



ARCADIS U.S., Inc.
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Transmittal Letter

To:
Mr. Rob Hill
Maryland Department of the Environment
Land Management Administration
1800 Washington Boulevard, Suite 620
Baltimore, MD 21230-1719

Copies:
S. Bull, MDE
J. Richmond, MDE – Email
P. Kurzanski, CSXT – PS&E Web

ENVIRONMENT

From:
Megan E. Kellner

Date:
October 23, 2013

Subject:
Revised Supplemental LPH Delineation Work Plan
CSXT Brunswick Yard, Brunswick, Maryland CSXT
Project # 9415381

ARCADIS Project No.:
MD843.10.04

We are sending you:

Attached **Under Separate Cover Via _____ the Following Items:**

- | | | | |
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| <input type="checkbox"/> Shop Drawings | <input type="checkbox"/> Plans | <input type="checkbox"/> Specifications | <input type="checkbox"/> Change Order |
| <input type="checkbox"/> Prints | <input type="checkbox"/> Samples | <input type="checkbox"/> Copy of Letter | <input checked="" type="checkbox"/> Reports |
| <input type="checkbox"/> Other: _____ | | | |

Copies	Date	Drawing No.	Rev.	Description	Action*
1	10/23/13			Revised Supplemental LPH Delineation Work Plan	

Action*

- | | | |
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| <input type="checkbox"/> A Approved | <input type="checkbox"/> CR Correct and Resubmit | <input type="checkbox"/> Resubmit _____ Copies |
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| <input type="checkbox"/> Other: _____ | | |

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| <input type="checkbox"/> Certified/Registered Mail | <input type="checkbox"/> United Parcel Service (UPS) | <input checked="" type="checkbox"/> FedEx Standard Overnight | <input type="checkbox"/> FedEx Economy |
| <input type="checkbox"/> Other: _____ | | | |

Comments: Enclosed is an electronic copy of the Revised Supplemental LPH Delineation Work Plan for the Brunswick Yard, Brunswick, Maryland. Please contact me with questions.

Thanks, Megan Kellner



Mr. Rob Hill
Oil Control Program
Maryland Department of the Environment
Waste Management Administration
33 West Franklin Street, Suite 303
Hagerstown, Maryland 21742

Subject:
Revised Supplemental LPH Delineation Work Plan
C&O Canal/CSXT Brunswick Rail Yard, Brunswick, Maryland
MDE Case Number 94-1379FR
CSXT Project #9415381

Dear Mr. Hill:

ARCADIS has prepared this work plan on behalf of CSX Transportation, Inc. (CSXT) to propose investigation activities to delineate the horizontal and vertical extent of liquid phase hydrocarbons (LPH) in the subsurface in the area east of the former roundhouse (Figure 1). The first occurrence of LPH in two site monitoring wells (CSXT MW-39 and CSXT MW-70) was reported in the first quarter of 2013. LPH have not been previously observed in CSXT MW-39 since it was installed in November 2007. LPH was also not observed in CSXT MW-70, which was installed on January 9, 2013, the first time it was gauged on January 11, 2013. Table 1 summarizes the observation of LPH at these well locations. LPH thicknesses measured at CSXT MW-39 and CSXT MW-70 in January, February, March and April 2013 were less than 0.10 feet. LPH has not been observed in CSXT MW-39 since April 11, 2013, but has been observed in CSXT MW-70 (up to 0.29 ft thickness) in September 2013.

The occurrence of LPH in both wells was reported to the MDE and LPH was removed using an absorbent sock. The LPH observed in these wells was pink or red, consistent with the coloration seen in off-road diesel fuel. The coloration and location of this LPH relative to LPH historically observed at the Site indicates a source unrelated to the historical diesel releases that have been the focus of previous Site investigations. Possible sources of the LPH detected at CSXT MW-39 and CSXT MW-70 have been investigated during preliminary assessment activities, including interviews with CSXT personnel, review of MDE records for properties in the vicinity

Imagine the result

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ENVIRONMENT

Date:
October 23, 2013

Contact:
Megan Kellner

Phone:
410.923.7814

Email:
Megan.kellner@arcadis-us.com

Our ref:
MD000843.0010

of the Brunswick Rail Yard available under the Public Information Act, review of potential subsurface conduits and site visits.

The piping from the fueling areas to the oil water separator (OWS) has been identified as a potential source of LPH. It has been recognized that any diesel fuel spilled during fueling operations at either the 20,000 gallon MARC diesel fuel tanks or at the locomotive fueling island, drains via subsurface piping to the on-site OWS, located on the east side of the turntable. On August 28, 2013, MARCs environmental contractors (Subsurface Technologies, Inc. and Day Environmental, Inc.) performed a dye test of the drainage system and observed dye in the lift station for the OWS, indicating that the subsurface piping is connected to the OWS. However, visual inspection indicated that the piping was composed of outdated construction materials. On October 9, 2013, ARCADIS and closed circuit television (CCTV) subcontractor PEER Consultants conducted a video survey of the piping, which confirmed that the piping construction is dated and does not appear to be suitable for petroleum conveyance. The soils around the piping will be a focus area of the investigation activities outlined below.

Laser Induced Fluorescence (LIF) Investigation

LIF investigations are conducted by advancing an ultraviolet optical sensing tool (UVOST[®]) probe in areas of known or suspected LPH impact. The UVOST[®] probe emits an ultraviolet excitation light and captures returning fluorescence. Polycyclic aromatic hydrocarbon (PAH) compounds, which are a component of common petroleum fuels, readily fluoresce when exposed to ultraviolet light. The UVOST[®] probe detects four distinct fluorescent light wavelengths; the relative returns of each wavelength at a given depth are collectively referred to as a waveform. Differences in waveform patterns may indicate differences in LPH composition.

The return (fluorescent) light signal is analyzed in real time by on-site equipment. As the probe is advanced downward, the fluorescence data form a vertical profile of LPH impact present at the soil boring location. Results are reviewed after completing each LIF boring and considered when selecting subsequent locations.

Hydraulic permeability and electrical conductivity (EC) will also be recorded as the UVOST[®] probe is advanced. A hydraulic profiling tool (HPT) measures permeability by injecting water into the formation as the probe is advanced. The pressure required to inject the water provides a direct indication of the soil grain size and permeability of the surrounding formation. The HPT data collected provides

additional evidence of potential migration pathways and confining units when evaluated in conjunction with the UVOST[®] data.

EC is the measure of the soils ability to conduct an electrical current measured on the UVOST[®] probe. Each boring log includes the vertical profile of the EC data recorded in millisiemens per meter (mS/m) in addition to the fluorescence and HPT data. The soil type can be interpreted from the EC data since soil is in the pathway of the electrical current flow. The lithology can thus be determined by comparing the EC log to previously completed boring logs and the corresponding HPT data.

The proposed investigation will include the completion of 15 initial borings (Figure 2). The data collected from these boring locations will be used to evaluate the distribution of LPH in the vicinity of CSXT MW-39 and CSXT MW-70 and potential sources of the LPH, including underground piping associated with the oil/water separator that may have acted as a migration pathway. If present, LPH collected from CSXT MW-39 and CSXT MW-70 will be applied to the UVOST[®] sensor to allow field personnel to understand the expected LIF response to LPH from the investigation area.

The borings will be advanced using direct-push equipment to 5 feet (ft) below the last LIF response in a boring or to refusal. If no LIF response is observed, the boring will be terminated at 20 ft below ground surface (bgs). The water table at the Site is historically less than 20 ft bgs. LIF data will be collected from ground surface to the bottom of each boring. At borings where shallow (less than 15 ft bgs) refusal is encountered, the direct-push equipment will be offset approximately 10 feet from the original location and a second effort will be made to advance the probe to depth.

Additional contingency borings will be advanced as needed to delineate the horizontal extent of LPH in the vicinity of CSXT MW-39 and CSXT MW-70 and beyond the initial 15 borings, to the extent possible based on the location of facility and underground structures. Figure 2 shows the 26 planned contingency boring locations. The final number of contingency borings advanced will be dependent on evaluation of LIF data collected as borings are completed.

The 15 initial and 26 contingency boring locations shown on Figure 2 will be cleared for underground utilities prior to the LIF subcontractor mobilizing to the Site. This facilitates delineating the extent of LPH in one mobilization.

LPH Characterization Sampling

As part of the investigation, a total of up to five LPH samples will be collected for fingerprint analysis from CSXT MW-39 or CSXT MW-70 and from selected monitoring wells where LPH has historically been observed:

- CSXT MW-70
- CSXT MW-55
- CSXT MW-49
- CSXT MW-56
- CSXT MW-37

The fingerprint analyses will be performed through NewFields Environmental Forensics Practice, LLC (Rockland, MA) and will include:

- Gas chromatography/flame ionization detector (GC/FID) fingerprinting (EPA Method 8015M);
- Alkylated polycyclic aromatic hydrocarbon (PAH) and sulfur-containing aromatic fingerprinting (EPA Method 8270M); and
- Total sulfur determination (ASTM D5453).

Comparison of the LPHs will assess the degree of spatial homo/heterogeneity among LPHs, which will provide a basis to evaluate continuity among the LPH and whether samples originated from the same release or source. The fingerprint analysis data may also provide an indication of how recently the LPH at CSXT MW-39 and CSXT MW-70 was released based on evidence of sulfur content and/or relative degree of weathering.

The final LPH sampling locations will be determined in the field based on LPH thicknesses observed on the day of LPH sampling. Active LPH recovery will be suspended for approximately 2 weeks prior to LPH sampling in an effort to maximize the volume of recoverable LPH.

Reporting

ARCADIS will submit a report presenting and evaluating the data collected during the investigation activities discussed above. The report will also provide

recommendations for future activities including additional investigation, monitoring, and/or LPH recovery activities, depending on the results of the initial investigation.

Schedule

ARCADIS will begin coordinating the investigation described in this work plan upon approval from the MDE. ARCADIS anticipates the investigation field work will start within 3 to 6 weeks of receiving MDE approval, depending on LIF subcontractor availability.

ARCADIS estimates that the investigation activities described in this work plan will require approximately 1 week to complete. Utility locating is expected to require 1 to 2 days. The LIF investigation is expected to require 2 to 4 days to complete, depending on the final number of LIF borings completed. ARCADIS will collect LPH samples for fingerprint analysis while on-site during the LIF investigation. ARCADIS has obtained an excavation/dig permit from CSX in anticipation of the investigation.

If you have any questions or concerns with the proposed LIF investigation, please do not hesitate to contact me at 410.923.7814.

Sincerely,

ARCADIS U.S., Inc.



Megan E. Kellner
Project Manager

Copies:

Susan Bull, MDE
Jim Richmond, MDE
Paul Kurzanski, CSXT

Figures

- 1 Liquid-Phase Hydrocarbon Thickness – January 11, 2013
- 2 LPH Delineation Boring Locations

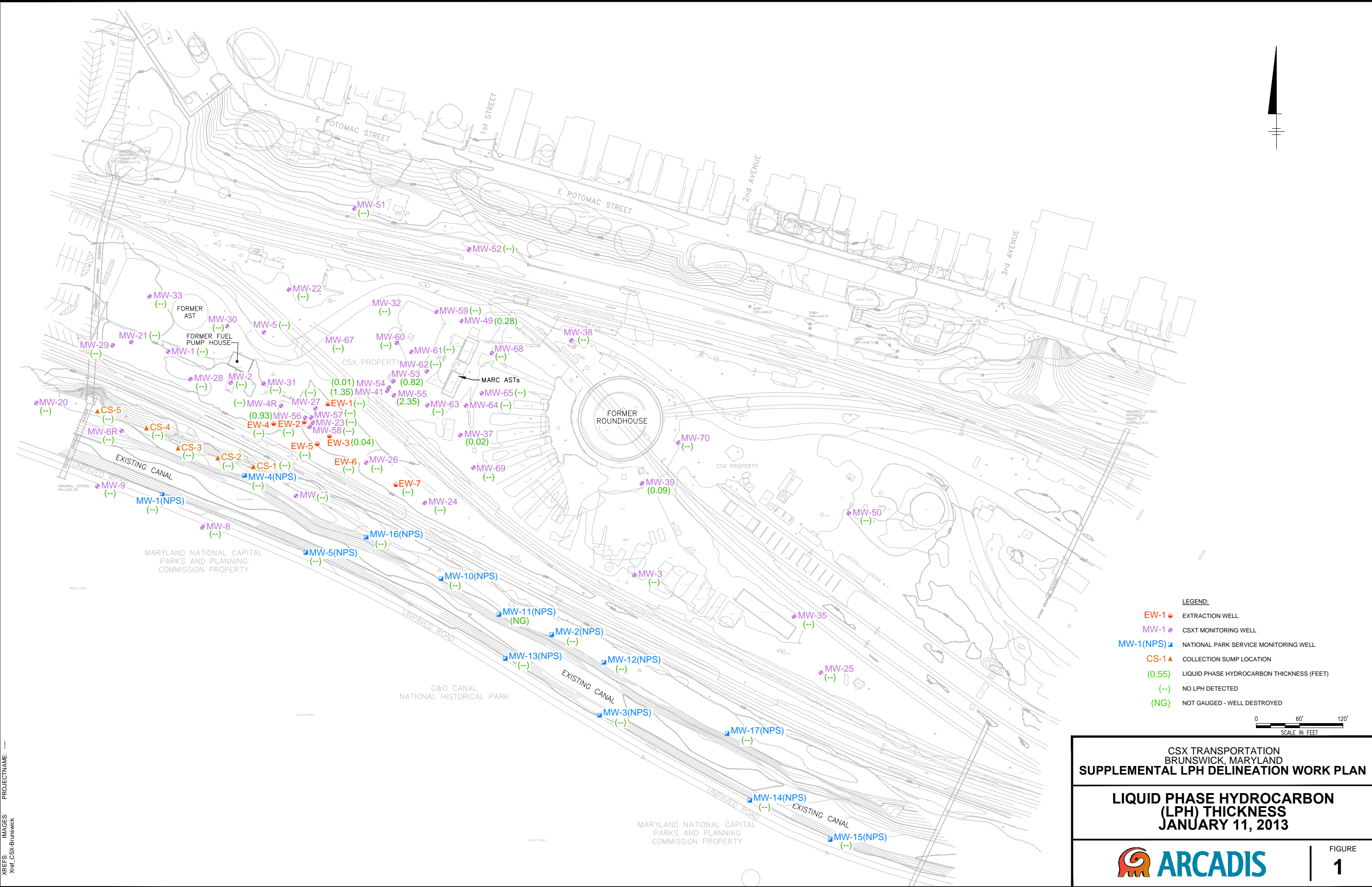
Tables

- 1 LPH and Water Level Data for CSXT MW-39 and CSXT MW-70



Figures

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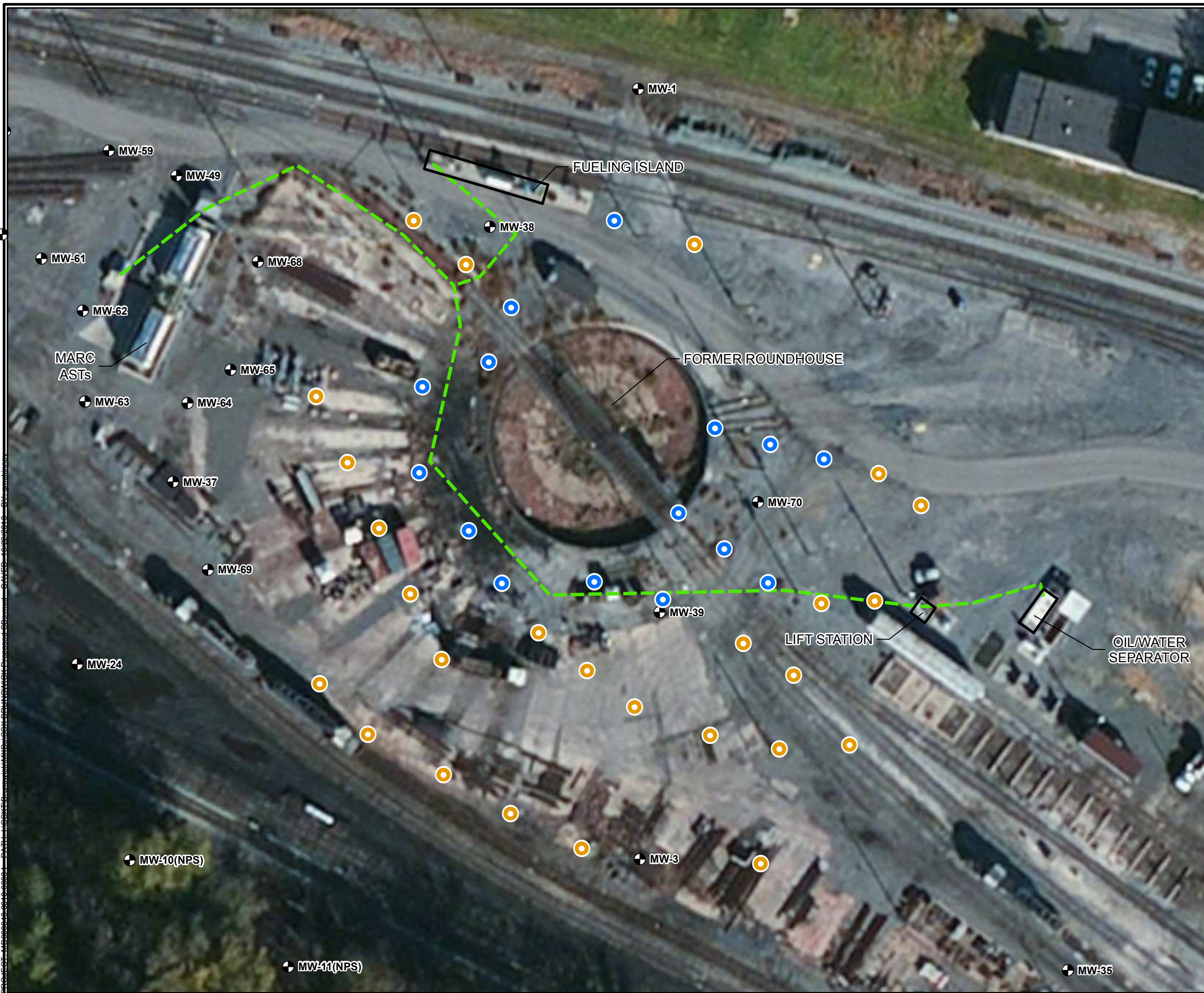
CSX TRANSPORTATION
BRUNSWICK, MARYLAND
SUPPLEMENTAL LPH DELINEATION WORK PLAN

**LIQUID PHASE HYDROCARBON
(LPH) THICKNESS
JANUARY 11, 2013**

 **ARCADIS**

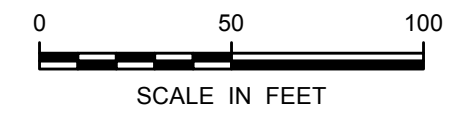
FIGURE
1

CITY: (HIGHLANDS RANCH) DIV: (GROUP: (ENV: (GIS) DB: B. BALTON LD: G. MCKINNEY PIC: PM: T.M. J. WILSON



LEGEND

- Monitoring Well
- Proposed LPH Delineation Boring
- Contingency LPH Delineation Boring
- Approximate Location of Oil/Water Separator Piping



PROJECTION: NAD 1983 StatePlane Maryland FIPS 1900 Feet
 DATA SOURCE:
 -IMAGERY PROVIDED BY BING MAPS, ACCESSED ON 10/22/2013
 THROUGH ARCGIS ONLINE USING ARCMAP 10.

CSX TRANSPORTATION, INC.
 BRUNSWICK, MARYLAND

SUPPLEMENTAL LPH DELINEATION WORK PLAN

PROPOSED LPH DELINEATION BORING LOCATIONS





Tables

Table 1
 LPH and Water Level Data for CSXT MW-39 and CSXT MW-70
 Supplemental LPH Delineation Work Plan
 Brunswick Yard, Brunswick, Maryland

Well ID	Measurement Date	Top of Casing Elevation (feet amsl)	DTLPH (feet bTOC)	DTW (feet bTOC)	LPH Thickness (feet)	Groundwater Elevation (feet amsl)	
MW-39	12/3/2007	245.65		15.37		230.28	
	2/25/2008			12.8		232.85	
	5/19/2008			10.75		234.9	
	2/25/2009			11.21		234.44	
	6/15/2010			13.22		232.43	
	9/21/2010			16.38		229.27	
	12/10/2010			13.95		231.70	
	2/14/2011			14.73		230.92	
	5/26/2011			11.95		233.70	
	8/8/2011			15.16		230.49	
	12/15/2011			11.95		233.70	
	3/21/2012			13.45		232.20	
	6/13/2012			13.23		232.42	
	9/24/2012			14.08		231.57	
	1/11/2013			13.22	13.31	0.09	232.42
	3/15/2013			11.48	11.56	0.08	234.16
	3/29/2013				12.91		232.74
	4/11/2013			13.43	13.46	0.03	232.23
	4/26/2013				13.86		231.79
	5/13/2013				12.78		232.87
	5/20/2013				13.91		231.74
	5/24/2013				13.25		232.40
	6/10/2013				12.40		233.25
8/2/2013				13.81		231.84	
9/4/2013				14.64		231.01	
9/12/2013				14.91		230.74	
9/16/2013				15.04		230.61	
MW-70	1/11/2013	245.57		13.43		232.14	
	3/1/2013		12.89	12.97	0.08	232.67	
	3/15/2013			12.41		233.16	
	3/29/2013		13.10	13.25	0.15	232.45	
	4/11/2013			13.41		232.16	
	4/26/2013		13.92	13.93	0.01	231.65	
	5/13/2013			13.24		232.33	
	5/20/2013			13.51		232.06	
	5/24/2013			13.13		232.44	
	6/10/2013			12.86		232.71	
	8/2/2013			13.80		231.77	
	9/4/2013		14.40	14.69	0.29	231.13	
9/12/2013			14.53		231.04		
9/16/2013			14.73	15.01	0.28	230.80	

Notes:

feet amsl - feet above mean sea level
 DTLPH- depth to liquid phase hydrocarbons
 DTW - depth to water
 feet bTOC - feet below top of well casing
 LPH - liquid phase hydrocarbon