



**SOIL AND GROUNDWATER MANAGEMENT PLAN
ROBINSON TERMINAL SOUTH
DUKE STREET AND SOUTH UNION STREET
ALEXANDRIA, VIRGINIA**

ECS PROJECT NO. 21983-E

FOR

EYA

**OCTOBER 19, 2015
REVISED: NOVEMBER 20, 2015**



July 27, 2015
Revised: October 19, 2015
Revised: November 20, 2015

Mr. Adam D. Hayes
Sr. Director of Engineering
EYA
4800 Hampden Lane, Suite 300
Bethesda, Maryland 20814

ECS Project No. 21983-E

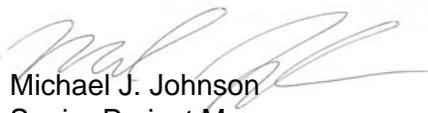
Reference: Soil and Groundwater Management Plan, Robinson Terminal South, Duke Street and South Union Street, Alexandria, Virginia.

Dear Mr. Hayes:

ECS Mid-Atlantic, LLC (ECS) is pleased to provide EYA with this revised Soil and Groundwater Management Plan for the above-referenced property. Our services were provided in accordance with ECS Proposal No. 51400-EP dated May 29, 2015. If you have any questions or comments regarding this report, or any other aspect of the project, please contact us at (703) 471-8400.

Respectfully submitted,

ECS MID-ATLANTIC, LLC


Michael J. Johnson
Senior Project Manager


David J. Bookbinder, C.P.G.
Senior Project Manager

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PURPOSE

The purpose of this Soil and Groundwater Management Plan is to communicate handling procedures associated with contaminated materials that may be encountered in the fill material at the Robinson Terminal South site to contractors who perform work at the site. This plan is not intended to act as a health and safety plan, but is intended to be presented to all onsite workers, as information, and to become an attachment to each contractor's health and safety plan. Each contractor is responsible for developing their own site specific, health and safety plan. Prior to initiating work, the applicant will identify a person who will serve as a dedicated person to monitor truck stacking and compliance with all erosion and sediment control requirements throughout the duration of construction. The name, telephone number, including an emergency contact number, of this individual shall be provided in writing to the Directors of P&Z and T&ES.

SITE HISTORY AND PROPOSED DEVELOPMENT SCENARIO

The subject Site is located at 2 Duke Street (Robinson Terminal South) and 226 Strand Street (Alexandria Marine) in Alexandria, Virginia. The site is identified as City of Alexandria Tax Assessment Map Numbers 075.03-04-01 (2 Duke Street) and 075.03-03-14 (226 Strand Street). The 3.35-acre subject site currently has three warehouses on two parcels of land. The warehouse encompassed two parcels: Robinson Terminal South, which had multiple warehouses (#1, 2, 3, 4, 6, 7 and 8) and an office building; and Alexandria Marine, a free-standing building to the adjacent north of Robinson Terminal South.

Previous environmental investigation at the Site include the following:

- Phase II Environmental Site Assessment. WSP. July 9, 2013.
- Phase I Environmental Site Assessment. ECS Mid-Atlantic, LLC. October 7, 2013. (ECS Project No. 21983-C).
- Phase II Environmental Site Assessment. ECS Mid-Atlantic, LLC. October 17, 2013. (ECS Project No. 21983)

The collective results of the environmental investigations at the Site indicate that concentrations of petroleum hydrocarbons, semi-volatile organic compounds (SVOCs), and metals are present in the fill material at concentrations that exceed their respective screening criteria.

Site development will consist of the construction of a mixed-use development which will consist of both commercial/retail facilities as well as multi-family residential structures. There will be a total of nine proposed above-grade structures, one proposed below-grade parking garage and one structure that will remain on site from the existing Robinson Terminal facility. The above-grade structures over the below-grade parking area will have a finished floor elevation of approximately EL. +11.75 feet and + 12.25, and the below grade parking garage slab will be at an elevation of approximately EL. 2.42 feet with bottom of footings bearing at EL. -4 feet. The three proposed 5-story commercial/retail buildings and two of the six proposed 4-story residential buildings are expected to be founded on a shared one level below-grade parking garage. The proposed 4-story townhouses located in the northwest portion of the site will be constructed near existing grade with a finished floor elevation of approximately EL. +12.25 feet. The existing one-story structure to remain onsite located within the northern portion of the site is understood to be founded at-grade. All mass fill and mass excavation material is to be conveyed to and from the Site by barge. Demolition debris and construction materials may be conveyed to and from the Site by barge or truck.

SOIL MANAGEMENT, POTENTIAL EXPOSURE AND CONTROLS

Potential exposure pathways are associated with archaeologists that may be present during the archaeological study as well as construction workers (present during the excavation of the parking garage, construction of the soil cutoff wall, excavation of the building foundations, and construction of the slab-on-grade town houses), utility workers, potential trespassers to the property and anyone else who may come into contact with the soil at the site. Risk scenarios for these individuals are expected to involve exposure pathways of inhalation from fugitive dust and incidental dermal contact and ingestion of soil particulates.

Contaminated material produced as a result of the archaeological survey, the excavation or utility work should be disposed of in accordance with applicable Virginia Department of Environmental Quality (VDEQ) Waste Management Regulations. Based on the contaminants detected at the site, impacted fill material should be taken to a lined landfill (or other appropriate disposal/treatment facility) capable of handling non-hazardous levels of heavy metals and TPH. Mass excavated contaminated materials should be loaded directly onto a barge and must be covered before being removed from the site and disposed appropriately. If it is necessary to stockpile the material for the archaeological survey or for any utility work that is performed, this material should be stockpiled on the Site only for the period of time it takes to excavate an appropriate length of trench and have it loaded onto barges and covered. Where possible, contaminated soils should not be stockpiled on site for a period longer than one working day. If however contaminated materials are stockpiled past the end of the working day, see controls in Contingency Planning section below.

During all activities at the site where soil disturbance will or may be conducted, including demolition, sediment and erosion control, archaeology, site utility work, excavation of the

sediment trap, mass excavation and vertical construction, etc., (i.e. during all phases of the construction), in areas where known contamination is present, a competent environmental professional must be onsite daily to screen the soils. The screening should be performed using a photoionization detector (PID), or other visual field-screening kit specific to the contaminants of potential concern (COPCs) at the Site.

For installation of the utility corridors in areas where impacted soils are encountered, it is required that the trenches be over excavated at least two feet on all sides unless a competent environmental professional has performed the requisite testing and documented that the soil are not contaminated. For utilities placed in the clean fill that will be brought onto the site, over-excavation is not required. Prior to installation of the utility, a layer of clean fill should be placed at the base of the excavation (i.e. replace the over-excavated material). If the excavation for the utilities is in non-impacted material, then over-excavation may not be necessary; however, the utility excavation should be observed by a competent environmental professional prior to final utility placement to verify the condition of the material remaining in the trench. Once the utility is placed in the excavation, the utility trench should be backfilled with clean fill (i.e. non-contaminated material).

During the development process, care should be taken to reduce worker exposure potential and ensure that the material is contained on the site until its final placement is complete. As such, engineering controls should be instituted so that no visible emissions or dust is produced during the handling process. This can be accomplished by the use of water sprayers or trucks as needed during site grading and excavation. In addition to these controls, any stockpiled material should be covered with plastic or otherwise stabilized to inhibit runoff, visible emissions and dust.

Workers should not be allowed to eat, smoke or drink in the areas of the site at which impacted soils are exposed. A designated worker "break" area should be established as needed at the site. Workers should be required to wash any exposed areas regularly during the workday and at a minimum prior to eating, smoking or drinking and upon leaving the Site. Also, work clothes that have come into contact with contaminated material should be changed prior to exiting the site. Worn work clothes removed should be placed into plastic bags prior to being taken home by the workers so that the work clothes can be laundered separately. Based on the known environmental information for the site it does not appear that personal protective equipment (PPE) above modified Level D (i.e. normal work clothes to include work gloves, safety glasses, hardhat, and safety shoes) will be needed when working at the site during the mass excavation. However, archaeologists and utility workers who come into direct contact with groundwater, or if splashing conditions are present, protective clothing (i.e. gloves, Tyvek suits, etc.) should be worn to reduce direct contact with groundwater. Any disposable protective clothing utilized (i.e. Tyvek suits, gloves, etc.) should be removed daily and placed into a properly labeled waste drum. Each day, the lid should be placed on each drum and properly secured. When the drum is full, the lid should be secured and it should be removed from the site in accordance with the Virginia Solid Waste Management Regulations and taken to an appropriate facility for disposal.

Based on the presence of metals detected at the surface, two feet of clean material should be placed on the surface to encapsulate this material and prevent direct exposure in areas not covered by the buildings or hardscape. The clean fill materials must be imported from offsite sources unless testing is done to ensure onsite material is suitable for reuse as clean fill.

If any future development of the property consists of cut operations, the areas should be over-excavated to a minimum depth of two feet to ensure the removal of contaminated materials, and the material replaced with clean, compacted fill materials. This form of encapsulation will effectively eliminate the long-term exposure potential by eliminating the potential for ingestion and inhalation of the impacted material. In areas that will not be capped by concrete or asphalt, a limited program of confirmatory testing should be performed to ensure that the soils will pose no significant risk to future occupants of the site.

SOIL CONTAMINANTS AND CONCENTRATIONS

Based on the previous environmental investigations at the Site, the following tables identify the COPCs present in soils beneath the Site, along with their respective maximum detected concentrations. Contaminants that were not detected are not included in these tables.

RCRA Metals

Date	Media	Contaminant	Concentration	Tier III Screening Level	Units
9/27/13	Soil	Arsenic	48.1	30	mg/kg
9/26/13	Soil	Barium	235	22,000	mg/kg
9/27/13	Soil	Cadmium	10.5	98	mg/kg
9/27/13	Soil	Total Chromium	31.8	No listing	mg/kg
9/27/13	Soil	Lead	1,180	800	mg/kg
9/26/13	Soil	Mercury	1.41	4.0	mg/kg
9/27/13	Soil	Silver	7.91	580	mg/kg

VOCs

Date	Media	Contaminant	Concentration	Tier III Screening Level	Units
9/27/13	Soil	Acetone	0.21	67,000	mg/kg
9/27/13	Soil	2-Butanone	0.047	19,000	mg/kg
9/26/13	Soil	Carbon Disulfide	0.011	350	mg/kg
9/27/13	Soil	2-Hexanone	0.38	130	mg/kg
4/18/13	Soil	Methylcyclohexane	8.0	No listing	mg/kg
9/26/13	Soil	Methylene Chloride	0.015	320	mg/kg
9/26/13	Soil	Total Xylenes	0.18	250	mg/kg

sVOCs

Date	Media	Contaminant	Concentration	Tier III Screening Level	Units
9/27/13	Soil	Acenaphthene	9.8	4,500	mg/kg
9/27/13	Soil	Acenaphthylene	0.084	2,300	mg/kg
9/27/13	Soil	Anthracene	18	23,000	mg/kg
9/27/13	Soil	Benzo (a) Anthracene	23	29	mg/kg
9/27/13	Soil	Benzo (a) Pyrene	22	2.9	mg/kg
9/27/13	Soil	Benzo (b) Fluoranthene	25	29	mg/kg
9/27/13	Soil	Benzo (g,h,i) Perylene	14	2,300	mg/kg
9/27/13	Soil	Benzo (k) Fluoranthene	12	290	mg/kg
9/27/13	Soil	Chrysene	22	290	mg/kg
9/27/13	Soil	Dibenz(a,h)anthracene	2.7	2.9	mg/kg
9/27/13	Soil	Fluoranthene	63	3,000	mg/kg
9/27/13	Soil	Fluorene	8.7	3,000	mg/kg

sVOCs (con't.)

Date	Media	Contaminant	Concentration	Tier III Screening Level	Units
9/27/13	Soil	Indeno (1,2,3-cd) Pyrene	13	29	mg/kg
9/27/13	Soil	Naphthalene	10	59	mg/kg
9/27/13	Soil	Phenanthrene	59	2,300	mg/kg
9/27/13	Soil	Pyrene	46	23,000	mg/kg

Pesticides and Herbicides

Date	Media	Contaminant	Concentration	Tier II Screening Level	Units
9/27/13	Soil	Methylchlor	0.0034	410	mg/kg

The impacted soil was found in the fill material, which extends down to depths ranging between 12-feet to 15-feet below ground surface (bgs). For this reason, all contractors and subcontractors should take special care to control surface runoff and fugitive dust emissions from fill materials when they are encountered.

As noted, it is likely that the petroleum-contaminated soils will be found in seams or pockets related to the presence of the historic fill material or the past use of the site and surrounding area, rather than from a single release with an identifiable plume. Therefore, it is not economically feasible to perform a full site characterization to identify all possible locations and quantities of petroleum-impacted soil on the property. Petroleum impacted soils will be identified during the mass excavation by field screening methods, and must be loaded onto a barge and covered. Impacted soils must be handled in accordance with applicable Virginia Solid Waste Management regulations and disposed of at an appropriate facility.

CONTINGENCY PLANNING

If impacted material is to be stockpiled for a period longer than one workday, then it should be placed in a designated stockpile area. The stockpile should be surrounded by a berm capable of containing the soil and any potential runoff that may occur in the event of rain and should also be covered. For a working stockpile, the berm should be replaced when left unattended for an extended period of time and at a minimum at the end of each workday. Engineering controls, as discussed above, should be instituted to eliminate visible emissions and dust from the stockpile area.

If during the course of development unknown or unforeseen conditions arise, work in the area of the site should cease until such time as the competent environmental professional can assess the situation. These situations may include:

- Unusual odors;
- Sheens or slicks on standing water surfaces;
- Seeping liquids or discolored water;
- Seeping gases and/or vapors;
- Underground piping, lines, tanks or drums or
- Any unusual buried object that cannot be readily identified.

Although this list is not exhaustive, in the event these situations or other unknowns are encountered, we strongly recommend that personnel immediately stop work in the area and contact their direct supervisor. **Do Not** attempt to fully assess the situation/item without first contacting your supervisor. Please keep in mind that worker safety is of utmost importance. **Do Not** perform any action that would jeopardize the health and safety of yourself or those working around you. You are responsible for your own actions as well as the health and safety of yourself and those working around you. Therefore, if you encounter an unusual situation, stop action and get appropriate advice before proceeding.

In the event that an unusual situation is encountered during work, first notify your direct supervisor. Your supervisor should then report directly to the site supervisor for EYA who will have responsibility to assess the situation and contact the appropriate competent environmental professional to handle the situation or item. ECS Mid-Atlantic, LLC (ECS) is the environmental consultant for EYA. Mr. Michael Johnson of ECS can be contacted at 703-471-8400, if needed.

If any unanticipated contamination, underground storage tanks, drums, or other containers of petroleum products or hazardous substances, the site supervisor must immediately notify the City of Alexandria Department of Transportation and Environmental Services, Office of Environmental Quality. The site supervisor will also notify City of Alexandria Code Enforcement when potentially hazardous substances have been discovered on the site. In the event of a large gas leak or discovery of flowing liquids of suspicious origin, on-site personnel must call 911 immediately.

GROUNDWATER MANAGEMENT

During the previous investigations at the Site, groundwater was encountered at depths ranging from 3-feet to 13.4-feet bgs. Based on the results of the previous environmental investigations, the groundwater contains elevated concentrations of TPH and concentrations of SVOCs that exceeded their respective Screening Levels. Based on the anticipated depth of the trenches for the archaeological survey and the anticipated depth of the excavation, dewatering will likely be required. Because the groundwater is impacted, a Virginia Pollution Discharge Elimination System (VPDES) permit from the VDEQ will be required prior to

discharge of groundwater from the property. The VPDES permit is site specific and will likely require monthly sampling of the effluent. If effluent sampling results exceed any of their respective permit limits, treatment of the discharge will be necessary to reduce contaminant concentrations to acceptable levels. The VPDES permit must be secured prior to beginning the archaeological survey but not necessarily before demolition.

During the archaeological survey and utility work, if groundwater is encountered, it can either be pumped out of the trench and containerized and disposed of at a facility capable of handling such material or discharged from the Site in accordance with the VPDES permit. During the excavation and dewatering, if treatment of the groundwater is required, it should be conducted by a granular activated carbon (GAC) treatment system. The water will be directed to a holding tank(s) which will be configured to allow sufficient separation of free-phase petroleum (if present). The water will then be directed through bag filters to remove sediment and GAC absorption vessels to remove VOCs. A flowmeter will track the discharge volume. Any free-phase petroleum will be captured and retained in separation tanks and removed by a licensed waste hauler.

If stormwater runoff accumulates within the excavation area during the mass excavation, it should be pumped from the surface of the excavation and directed to the treatment/discharge point of the excavation dewatering system and discharged from the Site in accordance the VPDES permit.

If petroleum hydrocarbons are still present in the groundwater following the completion of the construction dewatering, the property owner will be required to maintain the VPDES permit for long term post-construction dewatering. This will include collecting discharge samples and analyzing them for the contaminants of concern, at the frequency specified in the permit and reporting the results to VDEQ.

In order to minimize worker exposure, archaeologists, utility workers or any other construction personnel who come into direct contact with groundwater, or if splashing conditions are present, protective clothing (i.e. gloves, Tyvek suits, etc.) should be worn to reduce direct contact with groundwater. Refer to Section 6.0 of the Health and Safety Plan, dated September 14, 2015, for information related to personal protective equipment. Any disposable protective clothing utilized (i.e. Tyvek suits, gloves, etc.) should be removed daily and placed into a properly labeled waste drum. Each day, the lid should be placed on each drum and properly secured. When the drum is full, the lid should be secured and it should be removed from the site in accordance with the Virginia Solid Waste Management Regulations and taken to an appropriate facility for disposal.

Additionally, water used for washing hands, water that was used to wash vehicles, or water used for decontamination purpose that comes into contact with impacted soil shall not be discharged to the sewer system without prior testing. This water should be containerized and tested to determine the proper disposal of the water.