate the removal of encountered structures that potentially contain source material, the excavation will be deepened to the extent practical.

Encountered foundations and similar structures will be demolished utilizing a hoe ram attachment on an excavator, backhoe or equivalent. After demolition, the debris will be prepared and decontaminated, as necessary, to meet the acceptance criteria of the selected disposal or recycling facility. Preparation will consist of demolishing the surface slabs into pieces that are manageable and meet facility acceptance criteria. Decontamination of concrete debris will consist of pressure washing using a high pressure, low volume power washer. In addition, physical/mechanical agitation (scraping with hand tools) of soil may be utilized to minimize wastewater generation. Generated decontamination fluids will be containerized on-site where it will be characterized for off-site disposal.

Subsurface piping that contains product or product residue or exhibits elevated PID readings will be removed to the extent practical. Piping that extends beyond the perimeter of the Site, including into the existing electrical substation, will have any residual product evacuated through the use of vacuum extraction, high pressure water/steam or equivalent method to the extent practical. The final method of product evacuation will be determined in the field and will be based on the size and condition of the encountered piping. The piping will then be cut, capped and abandoned in place.

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Former MGP Features Not Containing Source Material:

Former MGP features within the planned remedial excavation areas (that do not potentially contain source material) will be removed only to the planned excavation depth (i.e., 8 feet bgs). These features will be broken up in place as previously described and either re-used on-site as backfill material or disposed off-site as construction debris.

3.5.4 Construction of Site Wide Cap

In order to limit exposure pathways, a site wide cap consisting of 18 inches of well graded sandy soil topped with six inches of gravel will be constructed across the entire on-site area. The site wide cap will also be underlain with a geotextile fabric to serve as a demarcation barrier. In on-site areas outside of the Shallow Excavation Area, the top two feet of soil will be excavated where required to facilitate the construction of the cap. However, the excavation depth for the construction of the cap may be less in the areas of the Site where the proposed grade is higher than the existing grade. All areas of the Site will contain a two foot thick cap consisting of imported clean materials.

Within the Bulkhead Area, the existing topography is level with the sidewalk along Beach Channel Drive before sloping downward several feet toward the Channel. The Contractor shall remove the upper two feet from this plateau area and construct the soil cap. In addition, the Contractor shall extend the cap up to the existing steel sheet pile bulkhead. The Contractor will backfill the existing low lying areas of the Bulkhead Area to within two feet below the final finished grade and conduct all required excavation need to establish the sub-grade for the soil cap. The Contractor shall extend and construct the soil cap in these areas up to the final finished grade. The cap within the Bulkhead Area will consist of a minimum of 18 inches of well graded sandy soil topped with six inches of topsoil capable of sustaining vegetation.

The remedial construction activities (i.e. pre-trenching, installation of migration barrier, and construction of the soil cap) within the bulkhead area shall be performed by the Contractor in a consecutive manner so as to minimize the total construction duration within this area.

3.6 NAPL Contingency Plan

Visible NAPL may be encountered at depth within the excavation areas. Indications of visible NAPL include the presence of an oil-like sheen or actual floating product. In instances where NAPL is noted to be floating on the water table surface or on storm water

within the excavation, absorbent pads/booms will be used to remove the NAPL. This approach is best suited for NAPL that appears as an oil-like sheen. Where the visible NAPL exists as floating product, the absorbent pads/booms will be used to collect and segregate the NAPL within the excavation. Once segregated, the NAPL will be recovered using a portable oil skimmer or similar device. The purpose of the skimmer is to remove the visible NAPL while minimizing the collection of water requiring disposal. In instances where visible NAPL occurs at the unsaturated/saturated zone interface, absorbent pads/booms will be used to entrain the NAPL and additional limited soil excavation will occur to remove the entrained NAPL.

In instances where visible NAPL is noted to be floating on the bottom of the trench during the flushing of the Waterloo Barrier® sheeting interlocks, absorbent pads/booms will be used to remove the NAPL. Similar to the NAPL recovery methods implemented during the remedial excavation activities, a portable oil skimmer or similar device will be utilized to recover NAPL. All collected NAPL will be containerized for eventual off-site disposal.

3.7 Subgrade Inspections

A. Notify KeySpan and PS&SPC representatives when excavations have reached required subgrade.

B. If KeySpan and PS&SPC determine that unsatisfactory soil is present, continue excavation and replace with fill material as directed.

C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices listed in the Technical Specifications Section 01025 - Measurement and Payment.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by KeySpan and/or PS&SPC, without additional compensation.

3.8 Unauthorized Excavation

A. The Contractor shall not perform any unauthorized excavation.

B. The Contractor shall, at his own expense, fill unauthorized excavations as directed by KeySpan and/or PS&SPC.

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3.9 Storage of Soil Materials

A. All excavated materials determined to contain source materials and any associated contaminated wastes shall be segregated by the Contractor for characterization, transportation and disposal at a KeySpan approved disposal facility.

1. The Contractor shall be responsible to ensure that material management is performed in a manner that will not negatively impact the progress of the work. The Contractor shall coordinate staging, containerization, characterization and disposal so that work will not be impeded.

2. Stockpile all materials (i.e. borrow soil, source material, topsoil, etc) without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3. Stockpiles of backfill materials shall not be placed on areas that have not been excavated for removal of source material unless protective measures to ensure separation of the backfill material and existing soil are put in place.

4. Stockpile soil materials away from edge of excavations. Do not store within drip line of any trees.

5. The Contractor shall coordinate with KeySpan and PS&SPC to designate areas for letdown and storage to ensure unimpeded progress of the work.

6. The Contractor shall identify and implement procedures to ensure that clean material is properly segregated from impacted material.

3.10 Backfilling

A. Place and compact excavated soil (not containing source material) or borrow backfill in excavations promptly, but not before completing the following:

1. Installation, inspection and surveying of sub-grade.

2. Within the pre-trenching excavations, inspection, flushing and grouting of the interlocking joints of the migration barrier.

3. Surveying of locations of underground utilities for Record Documents.

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4. Re-establishing and relocating underground utilities as required.

5. Removing trash and debris.

6. Removing temporary shoring and bracing and sheeting. The temporary shoring, bracing or sheeting may be removed after an excavation is substantially backfilled (i.e., to within one to three feet of final grade). Shoring, bracing or sheeting will not be removed unless the stability of the excavation is not in question.

7. Place and compact backfill to existing grade.

8. Place backfill on subgrades free of mud, frost, snow, or ice.

9. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

3.11 Compaction of Excavated Soils and Borrow Backfill

A. General: Place backfill and fill soil materials in loose layers, in the backfill areas and other additional approved areas, using approved material.

B. Backfill placed within the remedial excavation areas shall be placed in 12-inch thick lifts and mechanically compacted to a minimum of 90 percent of the modified proctor density (as determined by ASTM D1557).

C. Backfill for the pre-trenching excavations along the alignment of the DNAPL migration barriers shall be ultimately placed in 12 inch lifts and mechanically compacted to a minimum of 90 percent of the modified proctor density (as determined by ASTM D1557).

D. Within the on-site area, the site wide cap shall consist of 18 inches of well graded sandy material and 6 inches of crushed stone or gravel. The well graded sandy material shall be placed in two lifts and mechanically compacted to a minimum of 95 percent of the modified proctor density (as determined by ASTM D1557). The crushed stone or gravel shall be placed in one lift and mechanically compacted.

E. Within the Bulkhead Area, the soil cover shall consist of 18 inches of well graded sandy material and 6 inches of topsoil to be used as a growing medium. The well graded sandy material shall be placed in two lifts and mechanically compacted to

a minimum of 95 percent of the modified proctor density (as determined by ASTM D1557).

F. Care shall be taken so as to not disturb subgrade features during compaction.

3.12 Grading

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings or sidewalks and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Finish subgrade to a tolerance of 1/2 inch (13 mm) when tested with a 10-foot (3-m) straightedge.

C. Final grade at the top of the site wide cap shall approximate the existing site grade consistent with the requirements of this Specification.

3.13 Field Quality Control

A. Testing Agency: The Contractor shall provide a qualified independent geotechnical engineering testing agency to perform field quality-control testing for compaction.

The Contractor shall notify KeySpan and/or PS&SPC in advance of performing field quality control testing for compaction.

B. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

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1. Excavation Backfill: For each compacted backfill lift, at least 1 test for every 2,500 square feet but no fewer than 2 tests per backfill lift.

2. Pre-Trenching along Barrier Alignment: For each compacted backfill lift, at least 1 test for every 50 feet but no fewer than 2 tests per backfill lift.

C. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.14 Protection

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. The Contractor shall scarify and replace material to depth as directed by KeySpan, PS&SPC and/or the CM; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. The Contractor shall restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.15 Disposal of Waste Materials

3.15.1 Disposal (non-hazardous): The Contractor shall remove all non-hazardous waste material, trash, and debris, and dispose of it off KeySpan property as directed by KeySpan, PS&SPC and/or the CM in accordance with all applicable rules and regulations.

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3.15.2 Disposal (contaminated): The Contractor shall remove all Site generated surplus soil and waste material, including unsatisfactory and contaminated soils, and place in transportation containers (truck, tank, rolloffs) as directed by KeySpan, PS&SPC and/or the CM

3.15.3 Disposal (Construction Material): The Contractor shall remove all Site generated construction material, trash, and debris, and legally dispose of it off KeySpan property as directed by KeySpan, PS&SPC and/or the CM.

3.15.4 Waste Containers: The Contractor shall place any excavated contaminated soil generated within appropriate USDOT specification containers such as lined roll-off containers and/or dump trailers designated by the KeySpan, PS&SPC and/or the CM. The Contractor shall also place decontamination water generated as part of this project in appropriate USDOT specification containers provided by the Contractor and removed and disposed of by the Contractor.

3.15.5 Waste Transport: The Contractor shall coordinate all waste disposals with KeySpan, PS&SPC and/or the CM. The Contractor shall provide all labor and equipment necessary to load generated waste onto transport trucks, trailers, or roll-off containers and dispose of waste in accordance with the HASP, all applicable laws, rules, and regulations pertaining to such activities, and as directed by KeySpan, PS&SPC and/or the CM. Transport trucks may only access the site for delivery and off-site transport between the hours of 9:00 AM and 2:00 PM, Monday through Friday. The Contractor will be responsible for incurred demurrage costs resulting from improper coordination with disposal facilities and transport vehicles.

END OF SECTION

SECTION 02316
RECOVERY WELL INSTALLATION

PART 1 - GENERAL

1.1 Description

A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Design Drawings.

B. This Section describes the installation of DNAPL recovery wells on-site. The placement and target depth of each well will be determined by KeySpan and/or PS&SPC prior to installation.

1.2 References and Related Sections

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

A. New York State Department of Environmental Conservation (NYSDEC) Division of Hazardous Waste Remediation, Technical and Administrative Guidance Memorandum #4032 - Disposal of Drill Cuttings. 1989.

1.3 Submittals

The Contractor shall submit to KeySpan and/or PS&SPC the following information prior to Recovery Well Installation;

A. Drilling Contractor information, including:

1. Name and address of the drilling company;
2. Name of Driller; and
3. Copy of Drilling Company's NY Drilling Certification.
4. Certificate of Insurance naming KeySpan and/or PS&SPC as additionally insured

The Contractor shall submit to KeySpan, PS&SPC and/or the CM the following information after the recovery wells are installed:

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B. The driller's well daily drilling logs/records for each well installed and the quantity of materials used.

PART 2 - PRODUCTS

2.1 Recovery Well Material

A. Recovery wells will be constructed of flush joint threaded Schedule 40 PVC materials with locking O-ring seals.
B. Recovery well risers will be constructed of 4-inch diameter Schedule 40 PVC monitoring well riser.
C. Recovery well screens will be constructed of a 4-inch diameter 0.020-inch slot Schedule 40 PVC well screen. Each well screen will be a nominal 10-foot in length.
D. Recovery well sumps will be constructed of a 5-foot long 4-inch diameter Schedule 40 PVC solid sump.

2.2 Recovery Well Filter Pack Material

A. Filter pack material for the recovery wells will be #00 Well Sand.

2.3 Bentonite Well Seal

A. The recovery well screen and filter pack will be sealed above the filter pack using either hydrated bentonite powder or pellets.

2.4 Grout Mixture

A. A grout mixture will be used to seal the well annular space to the surface. Cement-bentonite slurry will be mixed at a ratio of 8.3 gallons of water to 5.0 pounds of dry bentonite to 94 pounds of dry Portland cement.

PART 3 - EXECUTION

3.1 Recovery Well Installation

Prior to the commencement of any installation activity, the Contractor shall notify KeySpan, PS&SPC and/or the CM for approval.

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RECOVERY WELL INSTALLATION

A. All recovery wells will be installed using a drilling technique capable of effectively reaching depths of 130 feet with an annular space of 6.25-inches or greater (hollow-stem/sonic/ or comparable drilling technique).
B. Specific depths and locations of recovery wells will be determined based on the final site reuse plan.

3.2 Recovery Well Construction Details

A. Recovery wells will be constructed within the borehole annulus.
B. The contractor shall not commence well installation unless a representative of KeySpan, PS&SPC and/or the CM is present to document installation.
C. A 5-foot long solid PVC sump will be installed at the base of the recovery well.
D. The PVC sump will be connected to a 10-foot long PVC screen section.
E. The PVC screen section will be connected to a PVC riser to the surface.
F. The annular space surrounding the PVC and the PVC well Screen will be filled with filter pack material to 2 feet above the top of the screen interval.
G. The annular space above the filter pack will be filled with a minimum two foot thick bentonite seal. Bentonite seal will be no thicker than 4 feet.
H. The annular space above the bentonite seal will be filled with a grout mixture utilizing a tremie pipe to fill the annulus from the bentonite seal to one foot below the surface.
I. Each recovery well will be allowed to cure overnight (minimum 12 hours). If necessary and settling of the grout mixture occurs, the annulus will be filled to 1 foot below grade with the grout mixture.
J. Each recovery well will be completed in either a 2-foot by 2-foot traffic rated well vault or well stick-up depending on the final reuse criteria for the site.

3.3 Recovery Well Development

Prior to the commencement of any development activity, the Contractor shall notify KeySpan, PS&SPC and/or the CM for approval.

A. Recovery wells will not be developed for a minimum of 1 week after installation. During that period, the wells will be gauged for the presence of DNAPL. Wells that exhibit DNAPL flow into the well will not be developed further.
B. Well development for recovery wells that do not produce NAPL will be performed by air lift technology. Air Lift is conducted using compressed air pumped into the well. The air loosens fines in the borehole annulus and

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RECOVERY WELL INSTALLATION

allows them to flow to the well. The aerated water containing the fine sediments is then surged to the surface.

C. The Contractor will provide an air compressor capable of developing using air lift technology to depths of 130 feet.
D. Surged water from the development will be captured and contained at the surface. The area surrounding the well head will be covered with 3-mill poly sheeting to minimize groundwater contact with surface materials. The well head will be covered with a plastic tub. The well head will be set inside a hole in the bottom of the tub and sealed at the surface with a bentonite slurry mix to prevent loss of groundwater around the well head.
E. Surged groundwater will be pumped from the tub into US/DOT approved 55-gallon drums provided by the contractor. The drums will be appropriately labeled and staged in the drum storage area.
F. Airlift surging will be conducted until either the turbidity of the development water is less than 50 nephelometric turbidity units (NTUs) or 3 full well volumes have been removed from the recovery wells A field turbidity meter will be used to monitor NTU levels.
G. If an appreciable volume of DNAPL is observed in the surged groundwater during development, then development will be halted.

END OF SECTION

SECTION 02610
MONITORING WELL ABANDONMENT

PART 1 - GENERAL

1.1 Description

A. The Contractor shall provide all materials, labor, transportation, insurance and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Design Drawings.

B. This Section describes the abandonment of existing monitoring wells that are on-site. The abandonment of environmental wells will require approval from KeySpan and/or PS&SPC prior to abandonment taking place. The Contractor, at the direction of KeySpan, PS&SPC and/or the CM, shall replace these monitoring wells during the restoration activities of the project.

1.2 References and Related Sections

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

A. New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation (DER), Groundwater Monitoring Well Decommissioning Procedures, dated April 2003.

1.3 Submittals

The Contractor shall submit (via the CM) to KeySpan and/or PS&SPC the following information prior to Monitoring Well Abandonment:

A. Drilling Contractor information, including:

1. Name and address of the drilling company;
2. Name of Driller; and
3. Copy of Drilling Company's NY Drilling Certification.

The Contractor shall submit (via the CM) to KeySpan and/or PS&SPC the following information after the monitoring wells are abandoned:

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MONITORING WELL ABANDONMENT

B. The driller's well sealing records for each well and the amount of grout used to seal each well.

PART 2 - PRODUCTS

2.1 Grout Mix

A. Grout Mix -a cement-bentonite slurry in the ratio of 7.8 gallons of water to 3.9 pounds of dry bentonite to 94 pounds of dry Portland Cement (Type I).

PART 3 - EXECUTION

3.1 Monitoring Well Abandonment

Prior to the commencement of any abandonment activity, the Contractor shall notify KeySpan, PS&SPC and/or the CM for approval.

END OF SECTION

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PART 1- GENERAL

1.1 References

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 90	(2001) Standard Test Method for Weight of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
ASTM A 370	(2002) Standard Test Methods and Definitions for Mechanical Testing of Steel Projects
ASTM A 392	(1996) Zinc-Coated Steel Chain-Link Fence Fabric
ASTM A 491	(1996) Aluminum-Coated Steel Chain-Link Fence Fabric
ASTM A 780	(2000) Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings
ASTM A 824	(1995) Metallic-Coated Steel Marcelled Tension Wire for Use with Chain Link Fence
ASTM C 94/C 94M	(2000) Ready-Mixed Concrete
ASTM F 626	(1996a) Fence Fittings
ASTM F 883	(1997) Padlocks
ASTM F 900	(1994) Industrial and Commercial Swing Gates
ASTM F 1043	(2000) Strength and Protective Coatings on Metal Industrial Chain-Link Fence Framework

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ASTM F 1083	(1997) Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
ASTM F 1184	(1994) Industrial and Commercial Horizontal Slide Gates

1.2 Related Documents

Design Drawings and general provisions of the Contract, including General and Supplementary Conditions and Technical Specification Sections, apply to this Section.

1.3 Submittals

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.

1. Fence and gate posts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.
3. Gates and hardware.
4. Gate operators, including operating instructions.
5. Accessories:
6. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.

B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.

1. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.

2. Wiring Diagrams: Power and control wiring and access control features.

3. For installed products indicated to comply with design loads, include structural analysis data.

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C. Samples for Initial Selection: Manufacturer's color charts or 6-inch (150-mm) lengths of actual units showing the full range of colors available for components with factory-applied color finishes.

D. Samples for Verification: For each type of chain-link fence and gate indicated.

1. Polymer-coated steel wire (for fabric) in 6-inch (150-mm) lengths.

2. Polymer coating, in 6-inch (150-mm) lengths on shapes for posts, rail wires, and gate framing and on full sized units for accessories.

E. Product Certificates: For each type of chain-link fence, operator and gate, signed by product manufacturer.

1. Strength test results for framing according to ASTM F 1043.

F. Qualification Data: For Installer.

G. Field quality-control test reports.

H. Maintenance Data: For the following to include in maintenance manuals:

1. Polymer finishes.

2. Gate operator.

1.4 Performance Criteria

A. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Minimum Post Size and Maximum Spacing for Wind Velocity Pressure: Determine based on mesh size and pattern specified, and on the following minimum design wind pressures and according to CLFMI WLG 2445:

a. Wind Speed: 80 mph.
b. Fence Height: 8 feet
c. Line Post Group: IA, ASTM F 1043, Schedule 40 steel pipe
d. Wind Exposure Category: B.

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2. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 12 feet (3.66 m) high, and post spacing not to exceed 10 feet (3 m).

B. Lightning Protection System: Maximum grounding-resistance value of 25 ohms under normal dry conditions.

1.5 Quality Assurance

A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified according to NETA ETT, or the National Institute for Certification in Engineering Technologies, to supervise on-site testing specified in Part 3.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. UL Standard: Provide gate operators that comply with UL 325.

E. Emergency Access Requirements: Comply with requirements of authorities having jurisdiction for automatic gate operators serving as a required means of access.

F. Preinstallation Conference: Conduct conference at Site to comply with requirements in Division 1.

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1.6 Project Conditions

A. Field Measurements: Verify layout information for chain-link fences and gates shown on the Design Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

B. Interruption of Existing Utility Service: Do not interrupt utility services to facilities occupied by KeySpan or others unless permitted.

PART 2- PRODUCTS

2.1 Chain Link Fence Fabric

General: The height of the new fencing shall be 8 feet. Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:

1. Steel Wire Fabric: Polymer-coated wire with a diameter of 0.148 inch (3.76 mm).

   a. Mesh Size: 2 inches (50 mm)

2. Polymer Coating: ASTM D 668, Class 1 over metallic-coated steel wire.

   a. Color: dark green complying with ASTM F 934.

2.2 Gates

ASTM F 900 and/or ASTM F 1184. Gate shall be the type and swing or slide as shown on the Design Drawings. Gate frames shall conform to strength and coating requirements of ASTM F 1083 for Group IA, steel pipe, with external coating Type A, nominal pipe size (NPS) 1-1/2. Gate frames shall conform to strength and coating requirements of ASTM F 1043, for Group IC, steel pipe with external coating Type A or Type B, nominal pipe size (NPS) 1-1/2. Gate frames shall be polyvinyl chloride-coated steel pipe Group IA with external coating Type A, a nominal pipe size (NPS) 1-1/2, conforming to ASTM F 1043.

Gate fabric shall be as specified for chain link fabric. Gate leaves more than 8 feet wide shall have either intermediate members and diagonal truss rods or shall have tubular

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members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods or intermediate braces. Gate fabric shall be attached to the gate frame by method standard with the manufacturer except that welding will not be permitted. Latches, hinges, stops, keepers, rollers, and other hardware items shall be furnished as required for the operation of the gate. Latches shall be arranged for padlocking so that the padlock will be accessible from both sides of the gate. Stops shall be provided for holding the gates in the open position. For high security applications, each end member of gate frames shall be extended sufficiently above the top member to carry three strands of barbed wire in horizontal alignment with barbed wire strands on the fence.

2.3 Posts

ASTM F 1083, zinc-coated. Group IA, with external coating Type A steel pipe. Group IC steel pipe, zinc-coated with external coating Type A or Type B and Group II, roll-formed steel sections, shall meet the strength and coating requirements of ASTM F 1043. Group III, ASTM F 1043 steel H-section may be used for line posts in lieu of line post shapes specified for the other classes. Post shall be either Group IA steel pipe, Group IC, Group II, roll-formed steel sections, or Group III steel H-sections and shall be zinc coated (Type A) or polyvinyl chloride coated conforming to the requirements of ASTM F 1043. Sizes shall be as shown on the drawings. Line posts and terminal (corner, gate, and pull) posts selected shall be of the same designation throughout the fence. Gate post shall be for the gate type specified subject to the limitation specified in ASTM F 900 and/or ASTM F 1184.

2.4 Braces and Rails

ASTM F 1083, zinc-coated, Group IA, steel pipe, size NPS 1-1/4. Group IC steel pipe, zinc-coated, shall meet the strength and coating requirements of ASTM F 1043. Braces and rails shall be Group IA, steel pipe, size NPS 1-1/4 or Group II, formed steel sections, size 1-21/32 inch and shall be zinc coated (Type A) and polyvinyl chloride-coated conforming to the requirements of ASTM F 1043. Group II, formed steel sections, size 1-21/32 inch, conforming to ASTM F 1043, may be used as braces and rails if Group II line posts are furnished.

2.5 Tension Wire

Tension wire shall be Type I or Type II, Class 2 coating, in accordance with ASTM A 824.

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2.6 Accessories

ASTM F 626. Ferrous accessories shall be zinc or aluminum coated. Ferrous accessories shall also be polyvinyl chloride-coated, minimum thickness of 0.006 inch, maximum thickness of 0.015 inch. Color coating of fittings shall match the color coating of the fabric (green). Truss rods shall be furnished for each terminal post. Truss rods shall be provided with turnbuckles or other equivalent provisions for adjustment. Tie wire for attaching fabric to rails, braces, and posts shall be 9 gauge steel wire and match the coating of the fence fabric. Tie wires for attaching fabric to tension wire on high security fences shall be 16 gauge stainless steel. The tie wires shall be a double loop and 6.5 inches in length. Threaded hardware shall be painted to match polyvinyl chloride coatings.

2.7 Concrete

ASTM C 94/C 94M, using 3/4 inch maximum size aggregate, and having minimum compressive strength of 3,000 psi at 28 days. Grout shall consist of one part Portland cement to three parts clean, well-graded sand and the minimum amount of water to produce a workable mix.

2.8 Padlocks

Padlocks shall conform to ASTM F 883, Type P01, Options A and 6, Grade 6, Size 1-3/4 inch. All padlocks shall be keyed alike.

PART 3- EXECUTION

3.1 Installation

Fence shall be installed to the lines and grades indicated. The area on either side of the fence line shall be cleared to the extent indicated. Line posts shall be spaced equidistant at intervals not exceeding 10 feet. Terminal (corner, gate, and pull) posts shall be set at abrupt changes in vertical and horizontal alignment. Fabric shall be continuous between terminal posts; however, runs between terminal posts shall not exceed 500 feet. Any damage to coated surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A 780.

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3.2 Excavation

Air monitoring, as per the requirements of the Health and Safety Plan, shall be conducted during all excavation for the post holes. Soils removed during the excavation activities will be field screened to assess the presence/absence of contamination. If source materials are noted in the excavated soil the soils will be added to the stockpile of impacted soils and disposed of off-site. If no source materials are noted, the post holes shall be cleared of loose material. Non-source material containing soils shall be spread where directed by KeySpan, PS&SPC and/or the CM. The ground surface irregularities along the fence line shall be eliminated to the extent necessary to maintain a 2-inch clearance between the bottom of the fabric and finish grade.

3.3 Post Installation

Posts shall be set plumb and in alignment. Except where solid rock is encountered, posts shall be set in concrete to the depth indicated on the drawings. Where solid rock is encountered with no overburden, posts shall be set to a minimum depth of 18 inches in rock. Where solid rock is covered with an overburden of soil or loose rock, posts shall be set to the minimum depth indicated on the drawing unless a penetration of 18 inches in solid rock is achieved before reaching the indicated depth, in which case depth of penetration shall terminate. All portions of posts set in rock shall be grouted. Portions of posts not set in rock shall be set in concrete from the rock to 2 inches above ground level. Posts set in concrete shall be set in holes not less than three times the outside diameter of the post or the diameter shown on the drawings. Diameters of holes in solid rock shall be at least 1 inch greater than the largest cross section of the post. Concrete and grout shall be thoroughly consolidated around each post, shall be free of voids and finished to form a dome. Concrete and grout shall be allowed to cure for 72 hours prior to attachment of any item to the posts. Group II line posts may be mechanically driven, for temporary fence construction only, if rock is not encountered. Driven posts shall be set to a minimum depth of 3 feet and shall be protected with drive caps when being set. For high security fences, fence post rigidity shall be tested by applying a 50 pound force on the post, perpendicular to the fabric, at 5 feet above ground; post movement measured at the point where the force is applied shall be less than or equal to 3/4 inch from the relaxed position; every tenth post shall be tested for rigidity; when a post fails this test, further tests on the next four posts on either side of the failed post shall be made; all failed posts shall be removed, replaced, and retested at the Contractor's expense.

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3.4 Rails

3.4.1 Top Rail

Top rail shall be supported at each post to form a continuous brace between terminal posts. Where required, sections of top rail shall be joined using sleeves or couplings that will allow expansion or contraction of the rail. Top rail, if required for high security fence, shall be installed as indicated on the drawings.

3.4.2 Bottom Rail

The bottom rail shall be bolted to double rail ends and double rail ends shall be securely fastened to the posts. Bolts shall be peened to prevent easy removal. Bottom rail shall be installed before chain link fabric.

3.5 Braces and Truss Rods

Braces and truss rods shall be installed as indicated and in conformance with the standard practice for the fence furnished. Horizontal (compression) braces and diagonal truss (tension) rods shall be installed on fences over 6 feet in height. A center brace or 2 diagonal truss rods shall be installed on 12 foot fences. Braces and truss rods shall extend from terminal posts to line posts. Diagonal braces shall form an angle of approximately 40 to 50 degrees with the horizontal. No bracing is required on fences 6 feet high or less if a top rail is installed.

3.6 Tension Wires

Tension wires shall be installed along the top and bottom of the fence line and attached to the terminal posts of each stretch of the fence. Top tension wires shall be installed within the top 4 inches of the installed fabric. Bottom tension wire shall be installed within the bottom 6 inches of the installed fabric. Tension wire shall be pulled taut and shall be free of sag.

3.7 Chain Link Fabric

Chain link fabric shall be installed on the side of the post indicated. Fabric shall be attached to terminal posts with stretcher bars and tension bands. Bands shall be spaced at intervals not exceeding 15 inches. The fabric shall be installed and pulled taut to provide a smooth and uniform appearance free from sag, without permanently distorting the fabric diamond or reducing the fabric height. Fabric shall be fastened to line posts at intervals

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not exceeding 15 inches and fastened to all rails and tension wires at approximately 12-inch intervals. Fabric shall be cut by untwisting and removing pickets. Splicing shall be accomplished by weaving a single picket into the ends of the rolls to be joined. The bottom of the installed fabric shall be 2 plus or minus 1/2 inch above the ground. For high security fence, after the fabric installation is complete, the fabric shall be exercised by applying a 50 pound push-pull force at the center of the fabric between posts; the use of a 30 pound pull at the center of the panel shall cause fabric deflection of not more than 2-1/2 inches when pulling fabric from the post side of the fence; every second fence panel shall meet this requirement; all failed panels shall be resecured and retested at the Contractor's expense.

3.8 Gate Installation

Gates shall be installed at the locations shown. Hinged gates shall be mounted to swing as indicated. Latches, stops, and keepers shall be installed as required. Slide and swing gates shall be installed as recommended by the manufacturer. Padlocks shall be attached to gates or gate posts with chains. Hinge pins and hardware shall be welded or otherwise secured to prevent removal.

3.9 Grounding

Fence shall be grounded as required and as specified.

END OF SECTION

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FABRIC ENCLOSURES

PART 1- PART 1 - GENERAL

1.1 Description

1.1.1 All workmen shall be skilled and qualified for the work that they perform. All materials used, unless otherwise specified, shall be new and of the types and grades specified. The Contractor shall certify that no asbestos containing building materials that exceed New York and Federal mandated safe asbestos levels have been used in the construction of the membrane-covered structure.

1.1.2 The orientation of the fabric enclosure(s) must be such that the main entrance to the enclosure(s) faces the prevailing wind in the area.

1.1.3 During the development of the final remedial design, the Contractor shall provide a plan signed and sealed by a New York State licensed Professional Engineer with the details of the Fabric Enclosure. The information included shall include but not be limited to the size, number, location, manufacturer, and any other information required by the Technical Specifications.

1.1.4 In general, the fabric enclosure(s) shall be a stressed membrane structure consisting of galvanized steel or aluminum framework of arched ribs, which supports a durable all-weather polyvinyl chloride (PVC) fabric membrane and will be equipped with a minimum of the following:

- Automated roll-up bay doors;
- Pedestrian doors;
- Observation windows;
- Automated louvers;
- Adequate interior lighting; and
- Provisions for enclosure re-location;

1.1.5 Perform all work necessary and required for the construction of the project as indicated. Such work includes the supply and installation of a membrane-covered structure complete with exterior and interior finishes. All buildings shall be as constructed in accordance with the Technical Specifications.

1.1.6 The Contractor shall determine whether or not a building permit is required for the temporary enclosure(s). The Contractor shall obtain all required building permits associated with the fabric enclosure(s).

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1.1.7 The fabric enclosure(s) will be equipped with a vapor management system(s) capable of providing a minimum 6 air exchanges per hour for the interior of the enclosure and the depth of the excavation while maintaining a negative air pressure within the enclosure. The vapor management system(s) will be designed to process (utilizing carbon adsorbers or other approved method) the recovered air from within the enclosure to remove contaminants to meet NYSDEC air emission standards and the requirements of the approved HASP. The Contractor shall continuously monitor the emissions from the vapor management system(s) utilizing a Photo Ionization Detector (PID), if the readings exceed 10 PPM or greater above background a detector tube for benzene will be utilized to sample the vapor management system(s)'exhaust to determine benzene concentrations. The calculated concentration of benzene will be compared to the NYSDEC Guidelines for Control of Toxic Air Contaminants; the Contractor will ensure that the type and quantity of carbon media used in the vapor management system(s) will meet the emission limits for benzene. The Contractor's HASP and Remedial Plan shall identify PID readings that require immediate action and the appropriate actions to be taken. The vapor management system(s) must also be equipped with the following (or as approved by KeySpan and/or PS&SPC):

- An adequately sized air handler system that will provide 6 air exchanges per hour;
- Flexible air ducts;
- Particulate filters;
- Granular activated carbon (GAC) box absorbers;
- Early warning GAC changeout determination devices;
- Pressure gauges;
- Air sampling ports; and
- Continuous effluent monitoring.

1.1.8 The design of the vapor management system(s) will be included with the Remedial Plan. Process air will be discharged to the atmosphere in accordance with applicable NYSDEC, local and federal regulations and procedures.

1.2 Scope of Work

1.2.1 Structural frame supported membrane covered roof and wall structure of the type described herein and in accordance with the approved Remedial Plan:

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1.2.1.1 The dimensions of the structure(s) shall be specified in the approved Remedial Plan and shall adequately house and facilitate the intrusive work areas.
1.2.1.2 Two complete flat gable ends.
1.2.1.3 At least two 14 foot wide by 14 foot high framed doorways.
1.2.1.4 At least two electric operated rollup doors.
1.2.1.5 At least two personnel doors c/w Panic Hardware
1.2.1.6 A fabric membrane shall be a durable all-weather polyvinyl chloride (PVC) membrane that is designed for negative air pressure, to be resistant to environmental impacts on the structure's interior, to be resistant to the elements of weather on the exterior and to be meeting the other requirements specified herein.
1.2.1.7 Anchorage with engineered fasteners to approved wall/foundation system.
1.2.1.8 New York Professional Engineer's signed and sealed approved engineered drawings for the structure(s).

1.2.2 Installation of vapor management system(s)
1.2.3 Site work.
1.2.4 Delivery to the Site.
1.2.5 Complete structure(s) and accessory installation
.

1.3 General Design Requirements

1.3.1 Scope

1.3.1.1 This specification covers the design, manufacture, shipping, handling and erection of a prefabricated membrane covered structure.

1.3.1.2 The membrane shall be tensioned over the framework. The structure shall be rectangular in shape with vertical gable end walls. The interior of the structure below the main trusses shall be clear span free of any structural support members and shall provide unobstructed floor space. No exterior purlins, guy ropes or cables shall be used for anchoring the structure.

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1.3.1.3 The structure shall include accessories to the extent shown on the project drawings required for the scope and intended use for:

1.3.1.3.1 Overhead doorways
1.3.1.3.2 Ventilation systems.
1.3.1.3.3 Other structure accessories (listed here and beyond)

1.3.2 Design Requirements - Structural Frame

1.3.2.1 Roof and Wall Surfaces: To provide for maximum compatibility with standard door, window, ventilation and other accessory and cladding systems, the structure shall be designed such that roof and gable side wall surfaces form flat planes.

1.3.2.2 Purlin Spacing: To provide for structural stability and to provide for installation of accessory items, the main structural trusses shall be laterally braced by purlins at intervals required by the truss design.

1.3.2.3 Wind and Frame Bracing: The structure shall be appropriately stabilized with wind bracing cables as well as any required secondary node restraint assemblies so as to efficiently transfer wind, snow and seismic induced stresses to the foundation/anchoring system. Cable diameter for main wind bracing shall be a minimum of 3/8” diameter and larger if so required. The end bays of the structure shall be designed to be "X" braced early during installation to allow for permanent stability of the frame during installation. The structural frame shall be provided with 3/8” thick steel attachment lugs for all main cable assemblies.

1.3.2.4 Connecting Joints: Connections between structural elements shall be designed so as to transfer the compressive and tensile forces present in a given joint. A minimum of four 5/8” diameter Grade 5 bolts shall be used at each truss chord joint. Primary axial steel, secondary purlins, and end wall frame connections shall be made with 5/8” diameter Grade 5 bolts.

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1.3.2.5 Mechanical Equipment Interface: The main structural roof trusses shall allow for installation of electrical and mechanical equipment. Likewise, the structure shall accept penetrations through the membrane for access doors and mechanical services with minimal modification.

1.3.2.6 Alternative Cladding materials: The structure shall be designed such that alternative covering materials such as metal wall cladding can be added with minimal modification, if required.

1.3.2.7 Shipping: The main structural trusses shall be two-dimensional; planar trusses which nest tightly together in order to minimize shipping and storage volume.

1.3.2.8 Ancillary Systems: The structure shall be designed such that it can be readily retrofitted with insulation systems and other ancillary systems such as lighting, heaters, process piping, etc.

1.3.3 Design Requirements - Membrane Cladding System

1.3.3.1 Continuous, Weather Tight Membrane: The structure membrane shall form a continuous uninterrupted weather tight shell over the framework. In order to provide for a good finished appearance and to insure weather tightness, the membrane shall be assembled and tensioned, in a manner to eliminate wrinkles in hot and cold temperatures.

1.3.3.2 The gable wall membrane cladding shall be manufactured and connected in one piece to the adjacent end wall and roof cladding.

1.3.3.3 Cladding Section Joints: The aluminum track system, which holds the membrane to the main structure support trusses, shall be removable to allow for quick interchange ability of the membrane if damage should occur, allowing for any section of the membrane to be removed. Adjacent membrane cladding sections shall be installed in the aluminum extrusion track and be tensioned both vertically and horizontally to prevent wear and abrasion. Horizontal stretch (warp direction pre-stress of 40 lbs/ft.) shall be maintained with horizontal purlins requiring no ongoing maintenance. Vertical stretch (fill

direction pre-stress of 40 lbs/ft.) shall be maintained with a winch lock system requiring no ongoing maintenance.

1.3.3.4 Overlap Seams: The membrane system shall be designed such that the membrane cladding panels can be supplied with optional overlap joints to allow adjacent panels to be field heat sealed together. Membrane welded seams shall maintain a minimum of 175 lbs/inch.

1.3.3.5 Base Tensioning System: The membrane cladding will be provided with a mechanical tensioning system that allows the membrane to be fully tensioned around the structure perimeter. The system will be designed such that the membrane can be tightly and neatly secured over the structural frame and such that the system has remaining range of adjustment.

1.3.3.6 Membrane Seal at Openings and Base: The structure supplier will provide all materials and methods necessary to fully tension and seal the membrane material around all doors, ventilation and other openings as well as around the structure perimeter below the main tensioning system. This seal shall provide a neat and finished appearance and eliminate any loose membrane cladding that could otherwise be damaged by flapping or abrasion. When a membrane base skirt is required, this shall be supplied and attached at the base perimeter to allow a reasonable seal against air and water intrusion.

1.3.3.7 The membrane shall not be designed to function as a structural member such that, should any damage to or penetrations of the membrane occur, the integrity of the structural framework shall not be affected.

1.3.3.8 The Contractor shall provide drawings and calculations acceptable to the Architect, meeting the provisions of the New York City Building Code. The Contractor shall bear all costs for production of drawings and associated structural calculations. Contractor shall make all revisions and corrections to those documents required for approval and shall resubmit as required to obtain approvals.

1.3.3.9 Successful bidders shall make all required changes or corrections and will deliver to the Owner's Architect all approved drawings and calculations.

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1.4 Dimensions

1.4.1 The Contractor shall propose the dimensions of the structure in the Contractor's Remedial Plan. The dimensions of the structure shall be sized to facilitate the proposed remedial activities.

1.5 Engineered Design Criteria

1.5.1 The structure shall be designed in accordance with appropriate building code standards using methodology from ASCE 7-98 or (or other applicable code). Primary and secondary framing shall comply with current issues of AISC, AISI, NEMA and ASTM specifications, as applicable. Structural members shall be designed using Allowable Stress Design (ASD) or Load Resistance Factored Design (LRFD) for the design loads given below. Appropriate safety factors to yield and ultimate shall be maintained. Wind load factors and coefficients used in design of structural members must be in accordance with ASCE 7-98 guidelines.

1.5.2 Snow Loads: At a minimum, the structure shall be capable of supporting a roof snow load of 45 pounds per square foot and a collateral load of 3 pounds per square foot projected over the entire roof area or portion of the roof area, and any probable arrangement of loading resulting in the highest stress in the members.

1.5.3 Wind Loads: The structure shall be capable of withstanding wind loads from any direction of 110 miles per hour (based on a 3 second gust). The structure shall be designed using an exposure category of C for determining design wind pressure of the structure. The methodology is to be taken from ASCE 7-98. In no event shall the wind load used in the design of the main wind force resisting system be less than 10 pounds per square foot multiplied by the area of the building or structure projected on a vertical plane that is normal to the wind direction.

1.5.4 Rainfall: The structure shall be capable of withstanding the effects of rainfall up to 4 inches per hour for at least 2 hours.

1.5.5 Deflection: For safety of specified or future suspended accessories, the maximum allowable deflection of structural members shall be no more than 1/180 of the clear span of that member when subjected to the design loads described herein.

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1.5.6 Design each member to withstand stresses resulting from combinations of loads that produce maximum percentage of actual to allowable stress in that member.

1.6 Operation and Use

1.6.1 The structure shall be designed to provide a minimum 15-year operational use period with appropriate inspection and maintenance.

1.6.2 The structure shall be capable of being assembled operated and dismantled in all ambient temperatures between -20°F and 120°F.

1.6.3 The structure shall be capable of being erected on concrete and of accepting differential settlement of up to 2-1/2% between truss positions.

1.6.4 The main entrance to the fabric enclosure(s) shall face the direction of prevailing winds in the area.

1.7 Materials

1.7.1 All materials used in the structure shall be new, without defects and free of repairs. The quality of the materials used shall be such that the structure is in conformance with the performance requirements as specified herein.

1.7.2 Cladding Membrane: The structure shall be clad with a FRU coated polyolefin fabric manufactured by an approved and reputable supplier with demonstrated long-term performance. The polyolefin membrane fabric shall be waterproof and free from defects. All roofs, walls, end walls and connecting sections shall be weather tight. The material will be selected from the manufacturer's standard colors for the sidewalls and roof panels. The material must be UV stabilized and flame retardant, must carry a minimum ten-year manufacturer's warranty and have a life expectancy of 10 to 15 years. The minimum fabric specification is as follows:

Coated Weight	12 +/- 2 oz/sy (373 gsm)
Base Fabric Weight	4 mils average, each side
Finished Thickness	23 mils (ASTM D-5199)
Grab Tensile Strength	340 lbs (ASTM D-5304)
Strip tensile Strength	250 lbs (ASTM D-5305)
Tongue Tear Strength	115 lbs (ASTM D-2261)
Mullen Burst	675 psi (ASTM D-3786)

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Cold Crack Resistance	-60 ^{o}C (ASTM D-2136)
UV Resistance & Weathering	90% retention after 2000 hr.
Permitivity	<2.5 x 10^{-6} cm/s (ASTM D-5199)
Hydrostatic Resistance	>171 psi (ASTM D-751A)
Flame Resistance	2 sec flame (NFPA 701) (CAN/ULC-S109)
Flame Spread (CAN/ULCS102.2)	15 or less (ASTM E84)
Smoke Developed	170 (ASTM E84) (CAN/ULC-S109)

Acceptable membrane suppliers include: Intertape, Seaman, and Heytex. Other membrane materials may be considered, however the membrane manufacturer must demonstrate a minimum of (5)-years successful field experience with provision of polyolefin membrane cladding in use on structures of the type contemplated in this specification.

1.7.3 All steel tubing used in the structure must have the following minimum structural and mechanical properties (ASTM A-500):

Tension Ultimate: 60 KSI and Yield: 55 KSI

1.7.4 All steel flat bar, cross rods and other steel components shall be fabricated from hot dipped galvanized material and have the following minimum structural and mechanical properties (CSA G40.21 / ASTM A572 GR 44):

Tensile: 50 KSI and Yield: 44 KSI

1.7.5 Corrosion Protection: All steel tube components, trusses, purlins, fastening tubes shall be coated, on the exterior, with a gloss finish providing a corrosion resistance of 2000 hours as per ASTM B 117-90; 100% zinc based organic coating shall be applied to the interior.

1.7.6 Bolts: Bolts subject to extreme stress and wear shall be structural bolts of Grade 5 and plated / galvanized or upgraded with Sun Seal corrosion resistant. All bolts shall be installed and securely torqued so as to prevent change in tightness. Those subject to removal or adjustment shall not be swaged, peened, staked or otherwise installed.

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1.7.6.1 Anchor bolts: Anchor bolts shall conform to ASTM A354, A307 or A687 and CAN3-S16.1 allowing bolt projections based on no grout as follows:

- Series 2 min. 1 3/4" max. 2 1/2"
- Series 3 min. 2" max. 3 1/2"
- Series 4 min. 2" max. 3 1/2"

1.7.6.2 Membrane Tensioning Hardware: The fabric membrane shall be tensioned with load rated hardware which is plated/hot dip galvanized so as to prevent corrosion. Hardware shall allow full and fee rotation at the foundation connection to avoid fatigue failure of threaded assemblies.

1.7.6.3 Membrane Tensioning Webbing: The membrane shall be tensioned with load-tested tie-downs.

1.7.6.4 Cable Assemblies: Main and wind bracing cable assemblies shall be manufactured to the required length and press swaged with metal sleeves. The cables are manufactured using preformed galvanized "aircraft" cables, sized with appropriate safety factors.

- 3/16" dia. = 4,200 lbs.
- 1/4" dia. = 7,000 lbs.
- 5/16" dia. = 9,800 lbs.
- 3/8" dia. = 14,400 lbs.
- 1/2" dia. = 22,800 lbs

1.7.6.5 Other Fasteners: Non-structural fasteners such as wood screws, tek screws, etc., shall be of standard commercial quality.

1.7.6.6 Exterior Trim: Aluminum extrusion shall be a natural mill finish, unpainted and non-anodized to prevent scratching and chipping. The aluminum alloy used in the structure shall meet or exceed 6063-T5 and shall carry a minimum pro-rated warranty of 10 years.

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1.7.6.7 Welding: Welding shall be employed only when specified in the original design. Welders qualified and tested to the CSA Standard W47.1 Division 2.1 certification shall perform welding in accordance with AWS D1.1. All welded components shall be prepared/sandblasted prior to the finish coating of hot molten zinc applied to a minimum of 3 mils thick.

1.7.6.8 Workmanship: The workmanship of all materials and components of the structure shall be commensurate with the functional requirements of the item.

1.7.7 Manufacturer: The structure supplier shall be a reputable manufacturer; shall have a minimum of five years direct experience in the design, manufacture and installation of structures of the type specified herein; shall operate according to a comprehensive quality system and shall provide documentary evidence as follows:

1.7.7.1 Provide three references with structures manufactured by the proposed vendor in use for at least five years or which enclose a similar area as that proposed in the RDR.

1.7.7.2 Provide information of company experience and engineering and installation capability, which meet the above experience requirements.

1.7.8 Piece Marking and Identification: All individual parts or bundles and packages of identical parts are to be clearly marked for identification. Bolts, nuts, washers and fasteners shall be packaged according to type, size and length. The shipping document shall list showing the description, quantity and piece mark of the various parts, components and elements.

1.7.9 Material Delivery: The building system materials shall be delivered to the project site during normal working hours on weekdays. Installation contractor will provide adequate workmen and equipment to promptly unload, inspect and accept material delivery.

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1.7.10 Handling: The installation contractor shall be responsible for unloading, field storage, protection and transfer to the work area of all materials and equipment required to perform the work. At no time shall materials be dropped, thrown or dragged over the transport equipment or the ground. Damage to any piece under its own or superimposed weight shall be cause for repair or replacement.

1.7.11 Short, Damaged or Excess Materials: Installation contractor shall inspect, count and verify quantities based on the shipping documents.

1.8 References and Standards

1.8.1 The following publications are for the standards listed below but referred to thereafter by basic letter designation only. They form a part of this specification to the extent referenced thereto:

1.8.1.1 American Institute of Steel Construction (AISC):

1.8.1.1.1 M016-89 - Manual of Steel Construction, Ninth Edition.
1.8.1.1.2 S326-78 - Design, Fabrication and Erection of Structural Steel Buildings
1.8.1.1.3 S329-85 - Structural Joints Using ASTMA325 or A490 Bolts.

1.8.1.2 American Iron and Steel Institute (AISI):

1.8.1.2.1 SG 503-76 - The Design of Fabrication of Cold-Formed Steel Structures

1.8.1.3 American Society for Testing and Materials (ASTM):

1.8.1.3.1 A36-89 - Structural Steel
1.8.1.3.2 A 123 A-89 - Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
1.8.1.3.3 A 307-89 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
1.8.1.3.4 A 325-89 - High-Strength Bolts for Structural Steel Joints
1.8.1.3.5 A 500 A-90 - Standard Specification for Cold Formed Welded And Seamless Carbon Steel Structural Tubing in Rounds and Shapes
1.8.1.3.6 A 563 Rev A-89 - Carbon and Alloy Steel Nuts
1.8.1.3.7 A 687-89 - High-Strength Non-Headed Steel Bolts and Studs.

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1.8.1.4 American Society of Civil Engineers (ASCE) Minimum Design Loads for Building and Other Structures:

1.8.1.5 American Welding Society (AWS)

1.8.1.5.1 D1.1-92 - Structural Welding Code-Steel

1.8.1.6 National Fire Protection Association

1.8.1.6.1 (NFPA) 701-89.1 Standard methods of Fire Tests for Flame Resistant Textiles and Films.

1.8.1.7 Canadian Standards Association

1.8.1.7.1 CAN/CSA-S16.1 - Limit States Design of Steel Structures

1.9 Foundation Design

The fabric structure manufacturer shall provide to the client three stamped (by applicable state licensed P.E.) copies of calculations and drawing for the structures foundation/footing design. All design criteria must be in conformance with applicable building codes.

The foundation shall be constructed to resist forces imposed by the structure based on wind, snow, and dead load requirements.

Design of the foundation and/or anchoring systems for the building shall be in accordance with proper design principles with appropriate safety factors and shall be based on the maximum column/truss reactions as determined and provided by the manufacturer. These drawings and signed calculations shall be submitted to the NY Building Department or other pertinent governmental authority for a building permit (as required).

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PART 2- PRODUCTS

2.1 Approval of Plans

2.1.1 Upon award of this contract, The Contractor shall furnish detail drawings and calculations for all architectural and structural work stamped by an engineer certified by the State of New York to verify compliance to local building code in accordance with the approved Remedial Plan.

2.1.2 All work to be performed under the conditions of these Specifications shall comply with the rules and regulations of all agencies having jurisdiction for this classification of construction and design and shall conform to the applicable live loads due to wind, rain and snow in accordance with the following:

a. Building Code of New York State (Latest Edition),
b. National Electric Code (Latest Edition),
c. National Plumbing Code (Latest Edition),
d. AWS Standard Qualification Procedures,
e. NFPA (Latest Edition),
f. SMACNA Duct and Seismic Restraints Manuals, and
g. OSHA.

2.2 Intent of Specifications

2.2.1 The specification as heretofore set forth are general in nature and scope and shall not be construed as to limit the work other than the requirement that the new portable buildings shall match the specifications in materials, appearance, configuration and details.

2.2.2 It is the intent of these specifications that the bidder shall include all labor, materials, equipment services and transportation to locate the buildings on the site designated with all other work.

2.2.3 Buildings shall be complete and operating and shall include all exterior and interior materials and systems as shown or indicated in contract documents.

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PART 3- EXECUTION

3.1 General

Building prefabrication shall be performed under factory conditions in a plant specifically arranged for this type of work. Contractor shall provide adequate space, equipment, personnel, and technical ability to coordinate the assembly and factory prefabrication of all major components of the work and all necessary operations in the packing, shipping and installation procedures. No fabrication shall be done until the materials have been tested and approved. Fabrication inspection shall be required at the plant.

All penetrations shall be pre-fabricated in the factory and all fabric flashing boots shall be factory fabricated.

Fabric Manufacturer shall joint warranty the water tightness of the structure with the contractor for a period of one year.

3.2 Welding

No welding shall be started until the welding inspector has inspected and approved the materials, joint preparation, equipment and the qualifications of the welders. Welders doing unsatisfactory work will be removed and required to pass qualification tests again before returning to work.

3.3 General

Triple coated, in-line galvanized structural steel tubing, cold-formed and induction welded of a modified grade carbon steel, providing a finished tubular product with exceptional mechanical and corrosion resistant properties.

3.4 Material

Hot-Rolled Steel Strip Conforming to the Requirements of ASTM A569
1.000" x 14 Ga./5.000" x 8 Ga.: Modified Grade 1010
All other sizes/gauges: Modified Grade 1015
Minimum Mechanical Properties of the Finished Tube
1.000" x 14 Ga./5.000" x 8 Ga.: 50,000 psi Yield Strength
55,000 psi Tensile Strength

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All other sizes/gauges:	55,000 psi Yield Strength 60,000 psi Tensile Strength

3.5 Tolerances

All dimensional tubing tolerances are in accordance with ASTM A500, Section 10.

3.6 Coatings

3.6.1 Exterior

In-line, hot-dip galvanized to a nominal coating zinc weight of 0.6 oz/ft2 Chromate conversion coating applied over the galvanized surface to provide additional corrosion protection.

Clear organic polymer applied as the top surface coat to retard oxidation, enhance surface appearance and provide a primer for subsequent painting or powder coating processes as desired.

3.6.2 Interior

Full zinc based organic coating applied to 100% of the interior surface as a corrosion barrier.

3.6.3 Corrosion Performance

The tubing shall demonstrate the ability to withstand a minimum of 1000 hours of accelerated salt fog testing to the condition of 5% surface red rust, when tested in accordance with ASTM B117 standards.

END OF SECTION