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New York City Department of Environmental Protection

Corrective Measures Work Plan for Landfill Cover System Restoration

Pelham Bay Landfill, Bronx, NY

December 2012

ARCADIS

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Pelham Bay Landfill, Bronx, NY

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New York City Department of Environmental Protection

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Table of Contents

Figures

Appendices

1. Introduction

ARCADIS of New York, Inc. (ARCADIS), at the request of the New York City Department of Environmental Protection (DEP), has prepared this Corrective Measures Work Plan for the Landfill Cover System Restoration (CMWP or Work Plan) to address damaged portions of the landfill cover system at the Pelham Bay Landfill (PBL or Site), located in Bronx, New York. On November 29, 2012, prompted by observations of damage to portions of the PBL engineering controls (i.e., perimeter fencing and landfill cover system) and non-engineering control infrastructure (i.e., the surrounding seawall) following Hurricane Sandy (October 29, 2012), personnel from the New York State Department of Environmental Conservation (NYSDEC) and the DEP performed an inspection of the PBL. During the inspection, damage to the perimeter fence, landfill cover system, and the seawall was confirmed and the NYSDEC requested the preparation and submission of a CMWP to address all damage to the landfill cover system at the Site. This CMWP complies with the requirements of the PBL Site Management Plan (SMP).

1.1 Description of Damage and Repairs Needed

Immediately following Hurricane Sandy, ARCADIS conducted an evaluation of conditions and damage to the engineering controls and seawall. The post Hurricane Sandy site evaluation was conducted based on observations made, site photographs (dated November 11, 2012) provided by, and discussions with the PBL Operation Maintenance and Monitoring (OMM) contractor, Stratis Contracting Corp (Stratis). Based on site observations made, Stratis personnel indicated that damage to the PBL following Hurricane Sandy was limited to portions of the seawall, the perimeter fencing, and the landfill cover system. A brief summary of the post Hurricane Sandy observed storm-related damage is provided below.

<u>Post-Hurricane Sandy Observed Damage at the Pelham Bay Landfill</u>

Based on the information provided by Stratis, it appears that approximately 1,700 linear feet of seawall has been impacted. Damage includes the loss of rip rap and erosion of the landfill cover (soil) behind the seawall. In addition, erosion in many areas along the seawall has also exposed the chain link fence post foundations and portions of the landfill's liner system. Storm-related impacts were observed along the landfill eastern and southern boundaries that border Eastchester Bay (Figure 1).

For the eastern portion of the Site, approximately 600 linear feet of seawall, fencing and landfill cover system has been impacted. Repairs needed for the eastern portion of the Site include replacement of seawall riprap, removal and replacement of chain link fencing, and placement of fill/topsoil (landfill cover material) in eroded areas behind the seawall.

For the southern portion of the Site, it appears that the majority of the seawall, fencing and landfill cover system has been impacted and is in need of repair. The estimated length of damage is approximately 1,100 feet. Again, repairs would include replacement of seawall riprap, removal and replacement of chain link fencing, and placement of fill/topsoil in eroded areas behind the seawall.

Of particular importance for the landfill is that erosive storm surge forces appear to have exposed the landfill's liner system. As observed in the field, the black HDPE geomembrane is visible along with the overlying gray-colored geocomposite and underlying geotextile. It is estimated that approximately 800 feet of landfill liner is exposed behind the south seawall. The liner is also visible in a several locations along the eastern wall; the total footage however is not known at this time.

2. Proposed Scope of Work and Methodology

The scope of work proposed herein includes conduct of a site inspection, topographic surveys, permitting, and landfill cover system restoration. Figure 1 shows the locations were restoration work is required. The various tasks associated with this work are described in Subsections 2.1 through 2.5 below.

Upon NYSDEC acceptance of this Work Plan and following subcontractor procurement, the selected subcontractor(s) will mobilize all equipment, materials and personnel (to the site) necessary to complete the restoration work. The anticipated schedule for well replacement activities is discussed in Section 4 of this Work Plan. ARCADIS will provide full-time oversight of the proposed restoration activities.

2.1 Site Preparation

Prior to initiating any field activities, all subsurface utilities will be cleared, as necessary. In addition, the New York City One Call Center will be notified prior to beginning any activities.

The restoration activities will require the removal of the existing perimeter fence. The chain link fence and posts in areas to be restored will be removed and disposed of off-site in accordance with the requirements in Section 2.3.2.5 (Materials Disposal Off-Site) of the SMP Temporary safety fencing shall be installed around the work area(s) to limit access by unauthorized personnel. The temporary safety fence will remain in place until all restoration activities are completed.

2.2 Equipment Mobilization

The selected subcontractor(s) will mobilize all equipment, materials and personnel (to the Site) necessary to complete the restoration activities. The OM&M contractor will designate an area on-site for staging of equipment and materials. Only clean equipment and materials will be mobilized to the Site.

2.3 Site Inspection and Topographic Survey

2.3.1 Site Inspection

The initial field activities will include the conduct of an on-site, visual inspection of the seawall, landfill cover system, and fence damage. ARCADIS will perform this inspection to verify the observations made by Stratis and to obtain more detailed information for the restoration efforts. In addition, the inspection will include a determination of whether the exposed geocomposite liner has been damaged.

2.3.2 Topographic Surveys

DEP will retain the services of a licensed surveyor to collect topographical data along the landfill perimeter for developing appropriate restoration measures. Two topographical surveys will be conducted. An initial topographical survey, will be completed along the full length of the seawall (details provided below) prior to conduct of Site restoration activities. As discussed below, this survey will provide information that will be used to develop the specific requirements for landfill cover system repairs. Data (topographic contours) generated from the initial survey will be compared to the existing cover system as-built details to determine the extent of storm-related damages (erosion) that were incurred, and will also be used to verify the quantities of repair materials estimated from the visual inspection and to assess slope stability issues within the surveyed area.

The second topographic survey will be performed after repairs to the landfill cover system have been completed. This second survey will serve as an "as-built" for documenting the final grades and elevations of the repaired landfill cover system and seawall. It will also be used as a baseline for future surveys and/or evaluations, if needed, of the seawall and landfill.

The topographic survey limits will extend 50 feet land side of the seawall and to the water level on the bay side of the wall. The surveys will focus on seawall and site features such as top of riprap, grade changes, edge of road, and edge of water. An existing conditions plan will be developed showing one foot topographic contours within the limits of the survey. The final as-built plan will also show one foot topographic contours.

2.4 Agency Coordination and Permitting

All work conducted under this CMWP will be coordinated with NYCDEP and NYSDEC. Any changes to the restoration efforts described herein that are required due to site conditions encountered in the field will be communicated to NYCEP and NYSDEC for approval, immediately upon identification of the need for a change.

In response to the damages from Hurricane Sandy, the NYSDEC has issued a General Permit for work in New York City, designated GP-2-12-002. GP-2-12-002 includes authorization for reconstruction of bulkheads and shoreline erosion structures that were functional before Hurricane Sandy. Prior to implementation of repair measures to the PBL seawall, a Notice of Intent (NOI) for GP-2-12-002 will be prepared and submitted to NYSDEC. The NOI for GP-2-12-002 will be included in the permit application to the New York City Department of Buildings.

2.5 Landfill Cover System Restoration

The approximate locations of the soil cover erosion and areas where the geocomposite liner is exposed are shown on Figure 1. As shown on Figure 1, soil has been eroded along the entire southern side of the landfill and in limited areas along the eastern side. The geocomposite liner has been exposed in the majority of the areas where soil has been eroded. The precise volume of soil that has been eroded and the precise areas where the geocomposite is exposed is not known at this time, however these volumes and areas will be determined as part of the topographic survey and site inspection discussed in Subsection 2.3 of this Work Plan. If the topographic survey results show that there are more widespread potential slope stability issues (away from the landfill

perimeter), additional cover system restoration activities, beyond the scope of work proposed in this CMWP, may be necessary. If necessary, these additional restoration activities will be addressed under a supplement to this CMWP. Based on the current information and initial assessments, the geocomposite liner has not been damaged in areas where it is exposed. However, if further inspection reveals that the geocomposite liner has been damaged, the geocomposite liner system will be repaired in the same manner described in the NYSDEC-approved Corrective Measures Work Plan for Landfill Gas System Maintenance (March 2011), and the specific areas, methodology and materials to be used will be described in a supplement to this Work Plan.

Restoration of the landfill cover system cannot be completed until restoration of the seawall is completed. However, in areas where the geocomposite liner is exposed, a limited, initial restoration will be immediately performed. Since the geocomposite liner system is subject to ultraviolet (UV) degradation, the geocomposite liner, where exposed, will immediately be covered with a six inch layer of loamy soil to minimize exposure to UV light. Erosion control mats will be placed and temporarily anchored in these areas to minimize the potential for erosion of the soil. The remaining landfill cover system restoration activities will then be conducted upon completion of the seawall restoration.

Restoration of the landfill cover system will include replacing the vegetated soil cover above the geocomposite liner. Directly behind (the landfill side) the seawall, the landfill cover system consists of a three (3) foot wide anchor trench which is constructed of a four (4) foot layer of loamy soil directly above the geocomposite liner followed by a six (6) inch layer of topsoil. A typical detail of the anchor trench construction is shown on Figure 2. The anchor trench will be restored as shown in the detail.

If erosion has occurred beyond the anchor trench, the soils will be placed as a two (2) foot layer of loamy soil directly above the geocomposite liner followed by a six (6) inch topsoil layer. All restored areas will be re-seeded, as necessary, in accordance with the requirements presented in Section 4.2.1.4 (Landfill Cover System Operation: Routine Inspection and Maintenance) of the SMP. A typical cover soil section is shown on Figure 2. To prevent erosion and loss of topsoil and seed, erosion control mats will be placed in the restored areas until the vegetative cover has been established.

All backfill materials (loamy soil and top soil) to be imported from off-site sources to be used for the cover system restoration will meet the requirements of Section 2.3.2.9 Backfill from Off-Site Sources of the SMP. All material proposed for import onto the Site must be approved by NYCDEP/ARCADIS and be in compliance with the provisions in

the SMP prior to receipt at the site. Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site. All imported soils will meet the Unrestricted Use Soil Cleanup Objectives as presented in 6 NYCRR Part 375-6.8(a). Non-compliant soils will not be imported onto the Site without prior approval by NYSDEC. Nothing in the approved Soil Management Plan (SoMP) or its approval by NYSDEC should be construed as an approval for this purpose.

Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Nothing in the SoMP should be construed as an approval for this purpose.

The subcontractor will provide NYCDEP/ARCADIS with the source of the backfill material, analytical results and sieve analyses for review and acceptance prior to importing any backfill material.

Upon completion of the landfill cover system the post restoration topographic survey, discussed in Subsection 2.3.2, will be conducted.

3. Health and Safety Plan

This project is being performed at a New York State Superfund Site, currently identified as a Class 4 Inactive Hazardous Waste Disposal Site by the NYSDEC. However, as described below, the potential for hazardous conditions exist at the Site. This project is being performed over and adjacent to a closed landfill containing buried wastes and refuse beneath a landfill liner/cover system. As these buried materials decompose, they may generate landfill gas, which normally consists of methane, carbon dioxide, and occasionally hydrogen sulfide and other gases, depending on the composition of the buried materials. Although all work is proposed to be conducted above the landfill liner, should the liner be breached exposure to landfill gases and refuse could occur. Additionally, this construction work is being performed in the winter along the elevated waterfront of the property. These working environments can pose significant hazards, including general construction hazards (heavy equipment) fall hazards, water and exposure to cold related hazards (hypothermia from emersion in water).

A site-specific HASP has been previously prepared and updated by ARCADIS for this work, and is included in Appendix A. Additionally, each subcontractor working on this project will be required to prepare a Contractor's Health and Safety Plan (CHASP) that

is at least as strict as the HASP prepared by ARCADIS and submit it for review by ARCADIS, DEP, and NYSDEC prior to the initiation of the field activities. The CHASP will include the Community Air Monitoring Plan (CAMP) that will be used by for all work associated with these restoration activities. The CHASPs and CAMP will be submitted under separate cover as addenda to this Work Plan once the contractors are selected. The CHASPs will address all the potential hazards associated with the site, the construction activities, water/waterfront work, seawall restoration, and the liner repair activities. The CHASPs will also include a section describing the air monitoring to be conducted in each work area, including air monitoring for methane, carbon dioxide, hydrogen sulfide, volatile organic compounds (VOCs), and dust. In addition, the CHASPs will include a CAMP to be implemented at the site during intrusive work activities. Since all of the proposed work is above the landfill liner it is anticipated that the CAMP will be prepared to address monitoring for particulates (dust) only.

4. Schedule

Upon NYSDEC acceptance of this CMWP, permitting, Contractor identification, selection, and procurement will begin. The site inspection and topographic survey will be completed first to refine/confirm volume estimates and to determine if any other restoration activities are required. Upon completion of the inspection and surveys and reports delivered, revised construction drawings will be prepared and contractors mobilized to the site to begin restoration activities. The first phase of restoration will include the limited, initial restoration of the landfill cover system. Final cover system restoration activities will be completed following the seawall restoration activities. The final restoration activities will include the conduct of the post-restoration topographical survey and perimeter fence replacement. An estimated project schedule is included as Figure 3

5. Report

Upon completion of the restoration work described herein, a Corrective Measures Report will be prepared, by ARCADIS, to summarize the restoration activities. In addition, this report will include all field logs generated, analytical results and bill of lading for any fill material imported onto or from the Site, and updated as-built drawings. Upon NYSDEC acceptance of this report, the SMP will be modified, as appropriate, including inserting the updated the as-built drawings to show the modifications made to these engineering controls.

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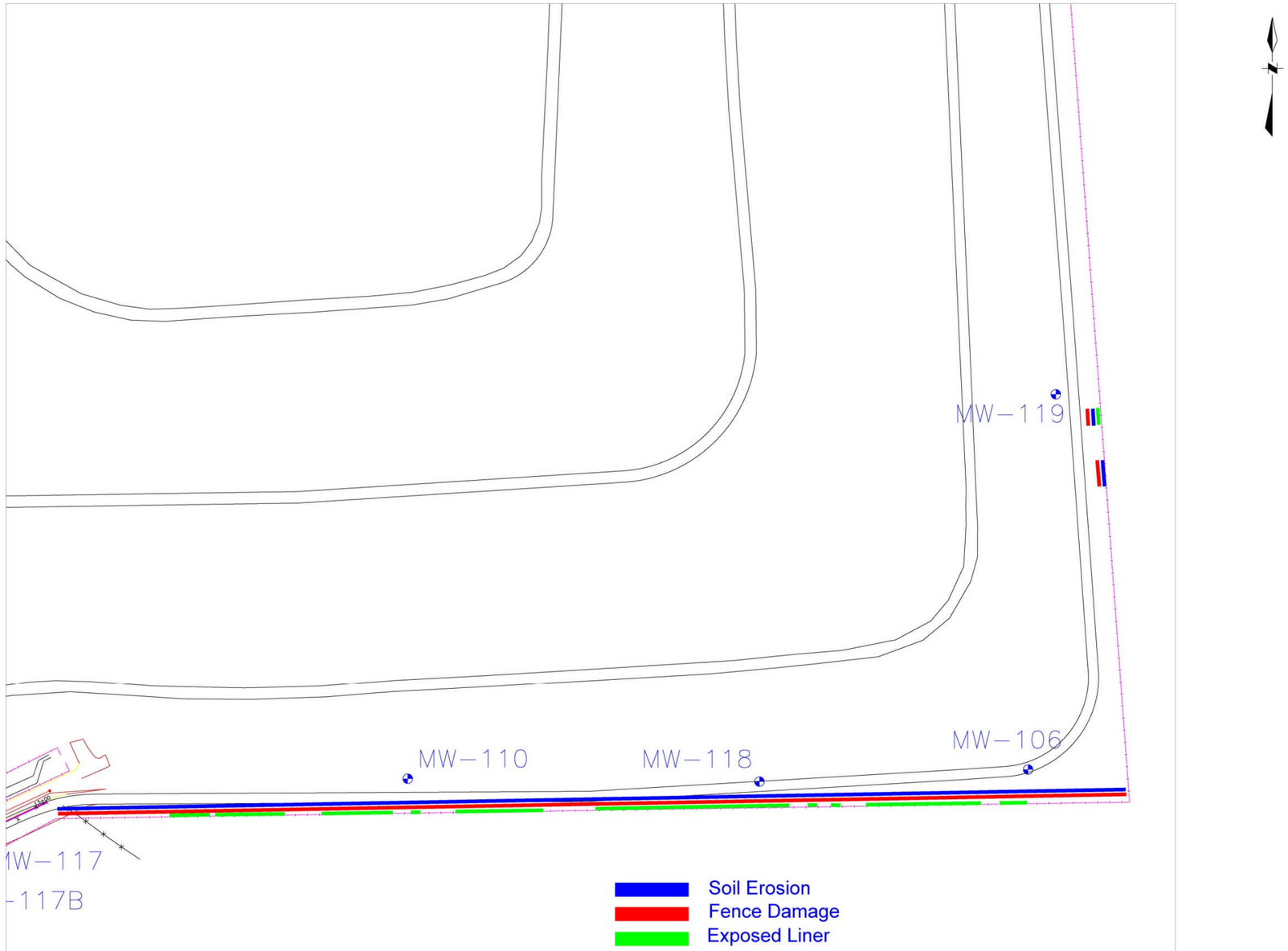
Figures



NYCDEP
PELHAM BAY LANDFILL
BRONX, NEW YORK

Damage from Hurrican Sandy

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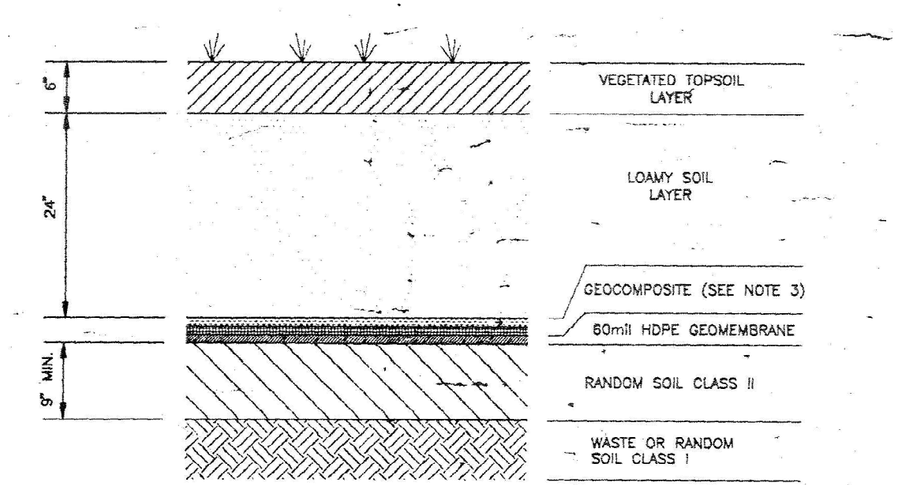
Figure 1
LOCATIONS OF PERIMETER FENCING AND LANDFILL COVER SYSTEM DAMAGE

New York City Department of Environmental Protection

Corrective Measure Work Plan for Landfill Cover System Restoration Pelham Bay Landfill, Bronx, NY

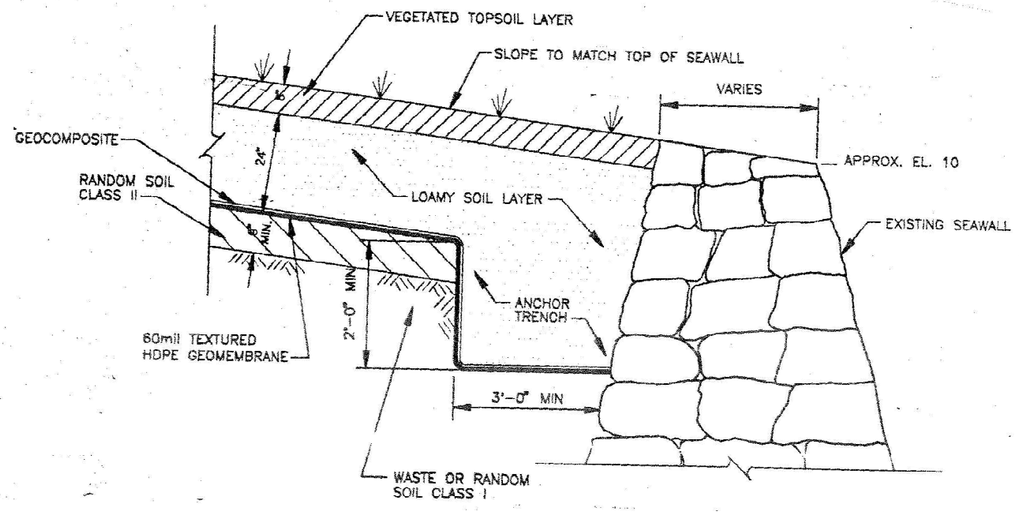
Source: Stratis Contracting Corp.

Project Number



TYPICAL COVER SECTION

N.T.S



TYPICAL ANCHOR TRENCH DETAIL

N.T.S

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Figure 2
TYPICAL DETAILS

New York City Department of Environmental Protection

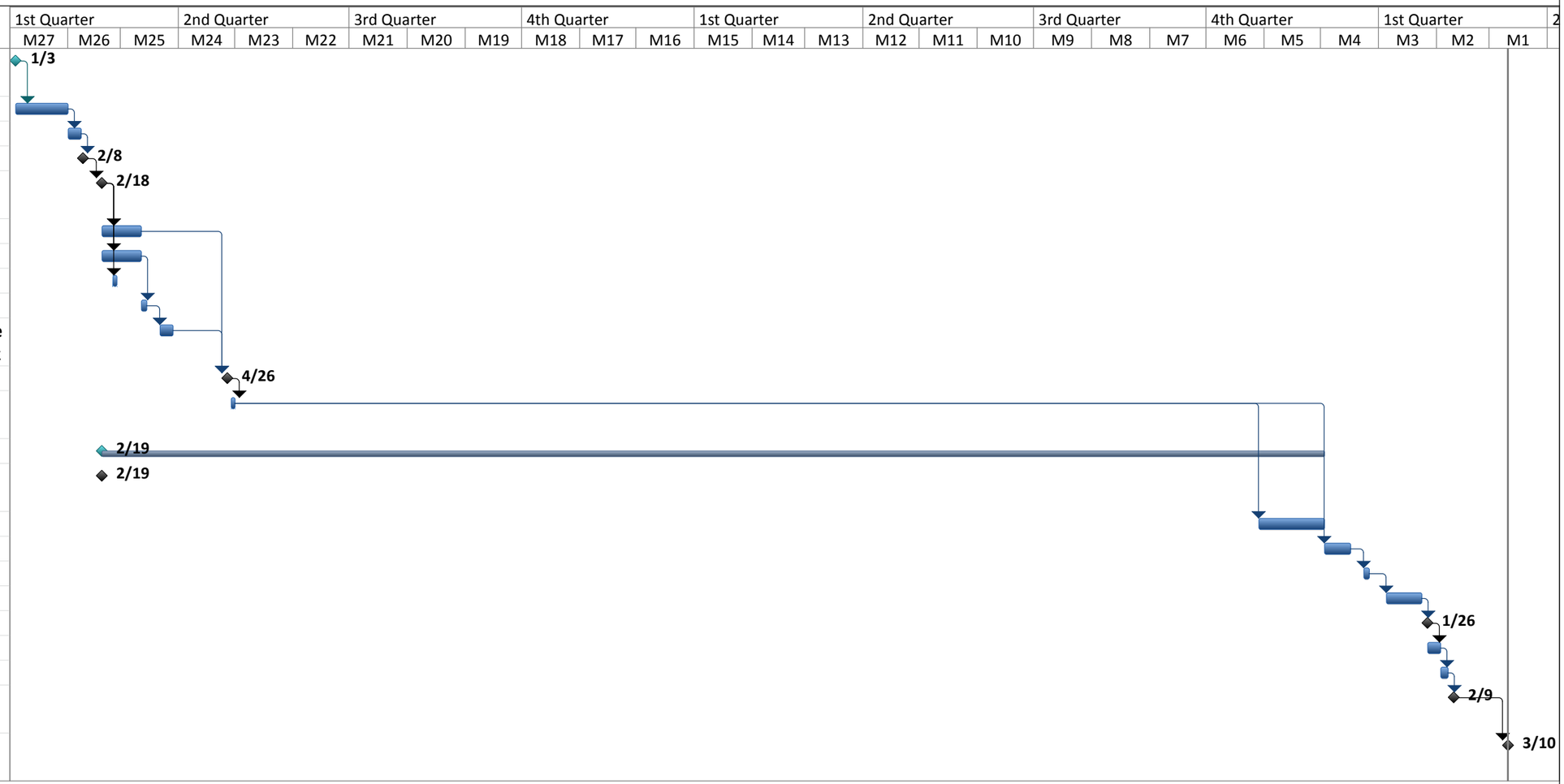
Corrective Measure Work Plan for Landfill Cover System Restoration Pelham Bay Landfill, Bronx, NY

Source: NYCDEP Pelham Bay Landfill Geomembrane Capping and Gas Collection System
Contract No. 876-HP As-Built Drawings
Prepared by Breco Environmental Contractors, Inc.

Figure 3
Estimated Project Schedule

DRAFT

ID	Task Name
1	**Submit Draft Corrective Measure Work Plan To NYSDEC**
2	**NYSDEC Review of Work Plan**
3	**Revise Work Plan**
4	**Submit Final Work Plan**
5	**NYSDEC Approval of Corrective Measures Work Plan**
6	**Permitting (General Permit GP-0-12-006)**
7	**Surveyor Identification, Contracting**
8	**Site Inspection**
9	**Initial Topographic Survey**
10	**Finalize Construction Documents and Volume Estimates for Cover System Restoration work**
11	**Restoration Contractor Mobilization**
12	**Initial Limited Landfill Cover System Restoration**
13	**Seawall Restoration**
14	Contractor Identification and Procurement (Duration To Be Determined)
15	Seawall Restoration
16	**Final Cover System Restoration**
17	**Final Topographic Survey**
18	**Prepare Draft Corrective Measure Report**
19	Submit Draft Report to NYCDEP
20	NYCDEP Draft Report Review
21	Revise Corrective Measure Report
22	Submit Final Corrective Measure Report to NYSDEC
23	NYSDEC Review & Approval of Corrective Measures Report



Project: Schedule-rev12-27-12
Date: Thu 12/27/12

Task	Project Summary	Inactive Milestone	Manual Summary Rollup	Deadline			
Split	External Tasks	Inactive Summary	Manual Summary	Progress			
Milestone	External Milestone	Manual Task	Start-only				
Summary	Inactive Task	Duration-only	Finish-only				

Appendix A

Health and Safety Plan (HASP)