

**PROCEDURE FOR COORDINATING UTILITY WORK
WITHIN CHROMIUM SOIL AREAS**

**BAYONNE FORCE MAIN
(FORMER MORRIS CANAL SITE)
JERSEY CITY, NEW JERSEY**

Prepared by

Amec Foster Wheeler Environment & Infrastructure, Inc.
200 American Metro Boulevard, Suite 113
Hamilton, New Jersey 08619

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This Standard Operating Procedure is hereby approved by the following parties and each agrees to abide by the obligations herein:

DocuSigned by:

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Honeywell - Global Remediation Director

2/1/2017

Date

Bayonne Municipal Utilities Authority - Director

Date

This Standard Operating Procedure is hereby approved by the following parties and each agrees to abide by the obligations herein:

Honeywell - Global Remediation Director

Date



2.1.2017

~~Bayonne Municipal Utilities Authority - Director~~

Date

Superintendent DPW 

1.0 INTRODUCTION AND SCOPE

Honeywell has developed this Standard Operating Procedure (SOP) to assist the Bayonne Municipal Utilities Authority (BMUA) in safely and protectively executing work on the BMUA force main, located within NJDEP Site 153, the Former Morris Canal Site in Jersey City (“Morris Canal Site” or “Site”). The Morris Canal Site is defined by NJDEP as the area between Danforth Avenue and Carbon Place (Block 21902, Lot 1).

Utility workers will follow this SOP when they have to repair or otherwise maintain the force main sewer pipeline and any associated equipment within the Site. This SOP has been prepared because the pipeline has been constructed in areas where chromium-contaminated soils or chromium fill (also referred as chromium ore processing residue [COPR]) is located. The SOP helps protect utility workers who may encounter chromium-contaminated soils at the Site in the course of their work. Chromium-contaminated soils (also referred to as “chromium soils”) refers to soils containing hexavalent chromium above the NJDEP soil criteria, currently 20 milligrams per kilogram (mg/kg or parts per million [ppm]).

The BMUA has entered into a long-term agreement with Suez Bayonne (formerly United Water) for the operation and maintenance of its water and sewer systems. Accordingly, any reference to the BMUA in terms of operation and maintenance of their system shall be interpreted as also referring to Suez Bayonne and its employees. Similarly, Honeywell uses remediation contractors and consultants and where this SOP references Honeywell, it should be understood that this includes its consultants and contractors.

This SOP addresses sewer repair or replacement performed either as part of planned maintenance work, or required as a result of an emergency situation at the Site. The procedure meets the requirements of the Consent Decree Regarding Sites 79 and 153 South, and the Consent Decree Regarding Remediation of the New Jersey City University (NJCU) Redevelopment Area, between the Hackensack Riverkeeper, Inc. (Riverkeeper or Plaintiffs) and Honeywell, filed on January 21, 2010 (“Consent Decrees”) since both of the referenced Consent Decrees apply to the Site. In the event of any planned maintenance or emergency repair of its sewer pipeline at the

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Site that will involve disturbance of remedial measures, the BMUA agrees to follow the steps identified in this procedure.

The SOP describes a series of steps to be taken before and during times when utility work is to be conducted by the BMUA at the Site. These steps detail requirements of Honeywell after BMUA notifies them that work is pending on the part of BMUA. The procedures contained in this document address the excavation of chromium-impacted material and safe handling methods in the event that BMUA workers and/or contractors are required to work in areas of chromium-contaminated fill. Worker safety and training requirements are addressed in an accompanying Worker Training Manual prepared by Honeywell for use by the BMUA and included as **Appendix C**.

The first step in this procedure is the determination by BMUA supervisory personnel (or BMUA representatives) that sewer utility work is going to be implemented in the Former Morris Canal Site, and the identification of the specific area within the Site where that work will be conducted. Based on the NJDEP definition of the Site, the work location could be between Danforth Avenue on the southern end and Carbon Place on the northern end of the Site (see **Figure 1**).



Figure 1: Former Morris Canal Site and NJCU Commercial Area

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Following this internal identification and acknowledgement, BMUA notifies Honeywell using the Telephone Response System established by Honeywell (“Chromium Response Hotline”) about the location and timing of work. These steps initiate the SOP process. A process flow chart for the SOP and information on key personnel are provided in **Appendix A**. Site maps are included in **Appendix B**.

Once the BMUA notifies Honeywell, through the Chromium Response Hotline, that work is required at the Site, Honeywell will provide technical assistance and coordination of field work with BMUA. For emergency utility work, BMUA will use an OSHA 40-hour trained contractor (Occupational Safety and Health Administration [OSHA] 40-Hour Hazardous Waste Operations and Emergency Response [HAZWOPER] training). This requirement is necessary because the time typically available does not allow for a case-by-case evaluation of whether the work is in an area of chromium soils, and therefore using an OSHA 40-hour trained contractor is prudent. Honeywell will cooperate with BMUA to provide field support, as needed, relating to the presence of chromium.

In a non-emergency situation, following notification of pending work, Honeywell personnel will evaluate the specific area of planned work against existing data and determine whether the area where the work will be conducted contains chromium-contaminated fill and, therefore, requires OSHA 40-hour trained personnel. In some cases, it may be necessary for Honeywell to collect samples to determine whether or not chromium impacts are present. Honeywell will communicate its conclusions to the BMUA. If the work is in a chromium containing area, Honeywell will provide technical assistance, field oversight and support, as needed, during the implementation of the sewer utility work and, if applicable, the restoration of any engineering controls.

BMUA contractor(s) will perform the excavation of materials generated during sewer work (with the exception of longer term planned sewer upgrade work which will be evaluated on a case by case basis). BMUA works with designated contractors who can provide properly trained personnel, as needed, to work in areas with chromium contamination. Honeywell will arrange for disposal of chromium-contaminated materials if required in connection with sewer work. Honeywell will provide information on specific licensed and Honeywell-approved facilities to be used for the disposal of chromium-contaminated materials and on the restoration of

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engineering controls, if applicable in connection with sewer work. Financial issues and cost reimbursement are discussed in Section 3.4.

Based on past experience, the bulk of BMUA's utility maintenance work will be of the non-emergency type, with only a small fraction being emergency work. In non-emergency cases, the work would follow a schedule established between Honeywell and the BMUA following initial notification. For a non-emergency or planned sewer project, the BMUA would retain a contractor for sewer work through a public bidding process. For emergency related sewer work, the BMUA has a designated emergency services contractor and these services are subject to periodic bidding. Honeywell will provide specifications for excavation and management of chromium-contaminated materials to the BMUA for inclusion as part of its contractor bidding process for sewer work. The BMUA will retain properly trained contractor(s) to perform sewer work in areas of chromium-contaminated fill.

Honeywell will also retain an emergency response contractor with capability to respond within an approximately three-hour timeframe (which BMUA has indicated is an acceptable timeframe for response action) if needed in the event that BMUA's contractor is unable to perform excavation of chromium-contaminated soils.

In addition to being subject to the requirements identified in this SOP, the Site is also the subject of an existing institutional control (deed notice) which includes certain provisions pertaining to disturbance and restoration of engineering controls (capping), as well as notification and reporting requirements. Because areas subject to capping and deed notice must maintain their integrity to function as they were intended, work activity in such areas will require restoration of the engineering control to its pre-disturbance condition. If work is occurring in an area subject to a deed notice and will involve disturbance of engineering controls, NJDEP notification and reporting requirements will apply in addition to the process described in this SOP. A copy of the existing deed notice is provided with the Worker Training Manual. The deed notice contains a copy of the Consent Decrees.

This SOP will be followed in all applicable cases; however, this SOP cannot account for all site specific conditions and field-driven modifications to this procedure can be made upon agreement of both Honeywell and the BMUA. As a reminder to BMUA personnel, Honeywell has installed warning signs at sewer access points (manholes) to communicate the presence of contaminated soils at the Site.

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Honeywell also provides annual notification letters to update stakeholders and utilities regarding conditions and activities at the Morris Canal Site and NJCU Commercial Area (located next to the northern portion of the Morris Canal Site) in accordance with the Consent Decrees. The annual notice updates include information on remedial measures, engineering and institutional controls (deed notices), and instructions to contact Honeywell prior to performing intrusive work in the area of the Site. The annual notification letters are currently sent to the following entities: NJCU, BMUA, Jersey City Fields, LLC (owner of Site 117, located next to the Morris Canal Site), Jersey City Municipal Utilities Authority, Suez Water Company, Public Service Electric and Gas Company, Comcast, Verizon, and New Jersey Department of Transportation.

This SOP is organized in the following sections:

2.0 Regulatory and Legal Section: Provides background information on the regulatory and legal basis for the development of this SOP.

3.0 Notification and Response Procedure: Describes the function of the proposed system.

3.1 Telephone Answering Service (Chromium Response Hotline):

Describes the function of the “Hotline”.

3.2 Honeywell Response Team: Describes the function of Honeywell’s staff.

3.3 Emergency Response Contractors: Describes the function of Emergency Response Contractors.

3.4 Responsibilities: Describes roles and responsibilities of the various parties.

4.0 Identification of Chromium Soil Areas: Describes the site where this SOP applies.

5.0 Hazard Evaluation and Worker Training: Provides information regarding the health hazards that may be encountered and worker training.

2.0 REGULATORY AND LEGAL SECTION

Chromium-contaminated fill was historically used as construction fill at various sites in Hudson County, New Jersey, including portions of sewer pipelines in Jersey City. Regulatory requirements for sewer sites containing chromium fill include the NJDEP-approved Sewer Protocol, which specifies remedial action requirements that take into consideration of:

- protection of the utility;
- depth of contaminated soils; and
- land use such as the presence of public streets or highways.

For these types of utility sites, with subsurface contamination at depths greater than 3 feet, or sites situated beneath city streets or highways, capping and institutional controls in the form of a deed notice constitute the prescribed remedy. For sites (or part of sites) with shallow contamination (less than 3 feet), the prescribed remedy is either installation of an engineered capping system or removal of the top 3 feet of contaminated soils and replacement with 3 feet of clean fill underlain by a demarcation layer.

The Sewer Protocol provides protective remedial measures while minimizing invasive excavation work that could disturb or damage sewer pipelines or other utilities. The Sewer Protocol requires excavation and removal of chromium-contaminated soils if it is necessary to affect the repair or replacement of the sewer pipeline. Coordinating soil removal with sewer repair or replacement allows for removal under more controlled conditions to reduce the likelihood of incidental damage to the sewer line or disruption of sewer service. A copy of the Sewer Protocol is provided for reference in **Appendix F**.

NJDEP regulations include requirements for engineering controls (capping) and institutional controls (deed notice) as part of remedial actions. These controls are established to communicate the presence of contaminated soils and control disturbance of these soils and potential exposure to them.

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Capping systems are implemented in conjunction with a deed notice to protect and prevent unauthorized disturbance of the cap. For remedial actions where residual groundwater contaminants may remain at concentrations above the NJDEP groundwater quality standards (GWQS), an institutional control for groundwater (referred to as a Classification Exception Area [CEA]) is required to communicate the presence of, and restrict the use of contaminated groundwater. A CEA for groundwater containing chromium above the NJDEP GWQS in the area of Morris Canal Site (and other adjacent sites) was approved by the NJDEP in February 2012. The CEA serves as notification that groundwater does not meet the GWQS and establishes well restrictions in the area of the CEA.

The Consent Decrees pertaining to the Morris Canal Site and NJCU Redevelopment Area (located next to the Morris Canal Site) specify requirements for Honeywell to develop a plan for training of individuals who might be exposed to chromium-contaminated soils or groundwater in conjunction with utility or other work performed at the site in conformance with OSHA rules and guidance. According to the Consent Decrees, *“BMUA shall develop a permanent plan to implement health and safety measures for its workers in accordance with OSHA rules related to hazardous materials and shall utilize the plan prepared by Honeywell setting forth the procedures and protections that BMUA shall employ when it conducts activities at Site 153.”* See Consent Decree Regarding Sites 79 and 153 South, Paragraphs 72 and 77; and Consent Decree Regarding Remediation of the New Jersey City University Redevelopment Area, Paragraphs 83 and 85.

The Worker Training Manual addresses worker protection requirements including training of workers for protection from exposure to chromium-contaminated media during utility or other work performed at the Site and coordination of work between Honeywell and the BMUA and NJCU. Further information regarding the Worker Training Manual is provided in Section 5.

This SOP provides details for the coordination between Honeywell and the BMUA of work involving the force main sewer pipeline at the Morris Canal Site. The notification and response procedure, coordination of work, key personnel and responsibilities for SOP implementation are described in the following section.

3.0 NOTIFICATION AND RESPONSE PROCEDURE

The following procedure guides work that will take place on the BMUA force main located within the Morris Canal Site in Jersey City (refer to Section 4 for site information). Fundamental to the process is the obligation that BMUA notify Honeywell if pending work is to be conducted at the Site so that Honeywell can take appropriate actions that will enable the BMUA to conduct its work in a safe manner.

The notification and response procedures described in this document involve collaborative work between Honeywell, BMUA and their respective representatives, and requires specific actions to be taken by each party. The success of this procedure will depend on the collaboration and full understanding of the procedure. A detailed activity flow process is presented in **Appendix A: Notification and Response System Flow Chart**. A simplified process flow illustration follows:

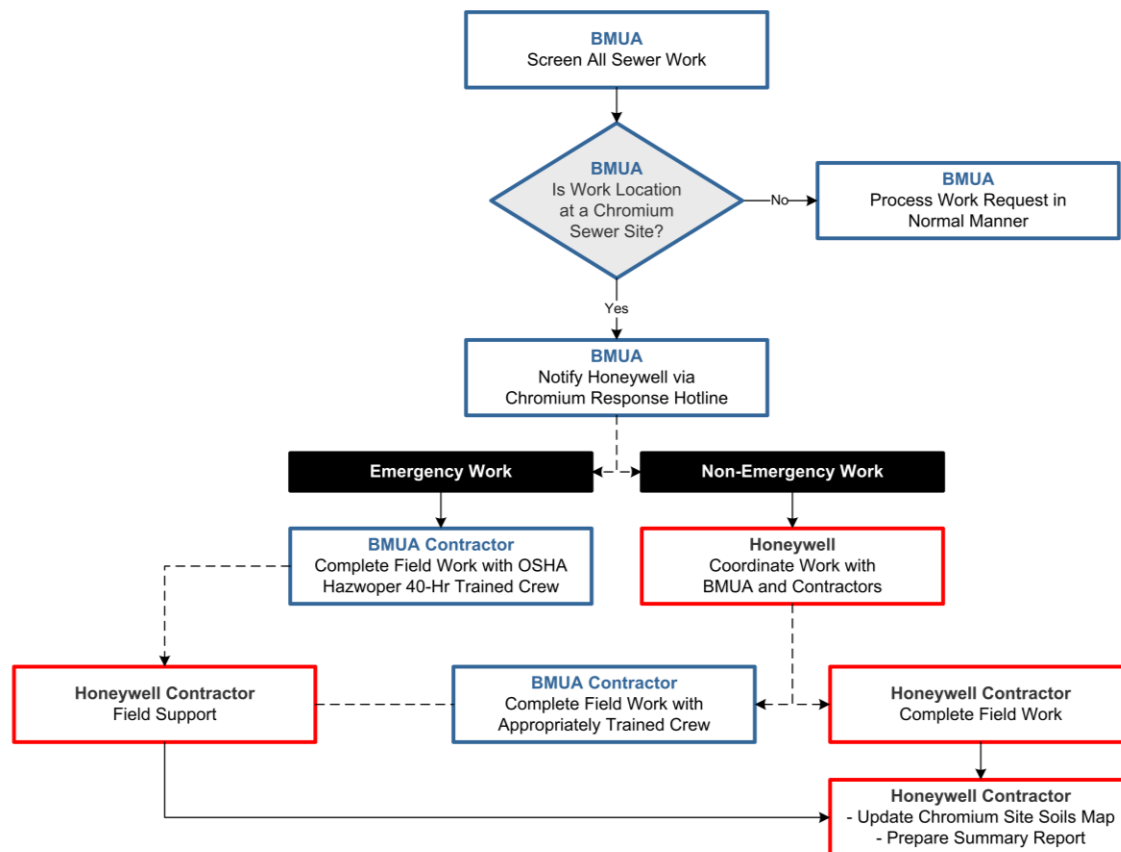


Illustration 1 SOP General Process Flow Summary

NOTIFICATION AND RESPONSE PROCEDURE

BMUA has established a checkpoint into its work order process that enables it to identify when work will occur on the Site. The procedure described in this section is initiated by the BMUA supervisor or BMUA's designated representative. Initiation of the process starts with a call to Honeywell's telephone answering service ("Chromium Response Hotline" or "Hotline") for Honeywell to respond. The Hotline is the single point of notification through which pending work will be reported. A detailed activity process flow chart is presented in **Appendix A-1** (Notification and Response System Flow Chart) and contains details regarding work identification, notification, coordination, and reporting requirements. The location of the work area can be made by a BMUA responsible individual by referring to the figures in **Appendix B** (Morris Canal site maps showing engineering controls).

The Chromium Response Hotline operates in a manner similar to the New Jersey One-Call utility mark-out notification. Following determination that work will be performed at the Site, the BMUA will contact the Chromium Response Hotline to report that work will be undertaken, specify the location, identify whether the work is emergency or routine maintenance, and provide information regarding the caller and pertinent contact information. For scheduled maintenance work, it will be necessary to indicate the projected timeframe for conducting the work. Based on the reported information, the Chromium Response Hotline will generate a report using appropriate templates for emergency or non-emergency situations, and will proceed to make notifications to designated Honeywell individuals (Honeywell Response Team list included in **Appendix A-2**). If BMUA is contacted by other parties regarding work at the Site, BMUA will notify Honeywell for coordination of work with other parties.

The process for emergency and non-emergency work is further described below.

Emergency Work

For emergency sewer work at the Site, the BMUA will be required to use OSHA 40-hour personnel as the timing typically will not allow for a determination as to whether the work location is in a chromium-impacted area. Therefore, for this procedure, all emergency work will be conducted in this manner. Honeywell will provide technical assistance and field support as needed in cooperation with the BMUA. In the event that, for some reason, the BMUA is not able to respond, Honeywell will respond and will target having its emergency response contractor

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onsite within an approximately three (3) hour timeframe (to be coordinated in consultation with the BMUA). Honeywell and/or BMUA will provide notification to Plaintiffs as soon as feasible following any emergency or unplanned disturbance.

Non-Emergency Work

For non-emergency work, after determining that it will conduct work on the Site, the BMUA must identify the type of work, specific location, and timing of the planned work. The determination on whether the area may have chromium contamination will be made by Honeywell after BMUA notification to the Chromium Response Hotline. Any utility work at or adjacent to the Site should be identified even if the work is not within the defined Site boundary. In some situations it may be necessary for Honeywell to go to the work area and make a visual inspection or collect samples to determine whether or not chromium impacts are present. If Honeywell determines that the work will occur in a chromium impacted area, it will notify the BMUA that the work will require properly trained contractor(s). The BMUA will then proceed with the work using properly trained contractors.

Completion of a Subsurface Work Authorization Form (“Dig Permit”) checklist is required prior to any subsurface work by BMUA and/or its contractors. The Dig Permit is intended to facilitate coordination with Honeywell prior to conducting utility work or any other work that may potentially disturb the engineering controls and is a pre-requisite for any planned subsurface work at Site 153. The Dig Permit Form will be included as an attachment to the Worker Training Manual, the LTMP for NJCU/Site 153 North and the LTMP for Sites 79/153 South.

The BMUA will also notify Plaintiffs of the planned action(s) involving disturbance of remedial measures and the date(s) for the planned action in conformance with the requirements of the Consent Decrees. Honeywell will provide notice to Plaintiffs and any stakeholders regarding planned actions and safety measures pursuant to the Consent Decrees; stakeholders include property owners/tenants at or adjacent to the eastern side of the Morris Canal Site and any entity that has a utility easement on the Morris Canal Site. Notification to the Plaintiffs by the BMUA and/or Honeywell be at least five days before any planned disturbance of the engineering controls (in the event that work does not begin on the scheduled date, Plaintiffs will be notified but will not be guaranteed five days notice of the new date). BMUA and Honeywell will provide a schedule of activities to Plaintiffs (including six-month

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forward look-ahead). Plaintiffs may have their technical consultants observe the field work.

Honeywell and BMUA have agreed that BMUA's contractor will perform excavation, sewer repair or replacement, backfilling and site restoration (with the exception of possibly longer term, planned sewer upgrade work). If work is in a chromium-impacted area, Honeywell will provide technical assistance, field oversight and support, as needed, during the sewer utility work and, if applicable, soil disposal and restoration of engineering controls. Backfilling and site restoration will require the placement of clean fill in accordance with BMUA specifications as well as NJDEP and Consent Decree requirements (including the NJDEP Fill Material Guidance; last updated April 2015). The Consent Decree requirements for clean fill brought onto the Site specify hexavalent chromium concentrations less than the more stringent of (i) a formal New Jersey soil standard for unrestricted use or (ii) 1 mg/kg. See Consent Decree Regarding Remediation of the New Jersey City University Redevelopment Area, Paragraph 69(a); Consent Decree Regarding Sites 79 and 153 South, Paragraph 52.

If the area is subject to a deed notice, restoration of the area will involve replacement in kind of the pre-existing engineering controls which may include clean fill, geotextile liner, landscaping and/or paving. Site backfill and restoration work may also include measures (e.g., placement of geotextile liner along the sides of excavation zone) to prevent recontamination of new fill from surrounding contaminated fill, to the extent practicable and allowable by the BMUA. Existing capped areas and engineering controls are indicated on site maps in **Appendix B**.

In some cases, it is possible that Honeywell's contractor may take the lead on field work or a portion of the field work, to be determined on a case by case basis in cooperation with the BMUA. For example, possible situations where Honeywell's contractor may take the lead on field work would be an emergency situation where BMUA's emergency services contractor could not provide properly trained workers in a timely manner for some unforeseen reason, or a non-emergency planned project where there is a mutual agreement between Honeywell and the BMUA for Honeywell's contractor to take the lead on the field work or a specific portion of the field work (e.g., Honeywell's contractor completes excavation/disposal of chromium materials and/or replacement of engineering controls while BMUA's contractor completes sewer-related repair or replacement work).

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It is possible that removal of COPR and/or chromium-impacted soils beyond the initial identified sewer repair work area may be performed, to be determined on a case-by-case basis and coordinated between Honeywell and the BMUA. Such additional remediation may be performed to coordinate work under existing permits and/or other measures (i.e., traffic control) as part of the sewer repair project.

As a last step in the process, Honeywell will update the chromium soil area site map by incorporating the changed conditions of the area subject to the work.

Key components of the notification and response system are described in the following sections. Additional activities and administrative controls for the Morris Canal Site include periodic cap inspections by Honeywell as specified in the Deed Notice and Long Term Monitoring Plan, and periodic communications via calls or meetings with the BMUA regarding any upcoming work at the Morris Canal Site.

3.1 TELEPHONE ANSWERING SERVICE (“CHROMIUM RESPONSE HOTLINE”)

Honeywell has established a contracted telephone answering service (Chromium Response Hotline: **855-727-2658**) to provide 24-hour coverage of notifications received from the BMUA. The answering service will record and relay to Honeywell the name of the person initiating the call on behalf of the BMUA, contact information, planned excavation location(s), expected start date, and the nature of the work (emergency or non-emergency). The Hotline has appropriate scripts and templates for the answering service personnel, so that incoming calls can be addressed appropriately. In addition, Honeywell has provided and will maintain a list of contacts, chain-of-command and telephone-chain so that incoming notifications can be routed to appropriate personnel for response in a timely manner.

After receiving a report through the Chromium Response Hotline, the answering service will contact the designated Honeywell representatives via email, text and telephone.

3.2 HONEYWELL RESPONSE TEAM

Honeywell will provide qualified personnel to respond to the BMUA notifications. As necessary, the person(s) responding to the notification of pending BMUA work

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will assess existing information to determine whether the proposed work is in an area of known or suspected chromium-contamination. The person responding will coordinate as necessary with other Honeywell staff, the BMUA and appropriate contractor staff to conduct work in accordance with procedures contained in this document. The Honeywell representative will visit the proposed work location and assess visually whether there is an indication of chromium impacted fill or collect samples, if necessary.

As part of the program, a Health and Safety Plan (HASP) will be implemented during field work activities. Existing HASP documents have been developed by Honeywell's contractors for site investigation and remedial action field work involving chromium-contaminated fill and include provisions for worker safety, community health and safety, and emergency response procedures.

3.3 EMERGENCY RESPONSE CONTRACTORS

The BMUA will retain an emergency response contractor with properly trained workers and equipment necessary to perform sewer work in areas of chromium-contaminated fill. Honeywell will provide specifications for excavation and management of chromium-contaminated materials to the BMUA for inclusion as part of its contractor bidding process for sewer work. Draft specifications and a list of specific licensed facilities for disposal of chromium-contaminated materials are provided for reference in **Appendix D**.

Honeywell will also retain one or more emergency response contractors that have the labor and equipment necessary to respond promptly in the case of an emergency if needed and in situations where the BMUA contractor may not be able to respond. The contractor(s) will have 24-hour response capability. Based on input from the BMUA and for the purposes of this SOP, an emergency is considered to be an unforeseen sewer-related problem that requires action including on-site response within three (3) hours of notification to Honeywell by the BMUA.

In the case of an emergency notification by BMUA where it is requested that Honeywell's emergency response contractor is needed to perform field work or other technical support, Honeywell will contact its emergency services contractor and make provisions to have the contractor on-site within three (3) hours of the call. The Honeywell contractor will contact BMUA and provide appropriate contact information and a time estimate for arrival of the emergency response contractor.

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The contractor will be responsible for excavating in the areas where BMUA needs to implement its work, and will make appropriate arrangements for the disposal of chromium-contaminated material, if required in connection with sewer work. The contractor will also be responsible for providing clean fill and restoring engineering controls. For emergency response cases, BMUA's contractor will generally take the lead in completing the field work activities. In some cases, Honeywell's contractor may take the lead in performing field work or a portion of the field work (i.e., transportation and disposal of chromium contaminated materials, restoration of engineering controls), to be determined on a case by case basis in coordination with the BMUA.

3.4 RESPONSIBILITIES

Telephone Answering Service (Chromium Response Hotline): Will receive all notifications from the BMUA and/or its designated contractor informing Honeywell of expected work at the site subject to this procedure. The answering service will obtain information from the calling party regarding work location, timing of work, whether the work is emergency or non-emergency, and the identity of the BMUA representative and contact information. The service will contact a responsible individual within the Honeywell Response Team.

Honeywell Remediation Director (or assigned personnel): Responsible for supporting the overall function of the system; and will have final approval authority for the development and revision of the SOP and its application to the BMUA force main at the Morris Canal Site.

Honeywell Remediation Manager: Responsible for implementation of procedures in accordance with the SOP including retaining contracted services, communicating with project personnel for proper coordination and documentation of the work, and providing for notifications to the NJDEP, Plaintiffs and stakeholders, as applicable.

Honeywell Project Personnel: Responsible for the implementation of SOP requirements, including providing an assessment to the entities submitting notice of intent to perform work at the Site, that chromium-contaminated fill is or is not present at the work site. Project personnel will provide field support and technical assistance as needed prior to and during the proposed work, and after completion of

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the work and document all information in a field log book. Project personnel will also be responsible for updating the chromium soils site maps and preparing summary reports following completion of field work.

Honeywell Emergency Response Contractor: Responsible for responding to emergency situations when requested by Honeywell in consultation with the BMUA. As part of the response, the contractor will be prepared to address all chromium-contaminated media including offsite transportation and disposal, and coordinate work with BMUA's project personnel and contractor as may be required for sewer work. In addition, the emergency response contractor will be responsible for developing a Health and Safety Plan (including emergency response procedures) for its workers. Non-emergency type work may also be conducted by the emergency contractor (or another contractor), to be determined by Honeywell based on the projected schedule and consultation with BMUA project personnel.

BMUA Supervisor/Superintendent: Responsible for retaining appropriate contracted services as indicated in the SOP, checking the proposed sewer work location on the chromium soils site maps, providing notification to Honeywell in the event of any sewer utility work at the Site, including notification to the Chromium Response Hotline, and providing notification to Plaintiffs regarding planned actions and timing for sewer work involving disturbance of remedial measures.

BMUA Project Personnel/Contractors: Responsible for coordinating sewer work with Honeywell's project personnel and contractor, as applicable. BMUA's employees (designated supervisory and field staff) will be required to have appropriate training as indicated in Section 5 and specified in the Worker Training Manual. BMUA personnel are not expected to conduct ground-intrusive work (e.g., digging, drilling, and excavation) in areas of chromium-contaminated soil. It is expected that BMUA's contractor(s) will perform the field work involving removal of chromium-contaminated soils and site restoration in conjunction with sewer repair or replacement work. BMUA's contractor performing field work will be required to have applicable health and safety training as indicated in the Worker Training Manual.

BMUA Rules and Regulations: All sewer-related work must comply with BMUA's Rules and Regulations, which include standard material specifications including backfill and restoration requirements. Backfill requirements include

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providing clean fill certification, laboratory analysis results, and specific requirements for compaction. A copy of BMUA's Rules and Regulations pertaining to site work, excavation, backfill and restoration are provided for reference in **Appendix E**.

The SOP notification and response system flow chart and Honeywell Response Team key personnel and contact information (phone numbers, email addresses) are included in **Appendix A**.

Cost Reimbursement: Financial issues and cost reimbursement details will be addressed through a separate agreement and escrow account between Honeywell and the BMUA. Honeywell will reimburse the BMUA for the need to employ OSHA 40-hour trained personnel as required by this SOP. Honeywell will also pay for costs associated with the transportation and disposal of chromium soils, as applicable on a project specific basis.

4.0 IDENTIFICATION OF CHROMIUM SOIL AREAS

This document applies to the following site containing chromium-impacted fill:

- Former Morris Canal referred to as NJDEP Site 153 (BMUA Force Main) located in Jersey City

Site maps are provided in **Appendix B**. The site maps include figures from the deed notice showing areas of soil contamination and engineering controls. In addition to the engineering controls, access point warning signs were installed within sewer manholes to communicate the presence of COPR or chromium contaminated soils and prevent contact with such soils. Honeywell will also provide survey coordinates for the Morris Canal Site for use by the BMUA and incorporation into its existing Geographical Information System (GIS) sewer mapping system.

The presence of chromium impacted soil or fill may be indicated as gray-black granular material, yellow-green colored staining, reddish-brown nodules in soils, or extremely hard layers of dark brown soil. Chromium-impacted groundwater may be indicated by yellow-green colored water. Fill soils may also contain other contaminants that are commonly associated with historic fill and unrelated to COPR fill, such as polycyclic aromatic hydrocarbons (PAHs) and metals. Site background information is provided in the following sections.

4.1 MORRIS CANAL SITE – JERSEY CITY

The information in this section serves as background information for the Morris Canal Site.

The Morris Canal Site is the location of the BMUA force main and consists of a narrow strip of land (25 feet approximate width) located along the eastern side of Route 440 between Carbon Place and Danforth Avenue in Jersey City (see **Appendix B-1**: Figure 1 Site Location Map). The Site is also referred to by the NJDEP as Site 153 and includes land adjacent to the current Home Depot retail center and the New Jersey City University, West Campus. The Morris Canal Site contains various utility lines including a 36-inch diameter sanitary sewer force main operated by the BMUA.

IDENTIFICATION OF CHROMIUM SOIL AREAS

The former Morris Canal site of interest here was a small segment of the original Morris Canal, which operated from the 1860s to the early 1900s. COPR was allegedly used to fill portions of the canal during its closure between 1924 and 1935. The BMUA force main is constructed of concrete encased PCCP (pre-stressed concrete cylinder pipe), with depths to the top of the pipeline ranging from just below the surface pavement (next to NJCU and Home Depot) to approximately 4 to 6 feet below grade (south of Home Depot). The force main conveys sewage from the City of Bayonne for ultimate treatment at Passaic Valley Sewerage Commission facility in Newark. Other utilities along portions of the site include electric, gas, storm sewer, water, and telephone lines that provide service to adjacent commercial properties.

Remedial investigation work to assess the presence of chromium impacts in both soils and the groundwater has been completed. Remedial actions were completed in 2009-2011 and are summarized as follows:

Adjacent to the NJCU site, engineering controls included asphalt pavement in the western portion (above and west of the BMUA force main sewer line) and a multi-layered cap system associated with the NJCU Commercial Area in the eastern portion (east of the force main). Remedial actions were documented in the Remedial Action Report for the NJCU site dated September 2012.

Adjacent to and south of the Home Depot site, remedial actions consisted primarily of:

- excavation of shallow soils (up to three feet below grade);
- placement of orange demarcation layer (geotextile material) at the bottom of excavation areas;
- backfilling with clean fill;
- restoration of soil vegetative or asphalt cap consistent with pre-remediation surface types; and
- re-pavement or replacement of existing asphalt.

IDENTIFICATION OF CHROMIUM SOIL AREAS

Engineering controls include a combination of clean fill/vegetative cover and asphalt pavement. Remedial actions for this portion of the property were documented in interim remedial measures reports dated October 13, 2010 and November 26, 2013.

The remedial measures and engineering controls are indicated on site maps in **Appendix B-2**. As-built figures for the remedial actions are included for reference in **Appendix B-3**. Site maps will be updated if needed based on results of any future sampling or remedial actions.

A Deed Notice associated with the engineering controls was recorded by the Hudson County Register of Deeds on November 30, 2010. A modified Deed Notice will be recorded to reflect the completed remedial actions and current NJDEP model deed notice format. A copy of the existing Deed Notice is provided for reference in the Worker Training Manual.

NJCU West Campus Commercial Area

The NJCU West Campus Commercial Area of Concern (AOC) is located alongside the eastern boundary of Site 153 North (east of the BMUA force main).

Remedial actions for the Commercial AOC included installation of engineering controls consisting of a multi-layered cap with the following components above chromium-contaminated soils (from bottom to ground surface):

- impervious geo-membrane linear low density polyethylene (LLDPE) liner;
- geo-composite drainage layer (consisting of geotextile and clay soils); and
- orange demarcation warning layer and clean soil cover (minimum 1-foot in paved areas, 2 feet in landscaped areas, and 3 feet in tree planting areas).

The warning layer consists of an orange colored geotextile material with markings in English and Spanish to prevent penetration of the underlying cap materials.

Remedial actions also included focused soil excavation to allow for clean utility corridors for site redevelopment with new utilities to be installed above the cap within the Commercial AOC. Therefore, future utility work in the Commercial AOC would not be expected to involve disturbance of the cap or potential exposure to chromium-impacted soils. Other remedial measures within the NJCU Commercial

IDENTIFICATION OF CHROMIUM SOIL AREAS

AOC included the installation of a perimeter hydraulic barrier consisting of sealed sheet pile and a groundwater recovery and treatment system to be operated on a contingent basis.

In addition, Long Term Monitoring Plans (LTMPs) have been prepared for the Morris Canal Site and NJCU Commercial AOC pursuant to the Consent Decrees. Refer to the Long Term Monitoring Plans for as-built figures for the chromium remedial actions, requirements in the event of future development or other site work that may disturb the chromium remedy within the NJCU Commercial AOC, and information regarding monitoring, maintenance and reporting requirements. The LTMPs are reviewed annually and updated as needed based on changes to field conditions and/or regulatory requirements of the Worker Training Manual or other relevant project documents for the Morris Canal Site and NJCU Commercial AOC.

5.0 HAZARD EVALUATION AND WORKER TRAINING

This SOP is intended to provide information and procedures for protection of utility workers and contractors who may be performing work in areas containing chromium-contaminated soils or groundwater at the Morris Canal Site.

Potential chemical exposure pathways are:

- Inhalation of airborne dusts and mists that may contain contaminated particulates
- Skin and eye contact and absorption due to direct contact with contaminated soil, sediment, and/or liquids
- Incidental ingestion of contaminated soils, liquids, and/or particulates

Contact with known or suspected chromium-contaminated media must be avoided. Potential exposure to chromium contamination could occur by utility workers performing ground intrusive activities (e.g., drilling, digging, and excavation). Only properly trained and equipped personnel should be allowed to perform tasks that may involve the handling of known or suspected chromium-contaminated media.

As stated in previous sections, it is anticipated that BMUA personnel will not conduct activities such as excavation and disposal of chromium-contaminated materials. Such activities will be implemented by BMUA contractors or Honeywell designated contractors whether on an emergency or non-emergency basis. However, BMUA personnel must be knowledgeable and trained on the potential hazards and safety procedures to be followed when work is conducted in areas of chromium fill, as well as the safety procedures that should be followed if exposure to chromium fill occurs during normal operation and maintenance of the sewer pipeline. Accordingly, Honeywell has developed a Worker Training Manual as discussed below.

Worker Training Manual

Honeywell has prepared a Worker Training Manual in accordance with requirements of the Consent Decrees, specifically Paragraph 83 of the Consent Decree Regarding Remediation of the New Jersey City University Redevelopment Area (including Site 153 North) and Paragraph 72 of the Consent Decree Regarding

HAZARD EVALUATION AND WORKER TRAINING

Sites 79 and 153 South (see **Appendix C**). The Worker Training Manual addresses worker protection requirements including training of workers who potentially may be exposed to COPR or chromium-impacted soils or groundwater in conjunction with utility or other subsurface work. According to the Consent Decrees, “*BMUA shall develop a permanent plan to implement health and safety measures for its workers in accordance with OSHA rules related to hazardous materials and shall utilize the plan prepared by Honeywell setting forth the procedures and protections that BMUA shall employ when it conducts activities at Site 153.*”

The Worker Training Manual contains details regarding worker training requirements and pertinent reference information regarding access point warning signs, fact sheets with information on chromium and potential health hazards, copies of deed notices, and site maps showing areas of contamination and engineering controls for the Morris Canal Site and NJCU Commercial AOC. Honeywell will provide training support to the BMUA as deemed appropriate, and BMUA will develop and implement a permanent worker training plan based on the requirements outlined in the Worker Training Manual.

Honeywell in consultation with the BMUA has identified the following training for BMUA employees that would be provided by Honeywell (or its contractor):

- Chromium Awareness Training - initial and periodic training (approximately every 3 years): estimated 1 to 2 hours duration and includes BMUA staff with responsibility for performing some level of field work.
- HAZWOPER 40-hour training and annual 8-hour refresher training: estimated to include two BMUA supervisory employees.

Honeywell will pay for the cost of the training program and the BMUA would cover the cost for the time for its employees to attend the training.

BMUA’s contractors performing field work on the Site involving disturbance of engineering controls and potential for exposure to chromium soils will be required to have applicable health and safety training as indicated in the Worker Training Manual. Health and safety training requirements for BMUA contractors will be specified as part of BMUA’s bidding process for sewer work and that contractors will

HAZARD EVALUATION AND WORKER TRAINING

be required to demonstrate appropriate training documentation to the BMUA prior to performing field work at the Site.

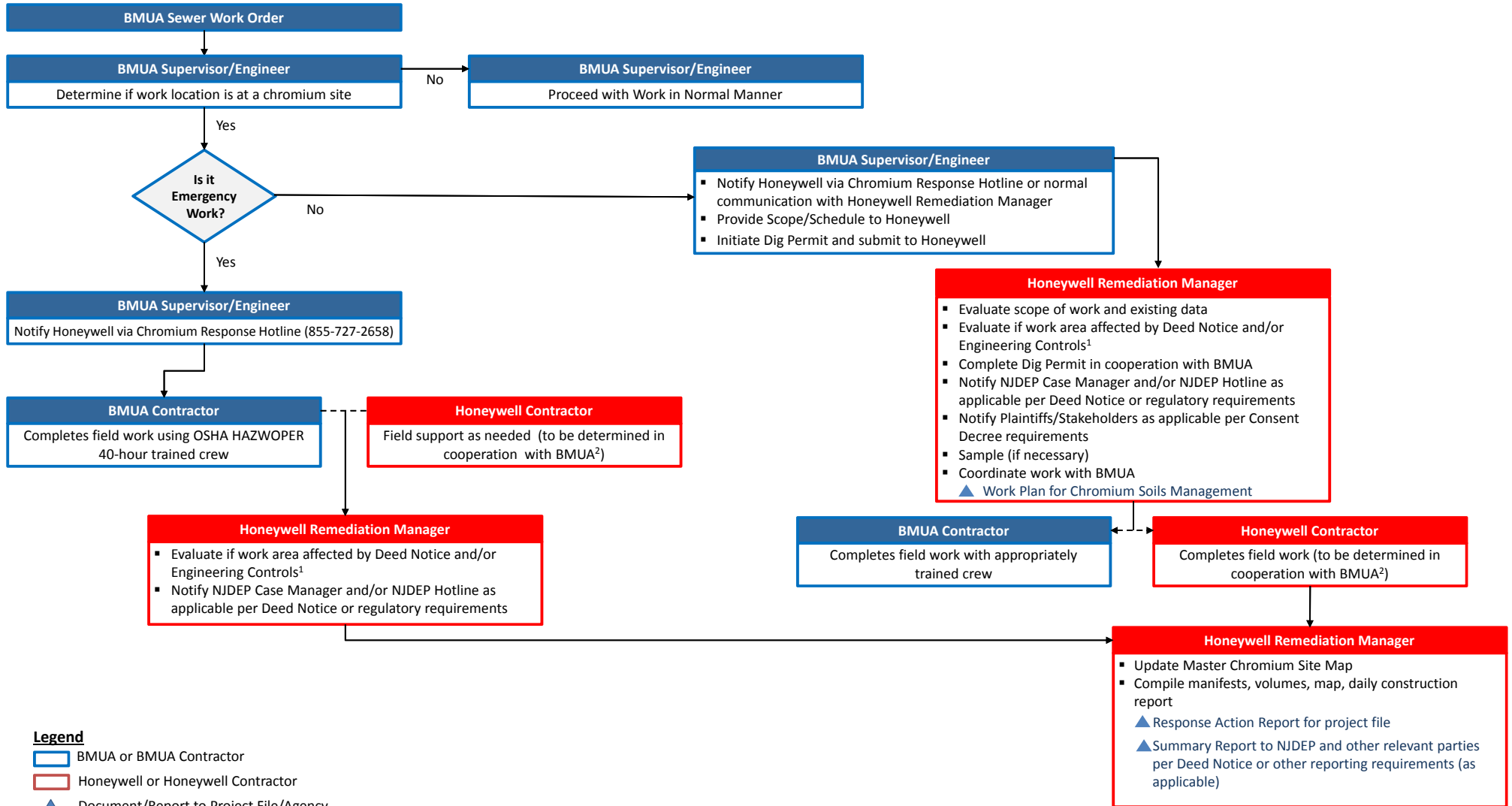
APPENDIX A

**SOP PROCESS FLOW CHART/
HONEYWELL RESPONSE TEAM KEY PERSONNEL**

APPENDIX A-1

NOTIFICATION AND RESPONSE SYSTEM FLOW CHART

Figure 1 Notification and Response System Flow Chart
Response Actions and Responsibilities for BMUA Projects in Areas of Chromium Sites



Legend

- BMUA or BMUA Contractor
- Honeywell or Honeywell Contractor
- ▲ Document/Report to Project File/Agency

¹ See Deed Notice For Notification/Reporting Requirements
² Refer to SOP for details on coordination and requirements for excavation and disposal of chromium soils, backfill, and site restoration. Honeywell reimbursement of BMUA for the portion of work associated with OSHA 40-hour trained crew and transportation/disposal of chromium soils

Points Of Contact:

Chromium Response Hotline: 855-727-2658 (24/7 answering service)
 Honeywell Remediation Manager: Maria Kaouris 973-455-3302 (office); 862-579-8453 (cell)
 BMUA Main Office Number: 201-858-6125
 BMUA Sewer Operations – Suez Bayonne: John Ludington 201-215-2786; 908-966-2541 (cell)

APPENDIX A-2

HONEYWELL RESPONSE TEAM KEY PERSONNEL

**Table 1: Notification and Response System Key Personnel
Bayonne Municipal Utilities Authority (BMUA) and Honeywell**

ORGANIZATION	KEY PERSONNEL	PHONE NUMBERS	EMAIL	MAILING ADDRESS
Honeywell Emergency Response Contractor (ERTS)	Nathan Walden, VP Operations Zane Gloer, Director	Honeywell Response # 855-727-2658 [rings to ERTS 24/7 # 800-924-6804]	nwalden@ertsonline.com zgloer@ertsonline.com	6001 Cochran Road Solon, OH 44139
Honeywell	John Morris, Remediation Director Bill Hague, Remediation Design & Construction Director Maria Kaouris, Remediation Manager John Mojka, Engineering & Construction Manager	973-455-3003 (973-727-6573 cell) 973-455-2175 (973-896-9366 cell) 973-455-3302 (862-579-8453 cell) 973-455-4252 (973-615-3782 cell)	john.morris@honeywell.com william.hague@honeywell.com maria.kaouris@honeywell.com john.mojka@honeywell.com	Honeywell 115 Tabor Road Morris Plains, NJ 07950
Honeywell Project Personnel / Consultant - Amec	Joe Clifford, Principal Engineer Ed Gaven, Principal Scientist Telly Giouzelis, Field Services Andrew Shust, H&S Coordinator Other Project Personnel TBD	973-455-4163 (610-505-9315 cell) 609-631-2905 (609-865-6959 cell) 609-631-2906 (609-865-3592 cell) 609-631-2921 (732-513-3390 cell)	joseph.clifford@amecfw.com ed.gaven@amecfw.com aristotelis.giouzelis@amecfw.com andrew.shust@amecfw.com	Amec Foster Wheeler Environment & Infrastructure, Inc 200 American Metro Blvd., Suite 113 Hamilton, NJ 08619 609-689-2829 (main office number)
BMUA	Timothy Boyle, Director [Other personnel to be provided as needed]	201-858-6125 / 201-858-6083 (M-F, 8:00 AM to 4:30 PM)	Tboyle@baynj.org	Bayonne MUA 630 Avenue C Bayonne, NJ 07002
Suez Bayonne (sewer operations and maintenance)	John Ludington, Project Manager (other personnel to be provided as needed)	Suez - Bayonne 201-215-2786 (908-966-2541 cell)	john.ludington@unitedwater.com	110 Oak Street Bayonne, NJ 07002
BMUA Consultant / Engineer - CME Associates	Rob Russo [Other personnel to be provided by CME as needed]	732-727-8000	rrusso@cmeusa1.com	CME Associates 3141 Bordentown Avenue Parlin, NJ 08859
BMUA Contractor(s)	[To be provided by BMUA]	[To be provided by BMUA]	[To be provided by BMUA]	[To be provided by BMUA]

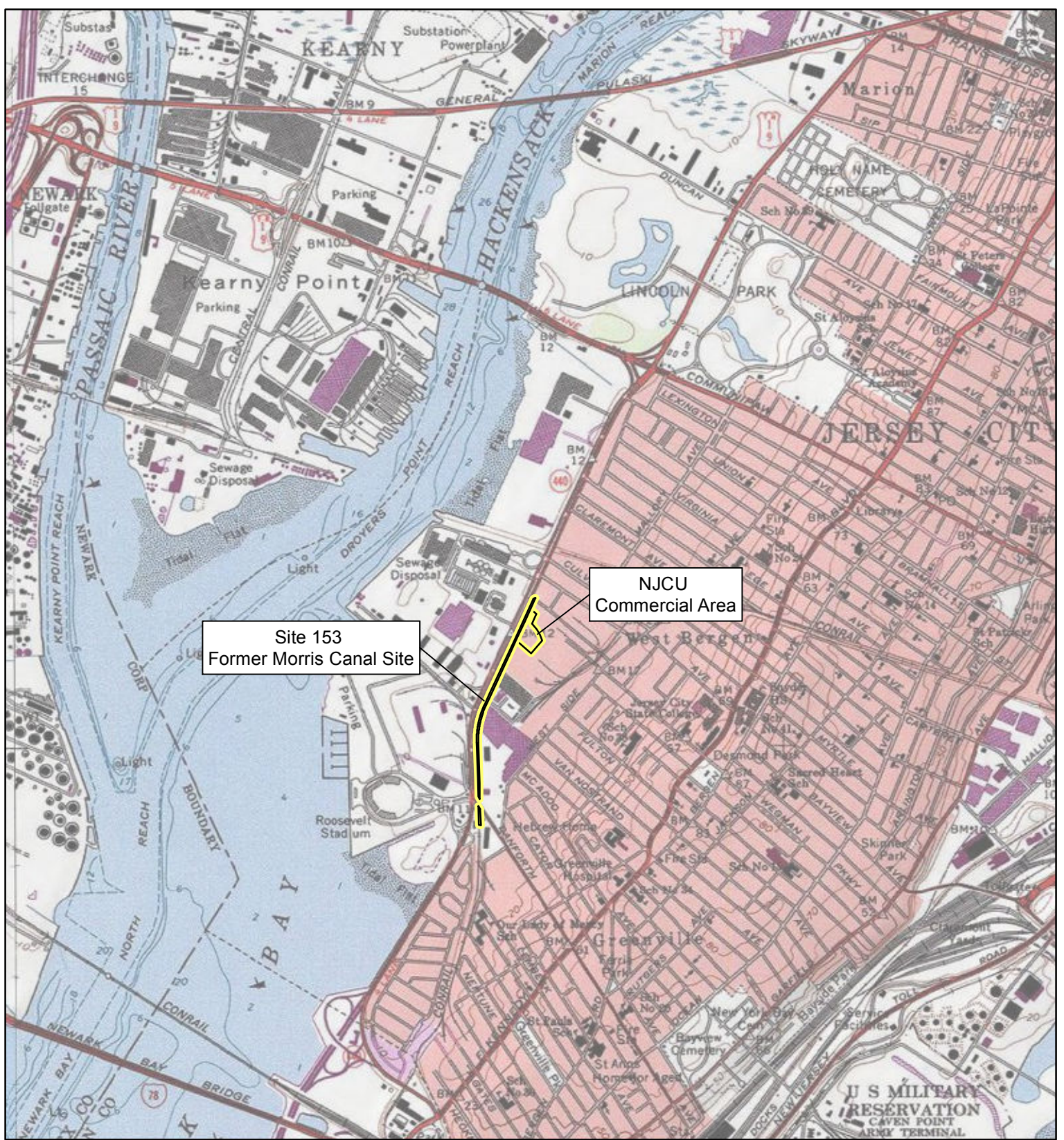
APPENDIX B

SITE MAPS

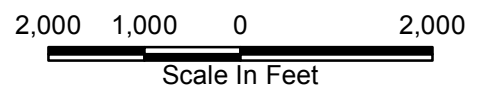
**MORRIS CANAL SITE/
BMUA FORCE MAIN**

APPENDIX B-1

SITE LOCATION MAP



NAD 1983 StatePlane New Jersey FIPS 2900 Feet



Legend

Site Boundary

Source:
USGS Topographic Maps, ESRI Server Map Service, 2012.



ENVIRONMENT & INFRASTRUCTURE
200 AMERICAN METRO BLVD, SUITE 113
HAMILTON, NEW JERSEY 08619

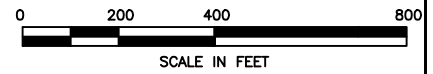
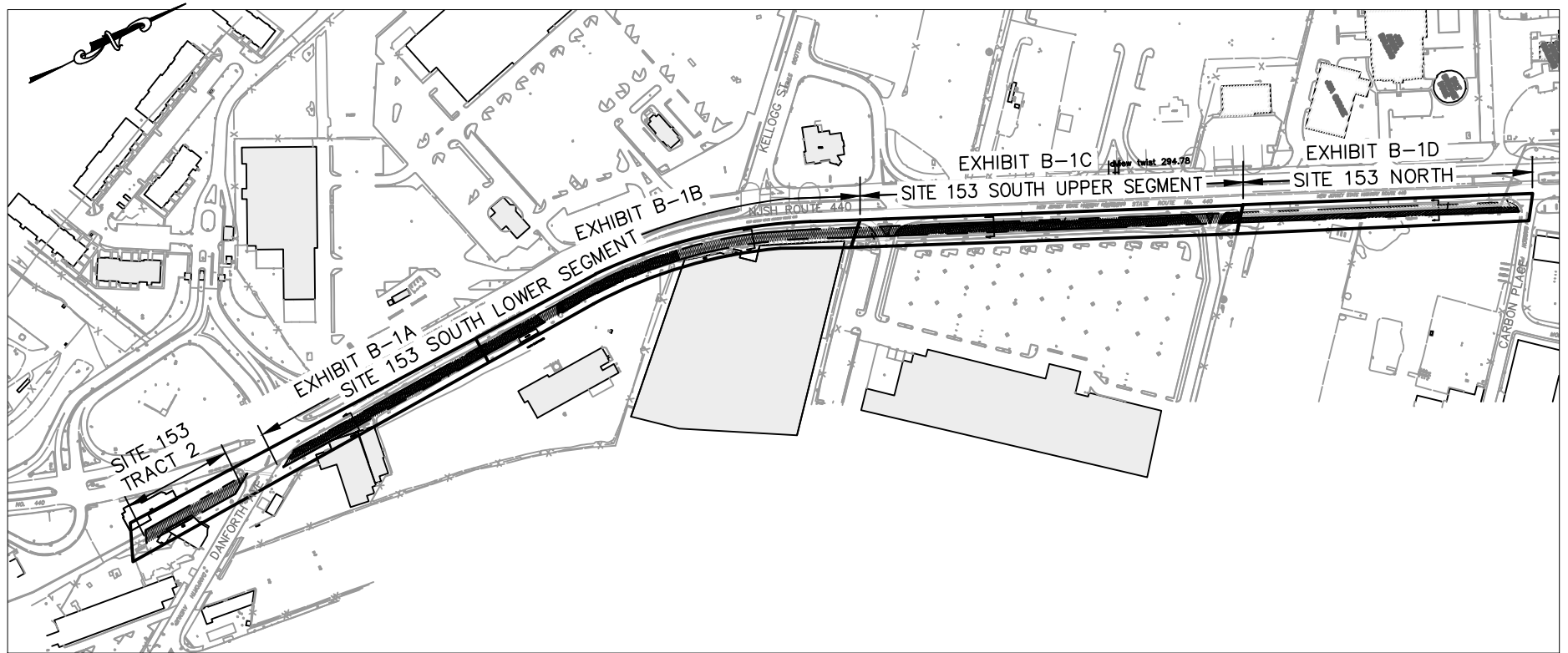
Figure 1
Site Location Map
Site 153 Former Morris Canal
Sites 090 & 184 NJCU Commercial Area
Jersey City, New Jersey

PROJ. NO.	3480130371	12/1/2014	REV.
DWN. BY.	WSL	CHKD BY.	EGG

APPENDIX B-2

AREAS OF CONTAMINATION AND ENGINEERING CONTROLS

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REV.	DATE	STATUS	DRFT BY	CHKD BY

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PREPARED/DATE: STR 02/27/12
 CHECKED/DATE: CMR 04/02/12

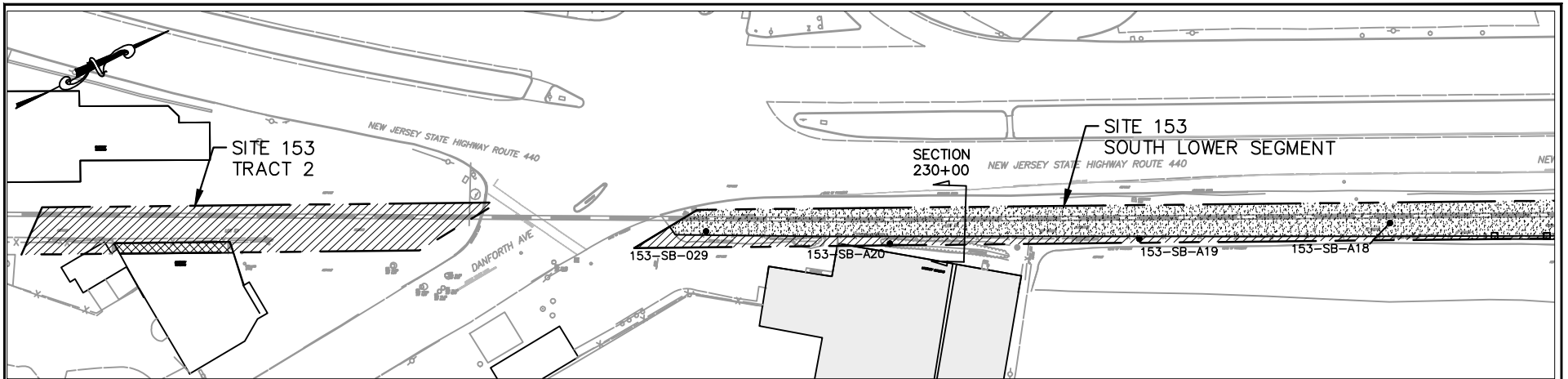
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ENVIRONMENT & INFRASTRUCTURE
 200 AMERICAN METRO BLVD, SUITE 113
 HAMILTON, NEW JERSEY 08619

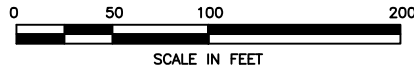
FIGURE 2
 SITE MAP KEY

SA 5 - SITE 153 FORMER MORRIS CANAL
 JERSEY CITY, NEW JERSEY
 BLOCK 21902, LOT 1 & BLOCK 26704, LOT 5

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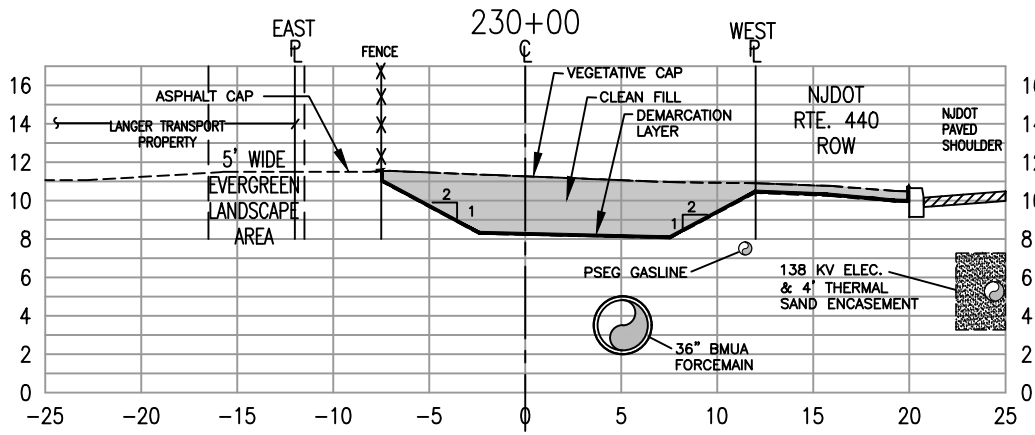


PLAN VIEW



LEGEND

- 153-SB-AXX SAMPLE LOCATION
- CROSS SECTION DIRECTION & LOCATION
- DEED RESTRICTION AREA
- BMUA FORCEMAIN
- PROPERTY LINE
- CENTERLINE STATIONING
- VEGETATED / SOIL CAP
- ASPHALT CAP
- CONCRETE CAP



CROSS SECTION STA. 230+00

SCALE: 1"=10' HORIZONTAL
1"=1' VERTICAL

NOTES:

1. FURTHER DETAILS ON THE CAP CONSTRUCTIONS CAN BE FOUND IN THE INTERIM REMEDIAL ACTION PLAN SUBMITTED TO THE NJDEP ON OCTOBER 15, 2009 AND IN EXHIBIT C-2 (A)(2) OF THIS DEED NOTICE.

REV.	DATE	STATUS	DRFT BY	CHKD BY

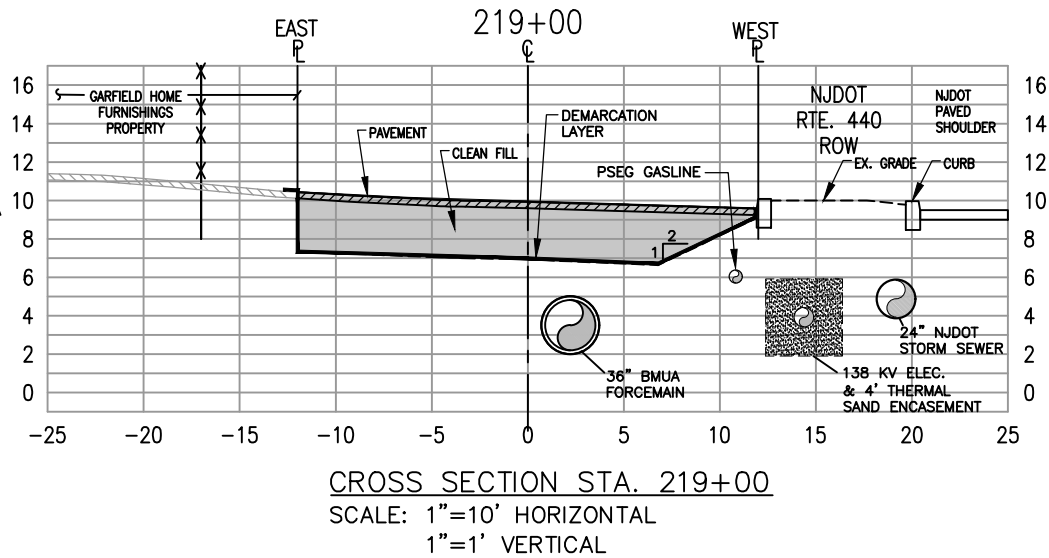
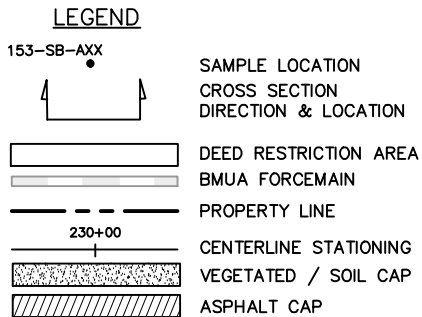
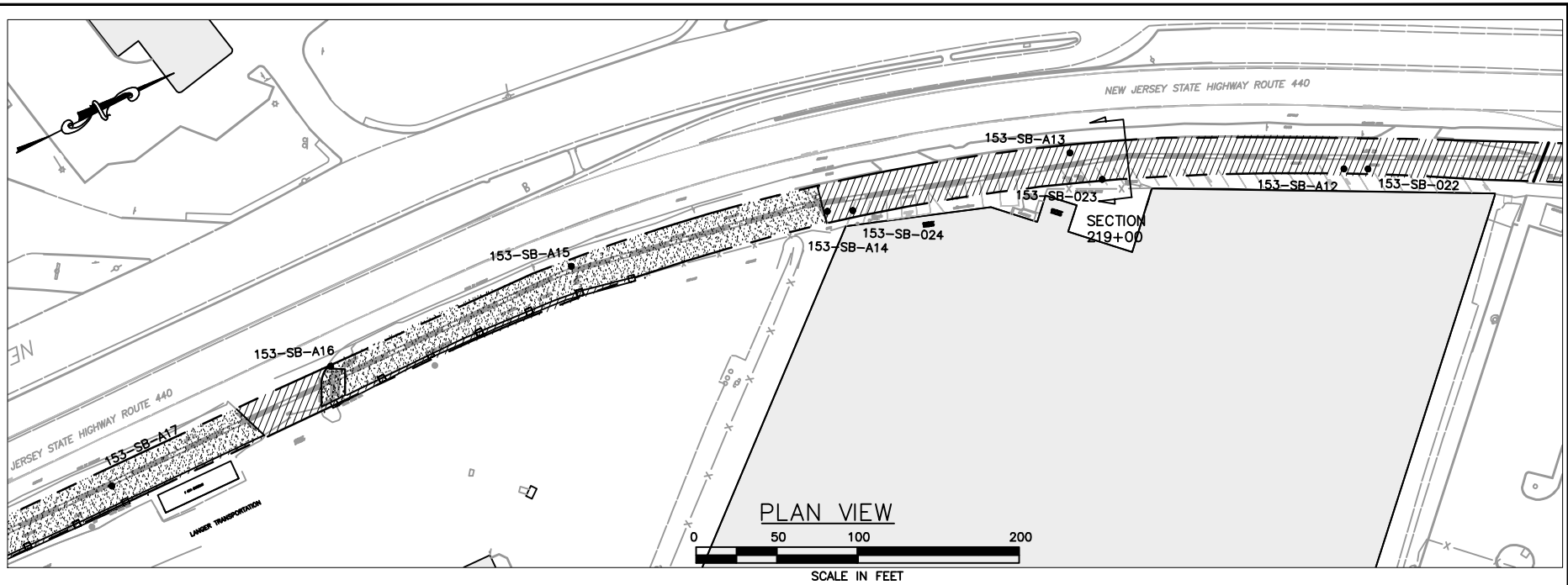
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ENVIRONMENT & INFRASTRUCTURE
 200 AMERICAN METRO BLVD, SUITE 113
 HAMILTON, NEW JERSEY 08619

FIGURE 2A
 SITE 153 SOUTH LOWER SEGMENT #1
 SA 5 - SITE 153 FORMER MORRIS CANAL
 JERSEY CITY, NEW JERSEY
 BLOCK 21902, LOT 1 & BLOCK 26704, LOT 5

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NOTES:

- FURTHER DETAILS ON THE CAP CONSTRUCTIONS CAN BE FOUND IN THE INTERIM REMEDIAL ACTION PLAN SUBMITTED TO THE NJDEP ON OCTOBER 15, 2009 AND IN EXHIBIT C-2 (A)(2) OF THIS DEED NOTICE.

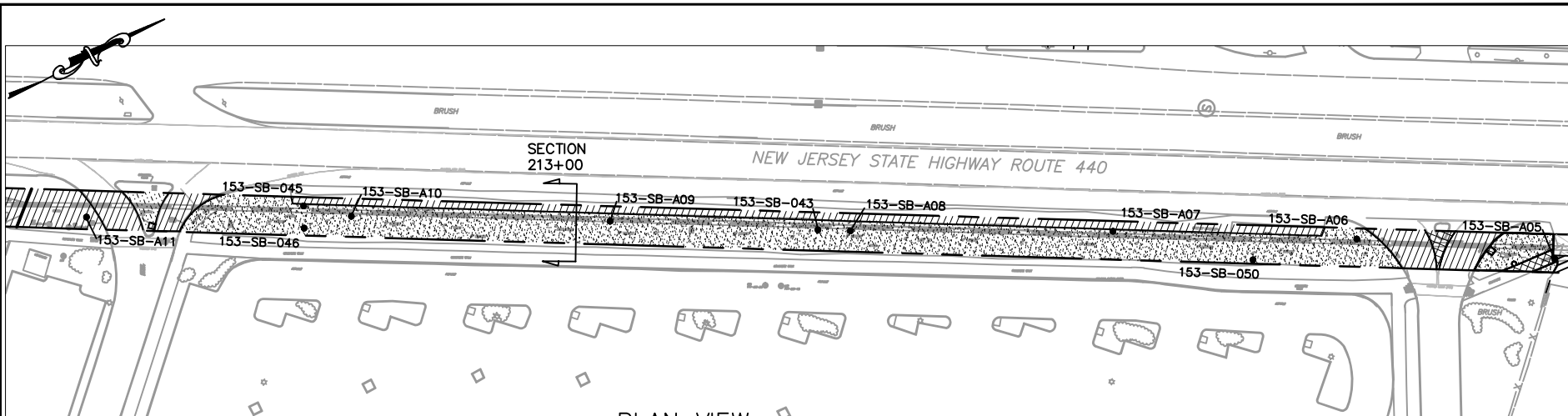
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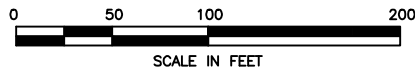
ENVIRONMENT & INFRASTRUCTURE
 200 AMERICAN METRO BLVD, SUITE 113
 HAMILTON, NEW JERSEY 08619

FIGURE 2B
 SITE 153 SOUTH LOWER SEGMENT #2
 SA 5 - SITE 153 FORMER MORRIS CANAL
 JERSEY CITY, NEW JERSEY
 BLOCK 21902, LOT 1 & BLOCK 26704, LOT 5

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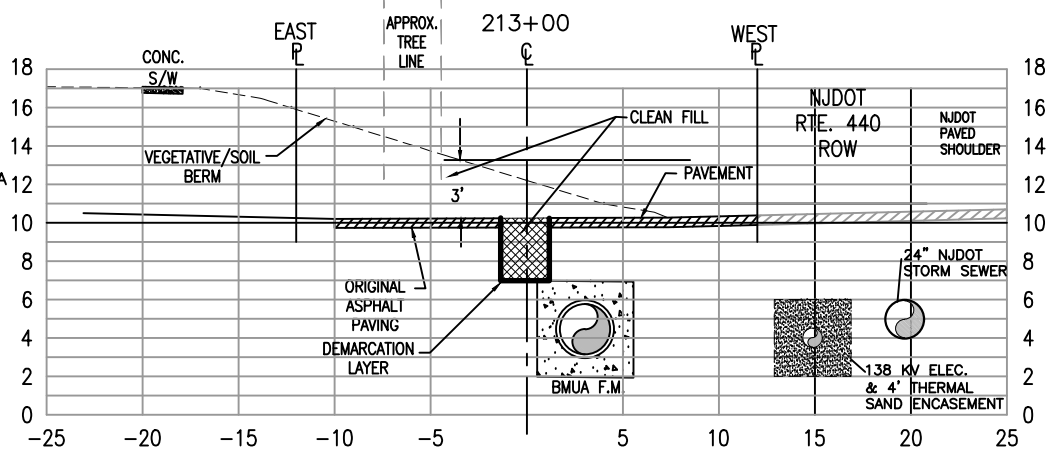


PLAN VIEW



LEGEND

- 153-SB-AXX SAMPLE LOCATION
- CROSS SECTION DIRECTION & LOCATION
- DEED RESTRICTION AREA
- BMUA FORCEMAIN
- PROPERTY LINE
- 230+00 CENTERLINE STATIONING
- VEGETATED / SOIL CAP
- ASPHALT CAP
- CONCRETE CAP
- MULCH CAP



CROSS SECTION STA. 213+00
 SCALE: 1"=10' HORIZONTAL
 1"=1' VERTICAL

NOTES:

1. FURTHER DETAILS ON THE CAP CONSTRUCTIONS CAN BE FOUND IN THE INTERIM REMEDIAL ACTION PLAN SUBMITTED TO THE NJDEP ON OCTOBER 15, 2009 AND IN EXHIBIT C-2 (A)(3) OF THIS DEED NOTICE.

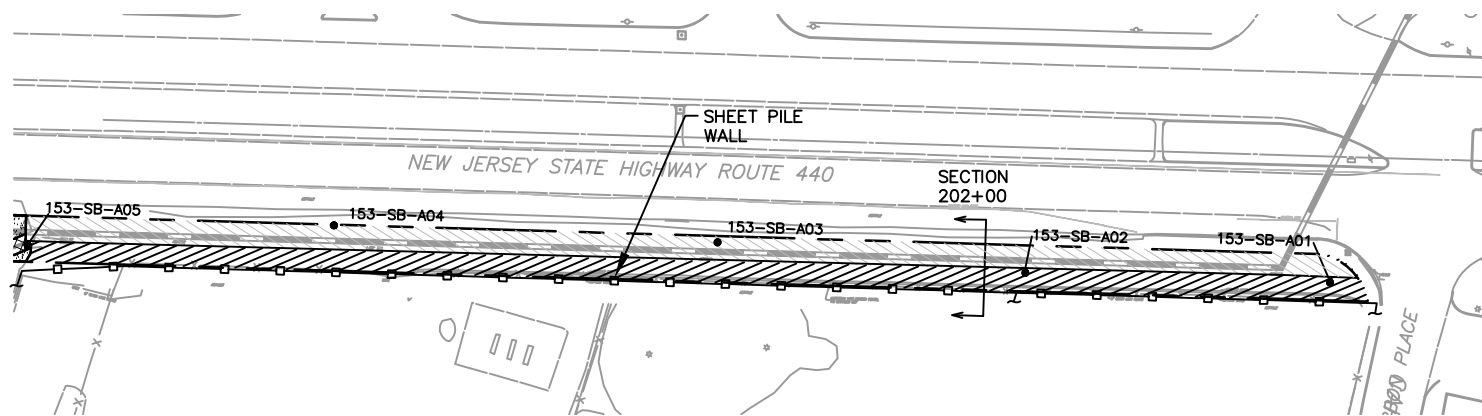
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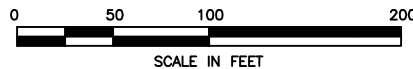
ENVIRONMENT & INFRASTRUCTURE
 200 AMERICAN METRO BLVD, SUITE 113
 HAMILTON, NEW JERSEY 08619

FIGURE 2C
 SITE 153 SOUTH UPPER SEGMENT
 SA 5 - SITE 153 FORMER MORRIS CANAL
 JERSEY CITY, NEW JERSEY
 BLOCK 21902, LOT 1 & BLOCK 26704, LOT 5

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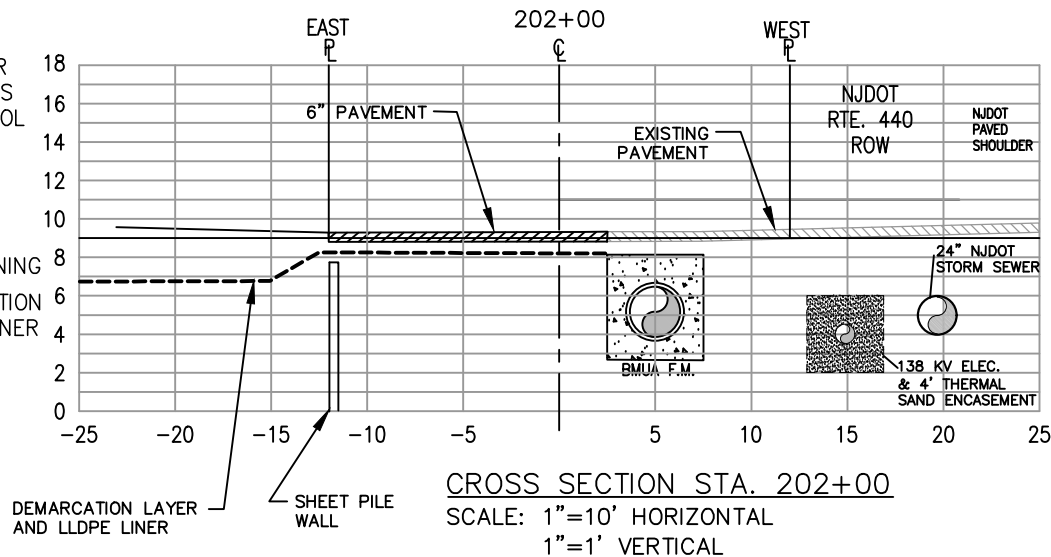


PLAN VIEW



LEGEND

- 153-SB-AXX ● SAMPLE LOCATION
- CROSS SECTION DIRECTION & LOCATION
- 6" OF ASPHALT PAVEMENT, ORANGE DEMARCATION LAYER AND LLDPE LINER AS ENGINEERING CONTROL
- EXISTING PAVEMENT
- BMUA FORCEMAIN
- PROPERTY LINE
- 230+00 CENTERLINE STATIONING
- ORANGE DEMARCATION LAYER & LLDPE LINER
- SHEET PILE WALL



NOTES:

1. DEPTH OF THE SHEET PILE WALL, LLDPE LINER, DEMARCATION LAYER AND BMUA FORCEMAIN VARY.
2. THE LLDPE LINER AND DEMARCATION LAYER TERMINATES AT THE CONCRETE ENCASUREMENT OF THE BMUA FORCEMAIN.
3. THE WIDTH OF THE CONCRETE ENCASUREMENT AROUND THE BMUA FORCEMAIN VARIES.
4. LIMIT OF LLDPE LINER AND LOCATION OF SHEET PILE WALL ARE BASED ON AS-BUILT DRAWINGS PROVIDED BY KENNON SURVEYING SERVICES, INC. FURTHER DETAILS ON CAP CONSTRUCTION ARE PROVIDED IN THE REMEDIAL ACTION REPORT FOR THE SA-5 NJCU REMEDIATION PROJECT AND EXHIBIT C-2 (A)(1) OF DEED NOTICE.

REV.	DATE	STATUS	DRFT BY	CHKD BY

AMEC PROJ No.: 3480130370
 DRAWING: 3480130379-6100-B200-0000
 PREPARED/DATE: STR 02/27/12
 CHECKED/DATE: CMR 04/02/12

ENVIRONMENT & INFRASTRUCTURE
 200 AMERICAN METRO BLVD, SUITE 113
 HAMILTON, NEW JERSEY 08619

FIGURE 2D
 SITE 153 NORTH SEGMENT
 SA 5 - SITE 153 FORMER MORRIS CANAL
 JERSEY CITY, NEW JERSEY
 BLOCK 21902, LOT 1 & BLOCK 26704, LOT 5

Exhibit Table B-2
Restricted Area Data
Site 153 Former Morris Canal
Block 21902, Lot 1, and Block 26704, Lot 5 (formerly Block 1289.5, Lot E), Jersey City, New Jersey

Location	Sample Date	Sample Depth (feet)	Elevation (feet below msl)	Field Sample ID	Contaminant	CASR#	NJDEP RDCSRS (mg/kg)	NJDEP NRDSRS (mg/kg)	Soil Concentration (mg/kg)
153-SB-A01	5/21/1997	04-06	2.89 to 4.89	153-SB-A01-0406	Hexavalent Chromium	18540-29-9	20	20	7490J
153-SB-A01	5/21/1997	06-08	0.89 to 2.89	153-SB-A01-0608	Hexavalent Chromium	18540-29-9	20	20	7690J
153-SB-A01	5/21/1997	12-14	-5.11 to -3.11	153-SB-A01-1214	Hexavalent Chromium	18540-29-9	20	20	60.7J
153-SB-A01	5/21/1997	14-16	-7.11 to -5.11	153-SB-A01-1416	Hexavalent Chromium	18540-29-9	20	20	20.8J
153-SB-A02	5/21/1997	00-02	7.11 to 9.11	153-SB-A02-0002	Hexavalent Chromium	18540-29-9	20	20	281J
153-SB-A02	5/21/1997	02-04	5.11 to 7.11	153-SB-A02-0204	Hexavalent Chromium	18540-29-9	20	20	998J
153-SB-A02	5/21/1997	04-06	3.11 to 5.11	153-SB-A02-0406	Hexavalent Chromium	18540-29-9	20	20	361J
153-SB-A03	5/21/1997	00-02	8.54 to 10.54	153-SB-A03-0002	Hexavalent Chromium	18540-29-9	20	20	66.1J
153-SB-A03	5/21/1997	04-06	4.54 to 6.54	153-SB-A03-0406	Hexavalent Chromium	18540-29-9	20	20	1160J
153-SB-A03	5/21/1997	06-08	2.54 to 4.54	153-SB-A03-0608	Hexavalent Chromium	18540-29-9	20	20	49.7J
153-SB-A03	5/21/1997	08-10	0.54 to 2.54	153-SB-A03-0810	Hexavalent Chromium	18540-29-9	20	20	227J
153-SB-A03	5/21/1997	08-10	0.54 to 2.54	153-SB-A03-0810	Mercury	7439-97-6	23	65	32.9J
153-SB-A04	5/21/1997	04-06	5.11 to 7.11	153-SB-A04-0406	Hexavalent Chromium	18540-29-9	20	20	7680J
153-SB-A04	5/21/1997	06-08	3.11 to 5.11	153-SB-A04-0608	Hexavalent Chromium	18540-29-9	20	20	33.2J
153-SB-A04	5/21/1997	08-10	1.11 to 3.11	153-SB-A04-0810	Hexavalent Chromium	18540-29-9	20	20	99J
153-SB-A04	5/21/1997	10-12	-0.89 to 1.11	153-SB-A04-1012	Hexavalent Chromium	18540-29-9	20	20	222J
153-SB-A04	5/21/1997	10-12	-0.89 to 1.11	153-SB-A04-1012-D	Hexavalent Chromium	18540-29-9	20	20	229J
153-SB-A05	5/21/1997	00-02	10.14 to 12.14	153-SB-A05-0002	Hexavalent Chromium	18540-29-9	20	20	624J
153-SB-A05	5/21/1997	02-04	8.14 to 10.14	153-SB-A05-0204	Hexavalent Chromium	18540-29-9	20	20	4520J
153-SB-A05	5/21/1997	04-06	6.14 to 8.14	153-SB-A05-0406	Hexavalent Chromium	18540-29-9	20	20	8250J
153-SB-A05	5/21/1997	06-08	4.14 to 6.14	153-SB-A05-0608	Hexavalent Chromium	18540-29-9	20	20	9150J
153-SB-A05	5/21/1997	08-10	2.14 to 4.14	153-SB-A05-0810	Hexavalent Chromium	18540-29-9	20	20	7020J
153-SB-A05	5/21/1997	12-14	-1.86 to 0.14	153-SB-A05-1214	Hexavalent Chromium	18540-29-9	20	20	2570J
153-SB-A05	5/21/1997	14-16	-3.86 to -1.86	153-SB-A05-1416	Hexavalent Chromium	18540-29-9	20	20	187J
153-SB-A06	5/22/1997	00-02*	10.8 to 12.8	153-SB-A06-0002	Hexavalent Chromium	18540-29-9	20	20	194J
153-SB-A06	5/22/1997	04-06	6.8 to 8.8	153-SB-A06-0406	Hexavalent Chromium	18540-29-9	20	20	159J
153-SB-A06	5/22/1997	06-08	4.8 to 6.8	153-SB-A06-0608	Hexavalent Chromium	18540-29-9	20	20	4110J
153-SB-A06	5/22/1997	08-10	2.8 to 4.8	153-SB-A06-0810	Hexavalent Chromium	18540-29-9	20	20	3230J
153-SB-A06	5/22/1997	08-10	2.8 to 4.8	153-SB-A06-0810-D	Hexavalent Chromium	18540-29-9	20	20	3600J
153-SB-A06	5/22/1997	10-12	0.8 to 2.8	153-SB-A06-1012	Hexavalent Chromium	18540-29-9	20	20	1070J
153-SB-A06	5/22/1997	12-14	-1.2 to 0.8	153-SB-A06-1214	Hexavalent Chromium	18540-29-9	20	20	1970J
153-SB-A06	5/22/1997	18-20	-7.2 to -5.2	153-SB-A06-1820	Hexavalent Chromium	18540-29-9	20	20	96.3J
153-SB-A06	5/22/1997	20-22	-9.2 to -7.2	153-SB-A06-2022	Hexavalent Chromium	18540-29-9	20	20	70.4J
153-SB-A06	5/22/1997	22-24	-11.2 to -9.2	153-SB-A06-2224	Hexavalent Chromium	18540-29-9	20	20	63.9J
153-SB-A07	5/22/1997	00-02*	10.29 to 12.29	153-SB-A07-0002	Hexavalent Chromium	18540-29-9	20	20	179J
153-SB-A07	5/22/1997	02-04	6.29 to 8.29	153-SB-A07-0406	Hexavalent Chromium	18540-29-9	20	20	1520J
153-SB-A07	5/22/1997	06-08	4.29 to 6.29	153-SB-A07-0608	Hexavalent Chromium	18540-29-9	20	20	7750J
153-SB-A07	5/22/1997	06-08	4.29 to 6.29	153-SB-A07-0608	Vanadium	7440-62-2	78	1100	443
153-SB-A07	5/22/1997	06-08	4.29 to 6.29	153-SB-A07-0608	Methylene Chloride	75-09-2	34	97	0.099
153-SB-A07	5/22/1997	08-10	2.29 to 4.29	153-SB-A07-0810	Hexavalent Chromium	18540-29-9	20	20	184
153-SB-A07	5/22/1997	16-18	-5.71 to -3.71	153-SB-A07-1618	Hexavalent Chromium	18540-29-9	20	20	30.4J
153-SB-A07	5/22/1997	18-20	-7.71 to -5.71	153-SB-A07-1820	Hexavalent Chromium	18540-29-9	20	20	34.1J
153-SB-A08	5/22/1997	00-02*	9.71 to 11.71	153-SB-A08-0002	Hexavalent Chromium	18540-29-9	20	20	13100
153-SB-A08	5/22/1997	02-04	7.71 to 9.71	153-SB-A08-0204	Hexavalent Chromium	18540-29-9	20	20	4750
153-SB-A08	5/22/1997	04-06	5.71 to 7.71	153-SB-A08-0406	Hexavalent Chromium	18540-29-9	20	20	3110
153-SB-A08	5/22/1997	06-08	3.71 to 5.71	153-SB-A08-0608	Hexavalent Chromium	18540-29-9	20	20	9070
153-SB-A08	5/22/1997	06-08	3.71 to 5.71	153-SB-A08-0608-D	Hexavalent Chromium	18540-29-9	20	20	8970
153-SB-A08	5/22/1997	08-10	1.71 to 3.71	153-SB-A08-0810	Vanadium	7440-62-2	78	1100	433
153-SB-A08	5/22/1997	08-10	1.71 to 3.71	153-SB-A08-0810	Hexavalent Chromium	18540-29-9	20	20	5380
153-SB-A09	5/22/1997	00-02*	9.09 to 11.09	153-SB-A09-0002	Hexavalent Chromium	18540-29-9	20	20	39.7
153-SB-A09	5/22/1997	04-06	5.09 to 7.09	153-SB-A09-0406	Hexavalent Chromium	18540-29-9	20	20	155
153-SB-A09	5/22/1997	06-08	3.09 to 5.09	153-SB-A09-0608	Hexavalent Chromium	18540-29-9	20	20	110
153-SB-A09	5/22/1997	08-10	1.09 to 3.09	153-SB-A09-0810	Arsenic	7440-38-2	19	19	250
153-SB-A09	5/22/1997	08-10	1.09 to 3.09	153-SB-A09-0810	Lead	7439-92-1	400	800	588J
153-SB-A09	5/22/1997	08-10	1.09 to 3.09	153-SB-A09-0810	Mercury	7439-97-6	23	65	299J
153-SB-A09	5/22/1997	08-10	1.09 to 3.09	153-SB-A09-0810	Benzo(a)anthracene	56-55-3	0.6	2	2.3J
153-SB-A09	5/22/1997	08-10	1.09 to 3.09	153-SB-A09-0810	Benzo(a)pyrene	50-32-8	0.2	0.2	1.5J
153-SB-A09	5/22/1997	08-10	1.09 to 3.09	153-SB-A09-0810	Benzo(b)fluoranthene	205-99-2	0.6	2	2.5J
153-SB-A09	5/22/1997	08-10	1.09 to 3.09	153-SB-A09-0810	Indeno(1,2,3-CD)pyrene	193-39-5	0.6	2	0.84J
153-SB-A10	5/22/1997	00-02*	8.84 to 10.84	153-SB-A10-0002	Hexavalent Chromium	18540-29-9	20	20	59.8J
153-SB-A10	5/22/1997	02-04	6.84 to 8.84	153-SB-A10-0204	Hexavalent Chromium	18540-29-9	20	20	599J
153-SB-A10	5/22/1997	04-06	4.84 to 6.84	153-SB-A10-0406	Hexavalent Chromium	18540-29-9	20	20	2450J
153-SB-A10	5/22/1997	08-10	0.84 to 2.84	153-SB-A10-0810	Hexavalent Chromium	18540-29-9	20	20	3680J

Exhibit Table B-2
Restricted Area Data
Site 153 Former Morris Canal
Block 21902, Lot 1, and Block 26704, Lot 5 (formerly Block 1289.5, Lot E), Jersey City, New Jersey

Location	Sample Date	Sample Depth (feet)	Elevation (feet below msl)	Field Sample ID	Contaminant	CASR#	NJDEP RDCSRS (mg/kg)	NJDEP NRDSRS (mg/kg)	Soil Concentration (mg/kg)
153-SB-A11	5/22/1997	00-02*	8.76 to 10.76	153-SB-A11-0002	Hexavalent Chromium	18540-29-9	20	20	58.5J
153-SB-A11	5/22/1997	02-04	6.76 to 8.76	153-SB-A11-0204	Hexavalent Chromium	18540-29-9	20	20	10900J
153-SB-A11	5/22/1997	04-06	4.76 to 6.76	153-SB-A11-0406	Hexavalent Chromium	18540-29-9	20	20	67J
153-SB-A11	5/22/1997	06-08	2.76 to 4.76	153-SB-A11-0608	Hexavalent Chromium	18540-29-9	20	20	481J
153-SB-A11	5/22/1997	08-10	0.76 to 2.76	153-SB-A11-0810	Hexavalent Chromium	18540-29-9	20	20	675J
153-SB-A11	5/22/1997	08-10	0.76 to 2.76	153-SB-A11-0810-D	Hexavalent Chromium	18540-29-9	20	20	560
153-SB-A12	5/22/1997	04-06	4.05 to 6.05	153-SB-A12-0406	Hexavalent Chromium	18540-29-9	20	20	52.7J
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Arsenic	7440-38-2	19	19	47.9
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Hexavalent Chromium	18540-29-9	20	20	1470J
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Mercury	7439-97-6	23	65	201J
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Vanadium	7440-62-2	78	1100	599
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Benzo(a)anthracene	56-55-3	0.6	2	300
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Benzo(a)pyrene	50-32-8	0.2	0.2	290
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Benzo(b)fluoranthene	205-99-2	0.6	2	340
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Benzo(k)fluoranthene	207-08-9	6	23	120J
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Carbazole	86-74-8	24	96	100J
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Chrysene	218-01-9	62	230	300
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Dibenzo(a,h)anthracene	53-70-3	0.2	0.2	39J
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Indeno(1,2,3-CD)pyrene	193-39-5	0.6	2	180
153-SB-A12	5/22/1997	06-08	2.05 to 4.05	153-SB-A12-0608	Naphthalene	91-20-3	6	17	170
153-SB-A13	5/22/1997	02-04	5.73 to 7.73	153-SB-A13-0204	Hexavalent Chromium	18540-29-9	20	20	54.5J
153-SB-A13	5/22/1997	04-06	3.73 to 5.73	153-SB-A13-0406	Hexavalent Chromium	18540-29-9	20	20	34.4J
153-SB-A13	5/22/1997	08-10	-0.27 to 1.73	153-SB-A13-0810	Hexavalent Chromium	18540-29-9	20	20	232J
153-SB-A14	5/22/1997	08-10	-0.07 to 1.93	153-SB-A14-0810	Hexavalent Chromium	18540-29-9	20	20	116J
153-SB-A15	5/22/1997	08-10	1.2 to 3.2	153-SB-A15-0810	Hexavalent Chromium	18540-29-9	20	20	315
153-SB-A16	5/22/1997	08-10	1.14 to 3.14	153-SB-A16-0810	Arsenic	7440-38-2	19	19	331
153-SB-A16	5/22/1997	08-10	1.14 to 3.14	153-SB-A16-0810	Lead	7439-92-1	400	800	710J
153-SB-A16	5/22/1997	08-10	1.14 to 3.14	153-SB-A16-0810	Mercury	7439-97-6	23	65	398J
153-SB-A16	5/22/1997	08-10	1.14 to 3.14	153-SB-A16-0810	Benzo(a)anthracene	56-55-3	0.6	2	1.1J
153-SB-A16	5/22/1997	08-10	1.14 to 3.14	153-SB-A16-0810	Benzo(a)pyrene	50-32-8	0.2	0.2	0.95J
153-SB-A16	5/22/1997	08-10	1.14 to 3.14	153-SB-A16-0810	Benzo(b)fluoranthene	205-99-2	0.6	2	1.5J
153-SB-A17	5/27/1997	02-04	7.72 to 9.72	153-SB-A17-0204	Hexavalent Chromium	18540-29-9	20	20	44.1J
153-SB-A18	5/27/1997	04-06	5.67 to 7.67	153-SB-A18-0406	Hexavalent Chromium	18540-29-9	20	20	42.2J
153-SB-A18	5/27/1997	08-10	1.67 to 3.67	153-SB-A18-0810	Hexavalent Chromium	18540-29-9	20	20	77.2J
153-SB-A19	5/27/1997	02-04	7.2 to 9.2	153-SB-A19-0204	Hexavalent Chromium	18540-29-9	20	20	21.6J
153-SB-A20	5/27/1997	12-14	-3.08 to -1.08	153-SB-A20-1214	Hexavalent Chromium	18540-29-9	20	20	92.7J
153-SB-022	3/12/2010	04-06	4.05-6.05	153-SB-022-0406	Hexavalent Chromium	18540-29-9	20	20	389
153-SB-022	3/12/2010	06-08	2.05-4.05	153-SB-022-0608	Hexavalent Chromium	18540-29-9	20	20	2950
153-SB-023	3/12/2010	04-06	3.73-5.73	153-SB-023-0406	Hexavalent Chromium	18540-29-9	20	20	269
153-SB-023	3/12/2010	06-08	1.73-3.73	153-SB-023-0608	Hexavalent Chromium	18540-29-9	20	20	435
153-SB-024	3/12/2010	04-06	1.93-3.93	153-SB-024-0406	Hexavalent Chromium	18540-29-9	20	20	84.3
153-SB-029	3/17/2010	04-06	6.92-8.92	153-SB-029-0406	Hexavalent Chromium	18540-29-9	20	20	117J
153-SB-029	3/17/2010	06-08	4.92-6.92	153-SB-029-0608	Hexavalent Chromium	18540-29-9	20	20	1730J
153-SB-029	3/17/2010	08-10	2.92-4.92	153-SB-029-0810	Hexavalent Chromium	18540-29-9	20	20	7860
153-SB-043	3/22/2010	02-04	7.71-9.71	153-SB-043-0204	Hexavalent Chromium	18540-29-9	20	20	54.5
153-SB-045	3/22/2010	02-04	6.84-8.84	153-SB-045-0204	Hexavalent Chromium	18540-29-9	20	20	84.6
153-SB-045	3/22/2010	02-04	6.84-8.84	153-SB-045-0204-D	Hexavalent Chromium	18540-29-9	20	20	88.5
153-SB-046	3/22/2010	04-06	4.84-6.84	153-SB-046-0406	Hexavalent Chromium	18540-29-9	20	20	47.2
153-SB-050	3/31/2010	02-04	6.54-8.54	153-SB-050-0204	Hexavalent Chromium	18540-29-9	20	20	92.6J

Notes:

NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS) N.J.A.C. 7:26D (last revised 11/4/09)

NJDEP Non-Residential Direct Contact Soil Remediation Standards (NRDCSRS) N.J.A.C. 7:26D (last revised 11/4/09)

The NJDEP Soil Cleanup Criteria for Hexavalent Chromium is 20 mg/kg (NJDEP Chromium Policy 2/8/07)

CASR#: Chemical Abstract Service Registry Number

J: indicates estimated value based on data validation

mg/kg: milligrams per Kilogram

msl: mean sea level

Sample locations and data from the initial RI (TTNUS November 1999) and subsequent RI (AMEC June 2009 to April 2010)

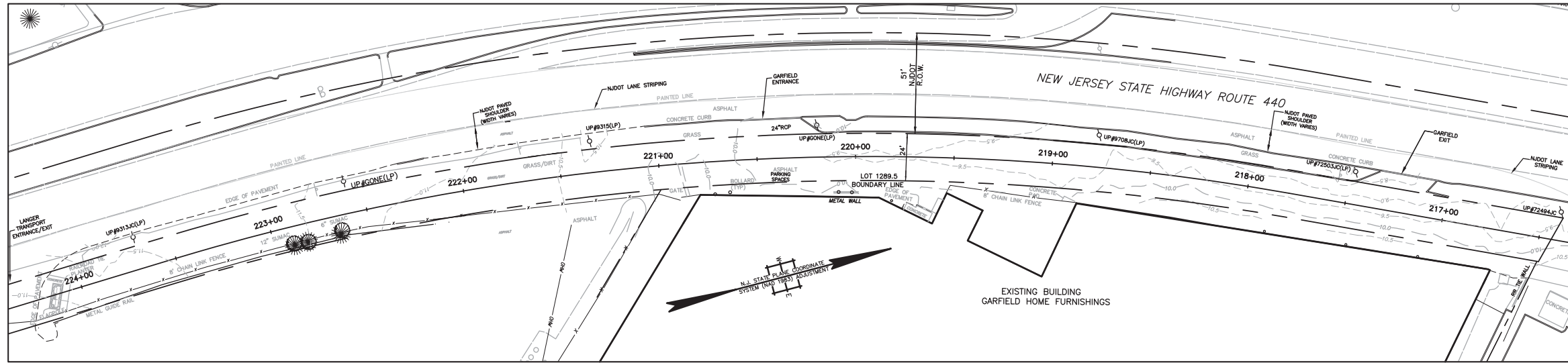
*: Remedial actions included a soil excavation at this location to 3 feet. Documentation was provided in Interim Remedial Measure Report submittals to the NJDEP

Refer to the Consent Decree regarding Site 079 and Site 153 South and the NJCU Redevelopment Area (1/22/10) for further information regarding deed restriction

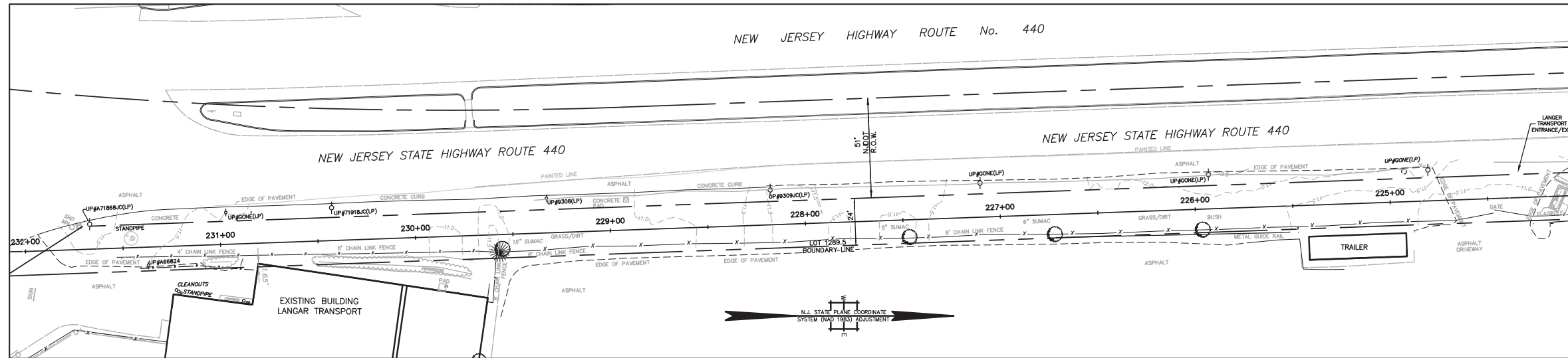
APPENDIX B-3

AS-BUILT FIGURES FOR REMEDIAL ACTIONS

PHASE II
STATIONS 216+50 TO 224+50



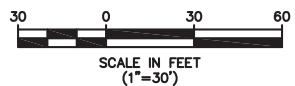
PHASE I
STATIONS 224+50 TO 232+00



BENCHMARK:
GPS BASE STATION
ELEVATION: 27.521
DATUM: NAVD 29

- NOTES:**
- THIS IS TO CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS MAP OR PLAN IS THE RESULT OF A FIELD SURVEY PERFORMED ON NOVEMBER 3, 2009 BY ENTACT, LLC, WITH PERIODIC FIELD SURVEY CHECKS PERFORMED BY MASER CONSULTING P.A. THE INFORMATION DEPICTED HEREON, CORRECTLY REPRESENTS THE CONDITIONS FOUND AT, AND AS OF THE DATE OF THE FIELD SURVEY, EXCEPT SUCH IMPROVEMENTS OR EASEMENTS, IF ANY BELOW THE SURFACE AND NOT VISIBLE. ACCORDINGLY THE UNDERSIGNED PROFESSIONAL IS NOT RESPONSIBLE FOR THE PRESENCE OF UNDERGROUND UTILITIES OR STRUCTURES, IF SAME ARE NOT VISIBLE OR OTHERWISE DISCLOSED BY ANY AFOREMENTIONED DATA LISTED ABOVE.
 - THIS PLAN IS MADE FOR AND CERTIFIED TO THE PARTIES NAMED HEREON FOR THE PURPOSE(S) STATED. NO OTHER PURPOSE IS INTENDED NOR IMPLIED. THE UNDERSIGNED PROFESSIONALS ARE NEITHER RESPONSIBLE NOR LIABLE FOR THE USE OF THIS PLAN BEYOND ITS INTENDED PURPOSE.
 - THE USE OF THE WORD "CERTIFY" OR "CERTIFICATION" CONSTITUTES AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THOSE FACTS OR FINDINGS WHICH ARE THE SUBJECT OF THE UNDERSIGNED PROFESSIONAL'S KNOWLEDGE, INFORMATION, AND BELIEF, AND IN ACCORDANCE WITH THE COMMONLY ACCEPTED PROCEDURE CONSISTENT WITH THE APPLICABLE STANDARDS OF PRACTICE, AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE EITHER EXPRESSED OR IMPLIED.
 - SITE BENCHMARK USED: GPS BASE STATION - ELEVATION = 27.52
THE HORIZONTAL DATUM IS NAD83, THE VERTICAL DATUM IS NAVD29.

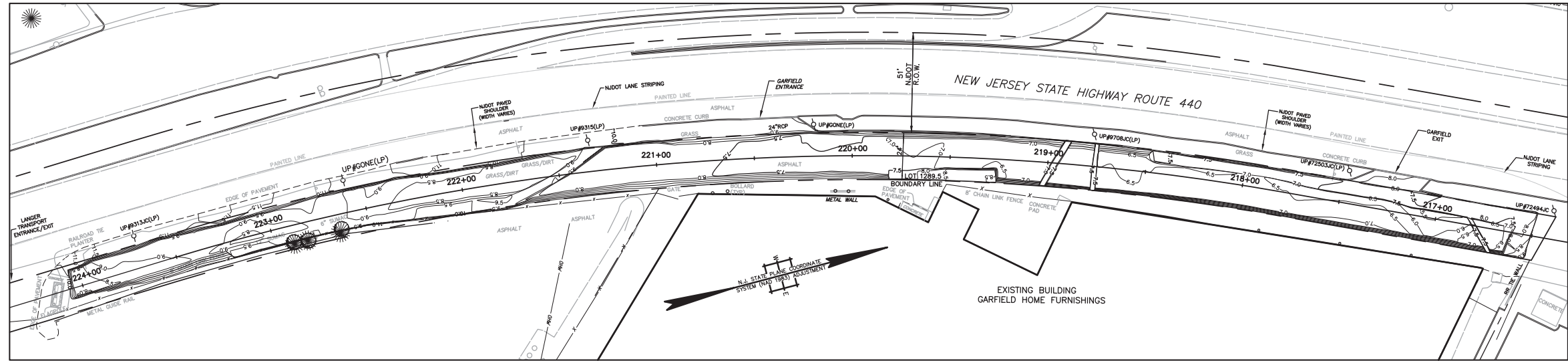
LEGEND
- 12 - SURVEYED PRE-EXCAVATION CONTOURS



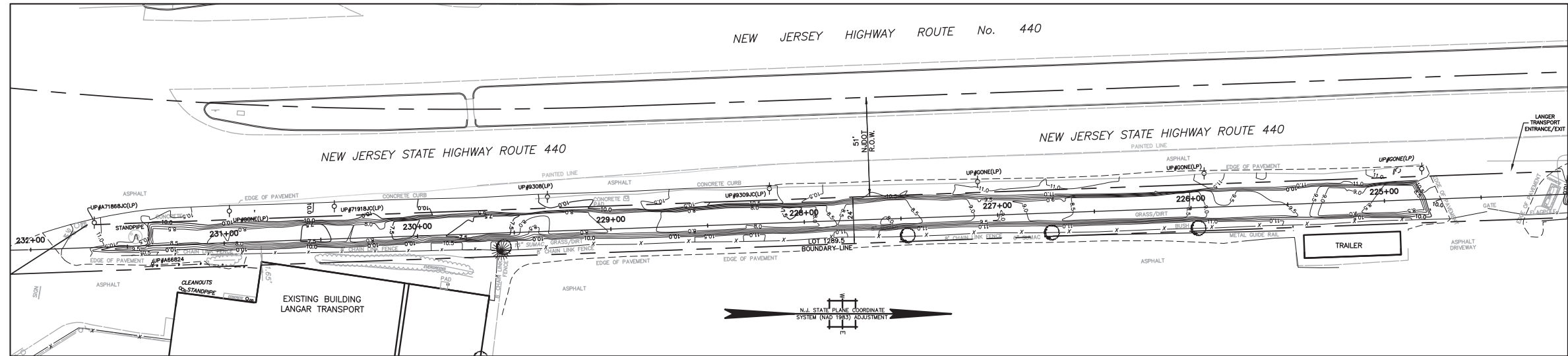
R. THOMAS HUGG
NEW JERSEY PROFESSIONAL
LAND SURVEYOR LIC. NO. 36737

		339 Haymaker Rd., Suite 1101 Monroeville, PA 15146 P: 412-357-1100	
		DRAWING NAME: FINAL AS-BUILT CONTOUR DRAWINGS LOCATION: PRE-EXCAVATION SURFACE PROJECT NAME & LOCATION: HONEYWELL SAS / SITE 153 JERSEY CITY, NEW JERSEY	
PREPARED BY	J. HOUGH	CHECKED BY	C. PANICO
DRAWN BY	J. HOUGH	APPROVED BY	C. PANICO
DATE	1/20/2010	DATE	1/20/2010
PROJECT NO.	D1177E	DRAWING NO.	D-1177E-001
REVISION	NO.	DATE	DESCRIPTION

PHASE II
STATIONS 216+50 TO 224+50



PHASE I
STATIONS 224+50 TO 232+00



BENCHMARK:

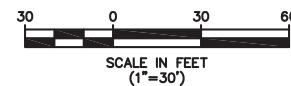
GPS BASE STATION
ELEVATION: 27.521
DATUM: NAVD 29

NOTES:

1. THIS IS TO CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS MAP OR PLAN IS THE RESULT OF A FIELD SURVEY PERFORMED ON DECEMBER 11, 2009 BY ENTACT, LLC, WITH PERIODIC FIELD SURVEY CHECKS PERFORMED BY MASER CONSULTING P.A. THE INFORMATION DEPICTED HEREON, CORRECTLY REPRESENTS THE CONDITIONS FOUND AT, AND AS OF THE DATE OF THE FIELD SURVEY, EXCEPT SUCH IMPROVEMENTS OR EASEMENTS, IF ANY BELOW THE SURFACE AND NOT VISIBLE. ACCORDINGLY THE UNDERSIGNED PROFESSIONAL IS NOT RESPONSIBLE FOR THE PRESENCE OF UNDERGROUND UTILITIES OR STRUCTURES, IF SAME ARE NOT VISIBLE OR OTHERWISE DISCLOSED BY ANY AFOREMENTIONED DATA LISTED ABOVE.
2. THIS PLAN IS MADE FOR AND CERTIFIED TO THE PARTIES NAMED HEREON FOR THE PURPOSE(S) STATED. NO OTHER PURPOSE IS INTENDED NOR IMPLIED. THE UNDERSIGNED PROFESSIONALS ARE NEITHER RESPONSIBLE NOR LIABLE FOR THE USE OF THIS PLAN BEYOND ITS INTENDED PURPOSE.
3. THE USE OF THE WORD "CERTIFY" OR "CERTIFICATION" CONSTITUTES AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THOSE FACTS OR FINDINGS WHICH ARE THE SUBJECT OF THE UNDERSIGNED PROFESSIONAL'S KNOWLEDGE, INFORMATION, AND BELIEF, AND IN ACCORDANCE WITH THE COMMONLY ACCEPTED PROCEDURE CONSISTENT WITH THE APPLICABLE STANDARDS OF PRACTICE, AND DOES NOT CONSTITUTE A WARRANTY OR GUARANTEE EITHER EXPRESSED OR IMPLIED.
4. SITE BENCHMARK USED: GPS BASE STATION - ELEVATION = 27.52
THE HORIZONTAL DATUM IS NAD83, THE VERTICAL DATUM IS NAVD29.

LEGEND

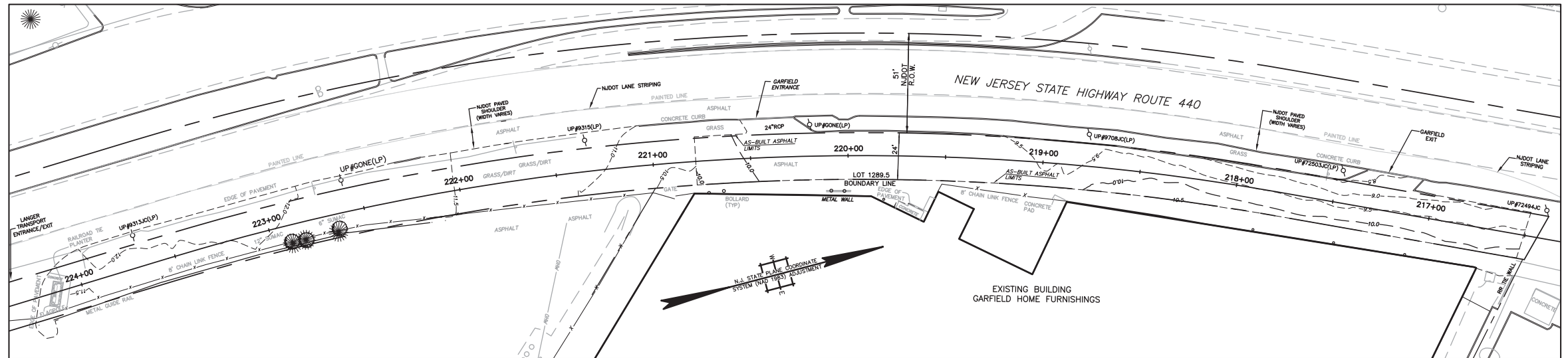
- 12 — AS-BUILT POST EXCAVATION CONTOURS
- LIMITS OF EXCAVATION



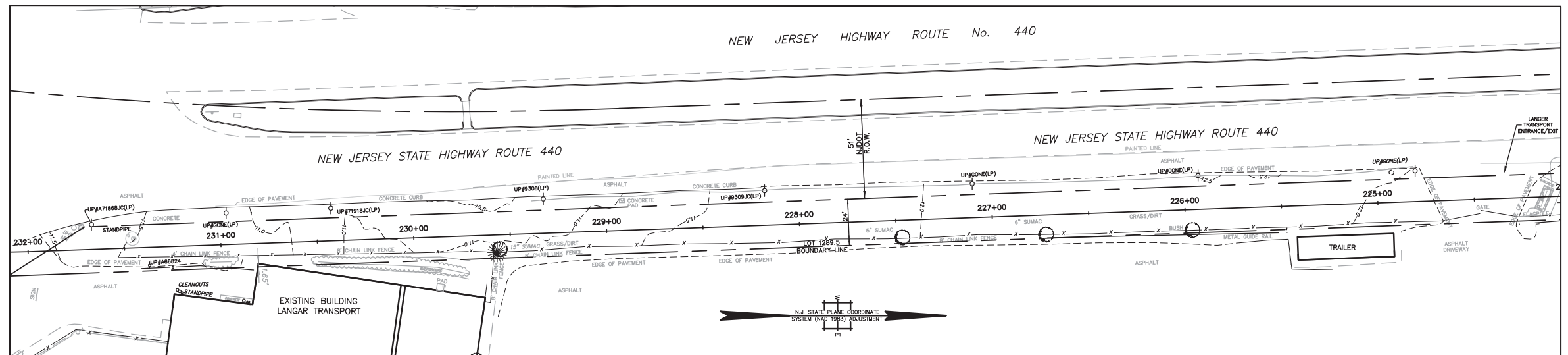
R. THOMAS HUGG
NEW JERSEY PROFESSIONAL
LAND SURVEYOR LIC. NO. 36737

ENTACT		339 Haymaker Rd., Suite 1101 Monroeville, PA 15146 P: 412-357-1100	
DRAWING NAME: FINAL AS-BUILT CONTOUR DRAWINGS			
LOCATION: POST-EXCAVATION SURFACE			
PROJECT NAME & LOCATION: HONEYWELL SAS / SITE 153 JERSEY CITY, NEW JERSEY			
PREPARED BY	J. HOUGH	CHECKED BY	C. PANICO
DRAWN BY	J. HOUGH	APPROVED BY	C. PANICO
DATE	1/20/2010	DATE	1/20/2010
PROJECT NO.	D1177E	DRAWING NO.	D-1177E-001
REV	DATE	BY	CHK'D
			APPROV'D
			DESCRIPTION

PHASE II
STATIONS 216+50 TO 224+50



PHASE I
STATIONS 224+50 TO 232+00



BENCHMARK:

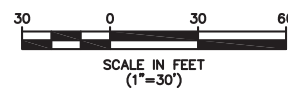
GPS BASE STATION
ELEVATION: 27.521
DATUM: NAVD 29

NOTES:

1. THIS IS TO CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS MAP OR PLAN IS THE RESULT OF A FIELD SURVEY PERFORMED ON DECEMBER 21, 2009 BY ENACT, LLC, WITH PERIODIC FIELD SURVEY CHECKS PERFORMED BY MASER CONSULTING P.A. THE INFORMATION DEPICTED HEREON, CORRECTLY REPRESENTS THE CONDITIONS FOUND AT, AND AS OF THE DATE OF THE FIELD SURVEY, EXCEPT SUCH IMPROVEMENTS OR EASEMENTS, IF ANY BELOW THE SURFACE AND NOT VISIBLE. ACCORDINGLY THE UNDERSIGNED PROFESSIONAL IS NOT RESPONSIBLE FOR THE PRESENCE OF UNDERGROUND UTILITIES OR STRUCTURES, IF SAME ARE NOT VISIBLE OR OTHERWISE DISCLOSED BY ANY AFOREMENTIONED DATA LISTED ABOVE.
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4. SITE BENCHMARK USED: GPS BASE STATION - ELEVATION = 27.52
THE HORIZONTAL DATUM IS NAD83, THE VERTICAL DATUM IS NAVD29.

LEGEND

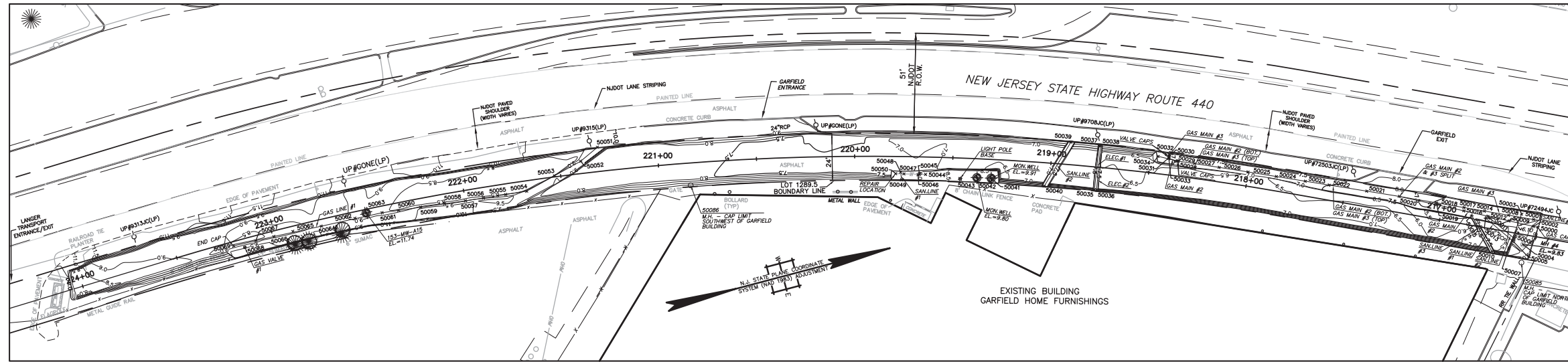
- - - 12" FINAL TOPSOIL AS-BUILT CONTOURS
- - - 12" FINAL ASPHALT AS-BUILT CONTOURS



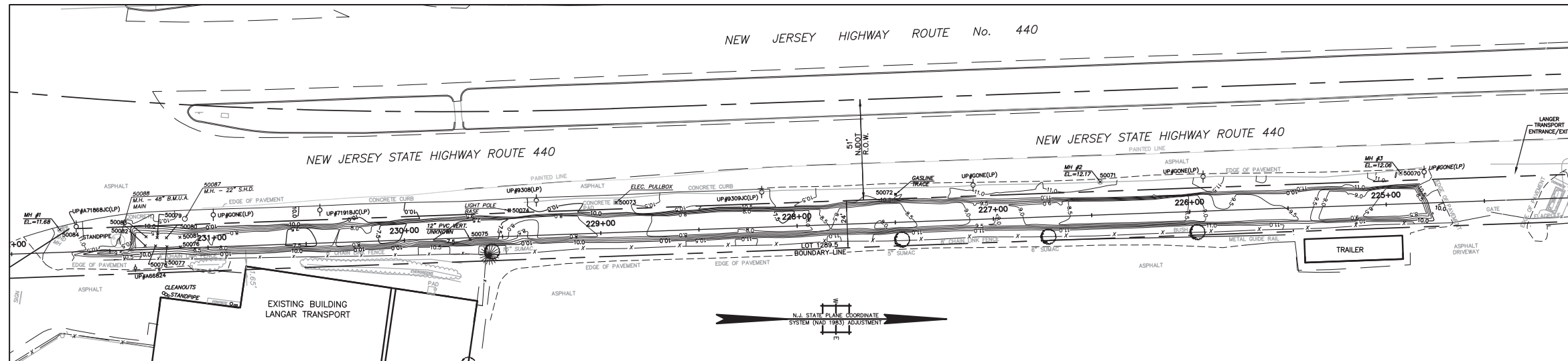
R. THOMAS HUGG
NEW JERSEY PROFESSIONAL
LAND SURVEYOR LIC. NO. 36737

ENTACT		339 Haymaker Rd., Suite 1101 Monroeville, PA 15146 P: 412-357-1100	
DRAWING NAME: FINAL AS-BUILT CONTOUR DRAWINGS TOPSOIL AND ASPHALT SURFACES			
PROJECT NAME & LOCATION: HONEYWELL SAS / SITE 153 JERSEY CITY, NEW JERSEY			
PREPARED BY	J. HOUGH	CHECKED BY	C. PANICO
DRAWN BY	J. HOUGH	APPROVED BY	C. PANICO
DATE	1/20/2010	DATE	1/20/2010
PROJECT NO.	D1177E	DRAWING NO.	D-1177E-001
REV	DATE	BY	CHK'D/APP'D
			DESCRIPTION

PHASE II
STATIONS 216+50 TO 224+50



PHASE I
STATIONS 224+50 TO 232+00



BENCHMARK:

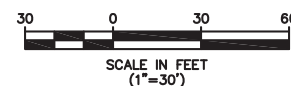
GPS BASE STATION
ELEVATION: 27.521
DATUM: NAVD 29

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LEGEND

- 12" AS-BUILT POST EXCAVATION CONTOURS
- LIMITS OF EXCAVATION
- GAS LINES AND AS-BUILT POINTS
- SANITARY LINES AND AS-BUILT POINTS
- ELECTRIC LINES AND AS-BUILT POINTS
- WATER LINES AND AS-BUILT POINTS
- WELLS, MANHOLES, OTHER OBJECTS
- X 50043 POINT NUMBER FOR UTILITY LOCATIONS (SEE SHEET NO. 5 OF 5)



R. THOMAS HUGG
NEW JERSEY PROFESSIONAL
LAND SURVEYOR LIC. NO. 36737

		339 Haymaker Rd., Suite 1101 Monroeville, PA 15146 P: 412-357-1100	
DRAWING NAME FINAL AS-BUILT DRAWINGS DISCOVERED UTILITIES DRAWING		PROJECT NAME & LOCATION HONEYWELL SAS / SITE 153 JERSEY CITY, NEW JERSEY	
PREPARED BY J. HOUGH	CHECKED BY C. PANICO	REVISION 1	
DRAWN BY J. HOUGH	APPROVED BY C. PANICO	DATE 2/9/2010	SHEET NO. 4 OF 5
PROJECT NO. D1177E	DRAWING NO. D-1177E-001		
1. 3/30/10 D.J.M. RTH REV DATE BY CHK'D APPROV	ADDITIONAL UTILITY LOCATIONS INCLUDED DESCRIPTION		

GAS LINES

GAS LINE #1: - VISIBLE IN EXCAVATION FROM STATION 221+30 TO 223+20
 - 4" LINE WITH TRACE WIRE 6" ABOVE CROWN
 - LOCATED WITHIN 3' CLEAN FILL ZONE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50051	683488.4039	603146.5691	8.29	4" GASLINE #1 INTO SLOPE	GASLINE #1 COMES OUT OF SLOPE ON
50052	683478.349	603151.273	8.23	4" GASLINE #1	NORTHWEST SIDE OF EXCAVATION
50053	683463.6195	603155.0406	8.31	4" GASLINE #1	
50054	683447.812	603159.084	8.38	4" GASLINE #1	
50055	683437.1066	603157.9731	8.41	4" GASLINE #1	
50056	683425.6486	603156.7842	8.68	4" GASLINE #1	
50057	683416.453	603155.65	8.832	4" GASLINE #1	
50058	683405.8799	603154.5975	8.75	4" GASLINE #1	
50059	683393.5769	603153.1636	8.89	4" GASLINE #1	
50060	683382.2877	603151.8477	8.8	4" GASLINE #1	
50061	683373.951	603150.876	8.54	4" GASLINE #1	
50062	683359.8873	603150.1129	8.6	4" GASLINE #1	
50064	683342.2666	603149.6365	8.69	4" GASLINE #1	
50065	683327.6294	603148.5062	8.51	4" GASLINE #1	
50066	683317.6308	603148.5589	8.7	4" GASLINE #1	
50067	683308.1043	603148.302	8.72	4" GASLINE #1	
50068	683301.887	603150.125	11.39	4" GASLINE #1 VALVE	
50069	683298.449	603147.947	8.43	4" GASLINE #1 ENDCAP	CAPPED AT SOUTH END
50072	682867.419	603146.705	10.79	GASLINE TRACE	

GAS LINE #2: - VISIBLE IN EXCAVATION FROM STATION 216+50 TO 218+50
 - 4" LINE WITH TRACE WIRE 6" ABOVE CROWN
 - LOCATED WITHIN 3' CLEAN FILL ZONE
 - GASLINE #2 RUNS BELOW GASLINE #3 UNTIL STATION 217+25
 WHERE IT SPLITS OFF TO THE EAST

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50000	683940.799	603308.148	9.04	216+50 CAP GAS?	GASMAIN #2 CONTINUES THROUGH NORTH END OF EXCAVATION
50002	683938.7242	603307.0748	6.1	4" GASMAIN #2	
50009	683927.4219	603301.2286	6.09	4" GASMAIN #2	
50012	683917.5805	603296.1384	6.07	4" GASMAIN #2	
50016	683898.3243	603290.4092	6.05	4" GASMAIN #2	
50019	683883.3144	603283.8972	6.01	4" GASMAIN #2	
50020	683876.5582	603274.9198	6.58	4" GASMAIN #2, #3 SPLIT	STOPPED BEING TOP/BOTTOM AND SEPARATED EAST TO WEST
50021	683861.2792	603268.103	6.6	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50022	683843.4816	603260.1915	6.53	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50023	683832.3049	603255.2209	6.52	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50024	683818.6752	603249.1594	6.51	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50025	683805.2821	603243.2031	6.55	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50026	683791.7164	603237.2329	6.55	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50027	683780.1735	603232.1861	6.56	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50034	683763.084	603223.842	5.7	4" GASMAIN #2 (BOTTOM) DEADEND	CAPPED AT SOUTH END

GAS LINE #3: - VISIBLE IN EXCAVATION FROM STATION 216+50 TO 218+50
 - 4" LINE WITH TRACE WIRE 6" ABOVE CROWN
 - LOCATED WITHIN 3' CLEAN FILL ZONE
 - GASLINE #3 RUNS ABOVE GASLINE #2 UNTIL STATION 217+25
 WHERE GASLINE #2 SPLITS OFF TO THE EAST

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50001	683939.6675	603303.6901	6.09	4" GASMAIN #3	GASMAIN #3 CONTINUES THROUGH NORTH END OF EXCAVATION
50008	683928.0039	603298.3728	6.07	4" GASMAIN #3	
50014	683916.6185	603293.1829	6.18	4" GASMAIN #3	
50017	683906.9606	603288.7798	6.21	4" GASMAIN #3	
50018	683894.0299	603282.8848	6.31	4" GASMAIN #3	
50020	683876.5582	603274.9198	6.58	4" GASMAIN #2, #3 SPLIT	STOPPED BEING TOP/BOTTOM AND SEPARATED EAST TO WEST
50021	683861.2792	603268.103	6.6	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50022	683843.4816	603260.1915	6.53	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50023	683832.3049	603255.2209	6.52	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50024	683818.6752	603249.1594	6.51	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50025	683805.2821	603243.2031	6.55	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50026	683791.7164	603237.2329	6.55	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50027	683780.1735	603232.1861	6.56	4" GASMAIN #3 (TOP), #2 (BOTTOM)	USE FOR LOCATION FOR BOTH #2 AND #3
50032	683768.7782	603224.4221	6.51	4" GASMAIN #3	
50033	683768.1088	603226.3949	6.51	4" GASMAIN #3 (TOP) 90 TO WEST	GASMAIN #3 COMES OUT OF WEST END OF SLOPE, 90 TO NORTH

GAS LINE VALVES: - ALL VALVES LOCATED WERE AT THE START OF GASLINE VIEW AT STATION 218+50

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50028	683772.502	603228.832	6.91	GAS VALVE CAPS	
50029	683771.9	603228.629	6.87	GAS VALVE CAPS	
50030	683768.4263	603225.5112	8.08	GAS VALVE CAPS	
50031	683768.313	603225.862	7.22	GAS VALVE CAPS	

BENCHMARK:

GPS BASE STATION
 ELEVATION: 27.521
 DATUM: NAVD 29

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R. THOMAS HUGG
 NEW JERSEY PROFESSIONAL
 LAND SURVEYOR LIC. NO. 36737

WATER LINES

- VISIBLE IN EXCAVATION AT STATION 219+75
 - 6" LINE LOCATED OUTSIDE OF EAST EXCAVATION SLOPE
 - NOT LOCATED WITHIN ORIGINAL 3' CLEAN FILL ZONE,
 BUT EXCAVATED AND CLEAN-FILLED DUE TO RUPTURED LINE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50044	683646.3433	603202.5977	7.69	6" WATER LINE	
50047	683635.7587	603199.5078	7.49	6" WATER LINE	
50050	683631.71	603198.325	7.21	6" WATER LINE - REPAIR LOCATION	WATER LINE RUPTURED DURING EXCAVATION
50045	683643.369	603201.731	9.07	WATER LINE VENT CAP	
50046	683642.576	603201.807	10.09	WATER MAIN VALVE CAP	

SANITARY LINES

12" RCP STORM LINES: - VISIBLE IN EXCAVATION NEAR STATION 216+75

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50005	683926.702	603311.832	6.92	12" RCP SANITARY #1	
50013	683916.2332	603296.7493	6.89	12" RCP SANITARY #1	
50006	683927.771	603310.645	6.91	12" RCP SANITARY #2	
50011	683918.125	603297.0997	7.07	12" RCP SANITARY #2	

6" PVC SANITARY LINES: - SANLINE #1 VISIBLE PERPENDICULAR WATER LINE AT 219+75
 - SANLINE #2 IS VISIBLE PERPENDICULAR TO EXCAVATION AT 219+00
 - SANLINES #3 AND #4 ARE VISIBLE NEAR STATION 216+75
 - ALL LINES LOCATED WITHIN 3' CLEAN FILL ZONE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50048	683634.345	603198.23	7.67	6" SANITARY LINE #1 90 DOWN FROM BUILDING	
50049	683633.797	603202.1406	7.69	6" SANITARY LINE #1 FROM BUILDING	
50039	683722.0452	603205.564	7.21	6" SANITARY LINE #2	
50040	683703.1678	603223.7656	7.48	6" SANITARY LINE #2	
50010	683915.0549	603314.0375	7.54	6" SANITARY LINE #3	
50015	683909.7637	603293.674	6.79	6" SANITARY LINE #3	
50003	683934.5288	603299.4222	5.54	6" SANITARY LINE #4	
50007	683923.722	603314.618	7.15	6" SANITARY LINE #4	

ELECTRIC LINES


- VISIBLE IN EXCAVATION PERPENDICULAR TO EXCAVATION AT STATION 218+75
 - LOCATED WITHIN 3' CLEAN FILL ZONE,

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50035	683727.456	603232.0212	7.66	ELECTRIC LINE 1	
50037	683735.4818	603210.9427	7.26	ELECTRIC LINE 1	
50036	683728.4695	603232.3838	7.11	ELECTRIC LINE 2	
50038	683736.2178	603211.2654	7.1	ELECTRIC LINE 2	

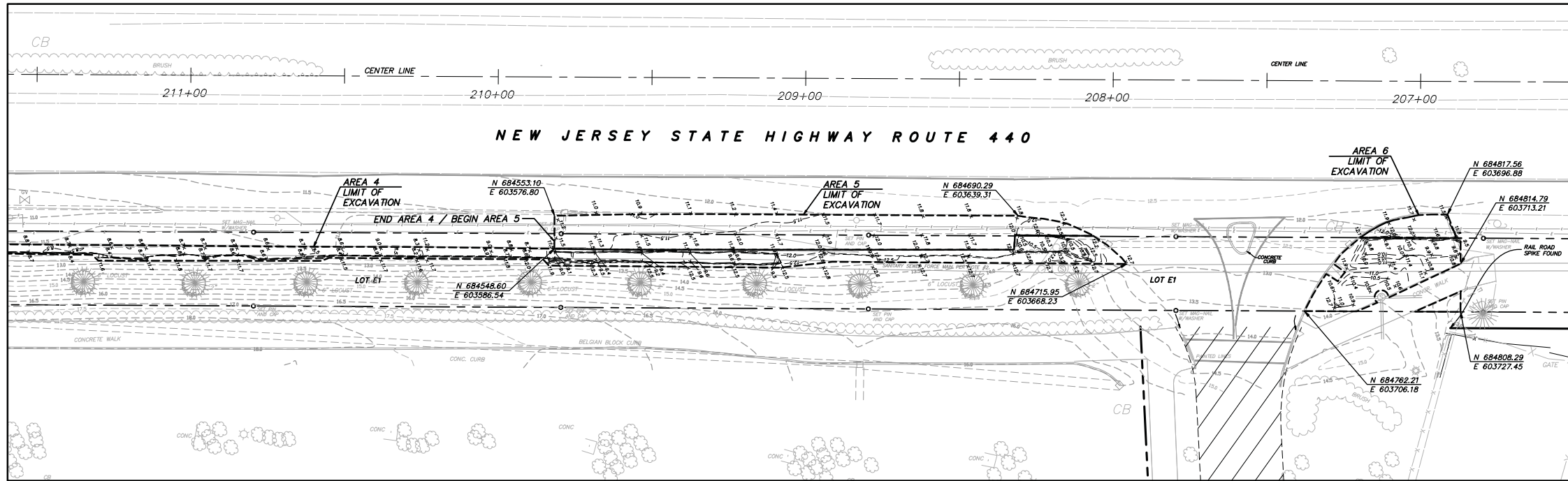
MISC UTILITIES AND ITEMS

- VISIBLE IN EXCAVATION PERPENDICULAR TO EXCAVATION AT STATION 218+75
 - ALL LOCATED WITHIN OR ABOVE 3' CLEAN FILL ZONE,

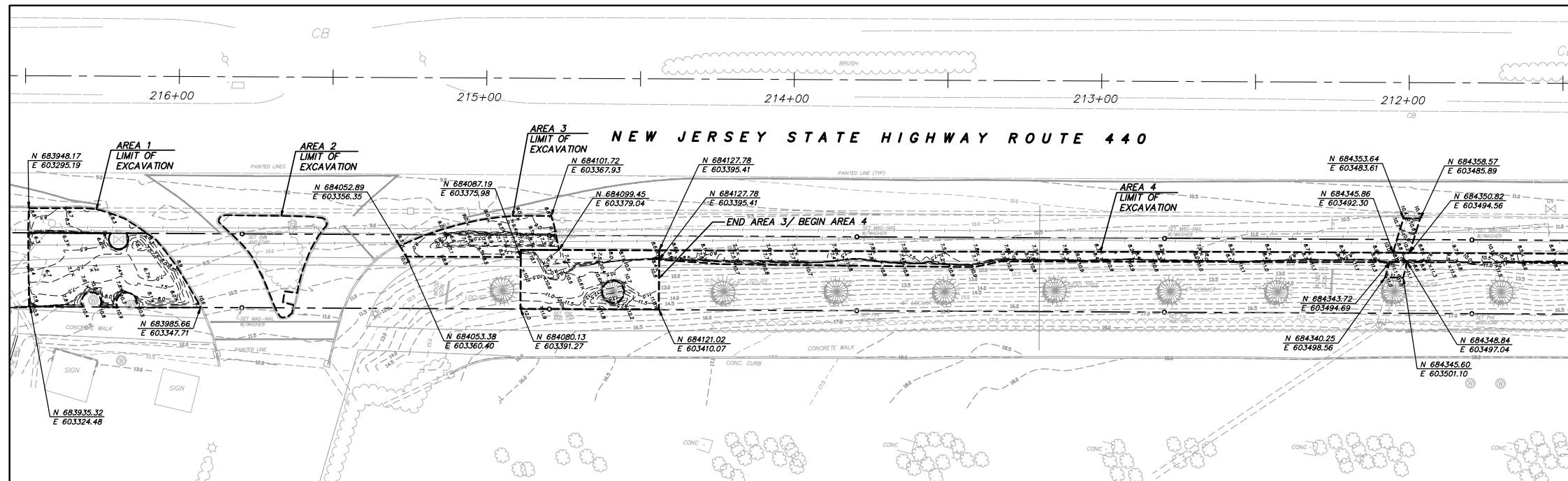
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION	NOTE/COMMENT
50063	683366.047	603148.971	11.74	153-MW-A15	MW HIT IN EXCAVATION PROGRESS
50041	683678.101	603212.934	9.91	MW	
50042	683671.178	603210.828	9.8	MW	
50075	682650.906	603169.621	8.27	12" PVC VERTICAL UNKNOWN	
50076	682503.5021	603173.4835	8.34	CONCRETE SLAB	STATION 231+25
50077	682496.608	603173.338	8.32	CONCRETE SLAB	
50078	682490.813	603172.948	8.23	CONCRETE SLAB	
50079	682491.666	603168.722	8.41	CONCRETE SLAB	
50080	682496.379	603168.843	8.55	CONCRETE SLAB	
50081	682503.217	603168.543	8.21	CONCRETE SLAB	
50082	682485.554	603172.823	8.2	CONCRETE SLAB	
50083	682486.03	603168.28	8.22	CONCRETE SLAB	
50073	682725.2195	603150.8424	10.94	ELECTRIC PULLBOX	ELEC LINE NOT IN EXCAVATED AREA
50043	683662.772	603209.23	9.63	LIGHTPOLE BASE	
50074	682670.8563	603154.8473	10.28	LIGHTPOLE BASE	
50084	682442.098	603164.631	11.68	MH #1	STATION 231+75
50071	682971.545	603140.326	12.17	MH #2	STATION 225+00
50070	683124.472	603135.841	12.06	MH #3	STATION 226+50
50004	683931.249	603314.674	9.83	MH #4	STATION 216+50
50065	683928.1	603323.3	10.3	MANHOLE	CAP LIMIT NORTH OF GARFIELD BUILDING
50086	683529.3	603177.5	10.214	MANHOLE	CAP LIMIT SOUTHWEST OF GARFIELD BUILDING
50087	682905.7	603159.2	10.793	MANHOLE	22" S.H.D.
50088	682472.1	603170.6	15.075	MANHOLE	48" B.M.U.A. MAIN

 339 Haymaker Rd., Suite 1101 Monroeville, PA 15146 P: 412-357-1100			
DRAWING NAME: FINAL AS-BUILT DRAWINGS DISCOVERED UTILITIES LIST			
PROJECT NAME & LOCATION: HONEYWELL SAS / SITE 153 JERSEY CITY, NEW JERSEY			
PREPARED BY	J. HOUGH	CHECKED BY	C. PANICO
DRAWN BY	J. HOUGH	APPROVED BY	C. PANICO
DATE	2/9/2010	DATE	2/9/2010
PROJECT NO.	D1177E	DRAWING NO.	D-1177E-001
1.	3/30/10	D.J.M.	RTH
REV	DATE	BY	CHK'D APPROV
			DESCRIPTION

STATION 206+50 TO 211+50



STATION 211+50 TO 215+50



NOTES:

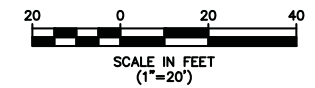
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BENCHMARK:

GPS BASE STATION
ELEVATION: 27.52
DATUM: NAVD 29

LEGEND

- - - AS-BUILT POST EXCAVATION CONTOURS
- - - LIMITS OF EXCAVATION



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REV.	DATE	DRAWN BY	DESCRIPTION
1.	1/3/2012	BSB	REV. PER ENG. REVIEW COMMENTS DATED 11/29/11

R. THOMAS HUGG
NEW JERSEY PROFESSIONAL
LAND SURVEYOR LIC. NO. 36737

MASER
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects
State of N.J. Certificate of Authorization: 24GAZ7986500

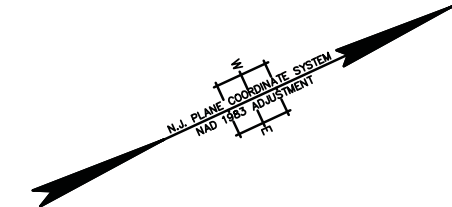
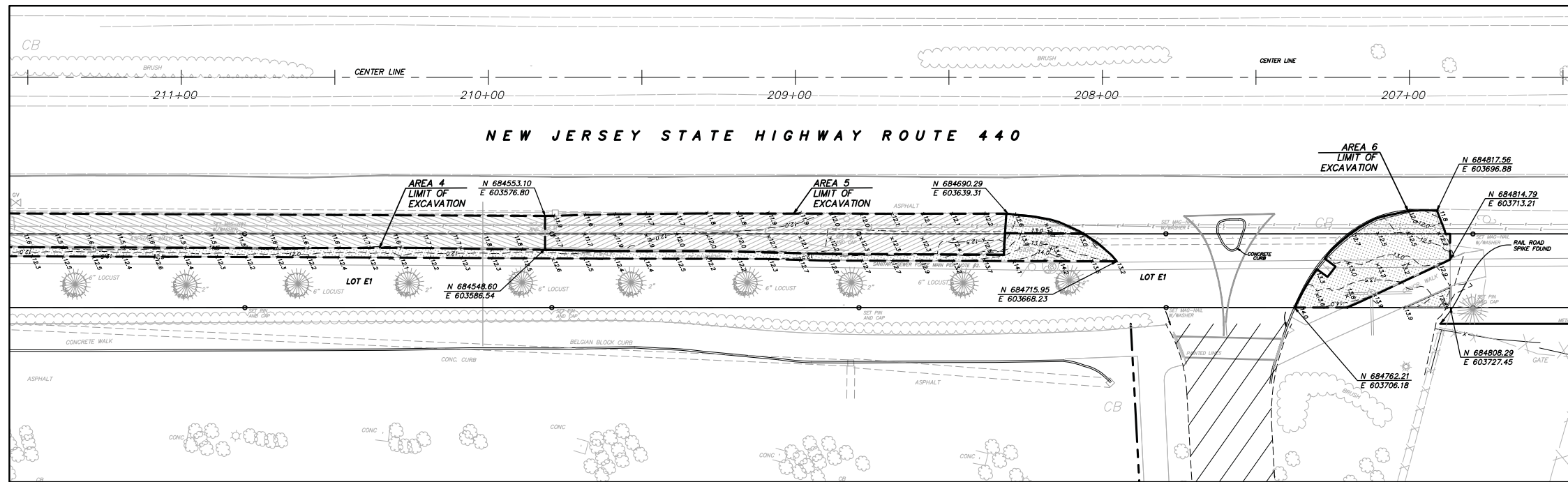
RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, N.J. 07701
Phone (732) 383-1950
Fax (732) 383-1984
email: solutions@maserconsulting.com

Regional Offices
Clinton, N.J.
Hamilton, N.J.
Lopatung, N.J.
Marmora, N.J.
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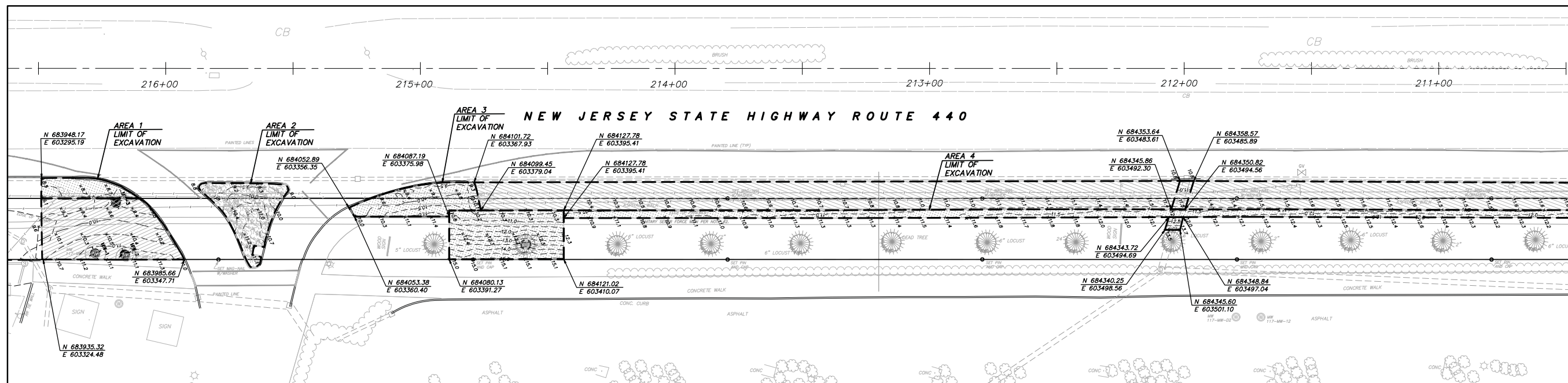
FINAL AS-BUILT CONTOUR DRAWING
POST-EXCAVATION SURFACE
HONEYWELL AREA 5 SITE 153
SOUTH UPPER SEGMENT
JERSEY CITY
HUDSON COUNTY NEW JERSEY

JOB NUMBER: 11000810A	DATE: OCT. 28, 2011
SCALE: 1"=20'	LATEST REVISION: JAN. 3, 2012
INDEX NUMBER: RBSU015980	DESIGN BY: MFM
SHEET NUMBER: 1 of 1	

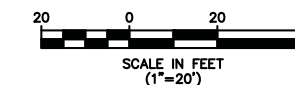
STATION 206+50 TO 211+50



STATION 211+50 TO 215+50



- LEGEND**
- AS-BUILT FINISH GRADE CONTOURS
 - LIMITS OF EXCAVATION
 - AS-BUILT SOIL AND GRASS AREAS
 - AS-BUILT 6' ASPHALT AREAS
 - AS-BUILT 2' ASPHALT AREAS



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BENCHMARK:
GPS BASE STATION
ELEVATION: 27.52
DATUM: NAVD 29

REV.	DATE	DRAWN BY	DESCRIPTION
2.	1/3/2012	BSB	REV. PER ENG. REVIEW COMMENTS DATED 11/29/11
1.	12/1/11	RTH	REVISIONS TO SHOW AS-BUILT AREAS AND TYPES

R. THOMAS HUGG
NEW JERSEY PROFESSIONAL
LAND SURVEYOR LIC. NO. 36737

MASER
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects
State of N.J. Certificate of Authorization: 24GA27986500

RED BANK OFFICE
331 Neuman Springs Road
Suite 203
Red Bank, N.J. 07701
Phone (732) 383-1950
Fax (732) 383-1984
email: solutions@maserconsulting.com

Regional Offices
Clinton, N.J.
Hamilton, N.J.
Lopatung, N.J.
Marmora, N.J.
Mt. Arlington, N.J.
Chestnut Ridge, N.Y.
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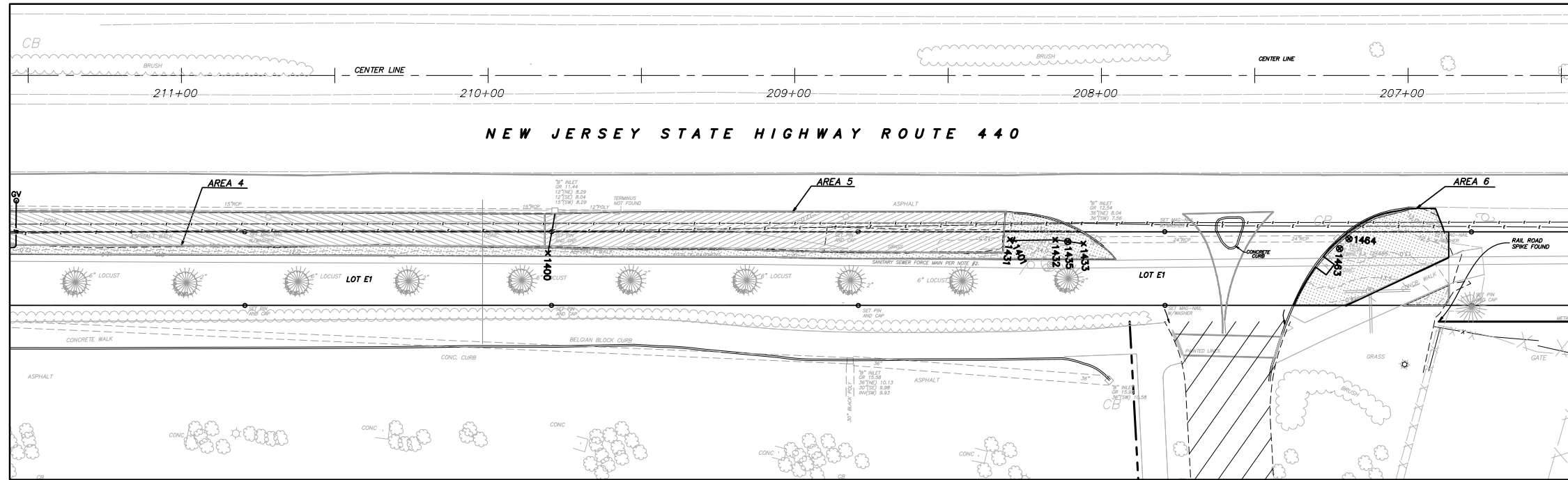
**FINAL AS-BUILT CONTOUR DRAWING
AND SITE RESTORATION
HONEYWELL AREA 5 SITE 153
SOUTH UPPER SEGMENT**

JERSEY CITY
HUDSON COUNTY NEW JERSEY

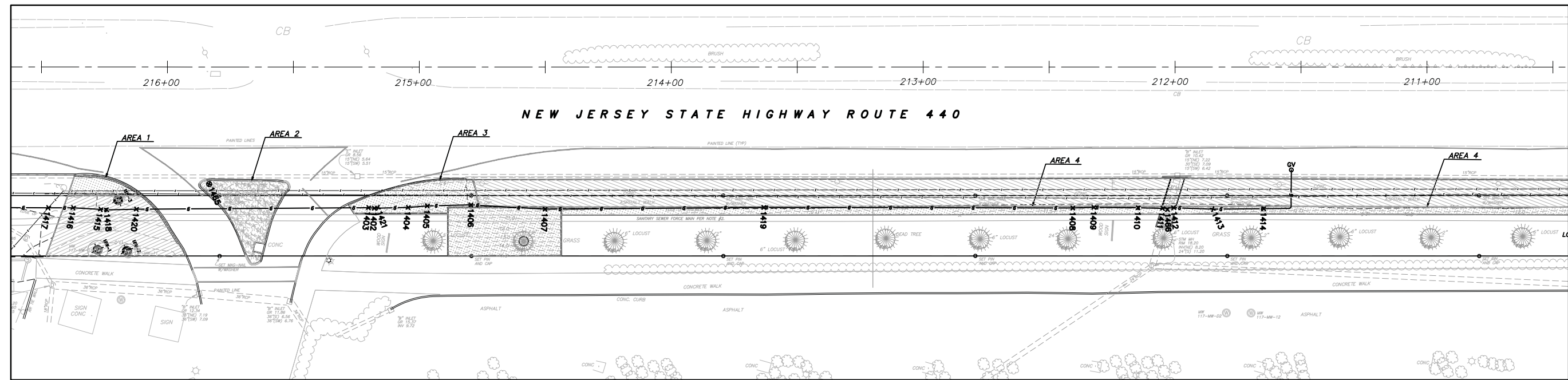
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SCALE: 1"=20'	LATEST REVISION: JAN. 3, 2012
INDEX NUMBER: RBSU016153	DESIGN BY: MFM
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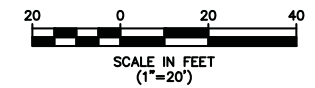
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LEGEND

- AS-BUILT FINISH GRADE CONTOURS
- LIMITS OF EXCAVATION
- AS-BUILT SOIL AND GRASS AREAS
- AS-BUILT 6" ASPHALT AREAS
- AS-BUILT 2" ASPHALT AREAS

BENCHMARK:

GPS BASE STATION
ELEVATION: 27.521
DATUM: NAVD 29



GAS LINE CHART

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1402	684061.58	603361.87	8.53	6" HDPE Gas Tracer 6" Offset above
1403	684059.60	603360.73	8.39	6" HDPE Gas Tracer 6" Offset above
1404	684073.91	603367.24	8.59	6" HDPE Gas Tracer 6" Offset above
1405	684081.08	603369.88	8.17	6" HDPE Gas Tracer 6" Offset above
1406	684096.98	603376.75	8.46	6" HDPE Gas Tracer 6" Offset above
1407	684122.97	603390.63	8.44	6" HDPE Gas Tracer 6" Offset above
1408	684313.37	603478.01	8.50	6" HDPE Gas Tracer 6" Offset above
1409	684321.04	603481.28	8.99	6" HDPE Gas Tracer 6" Offset above
1410	684336.95	603488.79	8.59	6" HDPE Gas Tracer 6" Offset above
1411	684345.69	603493.11	8.54	6" HDPE Gas Tracer 6" Offset above
1412	684349.76	603494.68	8.69	6" HDPE Gas Tracer 6" Offset above
1413	684363.62	603501.72	9.66	6" HDPE Gas Tracer 6" Offset above
1414	684382.04	603510.01	9.58	6" HDPE Gas Tracer 6" Offset above
1415	683962.73	603316.76	7.31	6" HDPE Gas Tracer 6" Offset above
1416	683953.12	603311.62	8.36	6" HDPE Gas Tracer 6" Offset above
1417	683944.16	603307.49	8.37	6" HDPE Gas Tracer 6" Offset above
1418	683964.77	603317.92	7.42	6" HDPE Gas Tracer 6" Offset above
1419	684202.07	603426.38	7.52	6" HDPE Gas Tracer 6" Offset above
1420	683975.67	603322.65	7.41	6" HDPE Gas Tracer 6" Offset above
1421	684062.96	603362.29	7.24	6" HDPE GAS

STORM CHART

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1400	684548.69	603588.86	9.64	18" RCP Top of Pipe
1401	684688.26	603648.72	10.38	36" Currogated HDPE STORM Top
1431	684687.30	603648.00	10.47	A5 36" Currogated HDPE STORM Top
1432	684700.69	603654.24	10.45	A5 36" Currogated HDPE STORM Top
1433	684708.56	603659.24	11.94	A5 36" Currogated HDPE STORM Top
1435	684704.13	603656.48	12.71	A5 STORM MANHOLE
1463	684783.68	603695.71	11.68	A6 DRAIN Box Manhole
1464	684787.80	603694.11	11.67	A6 DRAIN Box Manhole
1465	684006.07	603325.68	9.12	STORM MANHOLE
1466	684347.19	603494.29	10.25	STORM SEWER HDPE

REV.	DATE	DRAWN BY	DESCRIPTION

R. THOMAS HUGG
NEW JERSEY PROFESSIONAL
LAND SURVEYOR LIC. NO. 36737

MASER
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects
State of N.J. Certificate of Authorization: 24GA27986500

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, N.J. 07701
Phone (732) 383-1950
Fax (732) 383-1984
email: solutions@maserconsulting.com

Regional Offices
Clinton, N.J.
Hamilton, N.J.
Lopatcong, N.J.
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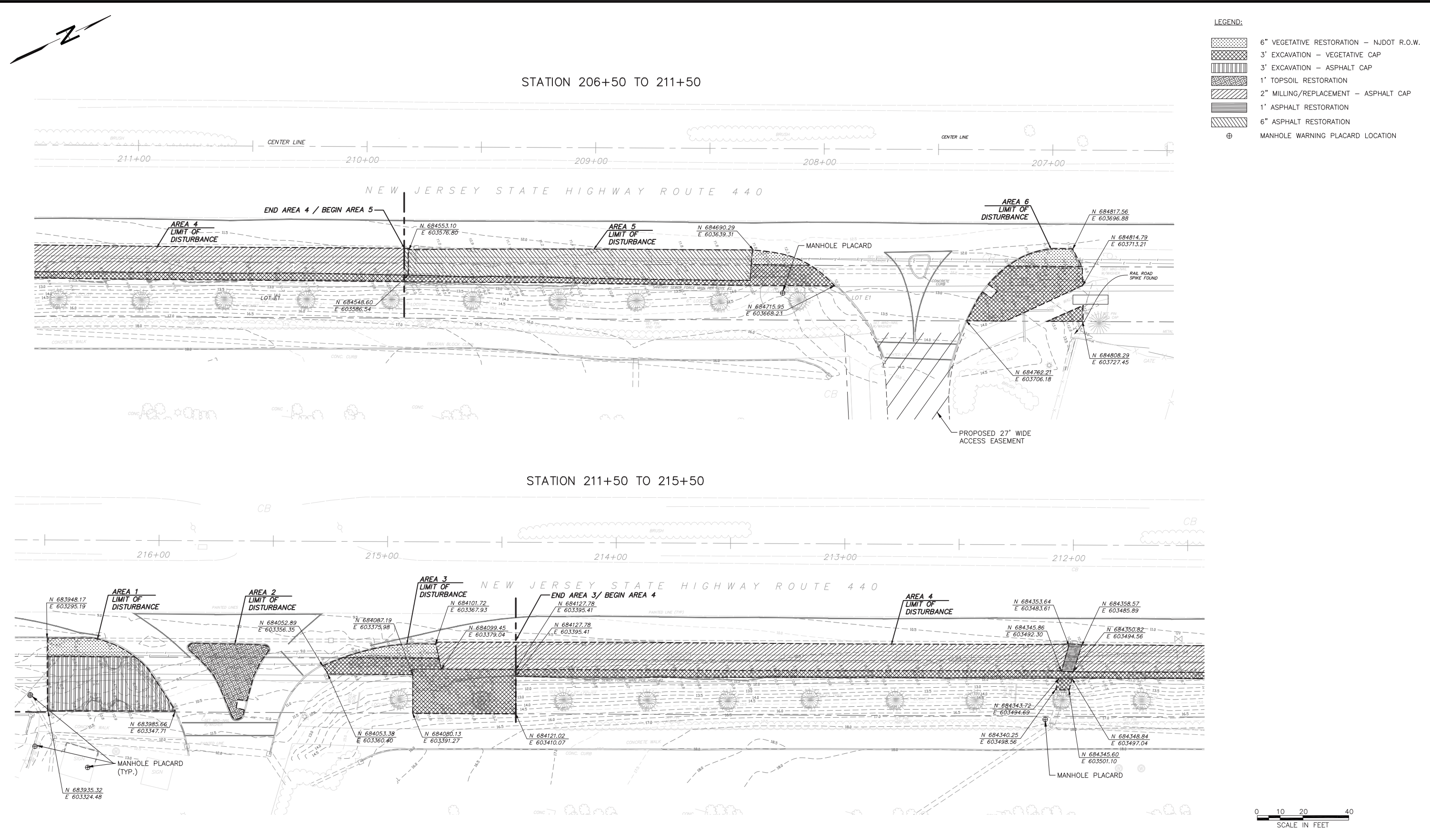
FINAL AS-BUILT CONTOUR DRAWING
DISCOVERED UTILITIES DRAWING
HONEYWELL AREA 5 SITE 153
SOUTH UPPER SEGMENT
JERSEY CITY
HUDSON COUNTY NEW JERSEY

JOB NUMBER: 11000810A	DATE: DEC. 1. 2011
SCALE: 1"=20'	LATEST REVISION:
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P:\CADD\HONEYWELL\JERSEY CITY\SA 5\SITE 153\3480120310-6100-IRM-RTC-0000.dwg Tue, 09 Oct 2012 - 3:27pm david.beech Layout



- LEGEND:**
- 6" VEGETATIVE RESTORATION - NJDOT R.O.W.
 - 3' EXCAVATION - VEGETATIVE CAP
 - 3' EXCAVATION - ASPHALT CAP
 - 1' TOPSOIL RESTORATION
 - 2" MILLING/REPLACEMENT - ASPHALT CAP
 - 1" ASPHALT RESTORATION
 - 6" ASPHALT RESTORATION
 - MANHOLE WARNING PLACARD LOCATION

REV.	DATE	STATUS	PRPD BY	CHKD BY

AMEC PROJECT No. 3480120310
 DRAWING: 3480120310-6100-IRM-RTC-0000

PREPARED/DATE: DL 10/3/12
 CHECKED/DATE: EGC 10/9/12

ENVIRONMENT & INFRASTRUCTURE
 200 AMERICAN METRO BLVD, SUITE 113
 HAMILTON, NEW JERSEY 08619

FIGURE 3
 EXCAVATION AND ASPHALT RESTORATION
 OF INTERIM REMEDIAL ACTIONS
 SA-5 SITE 153 SOUTH UPPER SEGMENT
 JERSEY CITY, NEW JERSEY

APPENDIX C

**WORKER TRAINING MANUAL
(Separate Document)**

APPENDIX D

**DRAFT SPECIFICATIONS FOR CHROMIUM MATERIALS
EXCAVATION AND MANAGEMENT**

DRAFT SPECIFICATIONS
FOR
CHROMIUM MATERIALS
EXCAVATION AND MANAGEMENT

Prepared by

AMEC Environment and Infrastructure, Inc.
200 American Metro Boulevard, Suite 113
Hamilton, New Jersey 08619

DECEMBER 2014

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ATTACHMENTS

List of Honeywell Approved Waste Facilities (to be provided to contractor if needed)

SECTION 01000 CHROMIUM-IMPACTED MATERIALS

PART 1 – GENERAL

1.01 DESCRIPTION

- A. These specifications were prepared by Amec on behalf of Honeywell for use by the Bayonne Municipal Utilities Authority (BMUA) and its Contractors to address excavation and management of chromium-impacted materials that may be encountered during sewer maintenance; repair and/or replacement work at designated sites in Bayonne and Jersey City. Chromium-impacted material refers to soil, fill or other materials such as concrete debris containing hexavalent chromium above the NJDEP soil criteria, currently 20 milligrams per kilogram (mg/kg or parts per million [ppm]). Chromium-impacted groundwater refers to groundwater containing chromium above the NJDEP groundwater quality standards, currently 70 micrograms per liter (ug/L or parts per billion [ppb] based on total chromium).
- B. This specification consists of the following sections.
 - Section 01001 Excavation of Chromium-Impacted Materials
 - Section 01002 Handling and Management of Chromium-Impacted Materials
 - Section 01003 Waste Transportation and Disposal of Chromium-Impacted Materials
- C. These specifications apply to excavation and management of chromium-impacted materials that may be generated during sewer work. For BMUA specifications applicable to sewer construction work, refer to the BMUA Rules and Regulations and Standard Specifications/Construction Details (August 2003).
- D. During work execution, the BMUA will be the contracting authority and will direct all work being conducted. However, coordination and consultation between the BMUA and Honeywell may be needed on how best to manage chromium-impacted materials on a case by case basis. Honeywell (or its designated Contractor) may observe or provide oversight of work involving excavation and handling of chromium-impacted materials. In such cases, Honeywell will provide a designated representative (“Honeywell Representative”) to provide guidance on the handling of these materials.
- E. These specifications are included as part of the Standard Operating Procedure (SOP) for Coordinating Work within Chromium Soil Areas. The SOP addresses coordination of work between Honeywell and the BMUA during sewer repair or replacement performed either as part of planned maintenance work, or required as a result of an emergency situation in areas of chromium-impacted soils. The SOP specifies that BMUA’s Contractor will take the lead in performing work associated with excavation of materials generated during sewer work. Honeywell’s and/or its designated representative will assist the BMUA in determining whether or not the work location is in an area of chromium soils and provide technical assistance, field oversight and support as needed during soil excavation and site restoration. Honeywell (or its designated contractor) will arrange for disposal of chromium contaminated materials if required in connection with sewer work. In some cases, the BMUA’s Contractor may take the lead in providing offsite transportation and disposal of chromium-contaminated materials, to be determined on a case-by-case basis in consultation with Honeywell.

1.02 REFERENCES

- A. The Contractor shall perform all work in accordance with all applicable, Federal, State and local regulations and guidance documents.
- B. Worker Training Manual: Prepared by Honeywell for use by the BMUA and addresses health and safety requirements for BMUA personnel and contractors who may be implementing sewer pipeline maintenance, repair and/or replacement work or other ground intrusive activities (e.g., digging, drilling, excavation) in areas of chromium-impacted fill.
- C. BMUA Rules and Regulations and Standard Specifications/Construction Details (BMUA, August 2003).
- D. NJDEP Guidance for the Characterization of Concrete and Clean Material Certification for Recycling.

1.03 SUBMITTALS

- A. The Contractor shall submit to the BMUA's designated representative for approval (unless otherwise specified) the following:
 - 1. Materials Management Plan: The plan shall include the identified chromium-impacted materials requiring management, the type of containers to be utilized, procedures for management of chromium-impacted materials, equipment to be utilized, and the proposed means/methods of coordinating the work.
 - 2. Health and Safety Plan (HASP): The HASP shall comply with all provisions of OSHA which are relevant to the excavation, handling and management of chromium-impacted materials. At a minimum, the plan shall cover OSHA personnel training requirements for work being performed, provisions for prevention of contaminant migration during work, emergency and contingency planning, and work zone monitoring, and perimeter air-monitoring (if required). It shall be prepared in conformance with all applicable Health and Safety laws and regulations including but not limited to OSHA 1910.120.
 - 3. Hazardous Waste Contingency Plan: The plan shall address preparedness and prevention, emergency procedures and evacuation plan, if required in accordance with 40 CFR 262.34 and 264.52. This plan may overlap with and be included as part of the HASP.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

- END OF SECTION -

SECTION 01001: EXCAVATION OF CHROMIUM-IMPACTED MATERIALS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. The work under this section shall consist of furnishing all labor, equipment and materials for performing all operations for excavation of chromium-impacted materials.

1.2 QUALITY ASSURANCE

- A. The Contractor shall be responsible for contacting Honeywell for coordination of offsite transportation and disposal of chromium-impacted materials, if required in connection with sewer work.
- B. Confirmatory/post-excavation sampling or testing may be required for excavation bottom and sidewalls, to be determined on a case by case basis in consultation with BMUA and Honeywell. Contractor shall cooperate with BMUA and/or Honeywell's designated representative and provide access for sampling if needed.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXCAVATION

The Contractor shall prepare and submit as part of the Materials Management Plan, a section describing excavation activities for chromium-impacted areas to the BMUA for review and approval. The excavation section of the Plan shall include a description of the work required in this specification section, work sequencing and scheduling including: excavation methods; plans for decontamination; dust control measures; any proposed temporary staging areas; handling and management of excavated materials; and any permit requirements. The excavation section of the Plan shall also include copies of required notifications and permits obtained by the Contractor and a list of all subcontractors proposed with copies of their current, valid permits or licenses to perform the work. All work shall be conducted in accordance with all OSHA requirements. Work shall not begin until approval is received from BMUA's designated representative.

3.2 REMOVAL OF CONTAMINATED SOIL

- A. The Contractor shall excavate contaminated soil/material as needed to complete sewer work as required by the BMUA.
- B. The Contractor shall provide means to suppress dust as needed during excavation and while the excavation is open and/or stockpiles are in place.
- C. The Contractor shall manage contaminated soil/material in accordance with Specification – Material Handling and Management.
- D. The Contractor shall coordinate access to the excavation(s) with BMUA's and/or Honeywell's designated representative as deemed necessary for inspection and collection of soil samples.
- E. The Contractor shall maintain a Record Drawing documenting the daily cumulative horizontal and vertical extent of the excavation in each area of concern including

estimated quantities. The Record Drawing shall be updated daily, provided to the BMUA's designated representative and shall be posted in the Contractor's trailer.

- F. Any subsurface structures, or portions thereof, or debris located within the limits of the chromium-impacted area being excavated shall be removed and decontaminated where practicable, and segregated for characterization prior to off-site disposal. Material shall be characterized in accordance with current NJDEP guidance and disposal facility requirements. Debris may be reduced in size to meet specific disposal facility requirements. Size reduction will be accomplished in coordination with and the concurrence of the BMUA's designated representative and be performed in compliance with all applicable state and local regulation.
- G. Any utilities and associated structures encountered within the excavation shall be addressed on a case by case basis by the Contractor in consultation with BMUA's designated representative and other utility owners (if encountered).
- H. Excavation in close proximity to active utilities or aboveground structures shall be done in a manner protective of the utility or structure. The Contractor shall protect all existing structures to remain and active utilities.
- I. All earthwork equipment and tools used for excavation of contaminated soil/material shall be decontaminated in accordance with the HASP, and these specifications, prior to being used elsewhere on site or before leaving the site.

3.3 EXCAVATION AREA

- A. The chromium-impacted areas to be excavated will be defined in the field by BMUA's and/or Honeywell's representative.
- B. Excavation activities include the excavation and removal of soil/material from designated chromium-impacted area(s).
- C. The activities shall be performed in accordance with OSHA requirements for excavation. Work shall be completed by OSHA trained individuals. Refer to the Worker Training Plan for guidance on applicable training requirements.
- D. The Contractor shall not backfill the excavation until the final limits of excavation are reviewed and approved by the BMUA's designated representative. Backfill can begin immediately upon approval of the BMUA's designated representative.
- E. The excavation shall be kept dry by the implementation of construction dewatering operations, if groundwater or storm water is encountered during construction. Evacuated water shall be characterized and disposed in accordance with all applicable Federal, State and local requirements.
- F. Refer to Section 01002 (Handling and Management of Chromium-Impacted Materials) and Section 01003 (Waste Transportation/Disposal of Chromium-Impacted Materials) for requirements for management, loading and transportation/disposal of chromium-impacted materials.
- G. The Contractor shall provide all labor, equipment and materials for road closures, as needed, based on the operation.

- END OF SECTION -

SECTION 01002: HANDLING AND MANAGEMENT OF CHROMIUM-IMPACTED MATERIAL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The Contractor shall furnish all labor, equipment, and materials necessary to provide for the proper on-site handling and management of chromium-impacted materials including but not limited to: excavated soils, fill materials (including materials identified as chromium-impacted solid waste), excavated chromium-impacted concrete/masonry, metal, and all other debris; excavated non-chromium impacted soils/materials; asphalt pavement; miscellaneous construction debris (vegetation, trees, wood, etc.); liquid waste (decontamination water, construction dewatering, etc.); and remediation waste (disposable PPE, plastic sheeting, sampling equipment, etc.).
- B. The Contractor is responsible to perform all work in compliance with applicable Federal, State, and local regulations and requirements.
- C. The Contractor is required to provide a Site Specific Health and Safety Plan, Materials Management Plan, and Hazardous Waste Contingency Plan.
- D. The Contractor shall be responsible for coordinating the work/schedule with Honeywell for transportation/disposal of chromium-contaminated materials (see list of approved facilities in Attachment A).
- E. Non-chromium impacted soils removed from excavation areas shall be stockpiled temporarily in a designated stockpile area, as approved by BMUA's designated representative.
- F. For chromium-impacted soils, the preferred soil management method is direct loading and offsite transportation of soils removed from excavation area. If direct loading is not possible, then soils may be stockpiled temporarily in a designated Waste Staging and Storage Area as approved by BMUA's and Honeywell's Representative.
- G. Asphalt and/or concrete materials removed from excavation areas shall be inspected for potential chromium impacts, characterized in accordance with current NJDEP guidance and properly disposed off-site. NJDEP Guidance for Characterization of Concrete and Clean Material Certification for Recycling may be applicable.
- H. Oversize material removed from excavation areas, shall be properly disposed off-site in accordance with local, State and Federal disposal requirements.
- I. The Contractor shall provide a system to weigh loaded trucks before they leave the site to confirm the maximum weight restriction is not exceeded. The system can include trucks equipped with load cells, or portable truck scale or similar device approved by BMUA and Honeywell's Representative.

1.02 WASTE CONTAINERS

- A. The Contractor shall provide as applicable:
1. Plastic bags for disposable personnel protection equipment. Plastic bags shall have a minimum thickness of six (6) mils.
 2. Containers (e.g., roll-off containers) for non-hazardous municipal trash and debris.
 3. DOT-approved, steel drums (55-gallon capacity) for storage of residual impacted material and/or water or roll-off containers, if needed.
 4. Portable temporary storage tanks (FRAC tanks, etc.) for the storage, treatment and/or disposal of any collected liquids, such as pumped groundwater from excavation dewatering, decontamination fluids. The Contractor is responsible for transportation/disposal of collected liquids at an approved facility. If water is discharged to local sanitary sewer system, Contractor is responsible for obtaining any approvals/permits, meeting local sewer utility discharge criteria and satisfying all other conditions and requirements of the local sewer utility, including sampling/analysis/reporting and compliance with NJDEP Treatment Works Approval for the construction and operation of on-site treatment system.

1.03 ON-SITE MANAGEMENT AND STORAGE OF MATERIALS

- A. The Contractor shall be responsible for proper on-site management of wastes generated in compliance with all Federal, State, and Local regulations and requirements.
- B. The Contractor shall load non-hazardous municipal trash and debris into appropriate containers for subsequent removal from the site in a timely manner.
- C. The Contractor shall load cleared vegetation and other non-impacted debris into appropriate containers for subsequent removal from the site in a timely manner.
1. Temporary on-site stockpiles of cleared material may be allowed, as approved by BMUA's designated representative, to facilitate the progress of the work.
- D. The Contractor shall be responsible for loading all waste containers, trucks, etc. with non-hazardous and hazardous solid waste materials removed from the work areas.
- E. The Contractor shall be responsible for movement/direction of the containers, trucks, etc. into positions required for proper loading and management of material.
- F. The Contractor shall be responsible for the on-site management of roll-off containers, storage of trash and debris from site preparation, and final site cleanup activities.
- G. The Contractor shall be responsible for coordinating the schedule for delivery and pick-up of supplied waste containers. The Contractor shall also be responsible for movement and storage of containers within the site to allow the progress of the work.
- H. The Contractor shall provide a base for any temporary stockpiles using at a minimum 6 mil polyethylene sheeting to prevent direct contact and cross-contamination of the underlying soil/asphalt. The plastic sheeting shall be properly overlapped to protect against direct soil/asphalt contact.

- I. The Contractor shall cover any temporary stockpiles with at a minimum 6 mil polyethylene sheeting to prevent erosion of the stockpiles or uncontrolled runoff while promoting runoff of precipitation. The plastic sheeting shall be weighted down appropriately for expected weather conditions.
 1. Temporary stockpiles shall be located in designated Stockpile Area, as approved by the BMUA's designated representative. The base of all stockpiles shall be contained by a siltation fence reinforced with staked straw bales. In addition to the above, asphalt berms and/or sand bags may be used to divert surface water runoff from the stockpile areas. In all cases contractor shall maintain conformance with standard methods for NJ Soil and Erosion Control and/or a Soil and Erosion Control Plan Certification.

1.04 ANALYTICAL TESTING AND CLASSIFICATION OF WASTE MATERIALS

- A. No testing requirements are expected for the following non-impacted wastes:
 1. Cleared vegetation; and
 2. General trash and rubbish from outside the exclusion zone.
- B. Contractor shall be responsible for waste classification testing of excavated soils and other debris destined for offsite disposal as required in accordance with applicable regulations and guidance; obtaining acceptance of waste material as needed from disposal facilities; and making arrangements for waste transportation and disposal including the use of Honeywell approved waste facilities for chromium-impacted materials, if required in connection with sewer work. Honeywell (or its designated contractor) may take the lead in making arrangements and providing for offsite transportation and disposal of chromium-contaminated materials, to be determined on a case-by-case basis.
- C. For non-chromium impacted soils, Contractor shall provide for waste classification sampling and transportation/disposal/reuse as appropriate in consultation with BMUA's designated representative. Excavated materials identified/characterized as non-chromium impacted soil shall be stockpiled temporarily in the designated Stockpile Area, as approved by BMUA's designated representative.
- D. For chromium-impacted soils, Contractor shall provide for direct-loading (where possible) into trucks/containers for transportation to an approved waste facility. If direct loading is not possible, then soils shall be stockpiled temporarily in a designated stockpile area (separate from non-chromium impacted soils). Direct loading and transportation of chromium-impacted soils is preferred whenever possible. When used, stockpiles of chromium-impacted soil shall be constructed and protected in a manner that will ensure the integrity of the stockpile is maintained and the potential for migration of chromium-impacted soil or water in contact with chromium-impacted soil is mitigated.

1.05 LOADING OF WASTES

- A. The Contractor shall furnish all labor, equipment, and materials necessary to provide for the proper loading of all materials generated during the execution of the work.
- B. The Contractor shall be responsible for coordinating the work/schedule with Honeywell (or its designated contractor) for the loading and transportation/disposal of chromium contaminated materials.

- C. The Contractor shall be responsible for any demurrage charges associated with delays in the timely loading the waste materials.
- D. Materials that contain excess water shall be mixed with a sufficient quantity of absorbent to prevent free water from developing in containers during transport to the disposal facility.
- E. Absorbents shall be approved by Honeywell's designated representative and the disposal facility as needed to allow effective transport of materials to designated disposal facility.

1.06 TRANSPORTATION OF WASTES

- A. The Contractor shall arrange for the proper transportation and disposal of non-impacted waste (e.g., cleared vegetation, general trash and rubbish) in accordance with applicable local, state and federal regulations.
- B. The Contractor shall arrange for the proper transportation of non-hazardous waste materials and chromium-impacted hazardous waste materials (if applicable) to appropriate licensed/permitted disposal facilities, in accordance with applicable local, state and federal regulations.
- C. The Contractor shall be responsible for coordinating with Honeywell (or its designated contractor) and scheduling transporters for offsite transportation and disposal of chromium-impacted materials generated during execution of the work at Honeywell approved waste facilities. Honeywell (or its designated contractor) may take the lead in coordinating and providing offsite transportation and disposal of chromium-contaminated materials, to be determined on a case-by-case basis.
- D. The Contractor shall require that the transporters arriving at the site for loading do not cause undue congestion to local streets, and shall stage trucks either within the perimeter of the site or at an off-site staging area.

DISPOSAL OF WASTES

- A. The Contractor shall be responsible for coordinating with Honeywell approved waste facilities, scheduling transporters and arranging for off-site transportation and disposal of chromium-impacted materials, if applicable for the project.
- B. The Contractor shall provide for offsite transportation and disposal of non-chromium impacted waste materials in accordance with in accordance with applicable local, state and federal regulations.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

Not Applicable.

--END OF SECTION--

SECTION 01003: WASTE TRANSPORTATION AND DISPOSAL OF CHROMIUM-IMPACTED MATERIALS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes the Contractor's minimum responsibilities for and requirements for Waste Transportation and Disposal of chromium-impacted materials, including coordination with Honeywell approved waste facilities, in the event that BMUA's Contractor takes the lead on transportation/disposal of chromium-impacted soils.
- B. Contractor's work includes determining the recipient of the waste, loading wastes into trucks and containers for shipment off site, providing temporary haul roads for trucks and traffic control as needed, and coordination and scheduling with Transportation Contractor and Disposal Facility to ensure timely arrival and departure of trucks.
- C. All work related to the management of chromium-impacted materials shall be done in conformance with a Health and Safety Plan (HASP), and in accordance with OSHA 1910.120. All personnel that may become exposed to impacted materials at levels above NJDEP criteria must be OSHA trained in accordance with OSHA requirements. The HASP will be reviewed by BMUA. Refer to the Worker Training Manual for applicable training requirements.

1.02 SUBMITTALS

- A. Prepare and submit a comprehensive detailed Materials Management Plan. This comprehensive plan shall address all waste categories: Rubbish and Construction Debris, Non-Hazardous Waste and Hazardous Waste.
- B. If required by BMUA, prepare and submit a Traffic Control and Transportation Plan at least 30 days prior to the excavation. The Traffic Control and Transportation Plan shall include, as a minimum: a proposed truck route from the on-site loading staging area to the disposal facility, traffic control, and alternate traffic patterns. The route(s) to and from the disposal facility shall be in accordance with the disposal facility requirements and Federal, State and local regulations, laws, and ordinances. The Contractor shall specify the weight limitations on all sections of the route(s) and indicate the maximum truck load/weight that will be maintained in accordance with route weight limits and any other applicable Federal, State and local regulations. In addition, the plan should outline the procedures that will be followed to comply with all applicable traffic and transportation regulations.
- C. Submit resume for Contractor's proposed Transportation and Disposal Coordinator.
- D. Submit technical data for the specified truck liner material and installation procedures.

1.03 QUALITY ASSURANCE

- A. BMUA in coordination with Honeywell will monitor the Contractor's activities associated with the work of this Section. This monitoring may include but not be limited to:
1. Verifying Contractor conformance with requirements for on-site management of excavated chromium-impacted materials;
 2. Reviewing requests from Contractor for off-site reuse, recycling, treatment, and disposal facilities, associated chemical testing and documentation of chromium-impacted waste materials acceptance by receiving facilities; and
 3. Verifying the appropriate Contractor-prepared paperwork accompanies each load of excavated soil and material that is transported from the site and verifying receipt of Contractor's submittal of paperwork for off-site facility receipt and processing of site materials.

PART 2 - PRODUCTS

2.01 GENERAL

Not applicable.

PART 3 - EXECUTION

3.01 GENERAL

- A. Transportation and Disposal Coordinator (TDC). The Contractor shall designate, by position and title, one person to act as the Transportation and Disposal Coordinator. The TDC shall be on-site full time. The TDC shall serve as the single point of contact for all environmental regulatory matters, and shall have overall responsibility for environmental compliance at the site including, but not limited to, accurate identification and classification of hazardous waste and hazardous materials, determination of proper shipping names, identification of marking, labeling, packaging and placarding requirements, completion of waste profiles, hazardous waste manifests, bills of lading, exception and discrepancy reports, and all other environmental documentation. In addition, the TDC responsibilities shall include maintaining any hazardous waste being stored in compliance with all applicable regulations (i.e. proper stockpiling) prior to shipment off-site. The TDC shall have, at a minimum, five-years of specialized experience in the management and transportation of hazardous waste. The TDC shall have appropriate DOT, OSHA and EPA training.

3.02 HAUL ROADS

- A. The Contractor shall construct and maintain temporary haul roads onsite from the site entrance to the locations of active excavation, stockpiles, weigh scales and truck washing facility, as needed to complete the work. Haul roads shall be maintained to permit efficient travel of fully loaded trucks. Contractor shall provide traffic control, such as signs and flaggers.

- B. Contractor shall prepare contingency plans for handling disabled vehicles, providing designated areas for queuing trucks, snow removal, lighting and any other facilities necessary to provide for efficient travel of trucks on-site.

3.03 COORDINATING WASTE SHIPMENTS

- A. Contractor will obtain letters of acceptance/commitment from waste haulers and from the TSDFs agreeing to handle and dispose wastes. Letters shall specifically state what types and quantities of waste the facility will accept. A copy of each letter shall be maintained in the Contractor's file.
- B. Contractor shall coordinate shipment of waste to a Honeywell approved waste facility, for each class of waste. Contractor shall be responsible for determining the disposal facility's testing requirements and other acceptance requirements, and complying with those requirements for each shipment of waste.
- C. Contractor shall prepare daily and weekly schedules for shipment of waste to each disposal facility, identifying the quantities and dates of shipments.
- D. Contractor shall coordinate the supply of trucks necessary for shipment of waste from the site to the TSDF. Contractor shall coordinate the number of trucks in service to meet Contractor's schedule. The Contractor shall coordinate the schedule for vehicle arrival and material deliveries at the construction site to meet the approved project schedule. The schedule shall be compatible with the availability of equipment and personnel for material handling operations and ensure that the excavation schedule is maintained.

3.04 SHIPPING DOCUMENTS AND PACKAGING CERTIFICATION

- A. The Contractor shall be responsible for obtaining all permits and shipping documents (from the TSDF or regulatory authorities) to ship hazardous wastes off site, either within the USA or outside of the USA.
- B. The Contractor shall use manifests for transporting hazardous wastes as required by 40 CFR 263. Transportation shall comply with all requirements in the Department of Transportation referenced regulations in the 49 CFR series. The Contractor shall prepare manifests in accordance with the hierarchy established in 40 CFR 262, Section 21.
- C. The Contractor shall prepare hazardous waste manifests for each shipment of hazardous waste shipped off site. Manifests shall be completed using instructions in 40 CFR 262, Subpart B and any applicable state or local law or regulation. Manifests and waste profiles shall be submitted to BMUA and Honeywell for review and approval. The Contractor shall prepare land disposal restriction notifications as required by 40 CFR 268 or any applicable state or local law or regulation for each shipment of hazardous waste. Notifications shall be submitted with the manifest to BMUA and Honeywell for review and approval.
- D. The Contractor shall verify that each truck and-or container complies with applicable permitting.

3.05 LOADING TRUCKS

- A. Chromium impacted waste shall be loaded into trucks or containers within the exclusion area. Trucks will include liners. When loading is complete, the liner flaps shall be placed over the top of the chromium impacted waste prior to covering the waste in a manner to prevent contact adjacent to the loading area with the road tarp.
- B. Contractor shall provide liners for trucks used to transport hazardous chromium-impacted waste materials. Contractor shall assume and use trucks and truck liners with a truck capacity of 18-cubic yards (loose). **Liners shall consist of a 7.4-oz Woven Polypropylene outer layer to provide strength, and a 3 mil Polyethylene inner layer as manufactured by PACTEC. Contractor shall be advised that these liners are heavy duty liners, and will require specialized scaffolding or other techniques to install. Normally 2 to 4 workers are required to line each truck prior to filling, and to zip closed once filling is complete. At no time will a worker enter the truck bed.**
- C. When truck loading is complete, the truck shall be decontaminated.
- D. Each loaded truck shall be weighed on-site.
- E. Each truck shall have a proper manifest and placard prior to leaving the site.
- F. Each truck entering and exiting the site shall be recorded and entered into the Disposal Manifest and Management system.

3.06 WEIGH SCALE

- A. The Contractor shall provide a system to weigh loaded trucks before they leave the site to confirm the maximum weight restriction for anticipated travel route is not exceeded. The system can include trucks equipped with load cells or a portable truck scale or similar device approved by BMUA and/or Honeywell's Representative.

3.07 HAULING BY TRUCK

- A. The Contractor shall ensure that the vehicle is properly decontaminated, weighed and has the proper manifests and placards before the truck leaves the site.
- B. The Contractor shall respond and remedy situations involving material spilled in transit or mud and dust tracked off-site, within a distance of one mile from the site.
- C. The Contractor shall protect trucks against contamination by properly covering and lining them with compatible material or by decontaminating them prior to any use other than hauling contaminated materials. The Contractor is responsible for inspection of transportation vehicles prior to leaving the site, to verify no material adheres to the wheels, undercarriage, tailgates, covers or other areas of transport vehicles.
- D. The Contractor shall utilize truck tarps on all trucks entering and exiting the site.

--END OF SECTION--

ATTACHMENT A
LIST OF HONEYWELL APPROVED WASTE FACILITIES
(To be provided by Honeywell)

DRAFT

Draft Document - Honeywell Confidential
This document is for Honeywell use only and
is not to be distributed to unauthorized personnel.

HONEYWELL APPROVED FACILITIES - FOR RESPONSE ACTIONS AT HUDSON COUNTY CHROMATE SITES							
Country	State / Province	City	Waste Management Facility Name	Address	Postal Code	Tel No. or Web Site	Regulatory ID
USA	New York	Model City	Chemical Waste Management (CWM Chemical Services)	1550 Balmer Rd	14107	786-286-1550	NYD049836679
USA	New Jersey	South Kearny	Clean Earth Of North Jersey, Inc.	105 Jacobus Avenue	7032	973-344-4004	NJD991291105
USA	Pennsylvania	York	Envirite	730 Vogelsong Road	17404	717-846-1900	PAD010154045

APPENDIX E

**REFERENCE BAYONNE MUA RULES AND REGULATIONS
FOR SITE WORK, EXCAVATION AND BACKFILL**

501. GENERAL REQUIREMENTS

The term "Design Engineer" and "Architect" are used interchangeably within the Contract Documents and are intended to refer to the Owner's Design Representative familiar with the design or construction phases of the project. The term "City" shall refer to the City of Bayonne or their Consulting Engineer, and the term "Authority" and "Engineer" shall refer to the Bayonne Municipal Utilities Authority and the Authority Consulting Engineer and are intended to refer to local agencies familiar with the approved design plans and specifications and responsible for providing review and approval of the project.

The Technical Specifications consists of sixteen (16) Items as follows:

Section 502	Site Work and Restoration
Section 503	Excavations and Backfill
Section 504	Broken Stone or Screened Gravel Foundation
Section 505	Backfill Materials
Section 506	Pre-cast Concrete Manholes
Section 507	Furnishing and Installing Ductile Iron Sewer Pipe
Section 508	Bypass of Combined/Sanitary Sewer Flows
Section 509	Pre-cast Concrete Catch Basin Inlets
Section 510	Reinforced Concrete Pipe
Section 511	PVC Sewer Pipe
Section 512	Furnishing and Installing Ductile Iron Water and Force Mains
Section 513	Furnishing and Installing Ductile Iron Fittings (Mechanical Joint) for Water and Force Mains
Section 514	Furnishing and Installing Underground Valves and Valve Boxes for Water Mains
Section 515	Furnishing and Installing Fire Hydrants
Section 516	Furnishing and Installing Water Services
Section 517	Furnishing and Installing Sewer Service Connections

Road opening permits must be obtained from the City of Bayonne Building Department prior to undertaking any construction in or along the City of Bayonne public right-of-ways. Backfill and resurfacing of County and NJDOT roadways shall be as per the requirements of the County and NJDOT. The Contractor is specifically alerted to include the requirement for traffic control, working hour restrictions, and provision of uniformed Municipal Policemen when working within municipal, County, and NJDOT rights-of-ways.

The construction schedule is to be coordinated with the Owner, the Design Engineer, the City of Bayonne, the Bayonne Municipal Utilities Authority, and the Engineer. Regularly scheduled job meetings are to occur at least monthly during the full contract period and thereafter as may be necessary.

501.1 Additional Information

501.1.1 Insurance and Time Limits

The Contractor is to refer to the appropriate sections of the Authority Rules and Regulations for insurance requirements and time limits relating to project completion.

501.1.2 Patents and Royalties

If any design, device, material or progress covered by letters, patent or copyright is used or installed by the Contractor, he is to secure, pay for and provide for such use by legal agreement with the holder of the patent or a duly authorized licensee of such holder, and is to save harmless the Authority and Engineer from any and all loss or expense on account of including its use by the Owner.

501.1.3 Guarantees

All work, materials, and equipment furnished under this Contract are to be guaranteed by the Contractor to perform the services required of them, to the full satisfaction of these Specifications, for a period of two (2) years from the date of the final acceptance.

501.1.4 Other Contracts

The Owner may let other contracts related to the work of the Contractor. The Contractor is to cooperate with other contractors with regard to storage of materials and execution of the work. It is the Contractor's responsibility to inspect all work by other contractors affecting his work and to report to the Owner any irregularities which will not permit him to complete his work in a satisfactory manner. His failure to notify the Owner of such irregularities indicates the work of other contractors has been satisfactorily completed to receive his work.

The Contractor is not responsible for defects of which he could not have known, which develop in the work of others after the work is completed. Where work under this Contract is to be connected to work under other contracts, it is the responsibility of the Contractor to measure the completed work in place and report to the Owner immediately any difference between completed work by others and the provisions of the Contract Documents.

501.1.5 Witness Testing

All testing of materials and equipment specified under the various sections of these Contract Documents is to be witnessed by the Engineer. The Contractor will give the Engineer a minimum of 72 hours of advanced notice of such testing (Saturday, Sunday, and Holidays not included) and will make reasonable accommodations for the Engineer to witness such testing.

501.2 Special Project Procedures

501.2.1 Emergency Telephone

The Contractor is to maintain telephones at all times after regular working hours, including weekends and holidays, where he or his representatives can be reached on an emergency basis. The Contractor or his representatives are to be prepared to act to correct conditions on the site deemed to constitute an emergency by either the Owner, his agent, the Design Engineer, the City of Bayonne, the Authority, or the Authority's Consulting Engineer, but he is not to wait for instructions before proceeding to properly protect both life and property. If a condition on the site requires attention after working hours, either the Owner, his agent, the Design Engineer, the City of Bayonne, the Authority, or the Authority's Consulting Engineer may call the Contractor or his representatives at the emergency telephone number, identify himself and describe the emergency condition. The Contractor is expected to dispatch men and equipment to adequately institute corrective measures within two (2) hours. If, for some reason, the Contractor or his agent cannot be reached at the emergency number after a reasonable time (1/2 hour), the Owner will have the right to immediately initiate corrective measures in accordance with the Article which follows, covering Emergency Services to Correct Hazardous Conditions, and the Contractor will be considered to have waived any right to perform emergency service.

501.2.2 Emergency Services to Correct Hazardous Conditions

In the event that the Contractor fails to maintain safe job conditions or traffic conditions, including, but not limited to, trench settlement and hazardous piling or storage of backfill or construction materials, the Owner, after failure of the Contractor to commence substantial steps at the job site to rectify the situation within two (2) hours of the time the contractor has been notified, pursuant to the preceding paragraph, of the unsafe conditions, may hire guards, take such precautions, make such repairs and take any other steps which the Owner or the Owner's agent, in its discretion, considers necessary to protect the property, persons, or the Owner. The cost of any of these precautions, guards, or steps will be deducted from the payments due the Contractor, and the Contractor will be billed for these services, work, and materials at prevailing rates.

501.2.3 Notification to Utility Companies and Owners of Buried Pipelines

The Contractor is to comply with all provisions of the "Underground Facility Protection Act" (Public Law 1994, Chapter 118). The Contractor is to give notice at least three (3) business days and not more than ten (10) business days prior to the start of any work in the vicinity of existing utilities or appurtenances to the Garden State Underground Plant Location Service (N.J. One-Call System at 1-800-272-1000). The Owner is to be furnished, in writing, with the date such notice was given and the Garden State Underground Plant Location Service "Markout Confirmation Number", prior to the

start of any work. In addition, it is the responsibility of the Contractor to notify the Owner of any utility, which is not a member of the "N.J. One-Call System".

501.2.4 Work In Bad Weather

During freezing, stormy or inclement weather, no work is to be done except such as can be done satisfactorily and in a manner to secure first-class construction throughout.

When required, protection is to be provided by use of tarpaulins, wood and building paper shelters, or other approved means.

During cold weather, materials are to be preheated, if required, and the materials and adjacent structure into which they are to be incorporated are to be made and kept sufficiently warm so that a proper bond will take place and a proper curing, aging or drying will result. Protected spaces are to be artificially heated by approved means, which will result in a moist or dry atmosphere according to the particular requirements of the work being protected. Ingredients for concrete and mortar are to be sufficiently heated so that the mixture will be warm throughout when used.

The Contractor shall also take measures to prevent run-off from entering the work area.

501.2.5 Explosives

Explosives are not to be stored at the site of the Project. If explosives are required, their use may be permitted after discussions with the City of Bayonne, the City Engineer, Authority, and the Engineer and written permission all parties having jurisdiction, and only under the supervision of competent licensed blasters.

501.3 Coordination

501.3.1 General

The review and coordination of shop drawings, actual execution of the work, and testing between general construction work, equipment and piping installation, pertinent instrumentation and electrical work is the responsibility of the Contractor.

The Design Engineer and the Engineer will check each shop drawing submitted to determine whether it complies with the intent of the Contract Documents and the design. This same requirement is placed on the Contractor and his supplier.

It is the intention of the Contract Documents to place various materials of construction and related requirements in their proper place in the specifications. However, no guarantee is made that such locations are, in every instance, where the Contractor might expect to find them.

The Contractor is required to provide, or make available, all appropriate documentation to each vendor and subcontractor, both prior to bid to ensure proper Proposals, and during construction to insure compliance with the intent of the Contract Documents. This is the sole responsibility of the Contractor.

The Design Engineer and the Engineer are not responsible for project coordination between various subcontractors, which is the responsibility of the Contractor. The Engineer will observe, by attendance at regularly scheduled job meetings, the orderly flow and progress of the work. The various subcontractors and those people responsible to them are required to interact with each other to insure that the work progresses in an orderly fashion and without exceeding the time allotted in the Contract.

The Contractor is responsible for reading all the Specifications. His review of all the Contract Documents as well as shop drawings, coordination drawings and other information required to complete the project is his sole responsibility. He is to request clarification on any matters where ambiguities might exist, in order to receive instruction as to the proper documents to follow.

All products or materials which require the selection of color finishes are to be submitted early and with sufficient lead time to permit the Authority, or Owner if the proposed facilities are not going to be owned and operated by the Authority, to develop an overall color coordination system for use by the Contractor in the final installation. Delays in submitting such product or material samples or color charts at one time may delay the selection process and prevent the Contractor from granting suppliers final releases for fabrication.

501.3.2 Working Hours

The Contractor should generally limit construction operations and activities between the hours of 7:00 a.m. to 4:00 p.m. unless law establishes stricter limitations. No pile driving, pulling or other noisy operations, or operations entailing the use of vibratory hammers or compactors will be permitted, other than between the hours of 8:00 a.m. to 4:00 p.m. The Contractor must also abide by the provisions of the Article of the contract entitled, "Night, Sunday, & Holiday Work".

The Contractor must also have all work completed (including backfilling, plating, and cleanup) on all County and NJDOT roads by 3:00 p.m. each afternoon. The Bayonne Municipal Utilities Authority will strictly enforce this requirement, and the Contractor shall include any hardship anticipated in his bid items.

501.4 Field Engineering

501.4.1 Method of Construction

Before starting the work, and from time to time during its progress as the Design Engineer or the Engineer may request, the Contractor is to outline to the Design Engineer and the Authority's Consulting Engineer the methods he plans to use in doing the work and the various steps he intends to take.

501.4.2 Additional Instructions and Detail Drawings

The Design Engineer may furnish the Contractor with additional instructions and detailed drawings as may, in the opinion of the Engineer, be required to clarify the work included in the Contract. The additional drawings and instructions, thus supplied to the Contractor, will be coordinated with the Contract Documents and will be so prepared that they can be reasonably interpreted as a part thereof. The Contractor is to carry out the work in accordance with any additional detailed drawings and instructions. Additional instructions and detail drawings are not to be considered extra work.

501.5 Regulations

501.5.1 General

All work under this Contract is to comply with all applicable requirements of Federal, State and local statutes, regulations, and codes, and especially the safety provisions contained therein.

Certain work to be done within the scope of this Contract may be required to meet the specification of persons, municipalities or bodies other than the Owner and the Authority. The Contractor is to be responsible for obtaining the approval and acceptance of his completed work by such persons, municipalities, counties and similar bodies. Such work may include, but is not to be restricted to installation of sidewalks, curbs, pavement or utilities; plumbing, electrical and building construction work or other incidental work required to complete the Contract.

501.5.2 Environmental Protection

The Contractor is to minimize environmental impact due to his construction operations during all phases of his work. This shall include, but is not limited to, prohibition of the following construction procedures.

1. Dumping of spoil material into any stream corridor, any wetlands, any surface waters, or any unspecified locations.

2. Indiscriminate, arbitrary, or capricious operation of equipment in any stream corridors, wetlands, or surface waters.
3. Pumping of silt-laden water from trenches or other excavations into catch basins, surface waters, stream corridors, or wetlands.
4. Damaging vegetation adjacent to or outside of the access road or the right of way.
5. Disposal of trees, brush, and other debris in any stream corridors, wetlands, surface waters, or at unspecified locations.
6. Permanent or unspecified alteration of any flow line of any stream.
7. Open burning of project debris.
8. Use of chemicals for dust control.
9. Use of asphaltic mulch binder.
10. Discharge of test waters with high chemical disinfectant or other pollutant concentrations.

The Contractor shall protect, to the dripline, all trees not designated by the Engineer, the City of Bayonne, or the Authority to be removed.

The Contractor is directed to the appropriate sections of the Specifications for additional information regarding environmental work and protection.

501.5.3 Labor, Safety, Health and Security Regulations

The Contractor is to refer to the appropriate portions of Information for Bidders regarding Regulations.

The Contractor is to provide adequate signs, barricades, red lights and uniformed guards and take all necessary precautions for the protection of the workers, the work and the safety of the public. All traffic control shall be in accordance with the requirements of the latest edition of the USDOT "Manual of Uniform Traffic Control Devices". All barricades and obstructions are to be protected at night by suitable signal lights which are to be lit from sunset to sunrise. Barricades are to be of substantial construction and painted such as to increase their visibility at night. Suitable warning signs are to be so placed and illuminated at night as to show in advance where construction, barricades or detours exist.

The Contractor is to keep on proper lights each night between the hours of sunset and sunrise at and upon all portions of his work; upon all ranges or other stakes in

connection with the work, when deemed necessary by the Owner, the Authority, or by the proper authorities, or when required by the liability insurance coverers, and is to be responsible for all injuries and damages resulting from neglect or failure in this respect. Night lighting must be so sized, concentrated and located so as to cast sufficient illumination around new construction and excavations. All excavations and obstructions must be properly marked, lighted and provided with railing and other guards.

The Contractor is to maintain sufficient guards by day and night to prevent accidents of any kind or character whatsoever, and will be liable for any damage, which may arise from any negligence on his part or that of his agents and employees.

If, at any time, in the opinion of the Owner, the Engineer, the City, of the Authority, the work is not properly lighted, barricaded, and in all respects safe in respect to public travel, persons on or about the work, or public or private property, the Owner will have the right, but not the obligation, to order such safeguards to be erected and such precautions to be taken as he deems advisable, and the Contractor is to promptly comply with such orders. If, under such circumstances, the Contractor does not or cannot immediately put the same into proper and approved condition or if the Contractor or his representative is not upon the grounds so that he can be immediately notified of this insufficiency of safety precautions in accordance with the procedures for notification of the Contractor specified under "Emergency Telephone", then the Owner may put the work into such a condition that it shall be, in his opinion, in all respects safe and the Contractor is to pay all expenses of such labor and materials as may have been used for this purpose by him or by the Owner. Such action of the Owner, or his failure to take such action, will in no way relieve the Contractor of the entire responsibility for any cost, loss, or damage by any party sustained on account of the insufficiency of the safety precautions taken by him, by the Owner acting under authority of this Section.

501.5.4 Sanitation

Sanitary conveniences, properly screened from public observation, for the use of all persons employed on the work and beginning with the first persons engaged in preliminary operations, are to be provided and maintained by the Contractor in sufficient numbers, in such a manner and at such locations as will be approved. Sanitary facilities are to be completely self-contained, chemically treated and regularly serviced.

501.5.5 Fire Safety

The Contractor is held responsible and is to maintain conditions, which promote fire safety in his operations at all times. Materials that could constitute a fire hazard such as gasoline, paints, wood and paper products are to be safely stored.

501.6 Project Meetings

501.6.1 Pre-construction Conferences

The Contractor shall schedule a pre-construction conference with the Owner, the Engineer, the City, and Authority to discuss the proposed schedule for construction and to coordinate construction observation and shop drawing submissions.

501.6.2 Job Meetings

The Owner may schedule regular job meetings at least monthly during the life of the Contract. The time and location of meetings is to be set by the Owner. The Contractor, unless otherwise notified by the Owner, is to have an authorized representative attend each meeting.

The purpose of these meetings is for maintaining communication between the Owner, Engineer, City, Authority, and Contractor, including the Contractor's subcontractors and suppliers. The meetings are to be used to coordinate various parts of the work, update construction schedules, prepare progress estimates and respond to questions which may be raised by the various participants.

501.7 Submittals

501.7.1 General

This section covers a variety of different types of documents, drawings, and material which the Contractor is to provide to the Engineer or Owner, and the Authority for their approval, information, or use. Submittals will include, but not be limited to: bonds, shop drawings, samples, color charts, operating and maintenance manuals, parts lists, spare parts and materials, special tools, and guarantees.

These items are to be submitted as specified in this Section and other Sections of the Specifications, in the proper quantities, and in a timely manner.

501.7.2 Shop, Coordination, Setting and Installation Drawings and Samples

The Contractor shall promptly submit to the Design Engineer, and the Engineer one (1) reproducible and four (4) copies of detailed shop drawings, guaranteed test curves, and manufacturer's specifications for all equipment, tools and furnishings to be supplied under this Contract. Detailed shop drawings shall be submitted for items such as backfill material, manholes, piping, ducts, miscellaneous metals, reinforced plastics, structural steel, reinforcing steel, mechanical equipment, fabricated items, electrical components, instrumentation and other work, whether or not mentioned in this section.

The Contractor shall submit these data with such promptness as to avoid delay in the work. **Unless otherwise approved in writing by the Authority, all materials,**

equipment, and appurtenance shop drawings required by the construction of this project must be submitted and approved by the Engineer prior to the placement of any manufacturer or supplier orders. Mechanical items, electrical items, instrumentation, reinforcing steel, and other items requiring long lead times and extensive review time shall be submitted first. In order for the Contractor to be deemed to have fulfilled this requirement, his individual submissions must be complete in every respect so that a logical and orderly review might follow. Piecemeal submissions are not acceptable. Final submissions for approval must be complete in all respects.

When dimensions are of particular importance, the drawing must be certified by the manufacturer as correct for this project.

The Engineer, and Design Engineer will review submitted data within a reasonable time after receipt of such data considering the complexity and completeness of such submissions. He shall determine at his sole discretion whether the data submitted are sufficient to render a decision. Resubmission of drawings by the Contractor for the Engineer's or Design Engineer's approval must be completed within ten (10) days of the return of the previous submission by the Engineer, or Design Engineer, unless the Authority Engineer specifically agrees to the contrary.

No materials, equipment or specialties are to be purchased, fabricated or released until the Engineer has approved the shop or working drawings as conforming to the contract requirements. All materials and work involved in the construction shall then be as represented by such drawings.

Shop drawings are to be not smaller in size than 8 1/2" x 11" nor larger than 30" x 42". Reproductions of the Design Engineer's drawings will not be acceptable as shop drawings. Before submitting shop drawings, the Contractor must check and sign all drawings, noting thereon any deviation from the Specifications.

One (1) reproducible and four (4) copies of shop drawings, test curves, or other material are to be submitted for approval. Following his review, the Engineer will return two (2) copies to the Contractor. If shop drawings are checked "Amend and Resubmit" by the Engineer, the Contractor must resubmit one (1) reproducible and four (4) copies of the revised shop drawings, of which two (2) will be returned to the Contractor by the Engineer.

The Contractor is to be responsible for furnishing subcontractors with approved shop drawings as required. No shop drawings are to be used for construction, ordering, fabrication, or other reasons unless marked "No Exceptions Taken" or "Make Corrections Noted" by the Engineer.

The Contractor is to note the difference in action expected by the Design Engineer or the Engineer with regard to Authority required drawings such as shop, coordination and installation drawings, and those that are presented by the Contractor, by his own choice, and for his convenience. Authority required drawings are to be construed as those,

which define shop systems work, parts drawings, fabrication drawings, test reports, certifications, and manufacturer's installation requirements. These will be reviewed and stamped appropriately by the Engineer after detailed review.

Contractor's coordination and/or installation drawings which are presented at his option are to be construed as those which assist the Contractor in his orderly execution of the work. Such drawings will be reviewed by the Engineer only as a convenience afforded the Contractor and shall not be stamped by the Engineer.

All Authority required drawings are to be stamped by the Contractor certifying his review and approval thereof. The stamp is to bear the following information:

APPROVED FOR CONTRACT REQUIREMENTS

The Contractor's signature below indicates that he has checked the drawing with the Specifications and found it to meet all requirements of same including dimensions, and that the Contractor's guarantee fully applies to the specified material or equipment.

RE: Specification Section _____ Page No. _____ Paragraph No.

Drawing Sheet _____ By: _____
Signature/Contractor

Approval of any shop drawings, manufacturer's specifications, or other material by the Design Engineer, or Engineer, does not relieve the Contractor of the responsibility for:

- a) Errors of any sort in shop or setting drawings or schedules.
- b) Deviations from Specifications unless the Contractor has given written notice to the Design Engineer and Engineer of any such deviations at the time of submission.
- c) Responsibility for proper performance of his work.
- d) Coordination with other trades.
- e) Safety and security on the job site.

Data must include dimensions, detailed drawings, and manufacturer's specifications for all items. Specific data required are set forth under the various Specifications items, but in general, are to include characteristics and efficiency curves for all motors and pumps, as well as weights of equipment to be delivered.

When required by the specifications, the Contractor is to furnish duplicate samples of materials, finishes or other items proposed to be used in the work. All materials, finishes and workmanship incorporated in the work are to be similar and equal to the approved samples. The Engineer shall retain such samples until final acceptance of the project and return only those samples specifically requested.

501.7.3 Operating and Maintenance Instructions

The Contractor is to furnish six (6) sets of approved operating and maintenance instructions, completely covering the operation and maintenance of all equipment. In addition, he is to neatly frame one (1) set of concise operating and maintenance instructions for each piece of equipment and deliver them to the Owner. Manuals are to be bound in hard covers and include, as a minimum, the following for each piece of equipment and device:

1. Manufacturer's descriptive literature.
2. Maintenance instructions, including recommended lubricants and lubrication schedule, spare parts, parts lists and assembly drawings.
3. Troubleshooting and repair information and charts.
4. Performance data.
5. Copies of all approved Shop Drawings.
6. Recommended spare parts lists, including part numbers.
7. Provided spare parts listing, including part numbers.

All operating and maintenance instructions are to be submitted prior to the Contract reaching fifty (50%) percent of completion.

501.7.4 Special Tools

The Contractor is to furnish with each equipment item furnished, all special tools required and recommended by the manufacturer. This requirement is in no way intended to cover the furnishing of readily available tools for mechanical work.

501.7.5 Packing

All equipment requiring packing is to be furnished newly packed with the packing recommended by the equipment manufacturer. The Contractor is to furnish six (6) copies of a schedule listing the type and manufacturer of the packing recommended for each piece of equipment. He is also to furnish sufficient packing to repack each piece of equipment once, or as otherwise specified.

501.7.6 Lubrication

The Contractor is to furnish and use, for each piece of equipment, the type of oil and grease recommended by the manufacturer of the equipment. He is to furnish six (6) copies of a schedule listing the type, frequency of application, and manufacturer of the

oil and grease recommended for each piece of equipment. At the time of turning the installation over to the Owner, the Contractor is to furnish sufficient quantities of lubricants to cover the period of start-up from regular break-in to the first oil change and time to reorder after takeover by the Owner.

501.7.7 Record Drawings – The Contract is to keep accurate records of all deviations of his work from that shown on the approved drawings, and indicate the actual construction with colored lines on a set of wet drawings. The as-built drawings shall be provided to the Design Engineer who will then prepare the As-Built Drawings for submission to the Authority as required under the Authority's Rules and Regulations.

501.8 Quality Control

501.8.1 Conformance and Specifications

All work is to be built in a thoroughly substantial and workmanlike manner, in accordance with the Specifications and directions given from time to time by the Design Engineer or the Engineer. In no case will any work in excess of the requirements of the Specifications be paid for, unless ordered in writing by said Owner.

501.8.2 Lines, Grades and Measurements

It is the Contractor's responsibility to obtain and keep proper lines and grades as required by the project.

501.8.3 Dimensions of Existing Structures

The Contractor is to verify in the field, the dimensions and locations of existing structures, where an error or incomplete information relative to the location or dimension of existing structures would affect the construction to be done under this Contract. The Contractor is to verify such dimensions and locations before continuing with the construction work to the point where it would be affected.

501.8.4 Datum

All elevations used in the project shall be based on a NAVD 1988 datum.

501.8.5 Standard Specifications

All standard specifications referred to herein, such as NJDOT, ANSI, ASTM, AWWA, and the like, unless otherwise noted are to be the latest revision thereof, at the time of bidding.

501.8.6 Services of Testing Laboratories and Special Consultants

The Authority may require and the Owner may retain the services of an independent testing laboratory to do such sampling and to make such tests as the Authority or Engineer may deem necessary to verify that the materials and equipment proposed for or incorporated into the work conform to the requirements of the Contract Documents. Any materials found not in compliance with the Authority's Rules and Regulations shall be removed and replaced at no additional cost to the Contract.

501.8.7 Watertightness

The attention of the Contractor is called to the specific requirements of this Contract whereby the most rigid supervision will be required to insure an absolute minimum of leakage or infiltration in the case of liquid conveying or liquid containing structures.

In general, all structures and all pipe and appurtenant structures are to be of watertight construction. Any leakage is to be repaired in accordance with the appropriate sections of the Specifications.

The Contractor is to provide, maintain and operate suitable and adequate dewatering equipment to insure satisfactory construction and maximum progress.

In certain instances dewatering permits may be required by regulatory agencies. The Owner shall obtain such permits from the New Jersey Department of Environmental Protection.

501.8.8 Clean-Up

During the course of construction all efforts must be made to maintain a neat and orderly project. Clean-up is to be pursued on a regular basis and in conjunction with the construction. The Contractor is to be responsible for clean-up during the life of this Contract with the full cooperation of all subcontractors. Upon completion of all construction, final clean-up is to include removal of all excess materials, equipment, backfill, etc., and the site is to be restored to a condition equal to or better than that existing prior to construction. Should the Contractor fail to remove such material, equipment and supplies, the Owner has the right to remove them at the expense of the Contractor.

At the completion of construction, the Contractor must tear down and remove all temporary structures unless expressly directed otherwise, and remove remaining rubbish of all kinds from all Contract structures, and from the site occupied during the progress of the work. The Contractor is to remove all concrete and ballast droppings and leave the site and the adjacent property which may have been affected by his operations in a neat and satisfactory condition. All structures and parts thereof constructed by the Contractor are to be thoroughly cleaned and left in first-class condition.

501.9 Construction Facilities and Temporary Utilities

501.9.1 Maintenance of Structures, Utilities, and Natural or Man-Made Surroundings

All existing utilities and/or process systems are to be kept in operation at all times during construction operations unless prior arrangements have been made to provide alternative service.

From the commencement of work, the Contractor is to be solely responsible for the care of the work during its progress for materials delivered and intended to be used, and for the protection to existing structures and trees or shrubs on or adjacent to the site of the work. Any injury or damage to the same is to be made good at the Contractor's expense.

Bypassing of sanitary flows are prohibited. Should any inadvertent bypassing of sanitary flows occur, the Contractor shall immediately notify the Authority, and appropriate notification is to be given to the NJDEP.

501.9.2 Occupying Private Land

The Contractor is not to enter or occupy with workers, tools, materials, or equipment, any land outside the easements or property of the Owner, unless written consent from said private property owner has been given to the Contractor and a copy of the consent provided to the Owner beforehand.

501.9.3 Existing Construction and Facilities

When new construction is adjacent to, or crosses streets or utilities under the jurisdiction of State, County, City or other public agency, public utility or private entity, the Contractor must secure written permission from the proper authority before executing such new construction. A copy of this written permission must be filed with the Authority before any work is done. The Contractor is to replace or repair all existing construction damaged in the execution of this contract. The Contractor will be required to furnish a release from the proper authority before final acceptance of the work.

501.9.4 Public Convenience

The Contractor is at all times to conduct his work so as to insure the least possible obstruction to traffic and inconvenience to the general public and residents in the vicinity of the work, and to insure the protection of persons and property. No road or street is to be closed to the public except with the permission of the proper authorities.

Fire hydrants on or adjacent to the work are to be kept accessible to fire-fighting equipment at all times. Temporary provisions are to be made by the Contractor to insure the use of sidewalks and the proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches, which are not to be obstructed.

The Contractor is solely responsible for satisfactorily maintaining flows in the existing utilities, affected by the work, at all times during the course of construction, unless otherwise indicated in the Contract Documents.

The Contractor is to review his construction schedule with the Authority, the City Engineer, and the Bayonne Police Department with respect to interruption of traffic and revise it accordingly if the City Engineer or the Police Department so requires.

501.9.5 Temporary Utilities

Unless otherwise agreed to by the Owner, the Contractor is to make all necessary arrangements for temporary utilities required or herein specified. No specific payment will be made for the costs of such utilities, but the costs thereof are to be included in the price bid for the work. Upon completion of the work, the temporary utilities are to be removed.

- a) Telephone: The Contractor is to provide a job site telephone or use public pay phones at no charge to the Owner.
- b) Electric: The Contractor shall provide temporary electricity for himself and his subcontractors.
- c) Water: The Contractor may be allowed to use City water for temporary water required during construction. The Contractor shall obtain written approval from the Authority for use of any hydrants for this project, prior to their use. (A copy of this letter shall be sent to the Owner and Design Engineer.) The cost of temporary utilities, including any setup or connection costs, are to be borne by the Contractor and included in the price bid.

501.10 Material and Equipment

501.10.1 Construction Equipment

Contractors are to familiarize themselves thoroughly with the type and nature of the equipment required in the proper execution of the work, and are to use and employ only first-class equipment. Previously used equipment must be in safe, first-class working order and condition. Sufficient equipment must be furnished and used by the contractor to permit the completion of the work within the time specified. The equipment used on

any portion of the work is to be such that no injury or damage to the streets, adjacent property, or utilities will result from its use.

501.10.2 Materials

Unless otherwise specified, only new materials are to be incorporated into the work. All materials furnished by the Contractor to be incorporated into the work may be subjected to the inspection and approval of the Engineer. No material is to be processed, fabricated, or delivered to the work without the prior approval of the Engineer, except at the risk of the Contractor.

The Contractor is to submit, to the Design Engineer and Engineer, data relating to materials he proposes to furnish for the work. Such data are to be in sufficient detail to enable the Engineers to identify the particular product in question and to form an opinion as to its conformity to the Authority Rules and Regulations. This data must be submitted for review and approval as soon as possible and prior to the ordering of any materials for construction.

Facilities and labor for the handling and inspection of all materials are to be furnished by the Contractor. Defective materials must immediately be removed from the site of the work.

If the Engineer so requires, either prior to beginning, or during the progress of the work, the Contractor is to submit samples of materials for such specific tests as may be necessary to demonstrate that the materials conform to the Specifications. Such samples are to be furnished, taken, stored, packed, and shipped as directed, at the expense of the Contractor. Except as otherwise noted, the Owner will make arrangements for and pay for tests.

All samples are to be packed so as to reach their destination in good condition and are to be so labeled as to indicate the materials represented, the name of the building or work and location for which the material is intended, and the name of the Contractor submitting the sample. To ensure consideration of samples, the Contractor is to notify the Engineer by letter that the samples have been shipped and is to properly describe the samples in the letter. In no case is the letter of notification to be enclosed with the samples.

The Contractor is to submit data and samples, or place his orders, sufficiently early to permit consideration, inspection, testing, and approval before the materials are necessary for incorporation in the work. Any delay resulting from his failure to do so is not to be used as the basis of a claim against the Owner, the Design Engineer, the Authority, or the Authority's Consulting Engineer.

When required, the Contractor is to furnish to the Engineer, in quadruplicate, sworn copies of manufacturer's shop or mill tests, or reports from independent testing laboratories relative to material data.

In accordance with the "Buy American" provision in Public Law 95-217 (Section 215 of the Public Law 92-500 as amended) N.J. Public Contracts Law 40A:11-18, and implementing EPA regulations and guidelines, the Contractor agrees that preference will be given to domestic construction material by the Contractor, subcontractor, material suppliers, and equipment suppliers in the performance of this contract.

The Contractor is to certify that the purchased products and materials are in accordance with the above referenced "Buy American" clause and, in addition, is to provide all information required to justify the use of any foreign made product.

501.10.3 Cutting and Patching

The Contractor is to do all necessary cutting and patching of the work that may be required to properly receive the work of the various trades or as may be required by the Specifications to complete the structures. He is to restore all such cut or patched work to a condition, which receives the approval of the Engineer. Cutting of structures that may endanger the work, adjacent property, workers or the public is not to be done.

501.10.4 Delivery and Storage

The Contractor is to deliver equipment and materials to the site and store them in original containers suitably sheltered from the elements, but readily accessible for inspection until installed. He is to store all items subject to moisture damage (such as controls and electrical equipment) in dry, heated spaces. All excavated materials, construction equipment and materials to be incorporated in the new work are to be so placed as not to damage the work and so placed that free access may be had at any time to all parts of the work and to all public utility installations in the vicinity of the work. If insufficient area is available, the Contractor is to provide off-site areas at his own expense. Materials are to be kept neatly piled and compacted and conveniently stored so as to inconvenience, as little as possible, public travel and adjoining tenants.

501.10.5 Service of Manufacturer's Representatives

The Contractor is to provide the services of a skilled and experienced representative of each manufacturer supplying equipment under this Contract, for such periods as, are satisfactory to the Engineer, are essential for the proper and satisfactory installation and testing of the equipment, and training of the Owner's personnel in its use. In certain instances, particular specification sections may indicate the minimum number of visits and/or hours required to comply with the intent of the specifications regarding services of manufacturer's representatives.

501.10.6 General Mechanical Design

All equipment is to be adequately designed for the work to be done and the loads to be sustained, and is to be proportioned for ample stability and rigidity. Design is to be neat and is to provide necessary clearances for erection, repairs and adjustment. Best modern practice is to be followed in all respects.

Design of similar units is to be such that they present a uniform appearance and be similar in operation. Fittings and fixtures on the units are to be of the same make wherever possible. Parts are to be interchangeable wherever feasible.

501.10.7 Housings and Guards

All exposed moving parts are to be covered by neatly detailed sheet metal housing or guards of approved thickness and design. Housings are to be as compact as possible, and are to be detailed to be readily removable and to allow convenient lubrication. Housings, unless otherwise specified, are to be not less than 14 gauge, and complete with all necessary bracing. Bracing preferably is to be on the inside of the housing. All housings and guards are to be in compliance with the latest Occupational and Safety Health Act regulations.

All equipment requiring the changing of fluid lubricants is to be provided with drain cocks and necessary piping to permit the draining of lubricants into a container.

Drip pans and splash plates are to be furnished where required, to prevent unsanitary or unsightly conditions. All such pans and plates are to be neatly detailed and accessible for cleaning. All housing, guards, drip pans, and splash plates are to be of aluminum or stainless steel.

501.10.8 Grease Fittings

The Contractor is to ensure that all grease fittings on each piece of equipment furnished under the Contract are standardized so that only the "Alemite" button head type of fitting is utilized. Fittings are to be standard or giant size according to the type of service performed.

501.10.9 Templates and Foundation Bolts

In order to insure the proper setting of all foundation bolts or fastenings, the Contractor is to furnish all templates for the equipment or fastenings, and furnish and set all bolts, guides, and fastenings required for the installation of the equipment at such times as the progress of the Contract work requires. All anchor bolts and nuts shall be of stainless steel.

If bolts or fastenings must be reset, or if drilling is required in the final installation, such work is to be done without further payment than is included in the lump sum price bid for the work of this Contract.

501.11 Special Conditions

501.11.1 General

The Contractor is to review the Specifications to determine the extent of the work. The Contractor is specifically alerted to this section concerning inspection of the existing field conditions. The Contractor is to visit and inspect the project prior to preparing his bid in order to clearly familiarize himself with all field conditions, and the extent of all work. After his review and inspection is complete, and before he submits his bid, if the Contractor has any questions regarding the extent and details of the work, he is to submit them to the Engineer in writing.

Before proceeding with any work, the Contractor is to confirm methods of construction and obtain field measurements as required.

Failure of the Contractor to familiarize himself with all conditions existing at the site of construction will not relieve him of his obligation to furnish all material and labor necessary to carry out the provisions of the Standard Specifications and to complete the contemplated work.

The Contractor is cautioned that existing utilities are to be kept in operation during the project unless otherwise approved by the Authority or utility owner.

The Contractor is alerted to the fact that the Authority assumes no responsibility for actual conditions of the areas affected by work indicated or called for by the Contract Documents.

501.11.2 Construction Sequence

The Contractor shall undertake work under this Contract only in accordance with the following sequence of construction activities. This sequence may be modified as required by the Engineer or Authority, but the Contractor shall not depart from the sequence indicated below without prior written permission from the Engineer or Authority to do so. Construction sequence follows below:

1. Mobilization.
2. Installation of erosion control measures.
3. Installation of traffic control devices in approved work areas.

4. Installation of water and/or sewer utilities and related appurtenances, backfilling and temporary pavement.
5. Testing and acceptance of pipelines and related appurtenances.
6. Restoration of unpaved areas at regular intervals as approved by the City of Engineer.
7. Final pavement restoration.

501.11.3 Asbestos-Containing Material and Hazardous Material

The Contractor shall not supply, provide or bring onto the construction site any asbestos containing material or hazardous material (either in kind, as a component of equipment to be used or furnished under the Contract, or as a component of another material to be used or furnished under the Contract) without the express advance, written consent of the Owner. The term, "hazardous material" shall have the meaning ascribed in Federal Standard No. 313B in effect on the date of the Contract.

The Contractor shall submit to the Authority and the Owner (with a copy to the Engineers) a Material Safety Data Sheet (Department of Labor Form OSHA-20) together with a complete written description of the intended usage for any such material for which the Owner's consent is required, at least thirty (30) days before the delivery of such material.

Such consent shall not be given if materials or equipment not containing asbestos or hazardous material are available, and the Contractor shall not be entitled to any adjustment in time or compensation for providing non-asbestos-containing and non-hazardous materials.

502.0 SITE WORK AND RESTORATION

Site and access clearing shall consist of all materials, labor and equipment necessary to complete the work of clearing the site of the Project within the limits of the construction site, or hereinafter specified, including the removal of trees, grubbing and pruning, shrubs, and stripping and stockpiling topsoil.

The Contractor shall also furnish all labor, materials and equipment required to control within reasonable limits, soil erosion resulting from construction operations and prevent excessive flow of sediment from the construction site. Such work shall include, but not be limited to the installation of water diversion structures, diversion ditches, sediment basins, snow fencing, silt fencing, seeding, mulching, matting or sodding Critical Areas to provide temporary protection.

502.1 Site and Access Clearing

Prior to commencing of the project the Contractor shall determine, and if necessary obtain, a tree permit per Chapter 14 of City Ordinance. Only that portion of the project area which is absolutely necessary and essential for the completion of the contract and which has been approved by the Design Engineer shall be cleared for construction. The ground surface shall be cleared of all trees, brush, weeds, roots, matted leaves, debris and other unsuitable matter, except as otherwise hereinafter provided. Tree stumps shall be grubbed out.

Straggling roots should be pruned. Trees, which must be pruned shall be cut cleanly and painted with tree paint. If the tree is damaged, the wood shall be repaired and painted with an approved material.

It is intended to protect and save trees from removal wherever possible. Where methods of construction or minor relocation will avoid tree removal such methods will be employed without additional compensation. Trees outside of the project area shall in no case be disturbed, and approved boxing shall be provided as may be required to protect trees adjacent to the project.

Trees, shrubs and other landscape features within the limits of the construction, which do not interfere with the Project shall not be removed, but shall be protected during the progress of the work in a manner satisfactory to the Engineer.

The Contractor shall be responsible for the preservation of all existing trees, plants and other vegetation that are to remain within or adjacent to the construction site and shall use every precaution necessary to prevent damage or injury thereto. The Contractor shall give special attention to the protection of the natural vegetation and other existing landscape features and surroundings. The Contractor shall repair all injuries to bark, trunk, limbs, and roots or remaining vegetation by properly dressing, cutting, bracing and painting, using only approved tree surgery methods, tools and materials.

The removal and disposal of elm trees in all counties of the state are subject to provisions of State laws and to regulations of the State Department of Agriculture. Before removing any elm trees, the Contractor shall consult the Plant Pathologist of said Department and shall comply with his instructions relating to the removal of elm trees and the marking segregation and disposal of elm wood. The Contractor shall submit to the said Plant Pathologist an "Application for Instructions for Disposal of Encountered Elm Wood."

Materials accumulated by clearing, grubbing and pruning as above described shall be disposed of by the Contractor at sites to be provided by him outside of the work. No burial of materials shall be permitted.

After interfering vegetation has been removed, the Contractor shall strip any and all topsoil from the area to be excavated and stockpile it for future use as specified elsewhere utilizing these specifications. Stripped topsoil shall not be intermixed with other excavated material. Stockpiles in all areas shall be protected during construction.

502.2 Erosion Control

Erosion control procedures, inclusive of mulching, shall be utilized in all project areas. Erosion control measures shall be taken, as required, starting immediately after site and access clearing, continuing during sewer construction, site demolition, and until the site has been satisfactorily restored.

The Contractor shall continuously control erosion during construction. Critical Areas shall be protected at all times by temporary seeding, mulching, or sodding, or the slope lengths shall be reduced by the installation of diversions or other means. Where topography permits, debris basins shall be constructed at points of water concentration from Critical Areas. Earth berms or diversions shall be constructed to intercept and divert runoff water away from Critical Areas. Diversion outlets shall be stabilized by paving or other means acceptable to the Engineer, if required.

Structures proposed for erosion control shall be designed by the Contractor and approved by the Engineer and constructed in accordance with the Engineering Practice Standards for diversions, waterways, and debris basins as defined by "Standards for Soil Erosion and Sediment Control in New Jersey," prepared by the New Jersey State Soil Conservation Committee.

In Critical areas, particularly along steep slopes and wetlands, site clearing shall be delayed until absolutely necessary for the continuation of construction.

502.3 Sediment Control

Sediment shall be settled or filtered out of all surface or subsurface water encountered during construction before such water enters any surface waters. Dewatering operations shall direct pumpage as far from stream banks as possible. Care should be

taken not to damage or kill vegetation by excessive watering or silt accumulation in the discharge area. Settling basins or sediment traps shall be constructed and used where necessary to protect vegetation and to achieve environmental objectives.

Construction staging areas, and areas for stockpiling material, shall be selected so as to be consistent with environmental objectives and constraints. All such areas shall be located so as to avoid erosion and siltation. Locations of staging areas used for stockpiling shall be approved by the Owner and modified as required by other authorities.

502.4 General

After the trench or project area has been backfilled, and properly graded, the area shall be prepared immediately for restoration of vegetation. Erosion control measures shall be utilized as required and final restoration shall be undertaken as soon as an area is no longer needed for construction, stockpile, or access. Excavated stones and boulders too large to be incorporated in backfilling shall be removed from the construction site. Excess soil in the area shall be graded or removed. When construction access roads are no longer needed, road fill shall be removed and the access area shall be restored according to the specifications contained herein. Care should be taken to avoid damage to adjacent vegetation and to prevent the formation of depressions that would form ponds of stagnant water.

502.5 Grading

Contractor shall rough grade areas disturbed by construction to a uniform finish which will form the bases for terraces, banks, lawns, and paved areas. Areas to be paved shall be graded to depth required for placing of sub-base and paving materials. Areas to be top soiled and seeded shall be graded to 6-inches below indicated finish contour elevations as shown on contract drawings. Contractor shall provide additional approved grading material if required to meet proposed grades.

502.6 Restoration

Environmental restoration shall consist of permanent replacement of vegetation over the entire area cleared for construction. The restoration shall be accomplished by one or more of the methods described within the various subdivisions of this Item. The restoration shall be permanent in all respects.

Permanent restoration of vegetation cover shall commence as soon as practical after backfill so that completion of restoration work will follow backfilling by a maximum of 10 calendar days. Time extension beyond the 10-day requirement may be requested in writing for specific areas or sections of the alignment. Approval of any such extensions shall be based on the potential of the particular area to present adverse environmental results if left barren over the extended period.

502.7 Topsoiling, Fertilizing, and Seeding

Topsoiling, fertilizing and seeding shall include all labor equipment and materials necessary for preparing topsoil stripped and stockpiled on the site for use as topsoil and placing it, furnishing and placing topsoil required in excess of that obtained from stripping, furnishing and placing seed mixtures and grain seed, fertilizer, ground limestone and any other materials specified herein. The Contractor shall restore the site under this item when existing lawns, parks or otherwise improved grass areas are disturbed during construction.

502.8 Topsoil

The topsoil shall be spread over the surface in a uniform 6-inch minimum layer. Ground limestone shall be added where necessary to produce a soil Ph of 6.5 in the upper 3-inches of topsoil. All stone, roots, debris and other unsuitable material shall be raked out. 10-20-10 commercial designated fertilizer shall be applied at the rate of 500 pounds per acre. All topsoil acquired from off-site locations shall be best quality screened topsoil of a similar color and texture as the existing topsoil and shall as minimum conform to Ph and organic content as required by the NJDOT Standard Specifications for Road and Bridge Construction, 1989 or latest edition.

502.9 Seeding Improved Areas

The seed mixture shall be sown at the rate of 100 pounds per acre together with rye or oat grain at the rate of 10 pounds per acre. Where slopes are greater than 2:1, rye or oat grain shall be used at the rate of 25 pounds per acre. When seeding in the spring, oats shall be used and in the fall, rye. On extremely steep slopes, the Engineer may order the addition of other seeds to the mixture.

No permanent seeding shall be done when the soil is wet or frozen.

A satisfactory stand of grass shall be established on all areas. All areas where a satisfactory stand of grass is not produced shall be re-fertilized and reseeded until a satisfactory stand is produced, with no additional payment.

Grass seed mixture shall be as follows:

	<u>Seed</u>	<u>Minimum Purity %</u>	<u>% of Total Minimum Weight of Germination Mixture</u>
Kentucky Blue Grass	85	75	20
Red Fescues	95	80	35
Kentucky 31	95	80	20
Redtop	92	85	10
Perennial Ryegrass	98	95	10
White Clover	97	90	5

The Contractor shall be required to water the seeded areas as necessary to produce a thick growth.

502.10 Seeding Unimproved Areas

The seed in unimproved areas shall be perennial rye sown at the rate of 100 pounds per acre. A thick stand of grass shall be established on all areas, and if a satisfactory stand is not produced after the initial seeding, the area shall be reseeded until a satisfactory stand is developed.

No seeding shall be done when the soil is wet or frozen.

Grass shall be watered if necessary to provide a satisfactory growth. Slope restoration shall be in accordance with other sections of these specifications.

502.11 Slope Restoration

Slope boards shall be used where necessary to hold topsoil on steep slopes. Satisfactory placement of topsoil on all construction areas is the responsibility of the Contractor and no additional payment for slope boards shall be made. Hay bales shall be placed at the base of the slope prior to ground disturbance. Steep slopes that have been disturbed, if not sodded, shall be seeded and mulched immediately after construction is complete.

502.12 Mulching

Mulching shall include all labor, materials and equipment necessary for the furnishing, spreading and binding of hay and salt hay on areas that have been seeded.

All designated seeded areas shall be mulched with hay uniformly spread in a layer 1 to 1-1/2 inches thick, loose measurement. Hay shall be blown on in its natural length. Chopped hay shall not be used. No designated seeded areas shall remain un-mulched longer than seven (7) days.

All mulch shall be bound in place with one application of binder applied at a temperature of 145EF to 155EF. After the hay mulch has been spread, the binder shall be applied at a rate of 0.04 gallons per square yard on slopes of less than 10% and a rate of 0.075 gallons per square yard over the entire area of slopes of 10% or steeper. The use of asphaltic mulch binders is prohibited.

If any mulch is displaced before the grass has made a growth of 1-1/2 inches, it shall be replaced and rebound without additional compensation.

502.13 Matting for Slope Stabilization & Restoration

The Contractor shall provide all labor, materials and equipment for the installation of matting for soil stabilization and restoration.

Jute mat shall be cloth of a uniform plain weave of un-dyed and unbleached single jute yarn, 48 inches in width plus or minus 1 inch and weighing an average of 1.2 pounds per linear yard of cloth with a tolerance of plus or minus 5 percent, with approximately 78 warp ends per width of cloth and 41 weft ends per linear yard of cloth. The yarn shall be of a loosely twisted construction having an average twist of not less than 1.6 turns per inch and shall not vary in thickness by more than one half of its normal diameter.

Excelsior mat shall be wood excelsior, 48 inches in width plus or minus 1 inch and weighing 0.8 pounds per square yard plus or minus 10 percent. The excelsior material shall be covered with a netting to facilitate handling and to increase strength.

Staples for anchoring soil stabilization matting shall be made of 12-to-20 inch lengths of No. 8 plain iron wire.

Shape and grade the area to be protected as required by the Contract Plans and Specifications. In general all areas shall be returned to the grades which existed prior to construction unless otherwise ordered by the Engineer. Remove rocks, clods over 1-1/2 inches in diameter, sticks and other material that will prevent contact of the matting with the soil surface.

Lime, fertilizer and/or seed in accordance with the applicable seeding standard except that for jute matting one half of the seed may be applied prior to laying the matting and the remaining seed applied after laying the matting.

Matting shall be laid from the top of the slope and unrolled downgrade so that the strip extends 12 inches past the toe of slope or to un-cleared land. For jute matting, allow at least a 2-inch overlap at all joints. Excelsior matting may be butted.

Bury the top end of jute strips in a trench 4 inches or deeper and tamp the trench full of soil. Reinforce with a row of staples driven through the jute 4 inches downhill from the trench. These staples should be 10 inches apart. Staple the overlap at all joints with staples three feet part. Closer stapling along the edges is required where concentrated water may flow down the slope. Edges of excelsior matting shall be stapled on 12-inch centers.

At any point, jute matting may be folded for burying in slit trenches and secured as were the upper ends. This checks water flow and erosion that may begin under the matting and improves tie-down. This procedure is required on the steeper slopes in sandy soil and gentler slopes subject to seepage.

Where diversion channels are constructed, the channel shall be protected with matting used in the same manner as on slopes.

Contact between matting and soil shall be obtained by rolling after laying stapling and seeding are complete. Complete contact is vital to keep water flow over, not under, the matting.

503.0 EXCAVATION AND BACKFILL

503.1 Character of Material

Any and all fill imported to the site shall be certified as clean fill. An original copy of such certification, and/or laboratory analysis reports, must be provided to the Authority prior to the material being brought to the site.

503.2 Excavations, Clearances and Trimming

Excavations shall be of sufficient width to permit work to be done competently, in the manner and of the size specified and shown, and limits shall be such as to permit the use of outside forms, unless permission for an alternate procedure is specifically granted. In no case shall excavations be carried below grade by machine and backfill used to bring the grade to the proper elevation for bottom slabs, footings or pipelines.

In all excavations for pipe, boulders, rock, masonry, or other similar materials shall be excavated to a level at least six inches below the invert of the pipe, and carefully refilled with 3/4 inch stone or other approved material. Rock or boulders shall be removed from sides of trenches to a plane 12 inches beyond the outside wall of the pipe, manholes, etc., unless permission to do otherwise is expressly given.

The trench width just above the top of the pipe shall be maintained as narrow as possible and in general shall not exceed the outside diameter of pipe plus two (2) feet.

503.3 Unauthorized Excavation

If any excavation is caused by the Contractor's error, or wherever the excavation is carried beyond or below the lines and grade given by the Engineer, the Contractor shall, at his own expense, refill all such excavated space with such material and in such manner as may be directed, in order to insure the stability of the various structures. Beneath all structures, the space excavated without Engineer shall be refilled with 4,000 lb. concrete.

503.4 Sheeting and Bracing

Where necessary, particularly to prevent disturbance, damage, or settlement of adjacent structures, pipelines, utilities, improvements, or paving, excavation shall be adequately sheeted and braced. In areas where excavations exceed five (5) feet in depth, the Contractor shall assume full responsibility for the design and installation of sheeting and bracing of excavations such that the sheeting and bracing design meets all the latest requirements of the New Jersey Construction Safety Code and the Federal Occupational Safety and Health Act.

Sheeting and bracing shall be furnished and installed, and if ordered by the Engineer, left permanently in place. If sheeting is not ordered to be left in place it shall be removed.

All permanent steel sheet piling and accessories shall be new and conform to the requirements of ASTM A6-99, "Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling". All steel sheet piling shall be interlocking steel sheeting as shown on Contract Drawings and conform to the ASTM Designation A572-99a, "Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel" (GR 50).

All payment for furnishing, and placing permanent new sheet piling and bracing or other excavation protection which is specified in the Specifications, to be left in place and not removed, are included under the lump sum bid for this project and not considered Extra Work. All permanent sheeting shall be cutoff to the lines and grades as required.

All payments for furnishing, placing and removing sheeting and bracing, for use of trench boxes or other excavation protection, are included under the prices bid.

503.5 Removal of Water and Protection from Flooding

The Contractor shall remove all water from the excavation promptly and continuously throughout the progress of the work and shall keep the excavation dry at all times by approved methods such as sumps, under-drains, or well points, until the structures to be built therein are completed. Pumping shall be continuous where ordered by the Engineer to protect the work and/or to maintain satisfactory progress. If the removal of water impairs water wells it is the Contractors responsibility to provide an alternate source of potable water until recovery of the well. Should the anticipated or actual volume of water pumped during dewatering exceed 3 million gallons per month, the Contractor shall be responsible for obtaining a water diversion permit from NJDEP.

Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes. All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected.

All necessary precautions shall be taken to prevent disturbance of and to properly drain the areas upon which concrete is to be poured, and upon which pipe is to be laid.

Contractor's plant and equipment shall be adequate to keep all concrete work dry until properly set.

503.6 Topsoil

In unpaved area(s), all topsoil shall be stripped and stockpiled and replaced. No topsoil shall be removed from the job site, but shall be stockpiled in the vicinity of the area

from which it is removed. Topsoil shall be replaced in the location and to the depth from which it was removed.

503.7 Compacting Foundation

Wherever the development of suitable foundation conditions requires it, the contractor shall take the proper means of compacting such foundation material. After excavation to grade, the surface shall be tamped, or otherwise consolidated to adequately prepare the bottom for the loads to come upon it, the method depending upon the quality and condition of the material. Where so required to stabilize the surface, screened gravel shall be placed on the surface and shall be compacted into the sub-grade in such thickness as may be required by the Engineer.

503.8 Additional Excavation

Wherever, in the opinion of the Engineer, the material found at the grades for the slabs, wall footings, or pipe inverts, is not satisfactory, the Contractor shall make any additional excavations as directed by the Engineer, and shall refill the same to two inches above the required grade with selected material.

503.9 Backfilling

As soon as practicable, after the pipe or masonry has been placed and the masonry has acquired a suitable degree of hardness, the backfilling shall begin and shall thereafter be prosecuted expeditiously.

All lumber, rubbish, and braces shall be carefully removed from behind walls or other structures, unless ordered left in place by the Engineer. Backfill under the pipe haunches, around the pipe, and up to a cover of at least 18 inches over the top of the pipe shall be placed by hand in 6-inch layers, each layer to be thoroughly compacted by mechanical tampers of an approved type.

All other backfill shall be compacted and tamped in maximum 6 inch to 12-inch lifts to obtain 90 to 95% of relative density. Smaller lifts shall be compacted if 90 to 95% of relative density is not obtained compacting 6 inch to 12-inch lifts. No heavy stones or boulders shall be allowed to drop in the trench.

All excavated soil within roadways and other paved areas shall be replaced with quarry process NJDOT I-5 stone. Backfill between a plane 18 inches above the top of the pipe and the finished surface grade shall be placed in successive layers of not over 6 inches compacted thickness. Each layer shall be thoroughly compacted using approved tamping machines.

In rights-of-way, easements, and paper streets, backfill between a plane 18 inches above the top of the pipe and the finished surface grade, the Contractor shall keep settlement to a minimum and shall promptly restore to proper grade any settlement that

might occur. Backfill in this zone shall be placed in successive layers of not over two (2) feet compacted thickness, or as directed by the Engineer. Each layer shall be thoroughly compacted using approved tamping machines.

All excavated material outside the roadways i.e., easements, shall be stockpiled at the site, outside the roadway. The stockpiled materials shall not interfere with vehicular, bicycle or pedestrian traffic, interfere with drainage or cause sight distance problems for vehicular bicycle or pedestrian traffic.

The trench outside the roadway shall be backfilled with only acceptable excavated material. Where in the opinion of the Engineer the excavated material is unsuitable for backfilling the excavated material shall be disposed of at approved off site locations and the trench backfilled with sub-base material Type I-5 as directed by the Engineer.

All backfill in embankments shall be thoroughly compacted by rollers of approved size and weight or by other approved methods.

503.10 Disposal of Material

Only excavated material acceptable to the Engineer shall be disposed of in backfilling, outside roadways, i.e. easements and to the lines and grades established by the Design Engineer. All other excess material and all material within roadways shall be disposed of by the Contractor in approved locations outside of the working areas.

Temporary storage of excavated material shall not be on environmentally sensitive areas. Also excess fill shall not be used for the top 6 inches of topsoil.

The contractor shall restore all grades to those elevations existing, prior to construction. The Contractor shall be responsible for removal and disposal of all excess excavated material. Approval by the City Engineer must be obtained prior to disposal of excess excavated material to sites within the City.

Prior to disposal of excess material, the Contractor shall notify and obtain approval from the City of Bayonne regarding the location of the disposal site. All permits, surveys, etc., required for disposal of material, by the City of Bayonne, State of New Jersey, or any other agency shall be obtained by the contractor. Under no circumstances shall material be disposed of in flood plain, wetlands, or any other environmentally sensitive area.

503.11 Solid Waste Disposal

The Contractor is directed to Public Law NJAC 7:26-1 et seq. Rules of the Bureau of Solid Waste Management, 1974. In general, this law requires that all solid wastes (concrete, black top, demolition or construction debris, etc.) must be disposed in an approved, licensed landfill site. Also, any truck hauling this type of material to a landfill must have a permit issued by the Bureau of Solid Waste Management.

503.12 Temporary Bridges and Crossings

The Contractor shall, where required to expedite the work, or where required to maintain traffic, or where otherwise ordered by the Engineer, construct temporary bridges, or walkways, of adequate sized members to safely carry the loads which may reasonably be anticipated, and the sizes of the members used shall meet with the approval of the Engineer.

Temporary bridges shall be removed when they are no longer needed and the area shall be restored. Erosion and sediment control procedures are to be included as described in the specifications.

503.13 Protection and Restoration of Existing Structures & Pipe Lines

The contractor shall carefully protect all existing structures, both above and underground, including but not limited to poles, curbs, driveways, parking areas, privately owned pavements, signs, sumps, pits, catch basins, manholes, underground tanks, and building foundations; pipe lines, including gas mains, water mains, hydrants, drain lines, storm sewers, sanitary sewers, service connections, conduits, and miscellaneous underground pipe lines; and shall restore same to a condition equivalent to conditions existing prior to his operation.

The contractor is specifically directed to the requirements of protecting all trees along the route of the work in an approved manner.

The work of protecting and restoring existing utilities and facilities and including trees where no definite physical interference exists, or where the interference is avoidable, shall be the responsibility of the Contractor.

Ample precautions shall be taken to prevent settlement of existing improvements.

The work will be located so as to avoid interference to the greatest degree practicable, based upon data available as to depth and location of existing utilities and other existing facilities.

The Contractor shall, insofar as possible, determine in advance of excavation of trenching machines, the location of all utilities and other subsurface structures and facilities and shall accurately mark same so that they may be avoided by the machine.

Where existing utilities or other sub-surface facilities adjacent to the trench or crossing through the trench require temporary support or protection, the work shall be the responsibility of the Contractor.

Where definite physical interference would be unavoidable in the final work and necessitates the removal, alteration, replacement or extension of existing utilities, the

Contractor shall make all excavations for such work and shall cooperated with other forces engaged in the work.

The labor, pipe and other material necessary for removing, altering, replacing, or extending such utilities, other than for excavation, will, unless otherwise ordered, be coordinated by the Contractor with the respective utility companies or other owners involved. In specific cases, the Contractor may be ordered to perform such work unless otherwise completed by the utility.

The Contractor shall be responsible for protecting all existing Bayonne Municipal Utilities Engineer (BMUA) appurtenances including, but not limited to catch basin inlets, sanitary/combined/storm manhole covers, and water valve boxes or manhole covers hereafter referred to as utility castings. The Contractor shall accurately mark out the location of all utility casings in advance of milling of the roadway. Care shall be exercised during the milling/paving operations to avoid damage to the utility castings by the milling/paving machines. Following the milling operation and prior to pavement, the Contractor shall inspect all utility castings within the roadway to assure that they were not hit and displaced during the milling activity and that no millings have entered the utility castings. The Contractor shall be responsible for removing any and all millings from the valve box or other utility castings and shall assure that complete and clear access is available to all valves and other utility appurtenances. In addition, the Contractor shall remove and reinstall/replace to the satisfaction of the BMUA all utility castings which have been dislodged by the milling or paving operations.

The Contractor shall also be responsible for raising all utility castings located in the roadway to the proposed finished grade in areas where the roadway is scheduled for additional pavement above the existing rim elevations. The work and materials associated with altering, replacing or extending such utility castings shall be the sole responsibility of the contractor and shall be coordinated by the Contractor with the Bayonne Municipal Utilities Engineer prior to the work being undertaken.

The BMUA shall be contacted within 48 hours of final paving to schedule an inspection of all the utility castings within the project area to assure compliance with this specification. All utility castings determined to have been buried, damaged, moved or in any other way affected by the project shall be reinstalled, replaced or uncovered to the satisfaction of the BMUA within two weeks of notification by the MUA.

503.14 Removal and Restoration of Pavement, Curbing, and Sidewalks

All sidewalks, curbs, lawns, private driveways, pavements, drainage swales, and other improvements damaged or removed due to the Contractor's operations shall be restored to a condition at least equivalent to conditions existing prior to the Contractor's operations. Replacement or restoration shall be done in accordance with applicable provisions of this specification and in conformity with the requirements of the authorities in charge; all work to be done to the satisfaction of the Engineer. Work on

City, County or NJDOT roadways shall be conducted in accordance with City, County or NJDOT requirements and details.

Temporary Pavement

Pavement restoration in City right-of-ways shall be started immediately after trenches have been backfilled. The Contractor shall place a six (6) inch thick layer of compacted bituminous stabilized base (Mix I-2) in two courses. The surface of the bituminous stabilized base course shall be flush with the existing pavement. This base shall be maintained in place and in a usable condition by placement of additional bituminous stabilized base as required for settlement, wear or erosion, with no additional payment.

Permanent Pavement

Permanent surface pavement in City right-of-ways shall be installed after the base pavement has been in place and maintained by the Contractor for a period of not less than two (2) months. This period may be shortened by a written directive from the Engineer.

Permanent surface pavement replacement shall consist of a compacted two (2) inch course of FABC (Mix I-5). Prior to installing the final pavement, the entire trench area shall be proof rolled to locate soft areas and bridging, with a single axle truck carrying a load of 10 tons or more. All existing pavement edges shall be saw cut back evenly along a neat line so as to provide an undisturbed shoulder of twelve (12) inches along both sides of the excavation.

The base pavement shall be removed to a depth of two inches. Prior to the application of the finished (permanent) surface course, the edge of the existing pavement shall be coated with a tack coat of cutback asphalt. Said tack coat shall also cover the surface of the remaining base pavement so as to produce a bond between the stabilized base course and the permanent surface course. The completed pavements shall be neat and have straight edges.

The Contractor shall maintain the permanent surface course until the completion of the maintenance period. Any sections of the trench which settle shall be properly restored to required final grade. Any sections which are defective shall be cut out completely and the sub-base reconstructed and the pavement replaced as hereinbefore specified.

Concrete Sidewalk

The Contractor shall remove sidewalk as required for construction at existing expansion joints. Should no expansion joint exist within a distance of 10 feet on either side of the construction area, the contractor shall saw cut existing sidewalk and remove the existing sidewalk in a neat and workmanlike manner. It is the contractor's responsibility to protect all sidewalks not removed for the duration of the construction

period. Concrete sidewalks shall be reconstructed in accordance with the City of Bayonne's requirements.

Bituminous Sidewalk

The contractor shall saw cut the existing sidewalk and remove the existing sidewalk within the construction area in a neat and workmanlike manner. It is the contractor's responsibility to protect all sidewalks not removed for the duration of the construction period. Bituminous sidewalk shall be reconstructed in accordance with the City of Bayonne's requirements or as directed by the Engineer.

Curbing

Curb shall be removed at the existing expansion joint. Should no joints exist within 10 feet of either side of the construction area, the contractor shall saw cut the existing curb and remove the curb in a neat and workmanlike manner. All curb not removed must be protected from damage during the course of the project. All curb removed or damaged during construction shall be reconstructed in accordance with the City of Bayonne's requirements.

All sidewalks and pavements, including pavements on roads, shall be maintained during the period of trench consolidation, and the contractor shall be expected to keep his trench adequately protected at all times. Pavement cutters shall be used prior to excavation to reduce the pavement disturbance to a minimum.

503.15 Trench Maintenance

The Contractor shall use barricades, lights and adequate signs to indicate that the trench is soft and upon settling of the trench shall immediately bring the trench up to the required grade. Where the trench has reached some degree of consolidation and may be used for vehicular traffic, the Contractor shall fill in any holes or ruts which may occur (prior to placement of temporary pavement) with crushed stone to maintain a safe and satisfactory condition at all times.

503.16 Work in Private Easements

Where the work is in easements located within privately owned areas, rear yards, etc., the Contractor shall make every effort to minimize disturbance to the area. All trees shall be boxed or fenced to dripline. Excavated material shall be stored on tarpaulins or other means used to prevent it from being spread on the ground. Backfill shall be completed on the same day. Topsoil shall be removed and stored separately, and upon completion of backfill shall be evenly spread over the disturbed area. If settlement occurs, the Contractor shall bring in additional topsoil of an approved variety to bring the trench up to grade.

All disturbed lawns, trees, shrubs, bushes, planting, fences, walls, driveways, walkways, etc., shall be restored to the satisfaction of the owner. It is required that the Contractor take "before and after" photographs of all such areas. Any disturbance or damage to existing structures and/or any site enhancement, shall be immediately repaired in kind by the contractor without compensation.

503.17 Methods

Methods of excavation and construction must be in accordance with the State of New Jersey, Department of Labor & Industry, Bureau of Engineering & Safety, CONSTRUCTION SAFETY CODE, and all other local, state, or federal requirements. Methods of excavation shall be as required by job conditions; in general, excavation may be done by suitable power equipment, but in cases where working room is limited or where necessary to prevent damage to existing structures, hand methods shall be used.

In cases where tunneling is adopted, either by option of the Contractor or by requirement of a utility or governmental authority having jurisdiction, and with the approval of the Authority, and in accordance with the requirements of these specifications. The Contractor shall perform work as required below.

503.18 Tunneling

Proposed methods and schedule for tunneling operations shall be submitted to the Authority for approval, and shall meet all requirements of the authority having jurisdiction. Tunneling operations shall be conducted in such a manner as to prevent settling or other damage to the roadway or other surface improvements. Shoring shall be provided and installed as required by ground conditions to prevent settling or loss of ground. Tunnel cross-sections shall be held to a minimum practicable size.

Immediately following installation and testing of the section of the pipe in the tunnel, the entire tunnel shall be solidly backfilled with a stiff sand-cement mixture containing not less than two (2) bags of cement per cubic yard of mixture. Extreme care shall be taken to insure that all voids are filled; the backfill mixture shall be rammed in place from both sides, working progressively from the center to the ends of the tunnel.

503.19 Blasting

No blasting will be permitted at locations near existing structures or near water, sewer, drain, oil, gas cable or other utilities. Where blasting is permitted, the Contractor shall take every precaution to protect all portions of the work already constructed or being constructed and shall use small charges and give ample notice so as not to endanger persons or property. Copies of local and state permits shall be provided to the Authority prior to the start of work.

Prior to blasting for rock excavation along any street, pavement shall be cut and removed. Blasting may then proceed provided all other requirements are met as specified and steel blasting mats are used to shield the blast area.

The Contractor, in addition to observing all of the requirements set forth and all municipal and, county ordinances, and State laws relative to the transportation, storage, handling and use of explosives, shall also conform to any further regulations that the Authority may deem necessary in this respect. The Contractor shall be liable for all damage to persons or property caused by blast or explosion.

Where blasting is not permitted, the rock shall be removed with air driven hammers or other methods approved by the City or Authority.

Prior to performing blasting operations the Contractor shall have complete surveys performed on all homes and structures along the sewer alignment where blasting is proposed. Written preblast surveys shall promptly be provided (in a form acceptable to the City) to the City upon completion of the survey.

The Contractor shall monitor all blasting by use of approved seismic instrumentation to ensure that frequency and peak particle velocity standards are strictly adhered to in accordance with Local and New Jersey State Standards.

503.20 Connection to Existing Manholes

Where new connections to existing manholes are required, the Contractor shall core drill a hole in the existing manhole to accept the pipe and a flexible gasket around the pipe with stainless steel appurtenances to hold the gasket in place. The Contractor shall properly reconstruct the existing manhole channel and benching to accommodate the new sanitary sewer upon testing and acceptance of the sewer.

Where it is determined by the Authority to be unfeasible to core drill an existing manhole, the Contractor shall use a hammer drill to create an adequately sized opening to accept the incoming sewer at the invert specified on the plans. A waterstop as manufactured by Fernco or approved equal shall be provided on the clean end of the new pipe. The water stop shall be positioned so that it is centered on the manhole wall. Non-shrink grout shall be placed around the waterstop to fill the voids between the manhole walls and the waterstop. The non-shrink grout shall be Five Star Structural Concrete, or approved equal. Prior to placement of the grout, the manhole surface shall be roughened to facilitate adherence of the grout.

503.21 Abandonment of Existing Sewers or Water Mains

Where deemed necessary and approved by the Authority in the approved plans and specifications, the Contractor shall undertake the abandonment of existing sewers or water mains. The abandonment of existing sewers and water mains must be coordinated with the Authority and must be approved by the system operator. The cast

iron frames, covers and castings on all manholes and drain inlets or water appurtenances to be abandoned shall be removed and transported to the Bayonne Municipal Utilities Authority Oak Street Pumping Station, or as designated by the Authority for future use.

The downstream end of the existing sewer to be abandoned shall be plugged with concrete or capped with a mechanical plug. All structures within a minimum distance of 12-inches from existing grade shall be demolished and removed. All sewers, manholes and drain inlets to be abandoned shall then be filled with pea gravel or sand and capped with a minimum of 4-inches of concrete. The upstream end of the pipes shall then be capped or plugged and the ground surfaces adjacent to all inlets or manholes shall be restored to their original condition.

504.0 BROKEN STONE OR SCREENED GRAVEL FOUNDATION

Broken stone or screened gravel shall be clean, hard aggregate as approved by the Engineer; shall be accurately leveled to required grades, and where required shall be compacted by tamping or other approved means.

In general, 3/4 inch clean broken stone or screened gravel will be required for foundation bedding and haunch purposes. In special cases, where large volumes of water are encountered and the greater consolidation effects of broken stone may be considered of less importance, clean, sound screened gravel, 3/4 inch to 1-1/4 inch in size may, at the option of the Engineer, be permitted.

505.0 BACKFILL MATERIAL

505.1 Quarry Process

Where specified or required by the Authority or Engineer, the Contractor shall furnish, place and compact quarry process. Quarry process, Type I5, N.J.D.O.T. Standard Specification, free of clay and foreign material, as approved by the Engineer; shall be accurately leveled to required grades, and shall be compacted by tamping or other approved means to the required grade.

Gradation shall be as follows;

<u>Sieve Size</u>	<u>Percentage by Weight Passing Square Mesh Sieve</u>
2"	100
3/4"	70-100
No. 4	30-80
No. 50	10-35
No. 200	5-12

505.2 Sand and Gravel

Where required by the Authority or Engineer, the Contractor shall furnish, place, and compact bank run sand and gravel. Bank run sand and gravel shall be bank run supply, Type I-3, N.J.D.O.T Standard Specification, free of clay and foreign material, as approved by the Engineer; shall be accurately leveled to required grades, and shall be compacted by tamping or other approved means to the required grade.

Gradation shall be as follows;

<u>Sieve Size</u>	<u>Percentage by Weight Passing Square Mesh Sieve</u>
4"	100
3/4"	60-100
No. 1	30-100
No. 50	5-35
No. 200	0-5

APPENDIX F

SEWER PROTOCOL

APPENDIX B

SEWER PROTOCOL

A. Investigation and Warning

1. The responsible party will investigate the sewer sites and delineate those areas of the Pipeline where Chromium Materials are present.

2. The responsible party will provide the utility with a map of those sections of sewer where Chromium Materials have been determined to be present and will fund training for utility employees on (a) recognition of Chromium Materials; (b) appropriate steps to be taken for worker protection; and (c) emergency utility repair procedures .

3. The responsible party and utility will develop administrative procedures to identify when Chromium Materials containing areas of the pipeline are scheduled for repair.

B. Remediation Protocols

1. Chromium Materials at the Surface. Whenever Chromium Materials or soils contaminated by Chromium Materials exceed the applicable standard for hexavalent chromium within the top 3 feet of soil, the presumptive remedy will consist of a capping system that includes, at a minimum, the following in vertical profile from top to bottom:

- Asphalt or concrete cover,
- Gravel subbase materials
- Geocomposite drainage layer, e.g. geonet, as a capillary break
- Linear Low Density Polyethylene (LLDP) liner
- Geotextile Fabric.

2. Chromium Materials Beneath the Surface. Whenever Chromium Materials or soils contaminated by Chromium Materials exceed the applicable standard for hexavalent chromium at a depth of 3 feet or more below the surface, the presumptive remedy consists of a capping system that includes the top three feet of clean fill as an engineering control. In addition, an orange demarcation layer (orange snow fence) will be installed below the surface as a warning not to disturb the engineering control.

3. Chromium Materials Beneath a Public Street or Highway. Whenever Chromium Materials or soils contaminated by Chromium

Materials exceed the applicable standard for hexavalent chromium beneath a public street or highway, the presumptive remedy consists of a capping system that includes the street itself as an engineering control.

4. **Chromium Materials Excavation and Removal** It is understood that repair or replacement of sections of a pipeline may be required from time to time to maintain efficient operation over the years. Whenever such normal operating repairs or replacement requires the removal of Chromium Materials or soils contaminated by chromium exceeding the applicable standard for hexavalent chromium, the responsible party will remove the Chromium Materials and/or contaminated soil.

5. **Emergency Repairs** The responsible party and the utility will develop procedures to be followed in the event of an emergency repair to any utility in an area where Chromium Materials were placed as bedding or fill around the utility. Such procedures will include: (a) appropriate steps to be taken to ensure worker safety; (b) the provision of notice to DEP and the responsible party as soon as practicable after the repair is made; (c) provisions for handling and disposal of any COPR Materials or chromium contaminated soil removed during the repair; and (d) provisions for restoring any remedial measures taken pursuant to the Sewer Protocol.