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PILOT STUDY AND CONCEPTUAL DESIGN REPORT FOR OPERABLE UNIT 3 (OU-3)

Amtrak Sunnyside Yard
Queens, New York

Prepared for:

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CERTIFICATION

I Charles J. McGuckin certify that I am currently a NYS registered professional engineer and that this Pilot Study and Conceptual Design Report was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

069509	3/24/11	
NYS Professional Engineer #	Date	Signature

1.0 INTRODUCTION

Roux Associates, Inc. (Roux Associates) and Remedial Engineering, P.C. (herein collectively referred to as Roux Associates) have prepared this report to summarize the results of the dual phase high vacuum extraction (DPVE) pilot study for Operable Unit 3 (OU-3) of the Sunnyside Yard (Yard) located at 39-29 Honeywell Street, Queens, New York (Site). Additionally, a conceptual design for a full scale DPVE system is also included in this report in Section 5.0. Following NYSDEC's approval of this report, Roux Associates will provide a Remedial Design/Remedial Action Work Plan (RD/RA Work Plan) detailing the construction and implementation of the full scale DPVE system and subsequent Enhanced Bioremediation Injection program.

The use of DPVE was proposed as an alternative remedial technology in lieu of open excavation below the water table in OU-3 to address the mobile separate-phase hydrocarbon (SPH) plume. The location of the pilot study area is shown on Figure 1. The DPVE pilot study was performed in accordance with the letter work plan dated August 6, 2009 (Roux Associates, 2009). The New York State Department of Environmental Conservation (NYSDEC) approved the letter work plan in a letter dated September 29, 2009.

The DPVE pilot study was conducted from July 27, 2010 to August 18, 2010 following installation of a network of extraction wells. The purpose of the DPVE pilot study was to determine the feasibility of using high vacuum to recover the mobile SPH and obtain the necessary information for development of a full-scale design. The DPVE pilot study was conducted by Roux Associates and Remedial Engineering, P.C. personnel with pilot study equipment (i.e., liquid ring pump) provided by ProAct Services Corporation (ProAct). Community air monitoring was conducted by Nova Environmental. The pilot was conducted over a four week period to allow sufficient time for the testing of multiple locations as requested by NYSDEC and for the collection of sufficient data representative of the overall plume area. The DPVE system used for the Pilot Study was successful in recovering substantial quantities of mobile SPH from multiple locations within the plume. All necessary performance data was obtained in order to design a full-scale system. As a result, development of a Remedial Action Work Plan (RAWP) using a full-scale DPVE system is recommended to address the mobile SPH plume in OU-3.

The remainder of the report describes the DPVE technology, the DPVE pilot study scope of work, presents the results of the pilot study, and provides a conceptual layout of the full-scale system.

1.1 Technology Overview

The DPVE technology is widely used in the environmental industry to recover mobile SPH. By applying a high vacuum, the hydraulic gradient and effective drawdown increases thus allowing for a greater volume of SPH to be drawn to a well and recovered. The high vacuum establishes a cone of reduced pressure around the well. The SPH then flows across the pressure-induced gradient from a region of higher pressure outside of the well to a lower pressure zone in the well.

The high vacuum also overcomes the capillary displacement pressure of water against the free product and thereby increasing the relative permeability of the free product (as compared to water). Through application of a high vacuum, capillary pressures that immobilize water in soil pore spaces can be overcome. By removing this pore water, the relative permeability of the SPH increases, increasing its mobility and potential for recovery.

2.0 DPVE PILOT STUDY SCOPE OF WORK

The DPVE Pilot Study consisted of the following activities:

- Installation of DPVE Pilot Study Wells and Monitoring Points;
- DPVE Pilot Study Equipment Set-up;
- DPVE Pilot Study Methodology and Performance Monitoring; and
- Community Air Monitoring.

A description of each activity is provided below.

2.1 Installation of DPVE Pilot Study Wells

Eight DPVE wells (DPVE-1 to DPVE-8) were installed for the pilot study. The pilot study also utilized existing product monitoring wells (P-1 to P-16). The monitoring points P-1 to P-16 were previously installed as part of the product gauging and recovery activities for OU-3. The location of the pilot study DPVE wells and monitoring points are shown on Figure 1. Additionally, well constructions logs are provided in Appendix C for the eight wells (DPVE-1 to DPVE-6 and existing wells P-3 and P-4) that were tested during this pilot study.

The DPVE wells were installed using a Geoprobe™ unit from Land, Air, and Water, Inc. under the oversight of Roux Associates. DPVE-1 and DPVE-2 were installed in September 2009 and DPVE-3 to DPVE-8 were installed in June 2010. Each well is constructed of 4-inch diameter Schedule 40 polyvinyl chloride (PVC) with 9 to 10 feet of 0.01-inch slot screens. Due to the shallow depth to product and groundwater, the DPVE well screens extended from 6 inches below land surface to approximately 10 feet below land surface (ft bls). Four feet of casing was added to the screens which provided 3-foot stick-ups. The DPVE wells were sealed with bentonite from 6 to 8 inches below land surface to grade to prevent leakage of the vacuum. The DPVE wells were finished with concrete collars and protective steel casing. The existing product monitoring wells were constructed of 4-inch diameter Schedule 40 PVC pipe and screened from 5 to 10 ft bls. The monitoring points were installed to a depth of 10 ft bls.

2.2 DPVE Pilot Study Equipment

A dual phase extraction system from ProAct was used for the pilot study. The dual phase extraction system from ProAct included a 20 horsepower (Hp) liquid ring pump (LRP), oil/water separator (OWS), bag filters, transfer pumps, and liquid and vapor phase carbon units. The LRP, the OWS, bag filters, transfer pumps and all meters and gauges were housed in a treatment trailer enclosure. The liquid and vapor phase carbon units and the 21,000 gallon frac tank were located outside.

The oil-sealed LRP was sized to handle 300 actual cubic feet per minute (acfm) at a vacuum of 28 inches of mercury (in. Hg). The LRP was connected to a manifold header to allow for the connection of up to 4 DPVE wells. Each connection on the manifold header consisted of clear pipe, in-line air flow meter, vacuum gauge, and valves. During the LRP operation, the recovered product, water and vapor passed through the manifold and entered the air/fluids separator (knock-out tank) prior to the LRP. The 120-gallon knock-out tank had three float switches to control the transfer pump. The recovered water/product was then pumped from the knock-out tank to the OWS. The OWS was designed for 10 gallons per minute (gpm) and had a coalescing pack constructed of hydrocarbon resistant polypropylene to enhance separation. A slotted oil skimmer recovered the product within the OWS. Recovered product was gravity discharged to a 55-gallon drum located outside the equipment enclosure. The product recovery drum was equipped with a high level float switch. The recovered groundwater was pumped from the OWS through two bag filters, a totalizer flow meter, four-220 pound organoclay units (two parallel pairs of units arranged in series) and four-180 pound liquid phase carbon (LPGAC) units (two parallel pairs of units arranged in series) prior to discharge to a 21,000 frac tank. The recovered vapor was discharged to four-180 vapor phase carbon (VPGAC) units (two parallel pairs of units arranged in series) prior to discharge to the atmosphere. A portable generator was used to provide power. A process flow diagram of the LRP system is shown on Figure 2.

2.3 DPVE Pilot Study Methodology

During set-up of the LRP system, liquid and vapor phase carbon units and the frac tank, the treatment system was primed with clean water to test the system for leaks and ensure proper function of the equipment. Following set-up of the LRP system, the pilot study began. A baseline round of product and water levels was performed on each DPVE well and monitoring

point. The DPVE wells and existing monitoring wells not being tested were sealed with well caps and tubing connected to a magnehelic vacuum gauge. All field activities and measurements were recorded in a field notebook and field forms. The details of the pilot study are outlined below.

The pilot study began by applying a vacuum to one DPVE well or existing monitoring well at a time. A one-inch diameter drop tube was installed in the DPVE well or existing monitoring well to be tested and extended to the middle or near the bottom of the well. The wellhead was then sealed to prevent leakage of the vacuum. The one-inch diameter drop tube was then connected to the LRP manifold. A total of eight wells (DPVE-1 to DPVE-6 and existing monitoring wells P-3 and P-4) were each tested individually over a sufficient period of time (i.e., 4 hours). During each test, the following measurements were also monitored and recorded:

- Vacuum readings at recovery test well;
- Vacuum readings at observation wells (existing monitoring wells and DPVE wells);
- Groundwater and SPH levels in observation wells;
- Amount of recovered groundwater (in gallons);
- Amount of SPH recovered (in gallons);
- Vapor flow rate;
- LRP temperature;
- Vacuum readings in LRP system; and
- Monitoring of the extracted vapor before and after the vapor phase carbon with a photoionization detector (PID).

The performance field readings were used to determine the following:

- The effectiveness of the high vacuum at recovering SPH;
- The radius of influence (ROI); and
- The effectiveness of the LRP and groundwater treatment system at removing product and treating the groundwater.

The performance field readings were recorded on forms that have been compiled and included in Appendix A. The product thicknesses in the knock-out tank, OWS, and product recovery drum were measured each morning before a new test was performed. A more accurate measurement was obtained by allowing the product to separate overnight (to not be as emulsified). The amount of recovered product was then calculated by using the measured product thickness with the appropriate dimensions of the knock-out tank, OWS, and product recovery drum.

Following the testing on each individual well, 4-mil polysheeting was placed on the ground surface around DPVE-3, DPVE-5, and DPVE-2. The polysheeting extended approximately 10 to 20 feet around the well and was sealed at the concrete collar. The purpose of the polysheeting was to evaluate if providing a surface seal significantly improved the product recovery rates. These three DPVE wells were selected for comparison to the SPH recovery rates without polysheeting in order to see any significant changes in the product recovery rates with the polysheeting.

Lastly, several DPVE wells were manifolded together and tested. The purpose of the manifold test was to simulate a full-scale system and what effect operating on several wells at a time had on the LRP and treatment system. A summary of the DPVE pilot study testing schedule is summarized as follows:

- DPVE-3 test (July 27, 2010);
- DPVE-5 test (July 28, 2010);
- DPVE-1 test (July 29, 2010);
- DPVE-2 test (July 29, 2010);
- DPVE-4 test (July 30, 2010);
- DPVE-3 second test with polysheeting (August 2, 2010);
- DPVE-5 second test with polysheeting (August 3 and 4, 2010);
- P-3 and P-4 tests (August 4 and 5, 2010);
- DPVE-2 second test with polysheeting (August 6, 2010);
- DPVE-6 test (August 9, 2010); and

- Manifold test on DPVE-1, DPVE-2, DPVE-3, and DPVE-5 (August 10, 2010 to August 18, 2010).

Three samples of the recovered groundwater were collected from the influent to the organoclay units (pre-treatment) and three samples of the effluent of the liquid phase carbon units (post-treatment) were collected and analyzed for New York City Department of Environmental Protection (NYCDEP) discharge standards. The samples of the recovered groundwater were collected on July 29, 2010, August 3, 2010, and August 17, 2010. The recovered groundwater samples were collected to evaluate the ability of the treatment system in meeting the NYCDEP discharge standards.

Two air samples were also collected for laboratory analysis using United States Environmental Protection Agency (USEPA) Method TO-15 and TO-3 (for methane) from the vapor stream (pre-carbon). One air sample was collected on July 28, 2010 during the individual test on DPVE-5 and the second air sample was collected on August 17, 2010 during the manifold test. The air samples were collected to evaluate the off-gas treatment requirements for a full-scale system. The results of the groundwater and air samples are discussed in Section 3.9.

2.4 Community Air Monitoring

During the pilot study, volatile organic compound (VOC) concentrations (i.e., PID readings) were monitored using a PID on an ongoing basis at upwind and downwind locations, approximately 20 to 30 ft away from the pilot study equipment. The PIDs were monitored by a full-time dedicated technician on a frequent basis each day. The PID readings were recorded on a laptop computer. The PID readings are provided in Appendix B.

3.0 PILOT STUDY RESULTS

The following section discusses the results of the DPVE pilot study. A total of eight wells (DPVE-1 to DPVE-6, P-3, and P-4) were tested. The monitoring points were gauged for depth to water and product thickness and pertinent readings of the LRP equipment (i.e., LRP vacuum) were recorded. The performance field readings were collected from the monitoring wells that showed a response to the high vacuum (i.e., water table and product thickness changes). These performance field readings from the pilot study are provided in Appendix A.

The ROI estimation for each test is based on the effective drawdown or response of the water table to the applied vacuum. As a "rule of thumb" the ROI will be based on effective drawdown values of 0.1 feet or greater. The effective drawdown was corrected for the presence of SPH (if necessary) and was either calculated as positive or negative. A positive effective drawdown was a result of the groundwater table increasing in elevation in a monitoring point due to the product thickness being decreased (the weight of product decreasing and not pushing down on the groundwater table). A negative effective drawdown indicates that the groundwater table decreased in elevation as the product thickness was either not reduced or product was not present. A detailed discussion for each test is presented below.

3.1 DPVE-3 Test Results

The first test on DPVE-3 was conducted over a period of approximately 4 hours on July 27, 2010. The one-inch diameter drop tube was set approximately 1.5 feet off the bottom of DPVE-3. The drop tube was connected to a 2-inch diameter flexible hose. The 2-inch diameter flexible hose was connected to the manifold header on the treatment enclosure. The LRP was started and a vacuum of 19 in. of Hg was applied at the well. The air flow rate was approximately 40 standard cubic feet per minute (scfm) and the total amount of recovered groundwater was 107 gallons. The baseline measured SPH thickness in DPVE-3 was 3.87 feet.

There was no measurable vacuum response in the monitoring points. The groundwater and product levels changed as summarized in the table below:

DPVE-3 Data From First Test

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-3 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-2	4.5	7.81	3.31	4.94	6.94	2.00	0.27	9
P-3	4.75	7.23	2.48	4.74	7.26	2.52	0.00	32
P-4	4.7	7.02	2.32	5.00	7.14	2.14	0.28	18
P-7	4.65	4.72	0.07	4.61	4.67	0.06	-0.04	43

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

The effective drawdown was significant in P-2 (9 feet from DPVE-3) and P-4 (18 feet from DPVE-3). Based on the effective drawdown of 0.28 feet in P-4, the estimated ROI for DPVE-3 (without polysheeting) was estimated to be approximately 20 feet. The SPH thickness decreased in P-2 and P-4 demonstrating an effective SPH recovery. The first test on DPVE-3 removed an estimated 45 gallons of SPH. The SPH to water recovery ratio of 0.43 is excellent illustrating a high potential recovery rate for this well location.

The second test on DPVE-3 was conducted over a period of 5 hours on August 2, 2010 following the placement of 4-mil polysheeting. The polysheeting was placed approximately 10 feet around DPVE-3. As with the first test on DPVE-3, the drop tube was set approximately 1.5 feet off the bottom of DPVE-3 and connected to the LRP. The applied vacuum at DPVE-3 was 24 to 22 in. of Hg which is an increase from 19 in. of Hg without polysheeting. The air flow rate was approximately 40 scfm and the total amount of recovered groundwater was 97 gallons.

There was measurable vacuum response in monitoring point P-2 at a vacuum reading of 0.01 inches of water column (in. of w.c.). The polysheeting was most likely responsible for increasing the vacuum response within 10 feet of the extraction well. In addition, the groundwater and product levels changed as summarized in the table below:

DPVE-3 Data From Second Test

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-3 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-2	4.67	7.5	2.83	4.95	6.89	1.94	0.16	9
P-3	4.78	8.14	3.36	4.78	8.15	3.37	0.00	32
P-4	4.77	7.75	2.98	4.96	7.78	2.82	0.17	18

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

Based on the effective drawdown of 0.17 feet in P-4, the estimated ROI for DPVE-3 (with polysheeting) was estimated to be approximately 20 feet. As with the first test, the product thicknesses decreased in P-2 and P-4. An estimated 53 gallons of SPH was recovered over a 5-hour period compared to 45 gallons of SPH recovered over a 4-hour period without polysheeting. The polysheeting did not seem to have a significant impact on the SPH recovery rate, however, the SPH to water ratio improved to 0.54 during this test which was also excellent.

3.2 DPVE-5 Test Results

The first test on DPVE-5 was conducted over a period of approximately 5 hours on July 28, 2010. The one-inch diameter drop tube was set approximately 2 feet off the bottom of DPVE-5. The drop tube was connected to a 2-inch diameter flexible hose. The 2-inch diameter flexible hose was connected to the manifold header on the treatment enclosure. The LRP was started and a vacuum of 17 in. of Hg was applied at the well. The air flow rate was approximately 100 scfm and the total amount of recovered groundwater was 555 gallons. The baseline measured SPH thickness in DPVE-5 was 2.41 feet.

There was no measurable vacuum response in the monitoring points. The groundwater and product levels changed as summarized in the table below:

DPVE-5 Data From First Test

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-5 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-3	4.72	7.42	2.7	4.96	7.58	2.62	0.23	24
DPVE-3	5.32	6.18	0.86	5.46	6.4	0.94	0.15	33
DPVE-4	8.12	8.97	0.85	8.33	9.2	0.87	0.21	29
DPVE-6	7.41	7.73	0.32	7.43	7.73	0.3	0.02	28

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

Based on the effective drawdown of 0.23 feet in P-3 and 0.15 feet in DPVE-3, the estimated ROI for DPVE-5 (without polysheeting) was estimated to be approximately 33 feet. The product thickness decreased in P-3 (24 feet from DPVE-5) and in DPVE-6 (28 feet from DPVE-5). The first test on DPVE-5 test removed an estimated of 11 gallons of SPH. This test well yielded a much lower SPH to water recovery ratio of 0.02 as compared to DPVE-3.

The second test on DPVE-5 was conducted on August 3 and 4, 2010 following the placement of 4-mil polysheeting. The polysheeting was placed approximately 20 feet around DPVE-5. As with the first test on DPVE-5, the drop tube was set approximately 2 feet off the bottom of DPVE-5 and connected to the LRP. The applied vacuum at DPVE-5 was 20 in. of Hg which is an increase from 17 in. of Hg without polysheeting. The air flow rate remained unchanged at approximately 100 scfm and the total amount of recovered groundwater was 515 gallons.

There was measurable vacuum response in monitoring point P-3 at a vacuum reading of 0.015 in. of w.c. There was no measurable vacuum response in the other monitoring points. The groundwater and product levels changed as summarized in the table below:

DPVE-5 Data From Second Test (with polysheeting)

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-5 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-3	4.74	8.21	3.47	4.9	8.33	3.43	0.15	24
DPVE-3	5.4	6.3	0.9	5.5	6.58	1.08	0.12	33
DPVE-4	6.21	6.94	0.73	6.36	7.15	0.79	0.16	29
DPVE-6	5.62	6.67	1.05	5.78	7.17	1.39	0.21	28

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

Based on the effective drawdown of 0.15 feet in P-3 and 0.12 feet in DPVE-3, the estimated ROI for DPVE-5 (without polysheeting) was estimated to be approximately 33 feet. The product thickness decreased in P-3 (24 feet from DPVE-5). An estimated 2 gallons of SPH was recovered compared to 11 gallons of SPH without polysheeting indicating no improvement during this test.

3.3 DPVE-1 Test Results

The test on DPVE-1 was conducted over a period of 1.5 hours on July 29, 2010. Initially, the one-inch diameter drop tube was set approximately 2 feet off the bottom of DPVE-5. The drop tube was connected to a 2-inch diameter flexible hose. The 2-inch diameter flexible hose was connected to the manifold header on the treatment enclosure. The LRP was started and a vacuum of 16 in. of Hg was applied at the well. The air flow rate was approximately 60 scfm and the total amount of recovered groundwater was 442 gallons. Due to the large amount of recovered groundwater, the drop tube was raised approximately one to two feet. However, a large amount of groundwater continued to be recovered.

The measurable vacuum response in P-5 was 27 in. of w.c. P-5 is located approximately 3 feet from DPVE-1. In addition, the groundwater and product levels changed as summarized in the table below:

DPVE-1 Data

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-1 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-5	4.56	4.97	0.41	6.6	7.1	0.5	2.05	3
P-4	4.66	7.23	2.57	4.67	7.25	2.58	0.01	59
P-7	4.65	4.71	0.06	5.34	5.4	0.06	0.69	34
P-8	4.58	4.9	0.32	4.93	5.31	0.38	0.36	35
P-9	--	4.63	--	--	4.68	--	0.05	55
P-10	--	4.75	--	--	4.75	--	0.00	59

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

The groundwater levels changed in P-7 (34 feet from DPVE-1). Based on the effective drawdown of 0.69 feet in P-7 and 0.36 feet in P-8, the estimated ROI for DPVE-1 was estimated to be approximately 35 feet. However, there was no measured SPH removed during the test on DPVE-1.

3.4 DPVE-2 Test Results

The test on DPVE-2 was conducted over a period of 3 hours on July 29, 2010. Initially, the drop tube was set approximately 1.5 feet off the bottom of DPVE-2 and connected to the LRP. The applied vacuum at DPVE-2 was 21 in. of Hg. The air flow rate was approximately 17 scfm and the total amount of recovered groundwater was 46 gallons over a three hour period. The baseline measured SPH thickness in DPVE-2 was 0.61 feet.

There was no measurable vacuum response in the monitoring points. The groundwater and product levels changed as summarized in the table below:

DPVE-2 Data From First Test

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-2 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-12	5.08	5.65	0.57	5.1	5.64	0.54	0.02	26
P-13	5.58	7.79	2.21	5.73	6.15	0.42	-0.09	12
P-15	6.32	6.8	0.48	6.32	6.79	0.47	0.00	41

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

Based on the rise in the water table in P-13 due to the removal of product, the estimated ROI for DPVE-2 (without polysheeting) was estimated to be approximately 10 feet. The product thickness decreased in P-12 (26 feet from DPVE-2), P-13 (12 feet from DPVE-2), and P-15 (41 feet from DPVE-2). An estimated 3 gallons of SPH was recovered. This test well yielded a SPH to water recovery ratio of 0.07.

The second test on DPVE-2 was conducted over a period of 5 hours on August 6, 2010 following the placement of 4-mil polysheeting. The polysheeting was placed approximately 20 feet around DPVE-2. As with the first test on DPVE-2, the drop tube was set approximately 2 feet off the bottom of DPVE-5 and connected to the LRP. The applied vacuum at DPVE-2 was 25.5 in. of Hg which is an increase from 21 in. of Hg without polysheeting. The air flow rate decreased to approximately 15 scfm and the total amount of recovered groundwater was 44 gallons.

There was no measurable vacuum response in the monitoring points. The groundwater and product levels changed as summarized in the table below:

DPVE-2 Data From Second Test

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-2 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-12	5.22	5.64	0.42	5.23	5.66	0.43	0.01	26
P-13	5.73	7.8	2.07	5.84	7.8	1.96	0.10	12
P-15	6.43	6.88	0.45	6.44	6.88	0.44	0.01	41

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

The product thickness decreased in P-12 (26 feet from DPVE-2), P-13 (12 feet from DPVE-2), and P-15 (41 feet from DPVE-2). Based on the effective drawdown of 0.1 feet in P-13, the estimated ROI for DPVE-2 (with polysheeting) was estimated to be approximately 12 feet. Due to operational issues with the OWS (product appearing in the groundwater effluent), the amount of SPH recovered was not estimated. The OWS operational issues were a result of combination of a lack of controls on the liquid transfer pumps and an undersized OWS.

3.5 DPVE-4 Test Results

The test on DPVE-4 was conducted over a period of 4 hours on July 30, 2010. The drop tube was set approximately 1.5 feet off the bottom of DPVE-4 and connected to the LRP. The applied vacuum at DPVE-4 was 25 in. of Hg. The air flow rate was approximately 60 scfm and the total amount of recovered groundwater was 123 gallons. The baseline measured SPH thickness in DPVE-4 was 0.77 feet.

There was no measurable vacuum response in the monitoring points. The groundwater and product levels changed as summarized in the table below:

DPVE-4 Data

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-4 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-3	4.75	7.86	3.11	4.8	7.85	3.05	0.04	25
DPVE-3	5.22	7.7	2.48	5.18	7.78	2.6	-0.02	18
DPVE-5	6.22	7.08	0.86	6.21	7.21	1.0	0.01	29
DPVE-6	5.48	7.01	1.53	5.47	7.17	1.7	0.01	58
DPVE-7	--	4.98	--	--	4.89	--	-0.09	50

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

Based on the effective drawdown of 0.04 feet in P-3, the estimated ROI for DPVE-4 was estimated to be approximately 15 feet. The SPH thickness decreased in P-3 (25 feet from DPVE-4). Due to operational issues with the OWS (product appearing in the groundwater effluent), the amount of SPH recovered was not estimated.

3.6 P-3 and P-4 Test Results

The tests on P-3 and P-4 were conducted over the course of two days (approximately 3 hours each) from August 4, 2010 to August 5, 2010. On August 4, 2010, the one-inch diameter drop tube was set approximately 2 feet off the bottom of P-3. The drop tube was connected to a 2-inch diameter flexible hose. The 2-inch diameter flexible hose was connected to the manifold header on the treatment enclosure. The LRP was started and a vacuum of 25 in. of Hg was applied at the well. The air flow rate was approximately 25 scfm and the total amount of recovered groundwater was 86 gallons.

There was no measurable vacuum response in the monitoring points, however, the groundwater and product levels changed as summarized in the table below:

P-3 Data

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to P-3 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-2	4.81	7.06	2.25	4.7	7.1	2.4	-0.09	41
DPVE-3	5.38	7.51	2.13	5.26	7.55	2.29	-0.10	32
P-4	4.78	7.8	3.02	4.76	7.8	3.04	-0.02	30
DPVE-4	6.35	7.17	0.82	6.27	7.08	0.81	-0.08	25
DPVE-5	--	6.44	--	6.39	6.42	0.03	-0.05	24
DPVE-6	5.82	7.03	1.21	5.67	6.68	1.01	-0.18	65

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

The product thickness decreased in DPVE-6 (64 feet from P-3) and DPVE-4 (25 feet from P-3). There was no measurable ROI achieved at P-3, however, the P-3 test removed an estimated 9 gallons of SPH.

On August 5, 2010, the one-inch diameter drop tube was set approximately 2 feet off the bottom of P-4. The drop tube was connected to a 2-inch diameter flexible hose. The 2-inch diameter flexible hose was connected to the manifold header on the treatment enclosure. The LRP was started and a vacuum of 22.5 in. of Hg was applied at the well. The air flow rate was approximately 40 scfm and the total amount of recovered groundwater was 131 gallons.

There was no measurable vacuum response in the monitoring points, however, the groundwater and product levels changed as summarized in the table below:

P-4 Data

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to P-4 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-2	4.59	7.62	3.03	4.67	7.72	3.05	0.08	24
DPVE-3	5.1	8.33	3.23	5.28	8.23	2.95	0.14	18
P-3	5.09	5.54	0.45	5.12	5.56	0.44	0.03	30
DPVE-1	5.89	5.93	0.04	5.89	5.94	0.05	0.00	59
DPVE-5	6.27	6.86	0.59	6.29	7	0.71	0.04	43

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

Based on the effective drawdown of 0.14 feet in DPVE-3, the estimated ROI for P-4 was estimated to be approximately 18 feet. The product thickness decreased in DPVE-3 (18 feet from P-4) and P-3 (30 feet from P-4). The P-4 test removed a significant volume of an estimated 73 gallons of SPH in only a 3-hour period of time. This test well yielded an excellent SPH to water recovery ratio of 0.56.

3.7 DPVE-6 Test Results

The test on DPVE-6 was conducted over a period of 4 hours on August 9, 2010. The drop tube was set approximately 2 feet off the bottom of DPVE-6 and connected to the LRP. The applied vacuum at DPVE-6 was 14 in. of Hg. The air flow rate was approximately 100 scfm and the total amount of recovered groundwater was 218 gallons.

There was no measurable vacuum response in the monitoring points. The groundwater and product levels changed as summarized in the table below:

DPVE-6 Data

Monitoring Point	Start of Test			End of Test			Effective Drawdown (feet)	Distance to DPVE-6 (feet)
	DTP	DTW	PT	DTP	DTW	PT		
P-1	4.57	4.66	0.09	4.58	4.65	0.07	0.01	37
P-2	4.71	7.61	2.9	4.71	7.62	2.91	0.00	36
DPVE-3	5.21	8.6	3.39	5.2	8.68	3.48	0.00	37
DPVE-5	6.11	8.89	2.78	6.13	8.96	2.83	0.03	30
DPVE-7	--	5.25	--	--	5.25	--	0.0	59

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

There was no measurable ROI achieved at DPVE-6. The product thickness decreased in P-1 (37 feet from DPVE-6). The DPVE-6 test removed an estimated 3 gallons of SPH resulting in a relatively low SPH to water recovery ratio of 0.01.

3.8 Manifold Test Results

The manifold test was conducted on DPVE-1, DPVE-2, DPVE-3, and DPVE-5 from August 10, 2010 to August 18, 2010 for approximately 5 hours each day. The one-inch diameter drop tube was set approximately 2 feet off the bottom of each DPVE well. The drop tube was connected to a 2-inch diameter flexible hose. The 2-inch diameter flexible hose for each DPVE well was connected to the manifold header on the treatment enclosure. The vacuum at the LRP was of 23 in. of Hg. The air flow rate was approximately 100 scfm for DPVE-5, 50 scfm for DPVE-3 and 15 scfm for DPVE-2. The total amount of recovered groundwater was 5,300 gallons.

There was no measurable vacuum response in the monitoring points. The groundwater and product levels changed as summarized in the table below:

Manifold Data

Monitoring Point	Start of Test on 8-10-10			End of Test on 8-18-10			Effective Drawdown (feet)
	DTP	DTW	PT	DTP	DTW	PT	
P-2	4.67	7.85	3.18	5.19	6.29	1.1	0.24
P-3	5.07	6.34	1.27	5.22	7.63	2.41	0.30
P-4	4.84	7.47	2.63	5.14	7.59	2.45	0.28
P-6	--	5.53	--	--	5.66	--	0.13
P-10	--	5.04	--	--	5.16	--	0.12
P-12	5.24	5.75	0.51	5.32	5.93	0.61	0.09
P-13	5.74	7.79	2.05	5.92	7.73	1.81	0.15
DPVE-4	6.26	7.3	1.04	6.44	8.05	1.61	0.26
DPVE-6	5.85	5.93	0.08	6.08	6.26	0.18	0.24

DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)

The product thickness decreased in P-2, P-4, and P-13 over the course of the manifold test. These wells contained the higher SPH thickness measurements at the start of the test. Based on the effective drawdown at most of the monitoring points, the manifolding of DPVE-1, DPVE-2, DPVE-3, and DPVE-5 allowed for a large areal effect of the high vacuum. This was more effective compared to individual well tests. The manifold test removed an estimated 305 gallons of SPH yielding a product to water recovery ratio of 0.06.

3.9 DPVE System Performance Data

Three samples of the recovered groundwater were collected from the influent to the organoclay units (pre-treatment) and three samples of the effluent of the liquid phase carbon units (post-treatment) were collected and analyzed for NYCDEP discharge standards. A summary of influent and effluent concentrations for the groundwater treatment system is presented in Table 1. The results indicate that the treatment system was able to treat the recovered groundwater to the NYCDEP discharge standards.

Several operation issues with treatment system were observed and will be taken into consideration for full scale design. The OWS was undersized for the amount of SPH produced by certain wells. The liquid transfer pumps from the knock out tank and from the OWS must be sized and design with appropriate controls to minimize system starts and stops and unnecessary shut down conditions.

As a precautionary measure, VPGAC units were provided for the vapor effluent of the LRP. The VOC concentrations of LRP effluent (after the VPGAC units) were monitored with a PID. The VPGAC effluent PID readings were zero for each day during the pilot study except briefly for one reading on July 30, 2010. The VPGAC units were adjusted to allow for a more uniform flow through the drum and the PID readings returned to zero.

During the pilot study, two influent air samples were taken from the sampling port of the LRP system (prior to the vapor phase carbon units). The purpose of the influent air samples was to provide for an evaluation of the anticipated air discharge for a full-scale system. One influent air sample was taken during the test on DPVE-5 on July 29, 2010 and the second influent air sample was taken during the manifold testing on August 17, 2010. The samples were sent to TestAmerica for analysis of VOCs using USEPA Method TO-15. The air sample collected on August 17, 2010 was also analyzed for methane using USEPA Method TO-3. The influent methane concentration was non-detect. A summary of influent concentrations for the LRP system is presented in Table 2.

Over the course of the pilot study, the LRP system removed and treated approximately 7,930 gallons of groundwater. In addition, approximately 450 gallons of SPH was recovered over the course of the pilot study. The average SPH to water recovery ratio for this pilot study was approximately 0.06. A graph of the recovered groundwater and SPH is shown on Figure 3. The results indicate that selected wells recovered SPH at a very high rate but the results were highly variable. This is not surprising given the varying geology of the formation in OU-3.

4.0 CONCLUSIONS AND RECOMMENDATIONS

As discussed in Section 1.0, the purpose of the DPVE pilot study was to evaluate the use of high vacuum extraction as an alternative remedial technology to address the mobile SPH plume. The following conclusions were determined based upon an evaluation of the data generated during the DPVE pilot study.

- The DPVE pilot study demonstrated that high vacuum was very effective at product recovery as evidenced by the reduced product thickness in the extraction wells and monitoring points observed during the testing period. For example, the product thickness in monitoring point P-2 decreased from 3.31 feet at the beginning of the pilot to 2.0 feet at the end. Monitoring point P-2 was influenced by several different extraction wells located between 9 and 38 feet away from P-2.

- The high vacuum (i.e., 20 in. Hg) applied during the DPVE pilot study enhanced the recovery of the SPH by allowing more SPH to be drawn to the extraction well and be recovered as a liquid by overcoming the capillary displacement pressures of water against the SPH (which can be as high as 29 in. Hg in clayey silt).

- Due to the low permeability of the soil and nearness of the well screens to ground surface, there was no measurable vacuum response in adjacent monitoring points except in a few instances where polysheeting was installed. However, as indicated by the effective drawdown and product recovery rates, the DPVE pilot study was effective at recovery of the SPH in the absence of a measurable vacuum field.

- The use of polysheeting did not significantly improve product recovery but it did impact vacuum. It may be necessary to use polysheeting for certain wells with less product where vacuum is more critical. It also may improve recovery in later stages of operations when product thickness is decreased and recovery becomes more difficult.

- The heterogeneity of the soil (i.e., relative permeability) across the pilot study area resulted in different a ROI found in northern portion (20 feet near DPVE-3) compared to southern portion of plume (10 feet near DPVE-2).

- The DPVE pilot study removed approximately 450 gallons of SPH and approximately 7,930 gallons of groundwater over a 4 week period. SPH was recovered from 7 out of the 8 wells tested. As would be expected, SPH recovery was generally more significant from wells that contained greater SPH thicknesses during the baseline monitoring.

- The majority of the recovered product occurred during the manifold test conducted over a two week period. Approximately 305 gallons of SPH was recovered during the manifold test. For comparison purposes, an average of 20 to 30 gallons of SPH is currently recovered each week with passive methods (i.e., bailing).

- The treatment system using bag filters, organoclay, and LPGAC units was able to treat the recovered groundwater to the NYCDEP sewer discharge standards.

- Due to the amount of recovered product, the OWS used in the pilot study was not large enough to handle some of the product recovery rates.
- The VPGAC units were able to treat the recovered vapor from the LRP.

Recommendations:

The results of the DPVE pilot study indicate that high vacuum extraction technology is very effective for product recovery. Therefore, it is recommended that a full-scale DPVE system be designed and installed to address the Mobile SPH plume. The DPVE wells for the full-scale system will be sized to achieve a wellhead vacuum of approximately 23 in. Hg with a flowrate of 40 scfm. The wells should be spaced from approximately 20 to 10 feet apart across the Mobile SPH plume with a greater spacing in the northern portion of the plume where the ROI was observed to be greater. The treatment system should be designed to accommodate the expected product recovery rate and meet NYCDEP sewer discharge permit and NYSDEC air permit equivalent requirements. The conceptual design is discussed in Section 5.0.

5.0 CONCEPTUAL DESIGN

This section discusses the proposed remedial objective and goals, and provides a brief description of the proposed full-scale DPVE system.

5.1 Remedial Action Objectives

The remedial action objectives for the Mobile SPH Plume and associated hydrocarbon impacted soils will be addressed using two technologies (DPVE and in-situ bioremediation) to replace the previously proposed SPH plume excavation described in the OU-3 RAWP. The remedial action objective for the full-scale DPVE system will be the removal of all Mobile SPH in the OU-3 Plume to a thickness of 0.1 feet. Once this product thickness is achieved, a bioremediation program will implemented targeting the hydrocarbon-impacted soil associated with the Mobile SPH plume. This will be accomplished through the injection of calcium nitrate throughout the area of the SPH Plume from just above the groundwater table to a depth of 10 feet below grade as otherwise described in the OU-3 remedial action work plan. The bioremediation program will address the remedial action objective of reduction of residual SPH mass in the subsurface to the extent technically feasible and practical.

5.2 Proposed DPVE System

Based on the results of the DPVE pilot study and to achieve the remedial goals, the full-scale system will consist of approximately 35 to 40 DPVE wells screened from 2 to 10 ft bls. The conceptual layout of the proposed DPVE wells is shown on Figure 4. The number and location of DPVE wells was based on the approximate current extent of the Mobile SPH Plume, the previously proposed Mobile SPH excavation area, and the ROI results from the pilot study. An approximate ROI of 20 feet was observed in the area of DPVE-3 and a ROI of 10 feet was observed in the area of DPVE-2. Each DPVE well will be constructed of 4-inch diameter PVC fitted with 1-inch diameter drop tubes.

The DPVE wells in the area of DPVE-3 will be designed for a flow rate of up to 40 cfm and 18 in. Hg. The DPVE wells in the area of DPVE-2 will be designed for a flow rate of 20 scfm at 20 in. Hg. The DPVE wells will be operated in zones with multiple zones utilizing the same LRP. Each zone will consist of up to 10 extraction wells. Depending on the measurable SPH in a particular zone, the operation of the zones will be alternated, as needed, to optimize SPH

recovery. Each LRP will be equipped with a dedicated liquid knockout system. As an oil-sealed LRP was used in the pilot study, oil-sealed LRPs will be used in the full-scale system. Each LRP will be capable of handling approximately 160 scfm at 23 in. of Hg. The treatment system used in the pilot study demonstrated that using an OWS followed by organoclay and LPGAC units was sufficient to meet the NYCDEP sewer discharge limits.

To ensure adequate separation of recovered SPH and groundwater, the OWS will be conservatively designed to handle the maximum expected flow rate for total recovered liquids (estimated to be 25 gpm). The treated groundwater will be discharged to the existing sewer manhole for discharge to the NYCDEP sewer. The vapor will be treated with VPGAC units. The recovered SPH will be transferred for storage in the existing 2,000 gallon above ground storage tank.

The DPVE wells will be manifolded together to a common header. The system will be designed to operate so individual wells can be shut off to focus operations in certain areas as necessary. The proposed location of the treatment system compound for liquid ring pumps, piping, controls, and associated off-gas treatment will be located within a fenced in area of OU-3 in the close proximity to the DPVE wells as shown on Figure 4. Full-scale design drawings and specifications will be prepared and submitted with the RD/RA Work Plan.

5.3 Remedial Action Schedule

In accordance with Section II-B(b) of the Order on Consent (OOC) effective May 10, 2010 between NYSDEC, Amtrak and NJ Transit, Roux Associates will submit a RD/RA Work Plan for DPVE System and Enhanced Bioremediation (95% Design Submission) within 60-days of NYSDEC's approval of this Pilot Study and Conceptual Design Report. The RD/RA Work Plan will contain a detailed remedial action implementation schedule and include all components required by NYSDEC's DER-10, Section 5.7(a).

Respectfully submitted,

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6.0 REFERENCES

Roux Associates, Inc., 2009. DPVE Pilot Study Report, Sunnyside Yard, Queens, New York.

Table 1. Summary of Influent and Effluent Groundwater, OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter	NYCDEP Discharge to Sewer Limits	Units	**Sample Designation:** / **Sample Date:**	OU-3 PT Effluent 8/17/2010	OU-3 PT Influent 8/17/2010	OU-3PT Post Treatment 7/29/2010
VOLATILE ORGANIC COMPOUNDS						
1,1,1-Trichloroethane	--	µg/L		1 U	1 U	1 U
1,4-Dichlorobenzene	--	µg/L		1 U	1 U	1 U
Benzene	134	µg/L		0.5 U	0.5 U	0.5 U
Carbon tetrachloride	--	µg/L		1 U	1 U	1 U
Chloroform	--	µg/L		1 U	1 U	1 U
Ethylbenzene	380	µg/L		1 U	1 U	1 U
m+p-Xylene		µg/L		1 U	1.4	1 U
MTBE	50	µg/L		0.5 U	0.5 U	0.5 U
o-Xylene	--	µg/L		1 U	1.1	1 U
Tetrachloroethene	20	µg/L		1 U	1 U	1 U
Toluene	74	µg/L		1 U	1.6	1.3
Xylenes (total)	74	µg/L		1 U	2.5	1 U
SEMIVOLATILE ORGANIC COMPOUNDS						
1,2,4-Trichlorobenzene	--	µg/L		2 U	60 U	2 U
Naphthalene	47	µg/L		2 U	60 U	2 U
Phenol	--	µg/L		2 U	60 U	2 U
METALS						
Cadmium	2000	µg/L		2 U	2 U	2 U
Copper	5000	µg/L		25 U	60	25 U
Lead	--	µg/L		5 U	23	5 U
Mercury	--	µg/L		0.2 U	0.2 U	0.2 U
Nickel	--	µg/L		10 U	10 U	10 U
Zinc	--	µg/L		25 U	81	25 U
POLYCHLORINATED BIPHENYLS						
Aroclor-1016	--	µg/L		0.05 U	0.5 U	0.05 U
Aroclor-1221	--	µg/L		0.05 U	0.5 U	0.05 U
Aroclor-1232	--	µg/L		0.05 U	0.5 U	0.05 U
Aroclor-1242	--	µg/L		0.05 U	0.5 U	0.05 U
Aroclor-1248	--	µg/L		0.05 U	0.5 U	0.05 U
Aroclor-1254	--	µg/L		0.05 U	5.1	0.05 U
Aroclor-1260	--	µg/L		0.05 U	0.5 U	0.05 U
Aroclor-1262	--	µg/L		0.05 U	0.5 U	0.05 U
Aroclor-1268	--	µg/L		0.05 U	0.5 U	0.05 U
Aroclor (Total)	1	µg/L		0.05 U	**5.1**	0.05 U

Table 1. Summary of Influent and Effluent Groundwater, OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter	NYCDEP Discharge to Sewer Limits	Units	**Sample Designation:** **Sample Date:**	OU-3 PT Effluent 8/17/2010	OU-3 PT Influent 8/17/2010	OU-3PT Post Treatment 7/29/2010
GENERAL CHEMISTRY						
Flash Point (Closed Cup)	> 140	DEG. F		>141	>141	>141
Hexavalent Chromium, Total	5	MG/L		0.025 U	0.025 U	0.025 U
Oil & Grease, Nonpolar (SGT-HEM)	50	MG/L		1.6	**220**	1.7
pH	5-12	PH		8	7.1	9
Total Suspended Solids	3504	MG/L		4 U	100	4 U

Notes:

NYSDEP - New York City Department of Environmental Protection

µg/L - Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

d - Pesticide % Diff > 40% between columns due to coelution. Lower concentration used

- - No NYCDEP Discharge to Sewer Limits available

Bold data indicates that parameter was detected above the NYCDEP Discharge to Sewer Limits

Table 1. Summary of Influent and Effluent Groundwater, OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter	NYCDEP Discharge to Sewer Limits	Units	**Sample Designation:** **Sample Date:**	OU-3PT Pre Treatment 7/29/2010	OU-3PT-POST 8/3/2010	OU-3PT-PRE 8/3/2010
VOLATILE ORGANIC COMPOUNDS						
1,1,1-Trichloroethane	--	µg/L		1 U	1 U	1 U
1,4-Dichlorobenzene	--	µg/L		1 U	1 U	1 U
Benzene	134	µg/L		1.3	0.5 U	1.2
Carbon tetrachloride	--	µg/L		1 U	1 U	1 U
Chloroform	--	µg/L		1 U	1 U	1 U
Ethylbenzene	380	µg/L		1.6	1 U	1 U
m+p-Xylene		µg/L		3.1	1 U	1.3
MTBE	50	µg/L		0.5 U	0.5 U	0.5 U
o-Xylene	--	µg/L		2.5	1 U	2
Tetrachloroethene	20	µg/L		1 U	1 U	1 U
Toluene	74	µg/L		3.2	1 U	2.4
Xylenes (total)	74	µg/L		5.6	1 U	3.3
SEMIVOLATILE ORGANIC COMPOUNDS						
1,2,4-Trichlorobenzene	--	µg/L		80 U-D	2 U	40 U d
Naphthalene	47	µg/L		80 U-D	2 U	40 U d
Phenol	--	µg/L		80 U-D	2 U	40 U d
METALS						
Cadmium	2000	µg/L		2 U	2 U	2 U
Copper	5000	µg/L		44	25 U	120
Lead	--	µg/L		9.5	5 U	36
Mercury	--	µg/L		0.2 U	0.2 U	0.2 U
Nickel	--	µg/L		10 U	10 U	10 U
Zinc	--	µg/L		78	25 U	240
POLYCHLORINATED BIPHENYLS						
Aroclor-1016	--	µg/L		0.05 U	0.05 U	0.1 U d
Aroclor-1221	--	µg/L		0.05 U	0.05 U	0.1 U d
Aroclor-1232	--	µg/L		0.05 U	0.05 U	0.1 U d
Aroclor-1242	--	µg/L		0.05 U	0.05 U	0.1 U d
Aroclor-1248	--	µg/L		0.05 U	0.05 U	0.1 U d
Aroclor-1254	--	µg/L		0.05 U	0.05 U	0.86 d
Aroclor-1260	--	µg/L		1.7	0.05 U	0.1 U d
Aroclor-1262	--	µg/L		0.05 U	0.05 U	0.1 U d
Aroclor-1268	--	µg/L		0.05 U	0.05 U	0.1 U d
Aroclor (Total)	1	µg/L		**1.7**	0.05 U	0.86 d

Table 1. Summary of Influent and Effluent Groundwater, OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter	NYCDEP Discharge to Sewer Limits	Units	**Sample Designation:** **Sample Date:**	OU-3PT Pre Treatment 7/29/2010	OU-3PT-POST 8/3/2010	OU-3PT-PRE 8/3/2010
GENERAL CHEMISTRY						
Flash Point (Closed Cup)	> 140	DEG. F		>141	>141	>141
Hexavalent Chromium, Total	5	MG/L		0.025 U	0.025 U	0.025 U
Oil & Grease, Nonpolar (SGT-HEM)	50	MG/L		**160**	12	**180**
pH	5-12	PH		6.8	9.1	7.1
Total Suspended Solids	3504	MG/L		210	4 U	240

Notes:

NYSDEP - New York City Department of Environmental Protection

µg/L - Micrograms per liter

J - Estimated Value

U - Compound was analyzed for but not detected

d - Pesticide % Diff > 40% between columns due to coelution. Lower concentration used

- - No NYCDEP Discharge to Sewer Limits available

Bold data indicates that parameter was detected above the NYCDEP Discharge to Sewer Limits

Table 2. Summary of Air Samples, OU-3, Amtrak Sunnyside Yard, Queens, New York

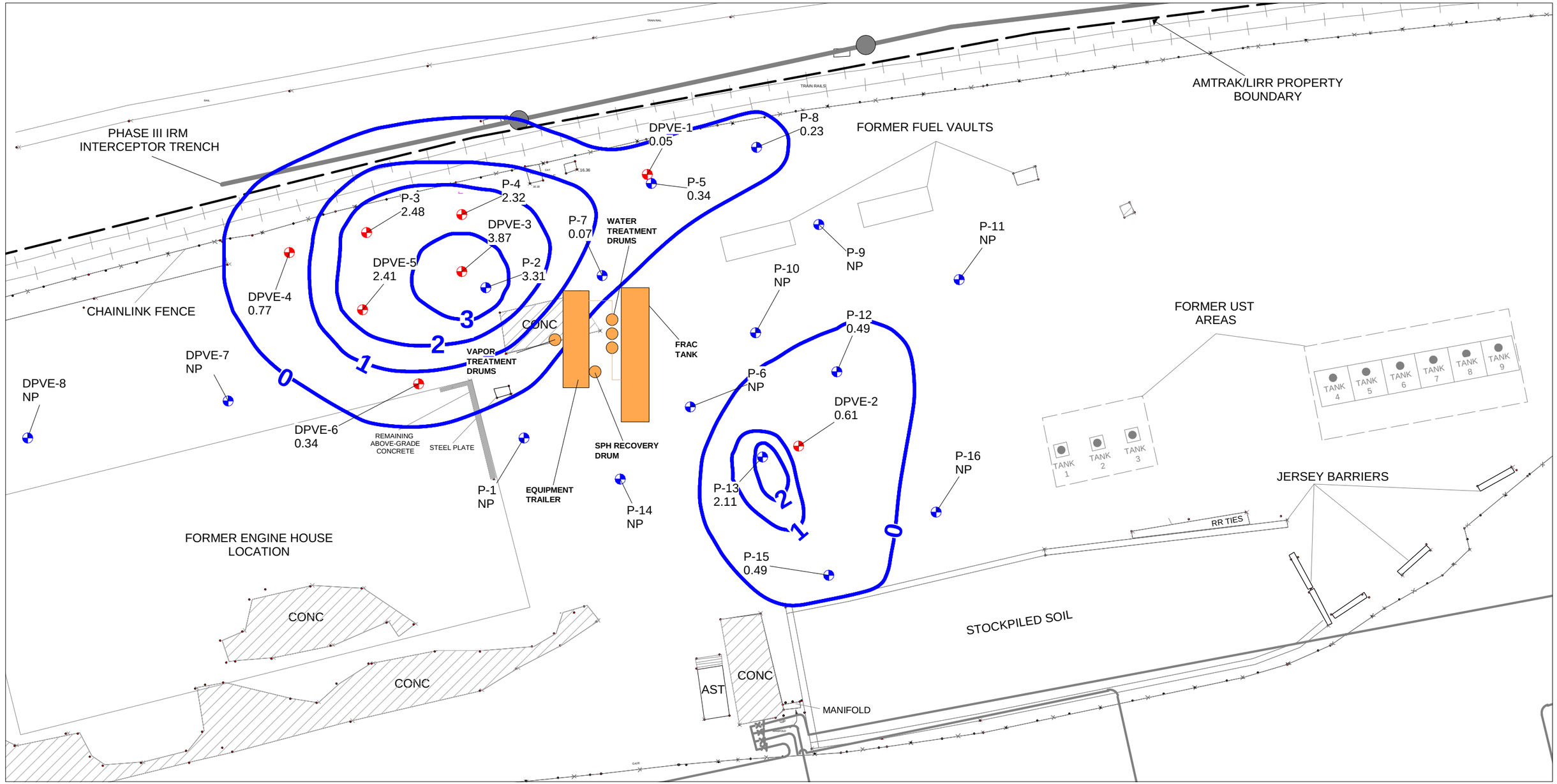
Parameter (Concentrations in ppbv)	**Sample Designation:** / **Sample Date:**	DPVE-5 INFLUENT 7/28/2010	OU-3 TP V-INFLUENT 8/17/2010
1,1,1-Trichloroethane		10 U	8 U
1,1,2,2-Tetrachloroethane		10 U	8 U
1,1,2-Trichloro-1,2,2-trifluoroethane		10 U	8 U
1,1,2-Trichloroethane		10 U	8 U
1,1-Dichloroethane		10 U	8 U
1,1-Dichloroethene		10 U	8 U
1,2,4-Trichlorobenzene		25 U	20 U
1,2,4-Trimethylbenzene		**26**	**430**
1,2-Dibromoethane		10 U	8 U
1,2-dichloro-1,1,2,2-tetrafluoroethane		10 U	8 U *
1,2-Dichlorobenzene		10 U	8 U
1,2-Dichloroethane		10 U	8 U
1,2-Dichloroethene (total)		10 U	8 U
1,2-Dichloropropane		10 U	8 U
1,3,5-Trimethylbenzene		**10**	**31**
1,3-Butadiene		10 U	8 U *
1,3-Dichlorobenzene		**81**	**57**
1,4-Dichlorobenzene		10 U	**24**
1,4-Dioxane		250 U	200 U
2-Butanone (MEK)		25 U	20 U
2-Chlorotoluene		10 U	8 U
2-Hexanone		25 U	20 U *
3-Chloropropene		25 U	20 U
4-Ethyltoluene		**97**	**210**
4-Methyl-2-pentanone (MIBK)		25 U	20 U *
Acetone		250 U	200 U
Benzene		**15**	**15**
Benzyl chloride		10 U	8 U
Bromodichloromethane		10 U	8 U
Bromoethene		10 U	8 U
Bromoform		10 U	8 U
Bromomethane		10 U	8 U
Butane		25 U	20 U *
Carbon disulfide		25 U	20 U
Carbon tetrachloride		10 U	8 U
Chlorobenzene		10 U	**33**
Chlorodifluoromethane		25 U	20 U *
Chloroethane		25 U	20 U
Chloroform		10 U	8 U
Chloromethane		25 U	20 U *
cis-1,2-Dichloroethene		10 U	8 U
cis-1,3-Dichloropropene		10 U	8 U
Cumene		**150**	**350**
Cyclohexane		**89**	**410**
Dibromochloromethane		10 U	8 U
Dichlorodifluoromethane		25 U	20 U *

Table 2. Summary of Air Samples, OU-3, Amtrak Sunnyside Yard, Queens, New York

Parameter (Concentrations in ppbv)	**Sample Designation:** **Sample Date:**	DPVE-5 INFLUENT 7/28/2010	OU-3 TP V-INFLUENT 8/17/2010
Ethylbenzene		**35**	**59**
Hexachlorobutadiene		10 U	8 U
Isooctane		10 U	**37**
Isopropyl alcohol		250 U	200 U
m+p-Xylene		**54**	**80**
Methyl Methacrylate		**220**	**450**
Methylene chloride		25 U	20 U
MTBE		10 U	8 U
Naphthalene		25 U	20 U
n-Butylbenzene		**130**	**240**
n-Heptane		**120**	**370**
n-Hexane		**35**	**220**
n-Propylbenzene		**250**	**650**
o-Xylene		**44**	**55**
p-Isopropyltoluene		**97**	**200**
sec-Butylbenzene		**110**	**310**
Styrene		10 U	8 U
t-Butyl Alcohol		250 U	200 U
tert-Butylbenzene		**17**	**45**
Tetrachloroethene		**11**	8 U
Tetrahydrofuran		250 U	200 U
Toluene		10 U	**10**
trans-1,2-Dichloroethene		10 U	8 U
trans-1,3-Dichloropropene		10 U	8 U
Trichloroethene		10 U	8 U
Trichlorofluoromethane		10 U	8 U
Vinyl chloride		10 U	8 U
Xylenes (total)		**98**	**140**

Parameter (Concentrations in ppmv)			
Methane			0.04 U

Notes:
J - Estimated value
E - Indicates value exceeded calibration range
U - Indicates that the compound was analyzed for but not detected
ppbv - Parts per billion/volume
ppmv - Parts per million/volume
Bold data indicates that parameter was detected



LEGEND:

DPVE-1 — LOCATION AND DESIGNATION OF MONITORING WELL WITH VACUUM APPLIED DURING PILOT STUDY

0.34 — SPH THICKNESS IN FEET (JULY 27, 2010 PRIOR TO INITIATING PILOT STUDY)

P-1 — LOCATION AND DESIGNATION OF MONITORING WELL

1 — SPH THICKNESS CONTOUR (FEET)

NOTES:

SHP - SEPARATE PHASE HYDROCARBON

DPVE - DUEL PHASE VACUUM EXTRACTION

LIRR - LONG ISLAND RAIL ROAD

NP - NO MEASURABLE SPH PRESENT

N

30' 0 30'

Title:

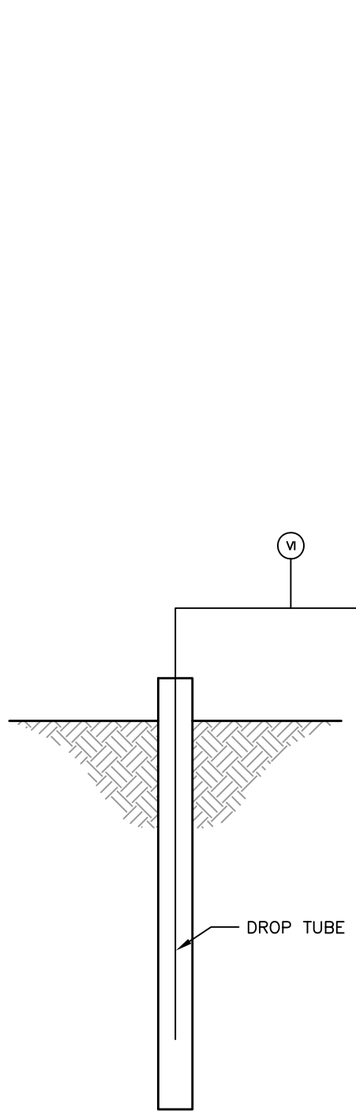
DPVE PILOT STUDY AREA AND BASELINE SPH CONFIGURATION

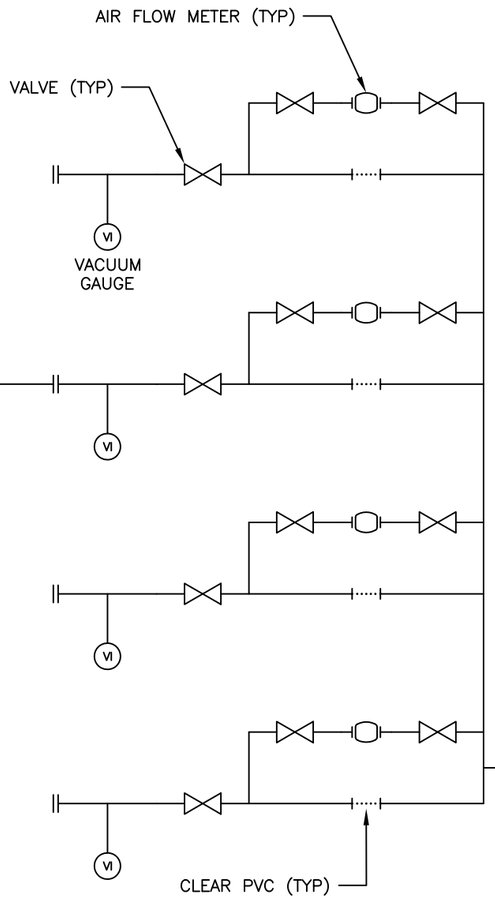
SUNNYSIDE YARD, QUEENS, NEW YORK

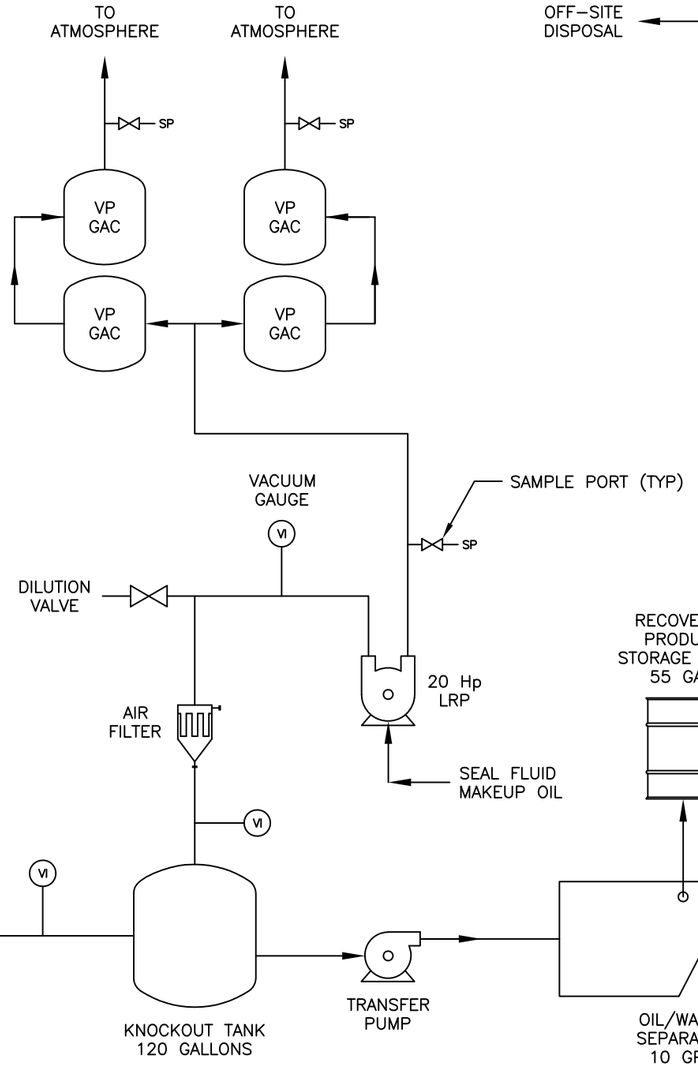
Prepared For: AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 10/1/2010	FIGURE 1
Prepared by: RSK	Scale: SHOWN	
Project Mgr: GN	Office: NY	
File No: AM4525603.WOR	Project: 0055.0045Y015	







LEGEND

VI – VACUUM INDICATOR

DPVE PILOT STUDY
PROCESS FLOW DIAGRAM

SUNNYSIDE YARD, QUEENS, NEW YORK

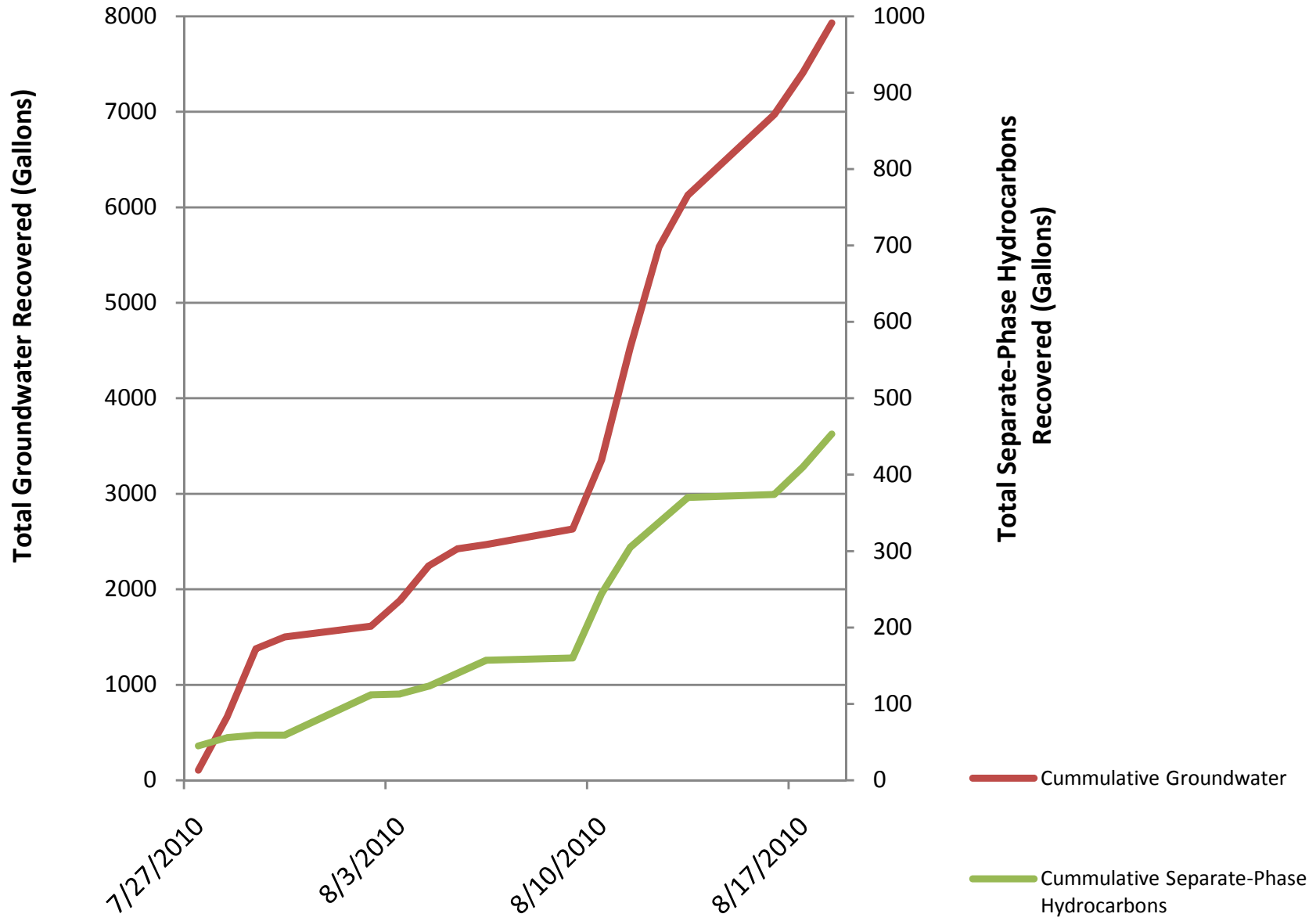
Prepared For:

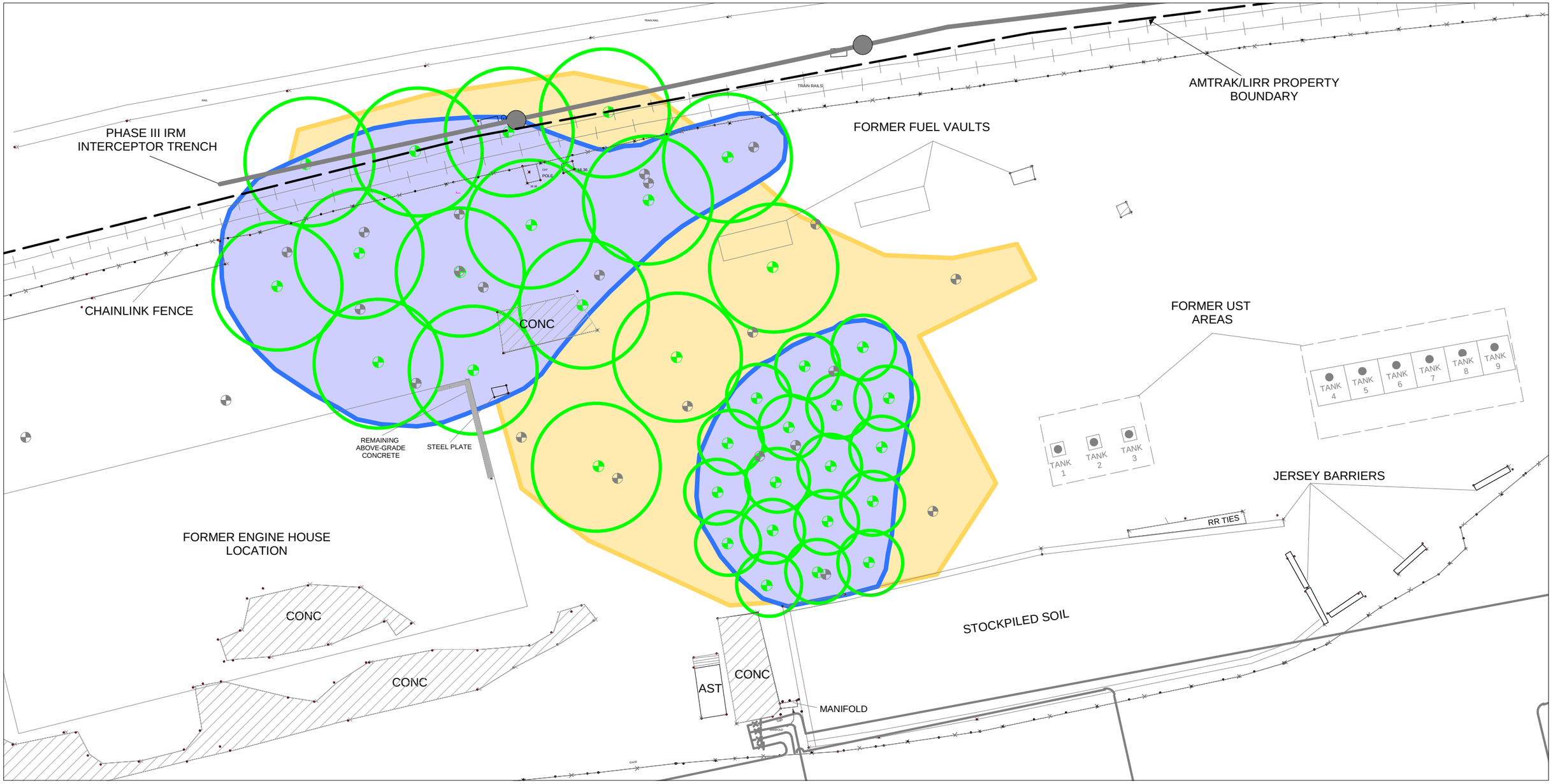
AMTRAK

Remedial REMEDIAL ENGINEERING, P.C. *ENVIRONMENTAL ENGINEERS*	Compiled by: G.N.	Date: 15SEPT10	FIGURE 2
	Prepared by: G.M.	Scale: NONE	
	Project Mgr: G.N.	Project: 05545Y15	
	File: AM4525601		

N:\PROJECTS\AM055Y\AM45Y\256\AM4525601.DWG

Figure 3. Liquid Recovery vs. Elapsed Time





LEGEND:

- LOCATION OF FORMER MONITORING WELLS USED DURING DPVE PILOT STUDY (ABANDONED IN PREPARATION OF OU-3 REMEDIATION)
- PROPOSED DPVE WELL (BASED ON CONCEPTUAL DESIGN)
- BOUNDARY OF CURRENT 0 FOOT SPH THICKNESS CONTOUR (BASED ON JULY 27, 2010 DATA)
- LIMIT OF PREVIOUS PROPOSED MOBILE SPH EXCAVATION (AS PROPOSED IN RAWP)
- ESTIMATED EXTENT OF DPVE ROI (BASED ON CONCEPTUAL DESIGN)

NOTES:

SHP - SEPARATE PHASE HYDROCARBON

DPVE - DUEL PHASE VACUUM EXTRACTION

ROI - RADIUS OF INFLUENCE

LIRR - LONG ISLAND RAIL ROAD

N

30' 0 30'

Title:

DPVE CONCEPTUAL DESIGN

SUNNYSIDE YARD, QUEENS, NEW YORK

Prepared For: AMTRAK

ROUX ASSOCIATES INC
Environmental Consulting & Management

Compiled by: RSK	Date: 10/1/2010	FIGURE
Prepared by: RSK	Scale: SHOWN	4
Project Mgr: GN	Office: NY	
File No: AM4525603.WOR	Project: 0055.0045Y015	

APPENDIX A

Pilot Study
Field Monitoring Forms

DPVE-3 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 7/27/10

LRP Hour Reading-Begin 19613.5 End-19617.8

OPERATING NOTES DPVE-3 solo test	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID (ppmv)	at Midfluent PID (ppmv)	at Effluent PID (ppmv)	Monitoring Points																					
														P-4				P-7				P-2				P-3				DPVE-6				DPVE-4			
														Distances from DPVE-3 (in feet)																							
														17.6				43.2				8.6				32				37				53.8			
														DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac
BASELINE	0800							0	0	Closed				4.7	7.02	2.32	0	4.65	4.72	0.07	0	4.5	7.81	3.31	0	4.75	7.23	2.48	0	5.28	5.62	0.34	0	6.09	6.86	0.77	0
START OF TEST	1005																																				
Stringer Depth: 1.5 feet off bottom of DPVE-3	1020	19	22.5	13	26	30	179	0	NR	Closed	NR	NR	NR	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0
	1035	19	22.5	12.5	24	40	NR	1	NR	Closed	NR	NR	NR	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0
	1050	19	23	12.5	24	40	181	1	NR	Closed	208	NR	NR	NR	NR	--	0	NR	NR	--	0	4.56	7.79	3.23	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0
	1105	19	23	13	24.5	40	182	1	NR	Closed	NR	NR	NR	4.72	7.05	2.33	0	NR	NR	--	0	4.66	7.76	3.10	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0
	1135	19	23.5	13	25	35	188	39	NR	Closed	200	NR	NR	4.79	7.05	2.26	0	NR	NR	--	0	4.76	7.67	2.91	0	NR	NR	--	0	NR	NR	--	0	NR	NR	--	0
	1205	18.5	23	13	24.5	35	186	39	NR	Closed	237	NR	NR	4.84	7.09	2.25	0	4.61	4.68	0.07	0	4.82	7.5	2.68	0	4.74	7.26	2.52	0	NR	NR	--	0	NR	NR	--	0
	1245	18.5	23.5	13	25	40	188	39	NR	Closed	174	NR	NR	4.9	7.12	2.22	0	4.61	4.67	0.06	0	4.88	7.23	2.35	0	4.75	7.26	2.51	0	NR	NR	--	0	NR	NR	--	0
	1310	18.5	23.5	13	24.5	40	186	39	NR	Closed	280	NR	NR	4.95	7.14	2.19	0	4.61	4.67	0.06	0	4.92	7.07	2.15	0	4.75	7.26	2.51	0	NR	NR	--	0	NR	NR	--	0
	1340	18.5	23.5	13.5	24.5	40	188	39	NR	Closed	193	NR	NR	4.98	7.12	2.14	0	4.61	4.67	0.06	0	4.94	6.97	2.03	0	4.75	7.26	2.51	0	NR	NR	--	0	NR	NR	--	0
	1400	18.5	23.5	13.5	24	40	190	107	45	Closed	230	6.3	0	5.0	7.14	2.14	0	4.61	4.67	0.06	0	4.94	6.94	2.00	0	4.74	7.26	2.52	0	NR	NR	--	0	NR	NR	--	0
END TEST	1415																																				

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 7/28/10

Hour Reading-Begin 19617.8 End-19622.6

OPERATING NOTES	Time	Influent Vacuum at Extraction Well	Vac at LRP	Vac at Manifold	Vac at Knock-out	Flow at Manifold	LRP Temp °F	Totalizer	Recovered Product	Dilution Valve Status:	PID Reading: at			Monitoring Points															
														DPVE-3				P-3				DPVE-4				DPVE-6			
DPVE-5 solo test														Distances from DPVE-5 (in feet)															
														32.8				24.2				28.9				28.6			
	(to 1 min)	(in. of Hg.)	(in. of Hg)	(in. of Hg)	(in. of Hg)	(scfm)		(gallons)	(gallons)	Open / Closed	Influent PID (ppmv)	Midfluent PID (ppmv)	Effluent PID (ppmv)	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac
BASELINE	0800									Closed				5.32	6.18	0.86	0	4.72	7.42	2.7	0	8.12	8.97	0.85	0	7.41	7.73	0.32	0
START OF TEST	0915							110																					
	0945	17	24.5	14	24.5	>100	180	137	NR	Closed	113	NR	0	5.37	6.24	0.87	0	4.77	7.47	2.7	0	8.21	9.07	0.86	0	7.42	7.71	0.29	0
Stringer Depth: 2 feet off bottom of well	1015		24	14	25	>100	180	210	NR	Closed	262	NR	0	5.39	6.3	0.91	0	4.84	7.52	2.68	0	8.25	9.13	0.88	0	7.43	7.72	0.29	0
	1045	17	24.5	14	23.5	>100	184	264	NR	Closed		NR		5.44	6.34	0.9	0	4.89	7.53	2.64	0	8.3	9.15	0.85	0	7.43	7.72	0.29	0
PID Malfunction	1115	17	24.5	7	24	>100	184	331	NR	Closed	NR	NR	NR	5.45	6.35	0.9	0	4.94	7.54	2.6	0	8.31	9.2	0.89	0	7.43	7.72	0.29	0
	1145	17	24	14	24	>100	186	407	NR	Closed	NR	NR	NR	5.46	6.37	0.91	0	4.95	7.54	2.59	0	8.33	9.2	0.87	0	7.43	7.72	0.29	0
	1245	17	23	15	23	>100	190	495	NR	Closed	NR	NR	NR	5.46	6.39	0.93	0	4.96	7.56	2.6	0	8.33	9.21	0.88	0	7.43	7.72	0.29	0
END TEST	1400	17	24.5	14	24	>100	190	665	11	Closed	NR	NR	NR	5.46	6.4	0.94	0	4.96	7.58	2.62	0	8.33	9.2	0.87	0	7.43	7.73	0.3	0

OPERATING NOTES	P-2							
DPVE-5 solo test								
	38.7							
	DTP	DTW	PT	Vac				
BASELINE								
START OF TEST								
	NR	NR	--	0				
Stringer Depth: 2 feet off bottom of well	NR	NR	--	0				
	NR	NR	--	0				
PID Malfunction	NR	NR	--	0				
	NR	NR	--	0				
	NR	NR	--	0				
END TEST	NR	NR	--	0				

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-1 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 7/29/10

Hour Reading-Begin 19622.6 End- 19627

OPERATING NOTES DPVE-1 solo test	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID (ppmv)	PID Reading: at Midfluent PID (ppmv)	PID Reading: at Effluent PID (ppmv)
BASELINE	0840									Closed			
START OF TEST	0915												
Stringer Depth: 2' off bottom of well initially, then raised due to water recovery	0945	10	25	17	26	50	180	890	NR	Closed	80	-	-
	1015	16	24	17	24.5	50	181	1129	NR	Closed	73	-	0
	1045	16	24	17	25	65	168	1265	NR	Closed	91.3	-	0
END TEST	1110							1332	0				

Monitoring Points — Distances from DPVE-1 (in feet)

Time	P-5 (2.9) DTP	P-5 DTW	P-5 PT	P-5 Vac	P-8 (34.9) DTP	P-8 DTW	P-8 PT	P-8 Vac	P-9 (55.1) DTP	P-9 DTW	P-9 PT	P-9 Vac	P-10 (59.5) DTP	P-10 DTW	P-10 PT	P-10 Vac	P-7 (34.4) DTP	P-7 DTW	P-7 PT	P-7 Vac	P-4 (58.9) DTP	P-4 DTW	P-4 PT	P-4 Vac
0840	4.56	4.97	0.41	0	4.58	4.9	0.32	0	ND	4.63	--	0	ND	4.75	--	0	4.65	4.71	0.06	0	4.66	7.23	2.57	0
0915																								
0945	6.51	7.0	0.49	16	4.65	5.02	0.37	0	ND	4.63	--	0	ND	4.75	--	0	4.79	4.85	0.06	0	4.67	7.25	2.58	0
1015	6.75	7.25	0.50	23	4.83	5.21	0.38	0	--	--	--	0	--	--	--	0	-	-		0	-	-	--	0
1045	6.6	7.1	0.50	27	4.93	5.31	0.38	0.03	ND	4.68	--	0	ND	4.75	--	0	5.34	5.4	0.06	0	4.67	7.25	2.58	0
1110																								

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-2 PILOT STUDY DATA SHEET

PROJECT NAME (client/location):	Amtrak Sunnyside Yard OU-3									**Project #:**	0055.0045Y015																						
TYPE OF EQUIPMENT (Model #, Hp):	20 Hp Liquid Ring Pump (LRP)									**DATE:**	7/29/10																						
Hour Reading-Begin 19622.6 End-19627.0																																	
OPERATING NOTES	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: Influent PID (ppmv)	PID Reading: at Midfluent PID (ppmv)	PID Reading: Effluent PID (ppmv)	Monitoring Points: P-6				P-13				P-12				P-16				P-15			
DPVE-2 solo test														Distances from DPVE-2 (in feet): 35.6				11.7				26.1				47.5				40.9			
														DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac
BASELINE	0840									Closed				ND	5.4	--	0	5.58	7.79	2.21	0	5.08	5.65	0.57	0	ND	6.99	--	0	6.32	6.8	0.48	0
START OF TEST	1140							1332		Closed																							
Stinger Depth: 2' off bottom of well	1120	21.5	25	15	26	17	180	1333	NR	Closed	73.1	-	0	ND	5.4	--	0	5.64	7.79	2.15	0	5.09	5.64	0.55	0	-	-	--	0	-	-		0
	1230	20.5	25	15	26	17	181	1333	NR	Closed	69.6	-	0	ND	5.4		0	5.69	7.79	2.10	0	5.09	5.65	0.56	0	ND	7		0	6.31	6.8	0.49	0
	1330	21	25	15.5	27	10	182	1333	NR	Closed	72.3	-	0	ND	5.42		0	5.73	7.75	2.02	0	5.1	5.67	0.57	0	ND	7		0	6.32	6.79	0.47	0
	1420	21	25	15	26	10	184	1378	NR	Closed	70.4	0	0	-	-		0	5.73	6.15	0.42	0	5.1	5.64	0.54	0	-	-	--	0	-	-		0
END TEST	1425							1378	3																								

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT- Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-4 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 7/30/10

Hour Reading-Begin 19627.0 End-19632.4

OPERATING NOTES	Time	Influent Vacuum at Extraction Well	Vac at LRP	Vac at Manifold	Vac at Knock-out	Flow at Manifold	LRP Temp °F	Totalizer	Recovered Product	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID	at Midfluent PID	at Effluent PID	Monitoring Points																			
														P-3				DPVE-3				DPVE-5				DPVE-7				DPVE-6			
DPVE-4 solo test														Distances from DPVE-4 (in feet)																			
														24.8				17.65				28.9				50				57.5			
	(to 1 min)	(in. of Hg.)	(in. of Hg)	(in. of Hg)	(in. of Hg)	(scfm)		(gallons)	(gallons)		(ppmv)	(ppmv)	(ppmv)	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac
BASELINE	0800													4.75	7.86	3.11	0	5.22	7.7	2.48	0	6.22	7.08	0.86	0	ND	4.98	--	0	5.48	7.01	1.53	0
START OF TEST	0835							1378																									
	0900	20.5	20	10.5	21	40	178	1378	NR	Closed	111	-	0	4.78	7.85	3.07	0	-	-		0	6.24	7.13	0.89	0	ND	4.98		0	5.47	7.05	1.58	0
	0930	20	22.5	13	24	50	180	1378	NR	Closed	144	-	0	4.78	7.85	3.07	0	5.22	7.7	2.48	0	6.24	7.13	0.89	0	ND	4.89		0	5.46	7.09	1.63	0
	1000	20	23	12.5	25.5	50	180	1378	NR	Closed	146	-	0	4.8	7.84	3.04	0	5.21	7.73	2.52	0	6.24	7.15	0.91	0	ND	4.89		0	5.46	7.12	1.66	0
	1030	20	23	13	25	55	180	1378	NR	Closed	169	189	252	4.81	7.86	3.05	0	5.21	7.73	2.52	0	6.24	7.15	0.91	0	ND	4.89		0	5.46	7.15	1.69	0
LRP off due to effluent readings	1100																																
Restart LRP	1120																																
	1130	NR	NR	NR	NR	NR	NR	NR	NR	Closed	151	-	0	NR	NR		NR	NR	NR		NR	NR	NR		NR	NR	NR		NR	NR	NR		NR
	1145	NR	NR	NR	NR	NR	NR	NR	NR	Closed	-	-	0	NR	NR		NR	NR	NR		NR	NR	NR		NR	NR	NR		NR	NR	NR		NR
	1200	20	24.5	8	26	50	180	1450	NR	Closed	174	-	0	4.8	7.86	3.06	0	5.2	7.74	2.54	0	6.22	7.16	0.94	0	ND	4.89	--	0	5.47	7.15	1.68	0
	1230	20	24.5	14.5	26	50	180	1450	NR	Closed	177	-	0	4.8	7.86	3.06	0	5.19	7.75	2.56	0	6.22	7.18	0.96	0	ND	4.89		0	5.47	7.18	1.71	0
	1300	20	24.5	14.5	26.5	55	180	1450	NR	Closed	189	-	0	4.8	7.86	3.06	0	5.19	7.75	2.56	0	6.21	7.19	0.98	0	ND	4.89		0	5.47	7.16	1.69	0
	1330	20	25	15	26.5	60	180	1450	NR	Closed	195	-	0	4.8	7.87	3.07	0	5.19	7.75	2.56	0	6.21	7.2	0.99	0	ND	4.89		0	5.47	7.17	1.70	0
	1400	20	25	14.5	26.5	60	180	1501	NR	Closed	185	-	0	4.8	7.85	3.05	0	5.18	7.78	2.60	0	6.21	7.21	1.0	0	ND	4.89		0	5.47	7.17	1.70	0
END TEST	1415																																

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT- Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-3 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/2/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin 19632.4 End-

OPERATING NOTES DPVE-3 solo test w/polysheeting	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID (ppmv)	Midfluent PID (ppmv)	Effluent PID (ppmv)	Monitoring Points: P-2 Distances from DPVE-3 (in feet): 8.6 DTP	P-2 8.6 DTW	P-2 8.6 PT	P-2 8.6 Vac	P-4 17.6 DTP	P-4 17.6 DTW	P-4 17.6 PT	P-4 17.6 Vac	P-3 32 DTP	P-3 32 DTW	P-3 32 PT	P-3 32 Vac	DPVE-5 32.8 DTP	DPVE-5 32.8 DTW	DPVE-5 32.8 PT	DPVE-5 32.8 Vac	DPVE-6 37 DTP	DPVE-6 37 DTW	DPVE-6 37 PT	DPVE-6 37 Vac
BASELINE	0									Closed				4.67	7.5	2.83	0	4.77	7.75	2.98	0	4.78	8.14	3.36	0	6.1	8.37	2.27	0	5.61	6.81	1.2	0
START OF TEST	835							1516																										
Poly sheeting laid between DPVE-3 & P-2 for duration of test	900	24	25	16	26	35	178	1516	NR	Closed	233	-	0	4.78	7.49	2.71	0	4.78	7.75	2.97	0	4.78	8.15	3.37	0	6.12	8.42	2.30	0	5.61	6.81	1.20	0
	930	23	26.5	16.5	27.5	35	180	1516	NR	Closed	-	-	-	4.74	7.48	2.74	0	4.79	7.78	2.99	0	4.78	8.14	3.36	0	6.13	8.41	2.28	0	5.61	6.82	1.21	0
	1000	23	26.5	15	28	35	180	1517	NR	Closed	283	-	0	4.78	7.44	2.66	0.01	4.8	7.75	2.95	0	4.79	8.14	3.35	0	6.12	8.42	2.30	0	5.61	6.81	1.20	0
	1100	21	26	15	26	40	180	1534	NR	Closed	233	-	0	4.84	7.26	2.42	0.01	4.84	7.78	2.94	0	4.78	8.15	3.37	0	6.11	8.41	2.30	0	5.61	6.8	1.19	0
	1200	21.5	24	15	26	45	181	1534	NR	Closed	155	-	0	4.89	7.08	2.19	0.01	4.89	7.78	2.89	0	4.78	8.15	3.37	0	6.12	8.44	2.32	0	5.61	6.8	1.19	0
	1300	21.5	24	15	26.5	45	181	1584	NR	Closed	165	-	0	4.92	7.01	2.09	0.01	4.92	7.78	2.86	0	4.78	8.15	3.37	0	6.12	8.45	2.33	0	5.62	6.81	1.19	0
	1400	21.5	24	13	26.5	45	181	1613	NR	Closed	180	0	0	4.95	6.89	1.94	0.01	4.96	7.78	2.82	0	4.78	8.15	3.37	0	6.12	8.45	2.33	0	5.61	6.8	1.19	0
END TEST	1425							1613	53																								

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/3/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin- End-19641.0

OPERATING NOTES DPVE-5 solo test w/polysheeting	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID (ppmv)	at Midfluent PID (ppmv)	at Effluent PID (ppmv)	Monitoring Points																									
														P-2				DPVE-3				P-4				P-3				DPVE-4				DPVE-7			DPVE-6			
														Distances from DPVE-5 (in feet)																									
														38.7				32.8				42.5				24.2				28.9				50			28.6			
														DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac
BASELINE	0									Closed				4.76	6.51	1.75	0	5.4	6.3	0.9	0	4.76	7.63	2.87	0	4.74	8.21	3.47	0	6.21	6.94	0.73	0	ND	5.06	0	5.62	6.67	1.05	0
START OF TEST	835																																					
	1220							1642	NR	Closed																													
	1310	19	24.5	15	26	>100	180	1748	NR	Closed	131	-	0	4.82	6.61	1.79	0	5.46	6.51	1.05	0	4.79	7.66	2.87	0	4.84	8.3	3.46	0.015	6.32	7.09	0.77	0	ND	5.09	0	5.78	7.09	1.31	0
RE-START TEST	1400	19	25	15	26.5	>100	181	1841	NR	Closed	120	-	0	4.85	6.65	1.80	0	5.5	6.58	1.08	0	4.81	7.78	2.97	0	4.9	8.33	3.43	0.015	6.36	7.15	0.79	0	ND	5.09	0	5.78	7.17	1.39	0
	1430							1880	1	Closed																													

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5 PILOT STUDY DATA SHEET

PROJECT NAME (client/location):	Amtrak Sunnyside Yard OU-3	**Project #:**	0055.045Y015
TYPE OF EQUIPMENT (Model #, Hp):	20 Hp Liquid Ring Pump (LRP)	**DATE:**	8/4/10
Stringer Depth: 2' above bottom of well	Hour Reading-Begin-19641.0 End-19643.4		

OPERATING NOTES DPVE-5 solo test w/polysheeting	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: Influent PID (ppmv)	PID Reading: at Midfluent PID (ppmv)	PID Reading: Effluent PID (ppmv)
BASELINE	0									Closed			
START OF TEST	815							1882	NR	Closed			
	845	18	23	14	24.5	>100	170	1882	NR	Closed	184	-	0
	945	20	25	15	25.5	>100	180	2017	NR	Closed	210	-	34
	1045	20	25	15	26.5	>100	180	2112	NR	Closed	212	-	0
END OF TEST	1105							2159	1				

Monitoring Points (Distances from DPVE-5 (in feet))

	P-2 (38.7)				DPVE-3 (32.8)				P-4 (42.5)				P-3 (24.2)				DPVE-4 (28.9)			DPVE-7 (50)				DPVE-6 (28.6)			
Time	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac
0	4.69	6.91	2.22	0	5.26	7.09	1.83	0	4.71	7.75	3.04	0	4.72	8.33	3.61	0	6.2	6.95	0	ND	5.11	--	0	5.65	6.55	0.9	0
815																											
845	4.72	6.95	2.23	0	5.31	7.21	1.9	0	4.73	7.75	3.02	0	4.77	8.37	3.6	0	6.25	7.02	0	ND	5.11	--	0	5.71	6.73	1.02	0
945	4.78	7.02	2.24	0	5.35	7.36	2.01	0	4.75	7.78	3.03	0	4.85	8.41	3.56	0	6.32	7.13	0	ND	5.11	--	0	5.82	6.98	1.16	0
1045	4.81	7.06	2.25	0	5.38	7.51	2.13	0	4.78	7.8	3.02	0	4.9	8.44	3.54	0	6.35	7.17	0	ND	5.12	--	0	5.82	7.03	1.21	0
1105																											

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

P-3 PILOT STUDY DATA SHEET

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PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/4/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19643.4 End-19646.3

OPERATING NOTES	Time	Influent Vacuum at Extraction Well	Vac at LRP	Vac at Manifold	Vac at Knock-out	Flow at Manifold	LRP Temp °F	Totalizer	Recovered Product	Dilution Valve Status:	PID Reading: at			Monitoring Points																							
P-3 solo test	(to 1 min)	at												P-2				DPVE-3				P-4				DPVE-5				DPVE-4				DPVE-7		DPVE-6			
														Distances from P-3 (in feet)																							
														41				32				30				24.2				24.8				68		64.7			
		(in. of Hg.)	(in. of Hg)	(in. of Hg)	(in. of Hg)	(scfm)		(gallons)	(gallons)	Open / Closed	Influent PID (ppmv)	Midfluent PID (ppmv)	Effluent PID (ppmv)	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac
BASELINE	0									Closed				4.81	7.06	2.25	0	5.38	7.51	2.13	0	4.78	7.8	3.02	0				0	6.35	7.17	0.82	0	ND	5.12	0	5.82	7.03	1.21	0
START OF TEST	1125							2159	NR	Closed																													
	1200	25	26.5	17	28	35	182	2159	NR	Closed	239	-	0	4.75	7.07	2.32	0	5.31	7.53	2.22	0	4.79	7.8	3.01	0	ND	6.44	--	0	6.3	7.04	0.74	0	ND	5.11	0	5.69	6.8	1.11	0
	1300	25	26	17.5	29	25	183	2159	NR	Closed	196	-	0	4.71	7.08	2.37	0	5.28	7.54	2.26	0	4.77	7.8	3.03	0	6.4	6.41	0.01	0	6.29	7.11	0.82	0	-	-	0	5.68	6.72	1.04	0
	1400	25	26.5	17.5	29	35	182	2211	NR	Closed	185	-	0	4.7	7.1	2.40	0	5.26	7.55	2.29	0	4.76	7.8	3.04	0	6.39	6.42	0.03	0	6.27	7.08	0.81	0	-	-	-	5.67	6.68	1.01	0
END TEST	1410							2245	9	Closed																													

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT- Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

P-4 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.045Y015
TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/5/10
Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19646.3 End-19651.3

OPERATING NOTES P-4 solo test	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading at: Influent PID (ppmv)	Midfluent PID (ppmv)	Effluent PID (ppmv)
BASELINE	0									Closed			
START OF TEST	810							2250	NR				
OWS Full, Stopped test at 1210 to fix problem. Shut sytem down at 1415.	900	21	26.5	16.5	27	70	180	2250	NR	Closed	276	-	0
	1000	22.5	26.5	17	28	70	182	2250	NR	Closed	276	-	0
	1100	22.5	26.5	17.5	29	55	188	2250	NR	Closed	214	-	0
	1200	22.5	28	17.5	29	40	190	2266	NR	Closed	291	-	0
	1210												
	1415							2381	73				

Monitoring Points	P-2				DPVE-3				P-3				DPVE-5				DPVE-1				P-5				P-7		
Distances from P-4 (in feet)	23.7				17.6				30				42.5				58.9				59.6				47.3		
Time	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac
0	4.59	7.62	3.03	0	5.1	8.33	3.23	0	5.09	5.54	0.45	0	6.27	6.86	0.59	0	5.89	5.93	0.04	0	4.61	4.98	0.37	0	ND	4.68	0
810																											
900	4.6	7.67	3.07	0	5.15	8.39	3.24	0	5.11	5.55	0.44	0	6.29	6.91	0.62	0	5.89	5.94	0.05	0	-	-	-	-	ND	4.69	0
1000	4.61	7.7	3.09	0	5.19	8.35	3.16	0	5.11	5.56	0.45	0	6.29	6.94	0.65	0	5.89	5.94	0.05	0	-	-	-	-	ND	4.68	0
1100	4.61	7.71	3.10	0	5.23	8.31	3.08	0	5.1	5.65	0.55	0	6.29	6.96	0.67	0	5.89	5.94	0.05	0	-	-	-	-	ND	4.69	0
1200	4.67	7.72	3.05	0	5.28	8.23	2.95	0	5.12	5.56	0.44	0	6.29	7	0.71	0	5.89	5.94	0.05	0	-	-	-	-	ND	4.69	0
1210																											
1415																											

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-2 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/6/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19651.3 End-19656.8

OPERATING NOTES DPVE-2 solo test w/polysheeting	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID (ppmv)	Midfluent PID (ppmv)	Effluent PID (ppmv)	Monitoring Points																		
														P-6			P-13				P-15				P-16			P-12				P-10		
														Distances from DPVE-2 (in feet)																		
														36			12				41				47.5			21				38		
														DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac
BASELINE	0									Closed				ND	5.53	0	5.73	7.8	2.07	0	6.43	6.88	0.45	0	ND	7.11	0	5.22	5.64	0.42	0	ND	4.99	0
START OF TEST	820							2424	NR	Closed																							
	900	25.5	28	19	29.5	15	178	2425	NR	Closed	194	-	0	ND	5.53	0	5.78	7.8	2.02	0	6.44	6.87	0.43	0	ND	7.12	0	5.23	5.65	0.42	0	ND	4.99	0
	1000	25.5	28	19	30	17	178	2425	NR	Closed	174	-	0	ND	5.53	0	5.88	7.8	1.92	0	6.44	6.89	0.45	0	ND	7.13	0	5.23	5.65	0.42	0	ND	4.99	0
	1100	25.5	28.5	19.5	>30	15	178	2425	NR	Closed	167	-	0	ND	5.54	0	5.86	7.8	1.94	0	6.45	6.89	0.44	0	ND	7.12	0	5.23	5.65	0.42	0	ND	4.99	0
	1200	25.5	28.5	20	>30	15	180	2425	NR	Closed	77	-	0	ND	5.55	0	5.86	7.8	1.94	0	6.45	6.88	0.43	0	ND	7.13	0	5.23	5.66	0.43	0	ND	4.99	0
	1300	25.5	29	19.5	>30	20	180	2468	NR	Closed	214	-	0	ND	5.55	0	5.84	7.8	1.96	0	6.45	6.89	0.44	0	ND	7.12	0	5.23	5.65	0.42	0	ND	4.99	0
	1400	25.5	29	20	>30	15	180	2468	NR	Closed	227	-	0	ND	5.55	0	5.84	7.8	1.96	0	6.44	6.88	0.44	0	ND	7.12	0	5.23	5.66	0.43	0	ND	4.99	0
END TEST	1415																																	

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-6 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/9/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19656.8 End-19662.0

OPERATING NOTES DPVE-6 solo test	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Pilot Reading: Vac at LRP (in. of Hg)	Vac at Manifold (in. of Hg)	Vac at Knock-out (in. of Hg)	Flow at Manifold (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID (ppmv)	Midfluent PID (ppmv)	Effluent PID (ppmv)	Monitoring Points: P-1 Distances from DPVE-6 (in feet): 37 DTP	P-1 37 DTW	P-1 37 PT	P-1 37 Vac	P-2 36.5 DTP	P-2 36.5 DTW	P-2 36.5 PT	P-2 36.5 Vac	DPVE-3 37 DTP	DPVE-3 37 DTW	DPVE-3 37 PT	DPVE-3 37 Vac	DPVE-5 28.6 DTP	DPVE-5 28.6 DTW	DPVE-5 28.6 PT	DPVE-5 28.6 Vac	DPVE-7 59 DTP	DPVE-7 59 DTW	DPVE-7 59 Vac
BASELINE	0									Closed				4.57	4.66	0.09	0	4.71	7.61	2.90	0	5.21	8.6	3.39	0	6.11	8.89	2.78	0	ND	5.25	0
START OF TEST	840							2413		Closed																						
	930	13.5	23	12	23	>100	180	2414	NR	Closed	105	-	0	4.58	4.65	0.07	0	4.72	7.62	2.90	0	5.21	8.64	3.43	0	6.16	8.95	2.79	0	ND	5.25	0
	1030	14	22.5	12	24	>100	184	2514	NR	Closed	136	-	0	4.58	4.65	0.07	0	4.72	7.62	2.90	0	5.21	8.68	3.47	0	6.15	8.94	2.79	0	ND	5.25	0
	1130	14	23	13.5	24.5	>100	188	2549	NR	Closed	108	-	0	4.57	4.65	0.08	0	4.71	7.62	2.91	0	5.21	8.66	3.45	0	6.15	8.96	2.81	0	ND	5.25	0
	1230	14	23.5	13.5	24.5	>100	190	2573	NR	Closed	116	-	0	4.57	4.65	0.08	0	4.71	7.62	2.91	0	5.21	8.66	3.45	0	6.14	8.96	2.82	0	ND	5.25	0
	1330	14	23	13	25	>100	190	2613	NR	Closed	95	3	0	4.58	4.65	0.07	0	4.71	7.62	2.91	0	5.2	8.68	3.48	0	6.13	8.96	2.83	0	ND	5.25	0
END TEST	1345							2631	3	Closed																						

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5,3,2 and 1 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 — **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) — **DATE:** 8/10/10

Stringer Depth: 2' above bottom of well — Hour Reading-Begin-19662.0 End-19666.9

OPERATING NOTES DPVE-5,DPVE-3,DPVE-2, DPVE-1	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Knock-out (in. of Hg)	Vac at Manifold DPVE-5 (in. of Hg)	Flow at Manifold DPVE-5 (scfm)	Vac at Manifold DPVE-3 (in. of Hg)	Flow at Manifold DPVE-3 (scfm)	Vac at Manifold DPVE-2 (in. of Hg)	Flow at Manifold DPVE-2 (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID (ppmv)	PID Reading: at Midfluent PID (ppmv)	PID Reading: at Effluent PID (ppmv)
BASELINE	800													Closed			
START OF TEST	800											2631	NR	Closed			
1120 OWS filled up. Brought DPVE-1 online at 1120. System shut down at 1410 for high product alarm.	900	17	22.5	24	13	95	14	*	9	<10	178	2764	NR	Closed	693	-	0
	1000	16.5	22.5	24.5	13	100	14	*	9	<10	178	2848	NR	Closed	701	-	0
	1100	16.5	22.5	22	13	100	14	*	9	<10	180	2925	NR	Closed	694	-	0
	1300	7	23	22.5	17	90	3	<10	8.5	<10	188	3198	NR	Closed	687	-	0
	1400	12	-	-	17	-	8	-	9	-	-	3346	NR	Closed	-	-	0
END TEST	1410						* Flow tube too silty to read					3349	84	Closed			

Monitoring Points

P-2				P-4				P-3				DPVE-4				DPVE-7				DPVE-6				P-6				P-13				P-15				P-16				P-12				P-10			
DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac
4.67	7.85	3.18	0	4.84	7.47	2.63	-	5.07	6.34	1.27	-	6.26	7.3	1.04	-	ND	5.27	-	5.85	5.93	0.08	-	ND	5.53	-	5.74	7.79	2.05	0	6.46	6.89	0.43	-	ND	7.13	-	5.24	5.75	0.51	-	ND	5.04	-
4.8	7.91	3.11	0	4.89	7.54	2.65	-	5.21	6.44	1.23	-	6.35	7.45	1.1	-	ND	5.27	-	6.04	6.14	0.1	-	ND	5.54	-	5.77	7.79	2.02	0	6.46	6.89	0.43	-	ND	7.13	-	5.24	5.75	0.51	-	ND	5.04	-
4.93	7.88	2.95	0	4.96	7.56	2.6	-	5.3	6.49	1.19	-	6.41	7.54	1.13	-	ND	5.27	-	6.07	6.17	0.1	-	ND	5.54	-	5.8	7.79	1.99	0	6.46	6.89	0.43	-	ND	7.14	-	5.24	5.75	0.51	-	ND	5.04	-
4.99	7.75	2.76	0	5.04	7.63	2.59	-	5.31	6.49	1.18	-	6.42	7.57	1.15	-	-	-	-	6.05	6.16	0.11	-	ND	5.55	-	5.83	7.79	1.96	0	-	-	-	-	-	-	-	5.26	5.79	0.53	-	-	-	-
4.99	7.41	2.42	0	5.06	7.64	2.58	-	5.28	6.5	1.22	-	6.4	7.54	1.14	-	-	-	-	6.04	6.19	0.15	-	ND	5.56	-	5.8	7.79	1.99	0	-	-	-	-	-	-	-	5.25	5.79	0.54	-	ND	5.04	-
5.05	7.24	2.19	0	5.08	7.65	2.57	-	5.3	6.52	1.22	-	6.42	7.57	1.15	-	-	-	-	6.04	6.2	0.16	-	ND	5.56	-	5.81	7.79	1.98	0	-	-	-	-	-	-	-	5.26	5.78	0.52	-	ND	5.05	-

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5,3,2 and 1 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 — **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) — **DATE:** 8/11/10

Stringer Depth: 2' above bottom of well — Hour Reading-Begin-19666.9 End-19673.0

OPERATING NOTES DPVE-5,DPVE-3,DPVE-2, DPVE-1	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Knock-out (in. of Hg)	Vac at Manifold DPVE-5 (in. of Hg)	Flow at Manifold DPVE-5 (scfm)	Vac at Manifold DPVE-3 (in. of Hg)	Flow at Manifold DPVE-3 (scfm)	Vac at Manifold DPVE-2 (in. of Hg)	Flow at Manifold DPVE-2 (scfm)	Vac at Manifold DPVE-1 (in. of Hg)	Flow at Manifold DPVE-1 (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent PID (ppmv)	Midfluent PID (ppmv)	Effluent PID (ppmv)
BASELINE	0															Closed			
START OF TEST	815													3349					
	915	5.5	22	23	11	90	3	25	8.5	<10	*	40	180	3720	NR	Closed	283	-	0
	1015	15	21.5	22.5	11	95	10.5	25	7	<10	*	15	180	3840	NR	Closed	268	-	0
	1115	15	21	23	11	95	10	30	7	<10	*	25	182	3979	NR	Closed	268	-	0
	1300	15	22.5	21.5	10.5	>100	11.5	35	8	<10	*	35	184	4288	NR	Closed	272	-	0
	1400	15	23.5	21	10.5	>100	11.5	35	8.5	<10	*	35	188	4493	NR	Closed	242	-	0
END TEST	1420													4533	61	Closed			
									*Manifold Gauge for DPVE-1 not working.										

Monitoring Points

Time	P-2 DTP	P-2 DTW	P-2 PT	P-2 Vac	P-4 DTP	P-4 DTW	P-4 PT	P-4 Vac	P-3 DTP	P-3 DTW	P-3 PT	P-3 Vac	DPVE-4 DTP	DPVE-4 DTW	DPVE-4 PT	DPVE-4 Vac	DPVE-6 DTP	DPVE-6 DTW	DPVE-6 PT	DPVE-6 Vac
0	4.81	6.91	2.1	0	4.86	7.53	2.67	-	5.07	6.54	1.47	-	6.26	7.36	1.1	-	5.56	5.98	0.42	-
815																				
915	4.91	6.97	2.06	0	4.91	7.58	2.67	-	5.23	6.66	1.43	-	6.37	7.51	1.14	-	6.04	6.19	0.15	-
1015	4.99	6.98	1.99	0	4.97	7.63	2.66	-	5.29	6.69	1.40	-	6.41	7.58	1.17	-	6.06	6.22	0.16	-
1115	5.04	6.95	1.91	0	5.01	7.66	2.65	-	5.29	6.69	1.40	-	6.42	7.61	1.19	-	6.06	6.22	0.16	-
1300	5.1	6.86	1.76	0	5.09	7.72	2.63	-	5.29	6.7	1.41	-	6.43	7.64	1.21	-	6.05	6.25	0.20	-
1400																				
1420	**EIP BROKEN, cannot finish final round of gauging.																			

Time	P-6 DTP	P-6 DTW	P-6 Vac	P-13 DTP	P-13 DTW	P-13 PT	P-13 Vac	P-12 DTP	P-12 DTW	P-12 PT	P-12 Vac	P-10 DTP	P-10 DTW	P-10 Vac	P-5 DTP	P-5 DTW	P-5 PT	P-5 Vac
0	ND	5.56	-	5.75	7.79	2.04	0	5.25	5.79	0.54	-	ND	5.06	-	4.75	5.16	0.41	0
815																		
915	ND	5.56	-	5.8	7.79	1.99	0	5.26	5.8	0.54	-	ND	5.06	-	5.9	6.71	0.81	3
1015	ND	5.57	-	5.84	7.8	1.96	0	5.27	5.81	0.54	-	ND	5.07	-	5.22	5.63	0.41	0
1115	ND	5.58	-	5.84	7.8	1.96	0	5.28	5.82	0.54	-	ND	5.07	-	5.22	5.63	0.41	0
1300	ND	5.60	-	5.86	7.8	1.94	0	5.28	5.82	0.54	-	ND	5.08	-	5.67	6.1	0.43	1
1400																		
1420																		

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT- Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5,3,2 and 1 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/12/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19673.0 End-1967.83

OPERATING NOTES DPVE-5,DPVE-3,DPVE-2, and DPVE-1	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Knock-out (in. of Hg)	Vac at Manifold DPVE-5 (in. of Hg)	Flow at Manifold DPVE-5 (scfm)	Vac at Manifold DPVE-3 (in. of Hg)	Flow at Manifold DPVE-3 (scfm)	Vac at Manifold DPVE-2 (in. of Hg)	Flow at Manifold DPVE-2 (scfm)	Vac at Manifold DPVE-1 (in. of Hg)	Flow at Manifold DPVE-1 (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent Multi-ray (%) LEL	Influent PID (ppmv) VOC's	Effluent Multi-ray (ppmv) LEL	Effluent PID (ppmv) VOC's
BASELINE	0															Closed				
START OF TEST	900													4536	NR	Closed				
	1000	9	18.5	20	7	>100	4.5	25	5	<10	*	70	178	4715	NR	Closed	0	49	0	0
	1100	9.5	18	19.5	7	>100	5.5	30	4.5	15	*	>100	178	4967	NR	Closed	0	150	0	0
	1300	11.5	17.5	19	7	>100	8.5	35	4.5	15	*	>100	178	5299	NR	Closed	0	131	0	0
	1400	11.5	17.5	19	7	>100	8	35	4	15	*	>100	180	5564	NR	Closed	0	113	0	0
END TEST	1430										*Manifold Gauge for DPVE-1 not working			5584	0	Closed				

Monitoring Points

OPERATING NOTES	Time (to 1 min)	P-2 DTP	P-2 DTW	P-2 PT	P-2 Vac	P-4 DTP	P-4 DTW	P-4 PT	P-4 Vac	P-3 DTP	P-3 DTW	P-3 PT	P-3 Vac	DPVE-4 DTP	DPVE-4 DTW	DPVE-4 PT	DPVE-4 Vac	DPVE-6 DTP	DPVE-6 DTW	DPVE-6 PT	DPVE-6 Vac	P-6 DTP	P-6 DTW	P-6 PT	P-6 Vac	P-13 DTP	P-13 DTW	P-13 PT	P-13 Vac	P-12 DTP	P-12 DTW	P-12 PT	P-12 Vac	P-10 DTP	P-10 DTW	P-10 Vac	P-5 DTP	P-5 DTW	P-5 PT	P-5 Vac
BASELINE	0	4.9	6.47	1.57	0	4.9	7.54	2.64	-	5.05	6.75	1.70	-	6.68	7.43	0.75	-	5.88	6.02	0.14	-	ND	5.6	-	-	5.79	7.8	2.01	0	5.26	5.81	0.55	-	ND	5.11	-	4.81	5.12	0.31	0
START OF TEST	900																																							
	1000	4.96	6.51	1.55	0	4.94	7.58	2.64	-	5.19	6.85	1.66	-	6.37	7.55	1.18	-	6.03	6.22	0.19	-	N D	5.6	-	-	5.84	7.8	1.96	0	5.27	5.83	0.56	-	ND	5.12	-	5.48	6.1	0.62	0
	1100	5.03	6.53	1.50	0	4.98	7.63	2.65	-	5.24	6.88	1.64	-	6.4	7.61	1.21	-	6.04	6.24	0.20	-	5.60	5.61	0.01	-	5.86	7.8	1.94	0	5.28	5.84	0.56	-	ND	5.11	-	5.68	6.34	0.66	1.0
	1300	5.09	6.49	1.40	0	5.03	7.67	2.64	-	5.24	6.89	1.65	-	6.42	7.64	1.22	-	6.04	6.26	0.22	-	ND	5.61	-	-	5.86	7.8	1.94	0	5.29	5.84	0.55	-	ND	5.11	-	5.72	6.29	0.57	1.8
	1400	5.13	6.46	1.33	0	5.05	7.68	2.63	-	5.25	6.9	1.65	-	6.42	7.65	1.23	-	6.04	6.26	0.22	-	ND	5.62	-	-	5.88	7.8	1.92	0	5.29	5.86	0.57	-	ND	5.11	-	5.82	6.38	0.56	3.2
END TEST	1430																																							

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5,3,2 and 1 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/13/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19678.3 End-19683.9

OPERATING NOTES DPVE-5,DPVE-3,DPVE-2, DPVE-1	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Knock-out (in. of Hg)	Vac at Manifold DPVE-5 (in. of Hg)	Flow at Manifold DPVE-5 (scfm)	Vac at Manifold DPVE-3 (in. of Hg)	Flow at Manifold DPVE-3 (scfm)	Vac at Manifold DPVE-2 (in. of Hg)	Flow at Manifold DPVE-2 (scfm)	Vac at Manifold DPVE-1 (in. of Hg)	Flow at Manifold DPVE-1 (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: Influent Multi-ray (%) LEL	PID Reading: at Influent PID (ppmv) VOC's	PID Reading: Effluent Multi-ray (ppmv) LEL	PID Reading: Effluent PID (ppmv) VOC's	Monitoring Points: P-2				P-4				P-3				DPVE-4				DPVE-6				P-6				P-13				P-12				P-10			P-5			
																					DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac
BASELINE	0													5586		Closed					4.98	6.17	1.19	0	4.95	7.53	2.58	-	5.06	6.9	1.84	-	6.31	7.46	1.15	-	5.89	6.04	0.15	-	ND	5.64	-	5.85	7.79	1.94	0	5.29	5.85	0.56	-	ND	5.16	-	4.89	5.15	0.26	0
START OF TEST	830																																																				
Started Test with only DPVE-5,3,and 2 online.	930	15.5	21	22.5	17	>100	12.5	45	8	15	-	-	178	5723			0	137	0	0	5.08	6.2	1.12	0	4.99	7.57	2.58	-	5.19	6.99	1.80	-	6.4	7.58	1.18	-	6.04	6.24	0.2	-	ND	5.64	-	5.89	7.79	1.9	0	5.3	5.86	0.56	-	ND	5.16	-	-	-	-	-
	1030	16	21.5	22.5	17	>100	12	50	8	15	-	-	178	5840			0	208	0	0	5.14	6.22	1.08	0	5.04	7.61	2.57	-	5.23	7.02	1.79	-	6.43	7.64	1.21	-	6.05	6.25	0.2	-	ND	5.65	-	5.91	7.79	1.88	0	5.31	5.86	0.55	-	ND	5.16	-	-	-	-	-
	1130	16	22	23	17.5	>100	12.5	50	8.5	15	-	-	178	5949			0	156	0	0	5.18	6.22	1.04	0	5.09	7.62	2.53	-	5.25	7.02	1.77	-	6.45	7.67	1.22	-	6.05	6.27	0.22	-	ND	5.65	-	5.93	7.79	1.86	0	5.31	5.89	0.58	-	ND	5.17	-	-	-	-	-
	1230	16	22	23.5	17.5	>100	12.5	50	8.5	15	-	-	178	6006			0	155	0	0	5.2	6.21	1.01	0	5.10	7.63	2.53	-	5.25	7.03	1.78	-	6.45	7.68	1.23	-	6.05	6.27	0.22	-	ND	5.65	-	5.93	7.79	1.86	0	5.32	5.89	0.57	-	ND	5.17	-	-	-	-	-
	1400	16	22	23	17.5	>100	12.5	50	8.5	15	-	-	178	6127	77		0	238	0	0	5.22	6.18	0.96	0	5.13	7.64	2.51	-	5.23	7.02	1.79	-	6.44	7.67	1.23	-	6.04	6.27	0.23	-	ND	5.66	-	5.93	7.79	1.86	0	5.32	5.88	0.56	-	ND	5.17	-	-	-	-	-

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5,3,2 and 1 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/16/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19683.9 End-19689.8

OPERATING NOTES DPVE-5,DPVE-3,DPVE-2, DPVE-1	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Knock-out (in. of Hg)	Vac at Manifold DPVE-5 (in. of Hg)	Flow at Manifold DPVE-5 (scfm)	Vac at Manifold DPVE-3 (in. of Hg)	Flow at Manifold DPVE-3 (scfm)	Vac at Manifold DPVE-2 (in. of Hg)	Flow at Manifold DPVE-2 (scfm)	Vac at Manifold DPVE-1 (in. of Hg)	Flow at Manifold DPVE-1 (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: Influent Multi-ray (%) LEL	PID Reading: at Influent PID (ppmv) VOC's	PID Reading: Effluent Multi-ray (ppmv) LEL	PID Reading: Effluent PID (ppmv) VOC's	Monitoring Points: P-2				P-4				P-3				DPVE-4				DPVE-6				P-6				P-13				P-12				P-10			P-5			
																					DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac
BASELINE	0															Closed					4.92	6.31	1.39	0	4.9	7.59	2.69	-	5	7.29	2.29	-	6.28	7.56	1.28	-	5.91	5.96	0.05	-	ND	5.59	-	5.79	7.75	1.96	0	5.26	5.86	0.6	-	ND	5.11	-	4.77	5.21	0.44	0
START OF TEST	830													6132																																								
	930	15	20	20	15	>100	10	45	6	15	-	<10	180	6276			0	184	0	0	5.01	6.35	1.34	0	4.94	7.62	2.68	-	5.13	7.37	2.24	-	6.36	7.7	1.34	-	6.06	6.15	0.09	-	ND	5.59	-	5.82	7.75	1.93	0	5.27	5.86	0.59	-	ND	5.11	-	4.79	5.21	0.42	-
	1030	15	20	20.5	15	>100	10	45	6	15	-	<10	180	6356			0	148	0	0	5.08	6.37	1.29	0	5	7.66	2.66	-	5.18	7.39	2.21	-	6.4	7.78	1.38	-	6.07	6.18	0.11	-	ND	5.6	-	5.85	7.76	1.91	0	5.28	5.88	0.6	-	ND	5.11	-	4.78	5.22	0.44	-
Started Test with only DPVE-5,3,and 2 online.	1130	16	19	19	15.5	>100	9.5	45	5	15	-	<10	180	6535			0	221	0	0	5.11	6.37	1.26	0	5.03	7.69	2.66	-	5.19	7.39	2.2	-	6.41	7.83	1.42	-	6.07	6.18	0.11	-	ND	5.6	-	5.87	7.76	1.89	0	5.29	5.9	0.61	-	ND	5.11	-	5.62	6.55	0.93	1.4
	1300	15	20.5	21	15.5	>100	11	40	6	15	-	<10	180	6853			7	143	0	0	5.12	6.35	1.23	0	5.06	7.7	2.64	-	5.18	7.4	2.22	-	6.41	7.86	1.45	-	6.06	6.17	0.11	-	ND	5.61	-	5.85	7.76	1.91	0	5.27	5.87	0.6	-	ND	5.12	-	5.32	6.2	0.88	-
	1400	15	20.5	21	15.5	>100	11	35	6.5	15	-	<10	180	6905			0	175	0	0	5.14	6.33	1.19	0	5.07	7.72	2.65	-	5.19	7.41	2.22	-	6.41	7.87	1.46	-	6.07	6.19	0.12	-	ND	5.61	-	5.87	7.76	1.89	0	5.29	5.89	0.6	-	ND	5.12	-	5.06	5.08	0.02	-
	1415													6971	4																																					

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5,3,2 and 1 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/17/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19689.8 End-19695.3

OPERATING NOTES DPVE-5,DPVE-3,DPVE-2, DPVE-1	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Knock-out (in. of Hg)	Vac at Manifold DPVE-5 (in. of Hg)	Flow at Manifold DPVE-5 (scfm)	Vac at Manifold DPVE-3 (in. of Hg)	Flow at Manifold DPVE-3 (scfm)	Vac at Manifold DPVE-2 (in. of Hg)	Flow at Manifold DPVE-2 (scfm)	Vac at Manifold DPVE-1 (in. of Hg)	Flow at Manifold DPVE-1 (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: at Influent Multi-ray (%) LEL	Influent PID (ppmv) VOC's	Effluent Multi-ray (ppmv) LEL	Effluent PID (ppmv) VOC's
BASELINE	0															Closed				
START OF TEST	830													6973						
Started Test with only DPVE-5,3,and 2 online.	1030	18	23.5	23.5	13	>100	13	45	9	15	-	-	182	7127			0	168	0	0
	1130	18	23.5	24	13	>100	13.5	50	9	25	-	-	182	7221			8	223	0	0
	1300	18	23.5	24	13	>100	13	50	9	25	-	-	184	7316			10	143	0	0
	1400	18	23.5	24	13	>100	13.5	45	9	20	-	-	186	7397			0	258	0	0
	1430													7410	36					
															*Collected vapor sample fopor sample for lab analysis					

Monitoring Points

Time	P-2 DTP	P-2 DTW	P-2 PT	P-2 Vac	P-4 DTP	P-4 DTW	P-4 PT	P-4 Vac	P-3 DTP	P-3 DTW	P-3 PT	P-3 Vac	DPVE-4 DTP	DPVE-4 DTW	DPVE-4 PT	DPVE-4 Vac	DPVE-6 DTP	DPVE-6 DTW	DPVE-6 PT	DPVE-6 Vac
0	5	6.26	1.26	0	4.99	7.55	2.56	-	5.05	7.41	2.36	-	6.33	7.71	1.38	-	5.94	6.01	0.07	-
830																				
1030	5.11	6.3	1.19	0	5.04	7.61	2.57	-	5.11	7.49	2.38	-	6.4	7.83	1.43	-	6.08	6.17	0.09	-
1130	5.16	6.31	1.15	0	5.08	7.63	2.55	-	5.21	7.51	2.3	-	6.43	7.9	1.47	-	6.09	6.2	0.11	-
1300	5.18	6.29	1.11	0	5.11	7.64	2.53	-	5.2	7.5	2.3	-	6.43	7.93	1.50	-	6.08	6.19	0.11	-
1400	5.18	6.29	1.11	0	5.13	7.64	2.51	-	5.2	7.5	2.3	-	6.43	7.94	1.51	-	6.06	6.2	0.14	-

Time	P-6 DTP	P-6 DTW	P-6 Vac	P-13 DTP	P-13 DTW	P-13 PT	P-13 Vac	P-12 DTP	P-12 DTW	P-12 PT	P-12 Vac	P-10 DTP	P-10 DTW	P-10 Vac	P-5 DTP	P-5 DTW	P-5 PT	P-5 Vac
0	ND	5.65	-	5.88	7.75	1.87	0	5.31	5.92	0.61	-	ND	5.16	-	4.87	5.22	0.35	0
830																		
1030	ND	5.66	-	5.9	7.75	1.85	0	5.31	5.92	0.61	-	ND	5.16	-	4.85	5.21	0.36	0
1130	ND	5.65	-	5.92	7.75	1.83	0	5.32	5.93	0.61	-	ND	5.16	-	4.84	5.21	0.37	0
1300	ND	5.66	-	5.92	7.75	1.83	0	5.3	5.91	0.61	-	ND	5.16	-	4.82	5.2	0.38	0
1400	ND	5.65	-	5.91	7.75	1.84	0	5.32	5.93	0.61	-	ND	5.16	-	4.88	5.21	0.33	0

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

DPVE-5,3,2 and 1 PILOT STUDY DATA SHEET

PROJECT NAME (client/location): Amtrak Sunnyside Yard OU-3 | **Project #:** 0055.0045Y015

TYPE OF EQUIPMENT (Model #, Hp): 20 Hp Liquid Ring Pump (LRP) | **DATE:** 8/18/10

Stringer Depth: 2' above bottom of well | Hour Reading-Begin-19695.3

OPERATING NOTES DPVE-5,DPVE-3,DPVE-2, DPVE-1	Time (to 1 min)	Influent Vacuum at Extraction Well (in. of Hg.)	Vac at LRP (in. of Hg)	Vac at Knock-out (in. of Hg)	Vac at Manifold DPVE-5 (in. of Hg)	Flow at Manifold DPVE-5 (scfm)	Vac at Manifold DPVE-3 (in. of Hg)	Flow at Manifold DPVE-3 (scfm)	Vac at Manifold DPVE-2 (in. of Hg)	Flow at Manifold DPVE-2 (scfm)	Vac at Manifold DPVE-1 (in. of Hg)	Flow at Manifold DPVE-1 (scfm)	LRP Temp °F	Totalizer (gallons)	Recovered Product (gallons)	Dilution Valve Status: Open / Closed	PID Reading: Influent Multi-ray (%) LEL	PID Reading: Influent PID (ppmv) VOC's	PID Reading: Effluent Multi-ray (ppmv) LEL	PID Reading: Effluent PID (ppmv) VOC's
BASELINE	0															Closed				
START OF TEST	750													7410						
Started Test with only DPVE-5,3,and 2 online.	900	16	22	22.5	14	>100	12	50	8	15	-	-	178	7533			0	184	0	0
	1000	16	21.5	22.5	14	>100	12	50	8	15	-	-	178	7631			0	148	0	0
	1100	16	22	22.5	14	>100	12	50	8	15	-	-	178	7685			0	221	0	0
	1200	16	22	23	14	>100	12	50	8	15	-	-	178	7771			7	143	0	0
	1300	16	21.5	23	14	>100	12	50	7	15	-	-	178	7834			0	175	0	0
	1400	16	21.5	22.5	14	>100	12	55	7.5	20	-	-	180	7912			0	175	0	0
	1415													7931	43					

Monitoring Points

P-2				P-4				P-3				DPVE-4				DPVE-6				P-6				P-13				P-12				P-10				P-5			
DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac	DTP	DTW	PT	Vac	DTP	DTW	Vac	DTP	DTW	PT	Vac
5.02	6.24	1.22	0	5.02	7.48	2.46	-	5.05	7.51	2.46	-	6.33	7.78	1.45	-	5.94	6.05	0.11	-	ND	5.65	-	5.88	7.73	1.85	0	5.32	5.94	0.62	-	ND	5.16	-	4.86	5.26	0.4	0
5.1	6.28	1.18	0	5.05	7.52	2.47	-	5.17	7.59	2.42	-	6.4	7.89	1.49	-	6.07	6.21	0.14	-	ND	5.65	-	5.91	7.74	1.83	0	5.31	5.93	0.62	-	ND	5.16	-	4.85	5.24	0.39	0
5.14	6.3	1.16	0	5.07	7.54	2.47	-	5.21	7.62	2.41	-	6.43	7.95	1.52	-	6.09	6.24	0.15	-	ND	5.66	-	5.92	7.74	1.82	0	5.32	5.94	0.62	-	ND	5.16	-	4.84	5.23	0.39	0
5.16	6.3	1.14	0	5.09	7.56	2.47	-	5.2	7.6	2.4	-	6.43	7.98	1.55	-	6.08	6.23	0.15	-	ND	5.66	-	5.93	7.73	1.8	0	5.32	5.93	0.61	-	ND	5.17	-	4.83	5.22	0.39	0
5.17	6.3	1.13	0	5.12	7.58	2.46	-	5.23	7.63	2.4	-	6.45	8.02	1.57	-	6.09	6.25	0.16	-	ND	5.66	-	5.92	7.74	1.82	0	5.32	5.93	0.61	-	ND	5.16	-	4.83	5.23	0.4	0
5.18	6.3	1.12	0	5.14	7.58	2.44	-	5.22	7.62	2.4	-	6.44	8.03	1.59	-	6.08	6.25	0.17	-	ND	5.65	-	5.91	7.73	1.82	0	5.32	5.93	0.61	-	ND	5.16	-	4.83	5.22	0.39	0
5.19	6.29	1.1	0	5.14	7.59	2.45	-	5.22	7.63	2.41	-	6.44	8.05	1.61	-	6.08	6.26	0.18	-	ND	5.66	-	5.92	7.73	1.81	0	5.32	5.93	0.61	-	ND	5.16	-	4.83	5.23	0.4	0

Miscellaneous Notes:
The quantity of recovered product measured from oil water separator, knock-out tank, and product recovery drum.
NR - Not recorded
DTP - Depth to Product (feet)
DTW - Depth to Water (feet)
PT - Product Thickness (feet)
Vac - Vacuum (measured as inches of water for monitoring points)

APPENDIX B

Community Air Monitoring Data

Community Air Monitoring
Volatile Organic Compound Sampling Data
7/26/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
9:03	0	9:10	0	**0.0**
9:18	0	9:25	0	**0.0**
9:33	0	9:40	0	**0.0**
9:48	0	9:55	0	**0.0**
10:03	0	10:10	0	**0.0**
10:18	0	10:25	0	**0.0**
10:33	0	10:40	0	**0.0**
10:48	0	10:55	0	**0.0**
11:03	0	11:10	0	**0.0**
11:18	0	11:25	0	**0.0**
11:33	0	11:40	0	**0.0**
11:48	0	11:55	0	**0.0**
12:03	0	12:10	0	**0.0**
12:18	0	12:25	0	**0.0**
12:33	0	12:40	0	**0.0**
12:48	0	12:55	0	**0.0**
13:03	0	13:10	0	**0.0**
13:18	0	13:25	0	**0.0**
13:33	0	13:40	0	**0.0**
13:48	0	13:55	0	**0.0**
14:03	0	14:10	0	**0.0**
14:18	0	14:25	0	**0.0**
14:33	0	14:40	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
7/27/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:06	0.2	8:09	0	**-0.2**
8:21	0.2	8:24	0	**-0.2**
8:36	0.1	8:39	0	**-0.1**
8:51	0.1	8:54	0	**-0.1**
9:06	0.1	9:09	0	**-0.1**
9:21	0.1	9:24	0	**-0.1**
9:36	0	9:39	0	**0.0**
9:51	0	9:54	0	**0.0**
10:06	0	10:09	0	**0.0**
10:21	0	10:24	0	**0.0**
10:36	0	10:39	0	**0.0**
10:51	0	10:54	0	**0.0**
11:06	0	11:09	0	**0.0**
11:21	0	11:24	0	**0.0**
11:36	0	11:39	0	**0.0**
11:51	0	11:54	0	**0.0**
12:06	0	12:09	0	**0.0**
12:21	0	12:24	0	**0.0**
12:36	0	12:39	0	**0.0**
12:51	0	12:54	0	**0.0**
13:06	0	13:09	0	**0.0**
13:21	0	13:24	0	**0.0**
13:36	0	13:39	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
7/28/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:21	0.3	8:23	0	**-0.3**
8:36	0.3	8:38	0	**-0.3**
8:51	0.3	8:53	0	**-0.3**
9:06	0.3	9:08	0	**-0.3**
9:21	0.3	9:23	0	**-0.3**
9:36	0.3	9:38	0	**-0.3**
9:51	0.3	9:53	0	**-0.3**
10:06	0.2	10:08	0	**-0.2**
10:21	0.2	10:23	0	**-0.2**
10:36	0.2	10:38	0	**-0.2**
10:51	0.1	10:53	0	**-0.1**
11:06	0.1	11:08	0	**-0.1**
11:21	0.1	11:23	0	**-0.1**
11:36	0	11:38	0	**0.0**
11:51	0	11:53	0	**0.0**
12:06	0	12:08	0	**0.0**
12:21	0	12:23	0	**0.0**
12:36	0	12:38	0	**0.0**
12:51	0	12:53	0	**0.0**
13:06	0	13:08	0	**0.0**
13:21	0	13:23	0	**0.0**
13:36	0	13:38	0	**0.0**
13:51	0	13:53	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
7/29/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
		8:24	0	**0.0**
		8:39	0	**0.0**
		8:54	0	**0.0**
		9:09	0	**0.0**
		9:24	0	**0.0**
		9:39	0	**0.0**
		9:54	0	**0.0**
		10:09	0	**0.0**
		10:24	0	**0.0**
		10:39	0	**0.0**
		10:54	0	**0.0**
		11:09	0	**0.0**
		11:24	0	**0.0**
		11:39	0	**0.0**
		11:54	0	**0.0**
		12:09	0	**0.0**
		12:24	0	**0.0**
		12:39	0	**0.0**
		12:54	0	**0.0**
		13:09	0	**0.0**
		13:24	0	**0.0**
		13:39	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
7/30/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
7:51	0	7:57	0	**0.0**
8:06	0	8:12	0	**0.0**
8:21	0	8:27	0	**0.0**
8:36	0	8:42	0	**0.0**
8:51	0	8:57	0	**0.0**
9:06	0	9:12	0	**0.0**
9:21	0	9:27	0	**0.0**
9:36	0	9:42	0	**0.0**
9:51	0	9:57	0	**0.0**
10:06	0	10:12	0	**0.0**
10:21	0	10:27	0	**0.0**
10:36	0	10:42	0	**0.0**
10:51	0	10:57	0	**0.0**
11:06	0	11:12	0	**0.0**
11:21	0	11:27	0	**0.0**
11:36	0	11:42	0	**0.0**
11:51	0	11:57	0	**0.0**
12:06	0	12:12	0	**0.0**
12:21	0	12:27	0	**0.0**
12:36	0	12:42	0	**0.0**
12:51	0	12:57	0	**0.0**
13:06	0	13:12	0	**0.0**
13:21	0	13:27	0	**0.0**
13:36	0	13:42	0	**0.0**
13:51	0			**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/2/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:14	0	8:19	0	**0.0**
8:29	0	8:34	0	**0.0**
8:44	0	8:49	0	**0.0**
8:59	0	9:04	0	**0.0**
9:14	0	9:19	0	**0.0**
9:29	0	9:34	0	**0.0**
9:44	0	9:49	0	**0.0**
9:59	0	10:04	0	**0.0**
10:14	0	10:19	0	**0.0**
10:29	0	10:34	0	**0.0**
10:44	0	10:49	0	**0.0**
10:59	0	11:04	0	**0.0**
11:14	0	11:19	0	**0.0**
11:29	0	11:34	0	**0.0**
11:44	0	11:49	0	**0.0**
11:59	0	12:04	0	**0.0**
12:14	0	12:19	0	**0.0**
12:29	0	12:34	0	**0.0**
12:44	0	12:49	0	**0.0**
12:59	0	13:04	0	**0.0**
13:14	0	13:19	0	**0.0**
13:29	0	13:34	0	**0.0**
13:44	0			**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/3/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
7:59	0.1	8:04	0	**-0.1**
8:14	0.1	8:19	0	**-0.1**
8:29	0.2	8:34	0	**-0.2**
8:44	0.2	8:49	0	**-0.2**
8:59	0.2	9:04	0	**-0.2**
9:14	0.1	9:19	0	**-0.1**
9:29	0.1	9:34	0	**-0.1**
9:44	0.1	9:49	0	**-0.1**
9:59	0.2	10:04	0	**-0.2**
10:14	0.2	10:19	0	**-0.2**
10:29	0.2	10:34	0	**-0.2**
10:44	0.1	10:49	0	**-0.1**
10:59	0.1	11:04	0	**-0.1**
11:14	0.1	11:19	0	**-0.1**
11:29	0.1	11:34	0	**-0.1**
11:44	0.2	11:49	0	**-0.2**
11:59	0.2	12:04	0	**-0.2**
12:14	0.2	12:19	0	**-0.2**
12:29	0.2	12:34	0	**-0.2**
12:44	0.2	12:49	0	**-0.2**
12:59	0.2	13:04	0	**-0.2**
13:14	0.1	13:19	0	**-0.1**
13:29	0.1	13:34	0	**-0.1**
13:44	0.1	13:49	0	**-0.1**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/4/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
7:59	0	8:05	0	**0.0**
8:14	0	8:20	0	**0.0**
8:29	0	8:35	0	**0.0**
8:44	0	8:50	0	**0.0**
8:59	0	9:05	0	**0.0**
9:14	0	9:20	0	**0.0**
9:29	0	9:35	0	**0.0**
9:44	0	9:50	0	**0.0**
9:59	0	10:05	0	**0.0**
10:14	0	10:20	0	**0.0**
10:29	0	10:35	0	**0.0**
10:44	0	10:50	0	**0.0**
10:59	0	11:05	0	**0.0**
11:14	0	11:20	0	**0.0**
11:29	0	11:35	0	**0.0**
11:44	0	11:50	0	**0.0**
11:59	0	12:05	0	**0.0**
12:14	0	12:20	0	**0.0**
12:29	0	12:35	0	**0.0**
12:44	0	12:50	0	**0.0**
12:59	0	13:05	0	**0.0**
13:14	0	13:20	0	**0.0**
13:29	0	13:35	0	**0.0**
13:44	0	13:50	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/5/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:04	0	8:09	0	**0.0**
8:19	0	8:24	0	**0.0**
8:34	0	8:39	0	**0.0**
8:49	0	8:54	0	**0.0**
9:04	0	9:09	0	**0.0**
9:19	0	9:24	0	**0.0**
9:34	0	9:39	0	**0.0**
9:49	0	9:54	0	**0.0**
10:04	0	10:09	0	**0.0**
10:19	0	10:24	0	**0.0**
10:34	0	10:39	0	**0.0**
10:49	0	10:54	0	**0.0**
11:04	0	11:09	0	**0.0**
11:19	0	11:24	0	**0.0**
11:34	0	11:39	0	**0.0**
11:49	0	11:54	0	**0.0**
12:04	0	12:09	0	**0.0**
12:19	0	12:24	0	**0.0**
12:34	0	12:39	0	**0.0**
12:49	0	12:54	0	**0.0**
13:04	0	13:09	0	**0.0**
13:19	0	13:24	0	**0.0**
13:34	0	13:39	0	**0.0**
13:49	0	13:54	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/6/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
7:51	0	7:56	0	**0.0**
8:06	0	8:11	0	**0.0**
8:21	0	8:26	0	**0.0**
8:36	0	8:41	0	**0.0**
8:51	0	8:56	0	**0.0**
9:06	0	9:11	0	**0.0**
9:21	0	9:26	0	**0.0**
9:36	0	9:41	0	**0.0**
9:51	0	9:56	0	**0.0**
10:06	0	10:11	0	**0.0**
10:21	0	10:26	0	**0.0**
10:36	0	10:41	0	**0.0**
10:51	0	10:56	0	**0.0**
11:06	0	11:11	0	**0.0**
11:21	0	11:26	0	**0.0**
11:36	0	11:41	0	**0.0**
11:51	0	11:56	0	**0.0**
12:06	0	12:11	0	**0.0**
12:21	0	12:26	0	**0.0**
12:36	0	12:41	0	**0.0**
12:51	0	12:56	0	**0.0**
13:06	0	13:11	0	**0.0**
13:21	0	13:26	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/9/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:00	0	8:08	0	**0.0**
8:15	0	8:23	0	**0.0**
8:30	0	8:38	0	**0.0**
8:45	0	8:53	0	**0.0**
9:00	0	9:08	0	**0.0**
9:15	0	9:23	0	**0.0**
9:30	0	9:38	0	**0.0**
9:45	0	9:53	0	**0.0**
10:00	0	10:08	0	**0.0**
10:15	0	10:23	0	**0.0**
10:30	0	10:38	0	**0.0**
10:45	0	10:53	0	**0.0**
11:00	0	11:08	0	**0.0**
11:15	0	11:23	0	**0.0**
11:30	0	11:38	0	**0.0**
11:45	0	11:53	0	**0.0**
12:00	0	12:08	0	**0.0**
12:15	0	12:23	0	**0.0**
12:30	0	12:38	0	**0.0**
12:45	0	12:53	0	**0.0**
13:00	0	13:08	0	**0.0**
13:15	0	13:23	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/10/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
7:47	0	7:55	0	**0.0**
8:02	0	8:10	0	**0.0**
8:17	0	8:25	0	**0.0**
8:32	0	8:40	0	**0.0**
8:47	0	8:55	0	**0.0**
9:02	0	9:10	0	**0.0**
9:17	0	9:25	0	**0.0**
9:32	0	9:40	0	**0.0**
9:47	0	9:55	0	**0.0**
10:02	0	10:10	0	**0.0**
10:17	0	10:25	0	**0.0**
10:32	0	10:40	0	**0.0**
10:47	0	10:55	0	**0.0**
11:02	0	11:10	0	**0.0**
11:17	0	11:25	0	**0.0**
11:32	0	11:40	0	**0.0**
11:47	0	11:55	0	**0.0**
12:02	0	12:10	0	**0.0**
12:17	0	12:25	0	**0.0**
12:32	0	12:40	0	**0.0**
12:47	0	12:55	0	**0.0**
13:02	0	13:10	0	**0.0**
13:17	0	13:25	0	**0.0**
13:32	0	13:40	0	**0.0**
13:47	0			**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/11/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
		7:47	0	**0.0**
		8:02	0	**0.0**
		8:17	0	**0.0**
		8:32	0	**0.0**
		8:47	0	**0.0**
		9:02	0	**0.0**
		9:17	0	**0.0**
		9:32	0	**0.0**
*	*	*	*	*
10:05	0	10:13	0	**0.0**
10:20	0	10:28	0	**0.0**
10:35	0	10:43	0	**0.0**
10:50	0	10:58	0	**0.0**
11:05	0	11:13	0	**0.0**
11:20	0	11:28	0	**0.0**
11:35	0	11:43	0	**0.0**
11:50	0	11:58	0	**0.0**
12:05	0	12:13	0	**0.0**
12:20	0	12:28	0	**0.0**
12:35	0	12:43	0	**0.0**
12:50	0	12:58	0	**0.0**
13:05	0	13:13	0	**0.0**
13:20	0	13:28	0	**0.0**
13:35	0	13:43	0	**0.0**
13:50	0	13:58	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/12/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background
Time	**15-min Avg. (PPM)**	**Time**	**15-min Avg. (PPM)**	**Corrected**
8:13	0	8:24	0	**0.0**
8:28	0	8:39	0	**0.0**
8:43	0	8:54	0	**0.0**
8:58	0	9:09	0	**0.0**
9:13	0	9:24	0	**0.0**
9:28	0	9:39	0.3	**0.3**
9:43	0	*	*	*
9:58	0			
10:13	0	10:14	0	**0.0**
10:28	0.1	10:29	0.5	**0.4**
10:43	2.7	*	*	**-2.7**
*	*	11:01	0	**0.0**
		11:16	0	**0.0**
		11:31	0	**0.0**
11:35	0	11:46	0	**0.0**
11:50	0	12:01	0	**0.0**
12:05	0	12:16	0	**0.0**
12:20	0	12:31	0	**0.0**
12:35	0	12:46	0	**0.0**
12:50	0	13:01	0	**0.0**
13:05	0	13:16	0	**0.0**
13:20	0	13:31	0	**0.0**
13:35	0	13:46	0	**0.0**
13:50	0	14:01	0	**0.0**
14:05	0	14:16	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/13/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
7:57	0	8:01	0	**0.0**
8:12	0	8:16	0	**0.0**
8:27	0	8:31	0	**0.0**
8:42	0	8:46	0	**0.0**
8:57	0	9:01	0	**0.0**
9:12	0	9:16	0	**0.0**
9:27	0	9:31	0	**0.0**
9:42	0	9:46	0	**0.0**
9:57	0	10:01	0	**0.0**
10:12	0	10:16	0	**0.0**
10:27	0	10:31	0	**0.0**
10:42	0	10:46	0	**0.0**
10:57	0	11:01	0	**0.0**
11:12	0	11:16	0	**0.0**
11:27	0	11:31	0	**0.0**
11:42	0	11:46	0	**0.0**
11:57	0	12:01	0	**0.0**
12:12	0	12:16	0	**0.0**
12:27	0	12:31	0	**0.0**
12:42	0	12:46	0	**0.0**
12:57	0	13:01	0	**0.0**
13:12	0	13:16	0	**0.0**
13:27	0	13:31	0	**0.0**
13:42	0	13:46	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/16/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
8:07	0	8:07	0	**0.0**
8:22	0	8:22	0	**0.0**
8:37	0	8:37	0	**0.0**
8:52	0	8:52	0	**0.0**
9:07	0	9:07	0	**0.0**
9:22	0	9:22	0	**0.0**
9:37	0	9:37	0	**0.0**
9:52	0	9:52	0	**0.0**
10:07	0	10:07	0	**0.0**
10:22	0	10:22	0	**0.0**
10:37	0	10:37	0	**0.0**
10:52	0	10:52	0	**0.0**
11:07	0	11:07	0	**0.0**
11:22	0	11:22	0	**0.0**
11:37	0	11:37	0	**0.0**
11:52	0	11:52	0	**0.0**
12:07	0	12:07	0	**0.0**
12:22	0	12:22	0	**0.0**
12:37	0	12:37	0	**0.0**
12:52	0	12:52	0	**0.0**
13:07	0	13:07	0	**0.0**
13:22	0	13:22	0	**0.0**
13:37	0	13:37	0	**0.0**
13:52	0	13:52	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/17/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	Corrected
7:56	0	7:56	0	**0.0**
8:11	0	8:11	0	**0.0**
8:26	0	8:26	0	**0.0**
8:41	0	8:41	0	**0.0**
8:56	0	8:56	0	**0.0**
9:11	0	9:11	0	**0.0**
9:26	0	9:26	0	**0.0**
9:41	0	9:41	0	**0.0**
9:56	0	9:56	0	**0.0**
10:11	0	10:11	0	**0.0**
10:26	0	10:26	0	**0.0**
10:41	0	10:41	0	**0.0**
10:56	0	10:56	0	**0.0**
11:11	0	11:11	0	**0.0**
11:26	0	11:26	0	**0.0**
11:41	0	11:41	0	**0.0**
11:56	0	11:56	0	**0.0**
12:11	0	12:11	0	**0.0**
12:26	0	12:26	0	**0.0**
12:41	0	12:41	0	**0.0**
12:56	0	12:56	0	**0.0**
13:11	0	13:11	0	**0.0**
13:26	0	13:26	0	**0.0**
13:41	0	13:41	0	**0.0**
13:56	0	13:56	0	**0.0**
		14:11	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/18/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

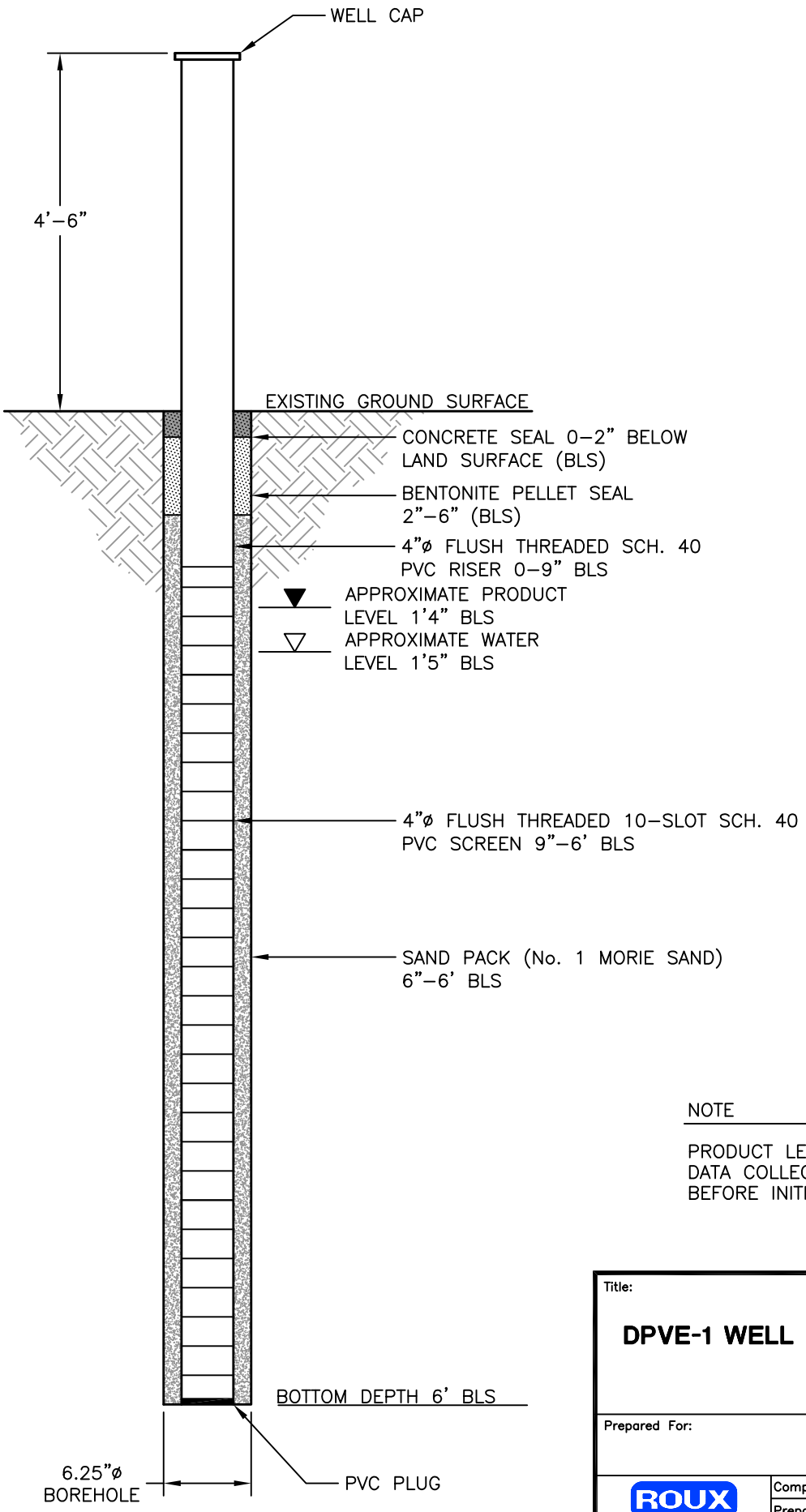
Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
7:54	0	7:56	0	**0.0**
8:09	0	8:11	0	**0.0**
8:24	0	8:26	0	**0.0**
8:39	0	8:41	0	**0.0**
8:54	0	8:56	0	**0.0**
9:09	0	9:11	0	**0.0**
9:24	0	9:26	0	**0.0**
9:39	0	9:41	0	**0.0**
9:54	0	9:56	0	**0.0**
10:09	0	10:11	0	**0.0**
10:24	0	10:26	0	**0.0**
10:39	0	10:41	0	**0.0**
10:54	0	10:56	0	**0.0**
11:09	0	11:11	0	**0.0**
11:24	0	11:26	0	**0.0**
11:39	0	11:41	0	**0.0**
11:54	0	11:56	0	**0.0**
12:09	0	12:11	0	**0.0**
12:24	0	12:26	0	**0.0**
12:39	0	12:41	0	**0.0**
12:54	0	12:56	0	**0.0**
13:09	0	13:11	0	**0.0**
13:24	0	13:26	0	**0.0**
13:39	0	13:41	0	**0.0**
13:54	0	13:56	0	**0.0**

Community Air Monitoring
Volatile Organic Compound Sampling Data
8/19/2010
Amtrak-Sunnyside Yard
OU-3 Pilot Test
Queens, NY

Upwind Station		Downwind Station		15-min Average Background Corrected
Time	15-min Avg. (PPM)	Time	15-min Avg. (PPM)	
7:49	0	7:49	0	**0.0**
8:04	0	8:04	0	**0.0**
8:19	0	8:19	0	**0.0**
8:34	0	8:34	0	**0.0**
8:49	0	8:49	0	**0.0**
9:04	0	9:04	0	**0.0**
9:19	0	9:19	0	**0.0**
9:34	0	9:34	0	**0.0**
9:49	0	9:49	0	**0.0**
10:04	0	10:04	0	**0.0**
10:19	0	10:19	0	**0.0**
10:34	0	10:34	0	**0.0**
10:49	0	10:49	0	**0.0**
11:04	0	11:04	0	**0.0**
11:19	0	11:19	0	**0.0**
11:34	0	11:34	0	**0.0**
11:49	0	11:49	0	**0.0**
12:04	0	12:04	0	**0.0**
12:19	0	12:19	0	**0.0**
12:34	0	12:34	0	**0.0**
12:49	0	12:49	0	**0.0**
13:04	0	13:04	0	**0.0**
13:19	0	13:19	0	**0.0**
13:34	0	13:34	0	**0.0**
13:49	0	13:49	0	**0.0**
14:04	0	14:04	0	**0.0**
14:19	0	14:19	0	**0.0**
14:34	0	14:34	0	**0.0**
14:49	0	14:49	0	**0.0**
15:04	0	15:04	0	**0.0**
15:19	0	15:19	0	**0.0**
15:34	0	15:34	0	**0.0**
15:49	0	15:49	0	**0.0**
16:04	0	16:04	0	**0.0**
16:19	0	16:19	0	**0.0**
16:34	0	16:34	0	**0.0**
16:49	0	16:49	0	**0.0**
17:04	0	17:04	0	**0.0**
17:19	0	17:19	0	**0.0**
17:34	0	17:34	0	**0.0**

APPENDIX C

DPVE Well Construction Logs



NOTE

PRODUCT LEVEL AND WATER LEVEL DATA COLLECTED ON JULY 27, 2010, BEFORE INITIATING PILOT STUDY.

Title:

DPVE-1 WELL CONSTRUCTION DETAIL

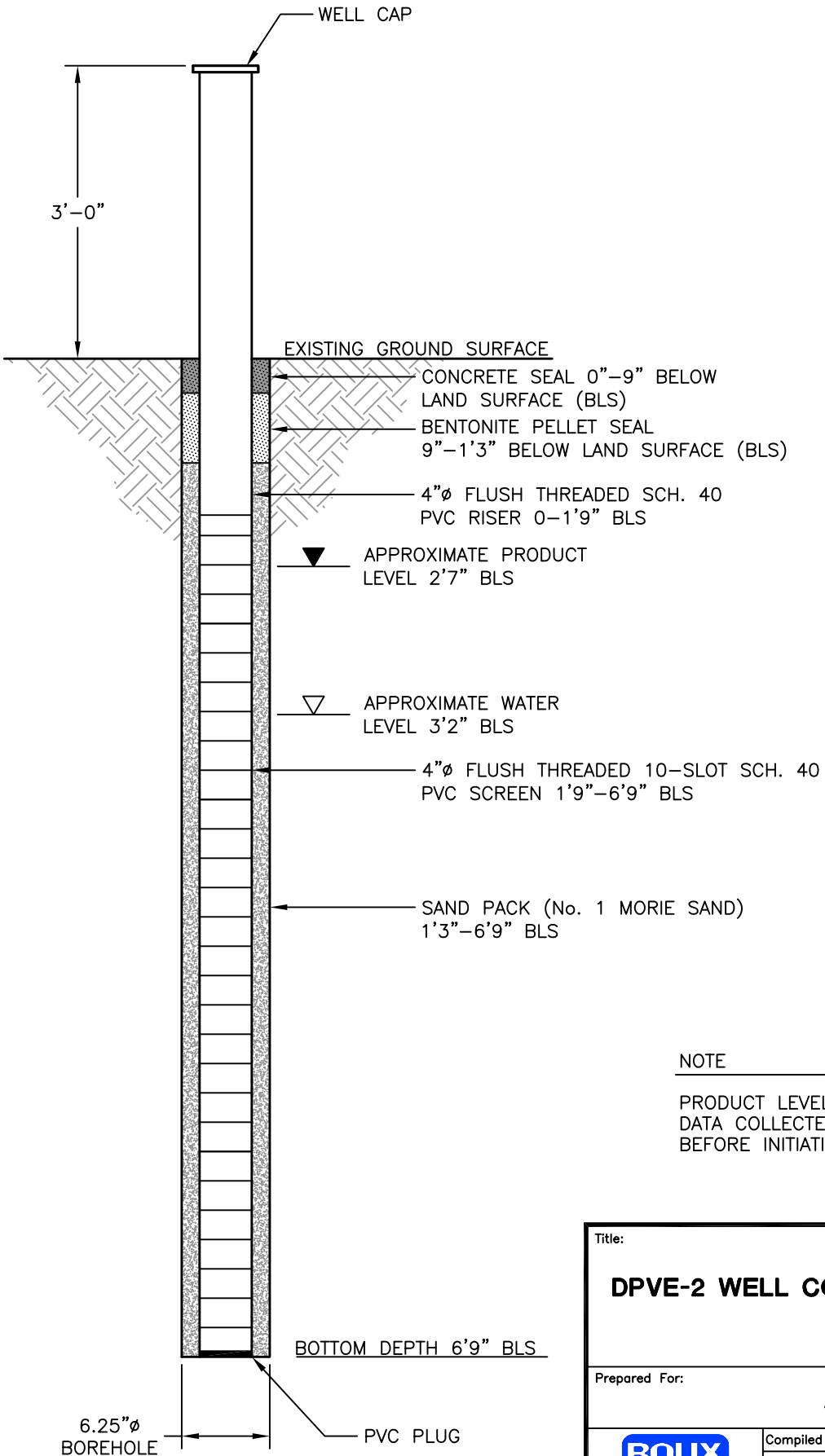
Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 21DEC10	FIGURE
Prepared by: J.A.D.	Scale: NTS	1
Project Mgr: R.K.	Office: NY	
File No: AM4526001	Project: 05545Y	

N:\PROJECTS\AM055Y\AM45Y\260\AM4526001.DWG



NOTE

PRODUCT LEVEL AND WATER LEVEL DATA COLLECTED ON JULY 27, 2010, BEFORE INITIATING PILOT STUDY.

Title:

DPVE-2 WELL CONSTRUCTION DETAIL

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 21DEC10	FIGURE
Prepared by: J.A.D.	Scale: NTS	2
Project Mgr: R.K.	Office: NY	
File No: AM4526001	Project: 05545Y	

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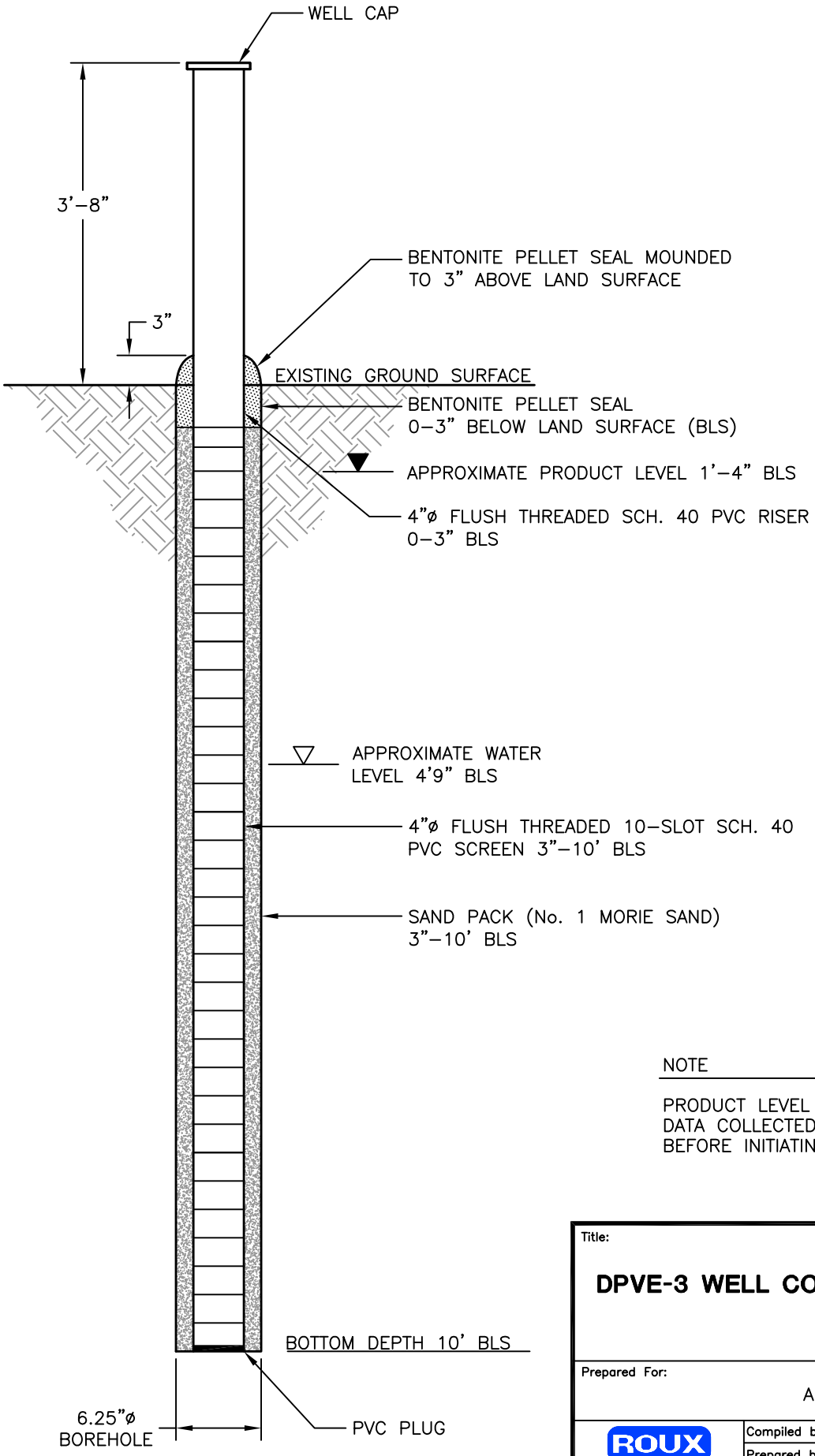

NOTE

PRODUCT LEVEL AND WATER LEVEL DATA COLLECTED ON JULY 27, 2010, BEFORE INITIATING PILOT STUDY.

Title:

DPVE-3 WELL CONSTRUCTION DETAIL

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 21DEC10	FIGURE
Prepared by: J.A.D.	Scale: NTS	3
Project Mgr: R.K.	Office: NY	
File No: AM4526001	Project: 05545Y	

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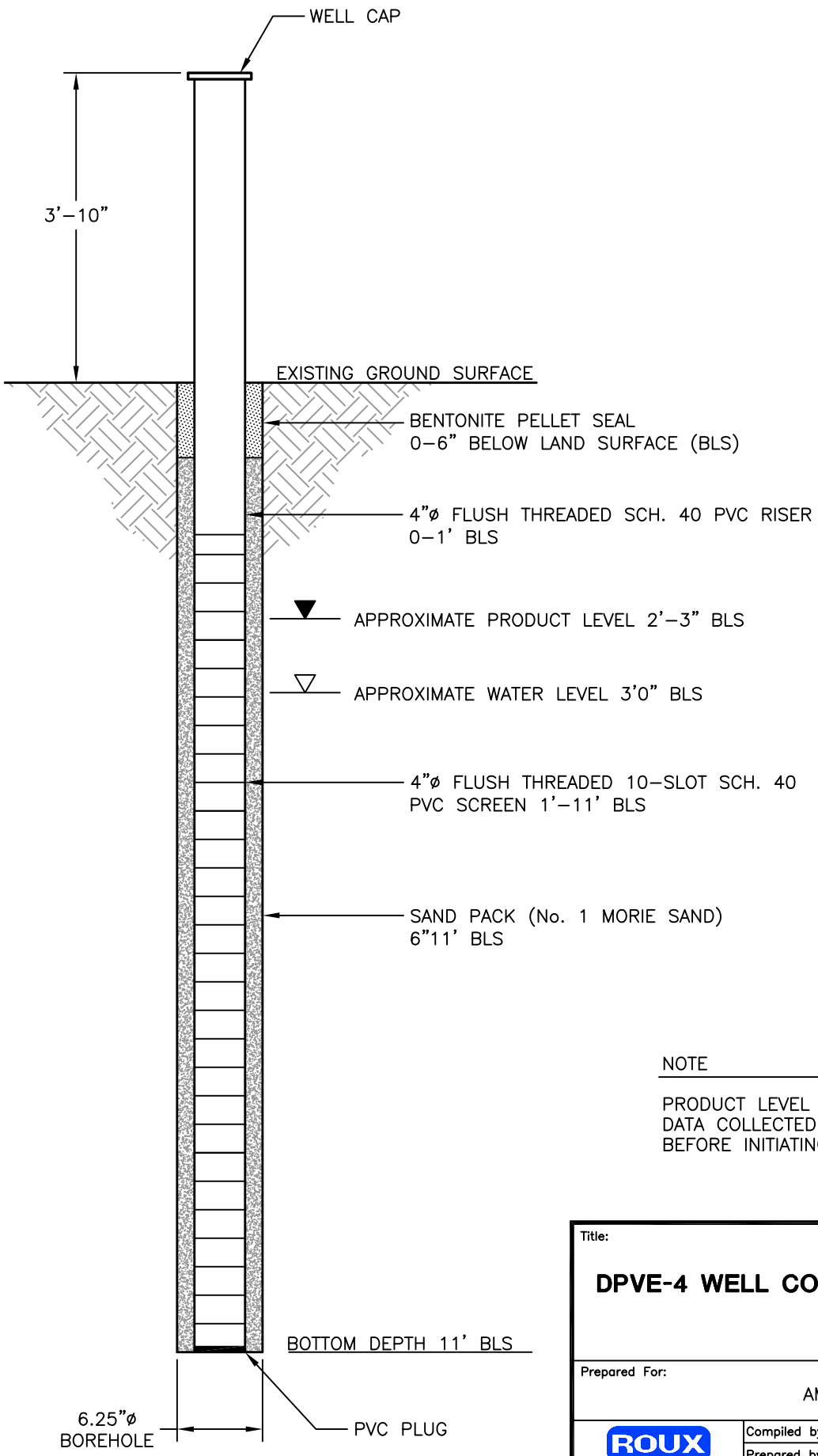

NOTE

PRODUCT LEVEL AND WATER LEVEL DATA COLLECTED ON JULY 27, 2010, BEFORE INITIATING PILOT STUDY.

Title:

DPVE-4 WELL CONSTRUCTION DETAIL

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 22DEC10	FIGURE
Prepared by: J.A.D.	Scale: NTS	4
Project Mgr: R.K.	Office: NY	
File No: AM4526001	Project: 05545Y	

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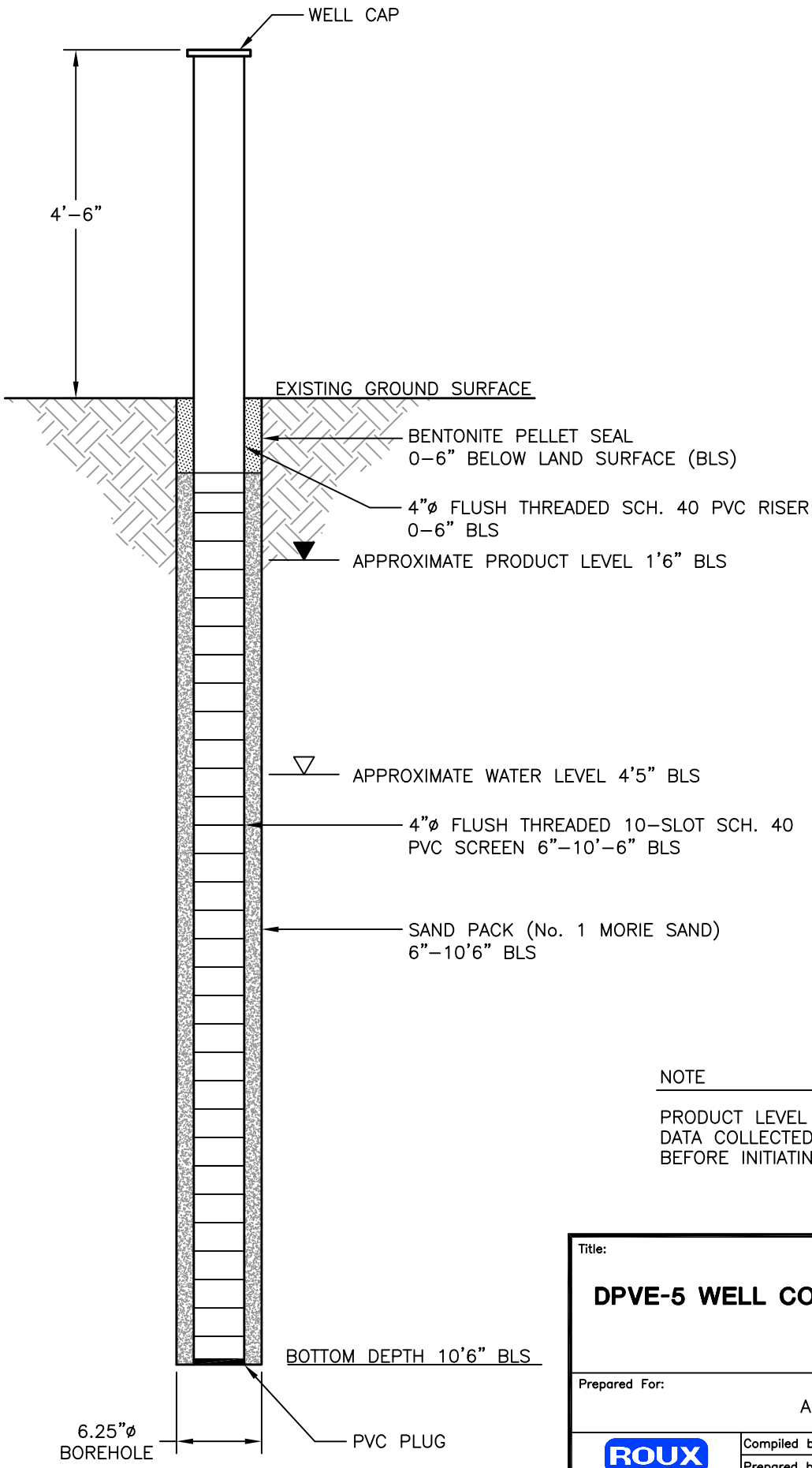

NOTE

PRODUCT LEVEL AND WATER LEVEL DATA COLLECTED ON JULY 27, 2010, BEFORE INITIATING PILOT STUDY.

Title:

DPVE-5 WELL CONSTRUCTION DETAIL

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 21DEC10	FIGURE
Prepared by: J.A.D.	Scale: NTS	5
Project Mgr: R.K.	Office: NY	
File No: AM4526001	Project: 05545Y	

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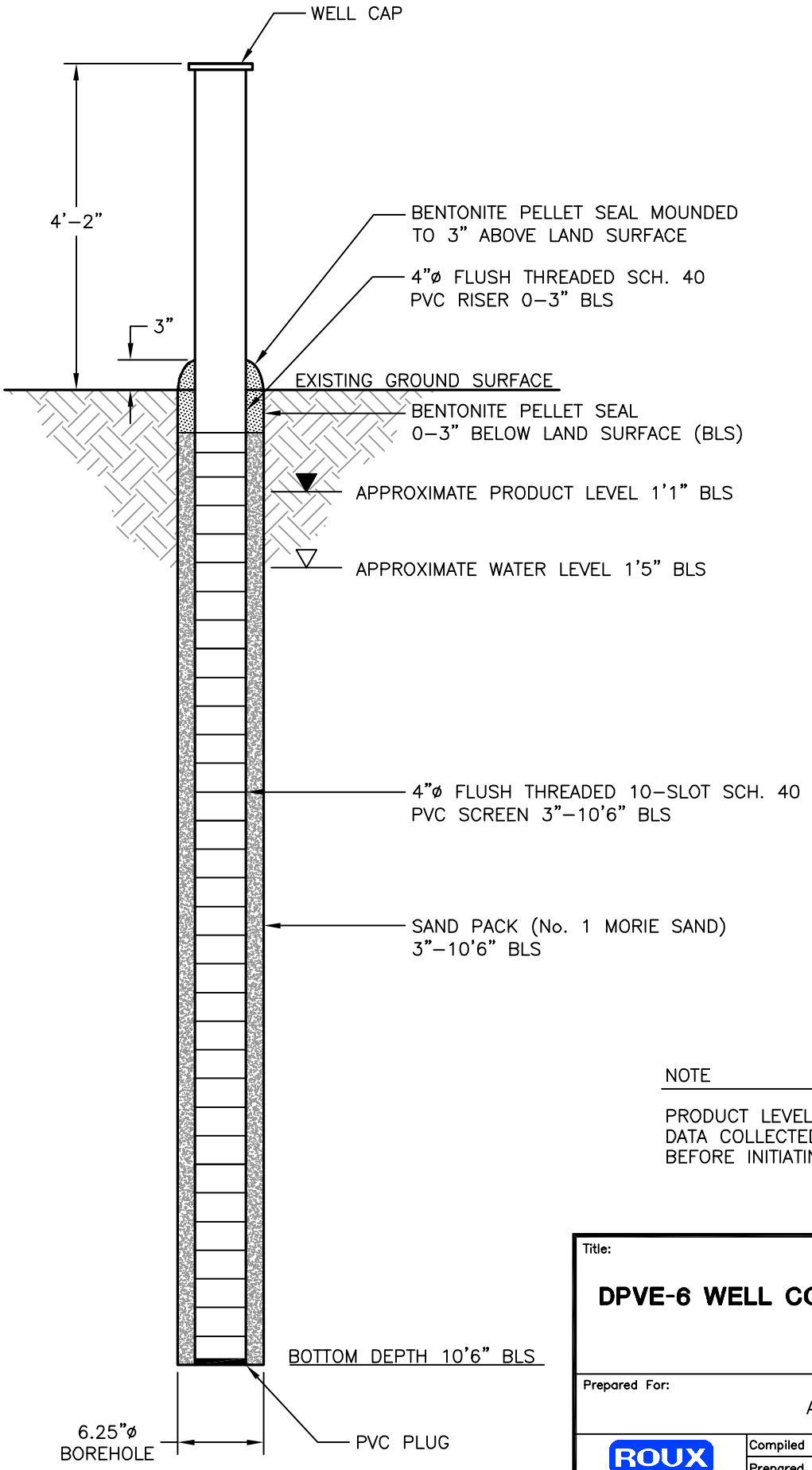

NOTE

PRODUCT LEVEL AND WATER LEVEL DATA COLLECTED ON JULY 27, 2010, BEFORE INITIATING PILOT STUDY.

Title:

DPVE-6 WELL CONSTRUCTION DETAIL

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 22DEC10	FIGURE
Prepared by: J.A.D.	Scale: NTS	6
Project Mgr: R.K.	Office: NY	
File No: AM4526001	Project: 05545Y	

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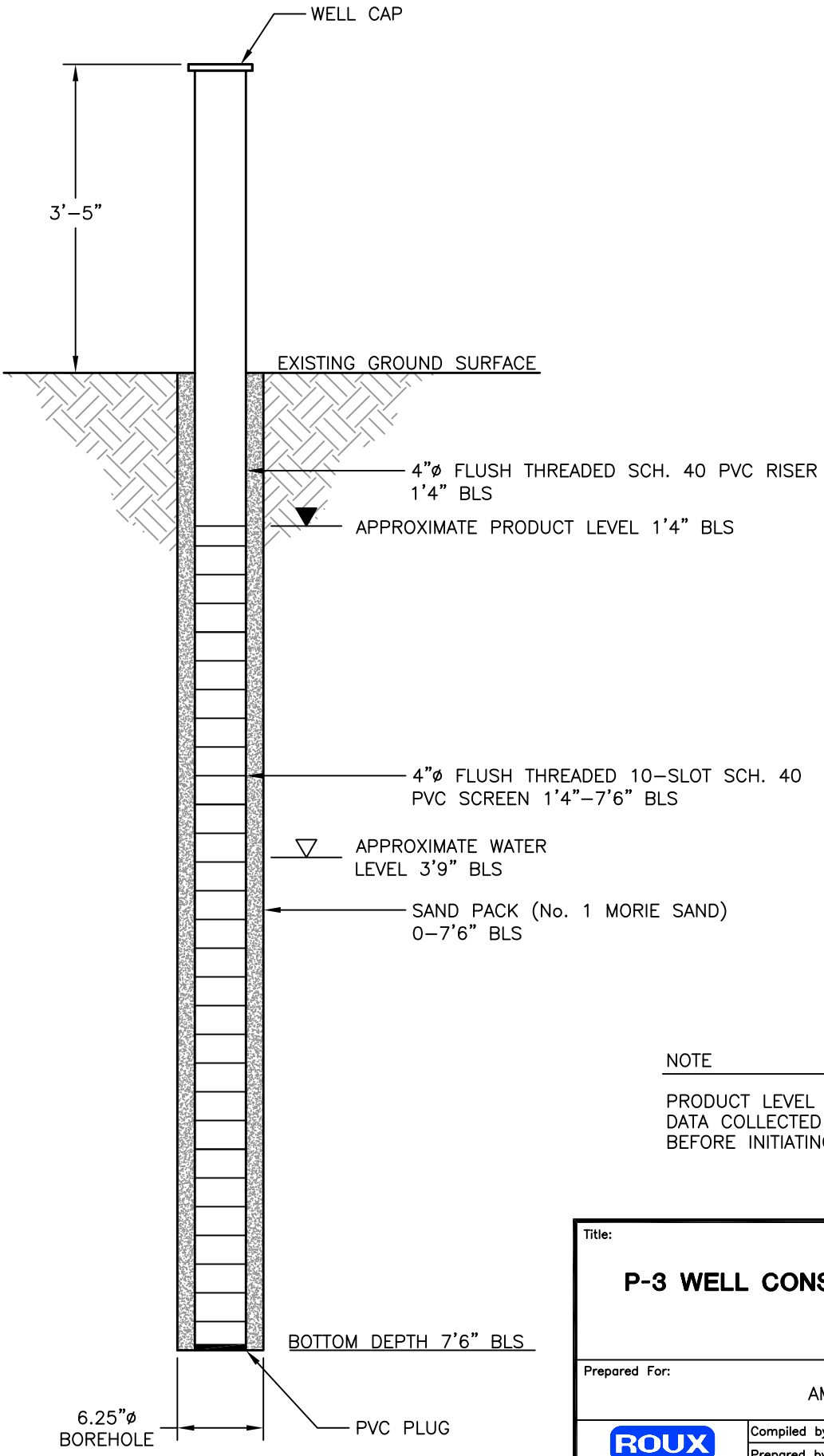

NOTE

PRODUCT LEVEL AND WATER LEVEL DATA COLLECTED ON JULY 27, 2010, BEFORE INITIATING PILOT STUDY.

Title:

P-3 WELL CONSTRUCTION DETAIL

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 21DEC10	FIGURE
Prepared by: J.A.D.	Scale: NTS	7
Project Mgr: R.K.	Office: NY	
File No: AM4526001	Project: 05545Y	

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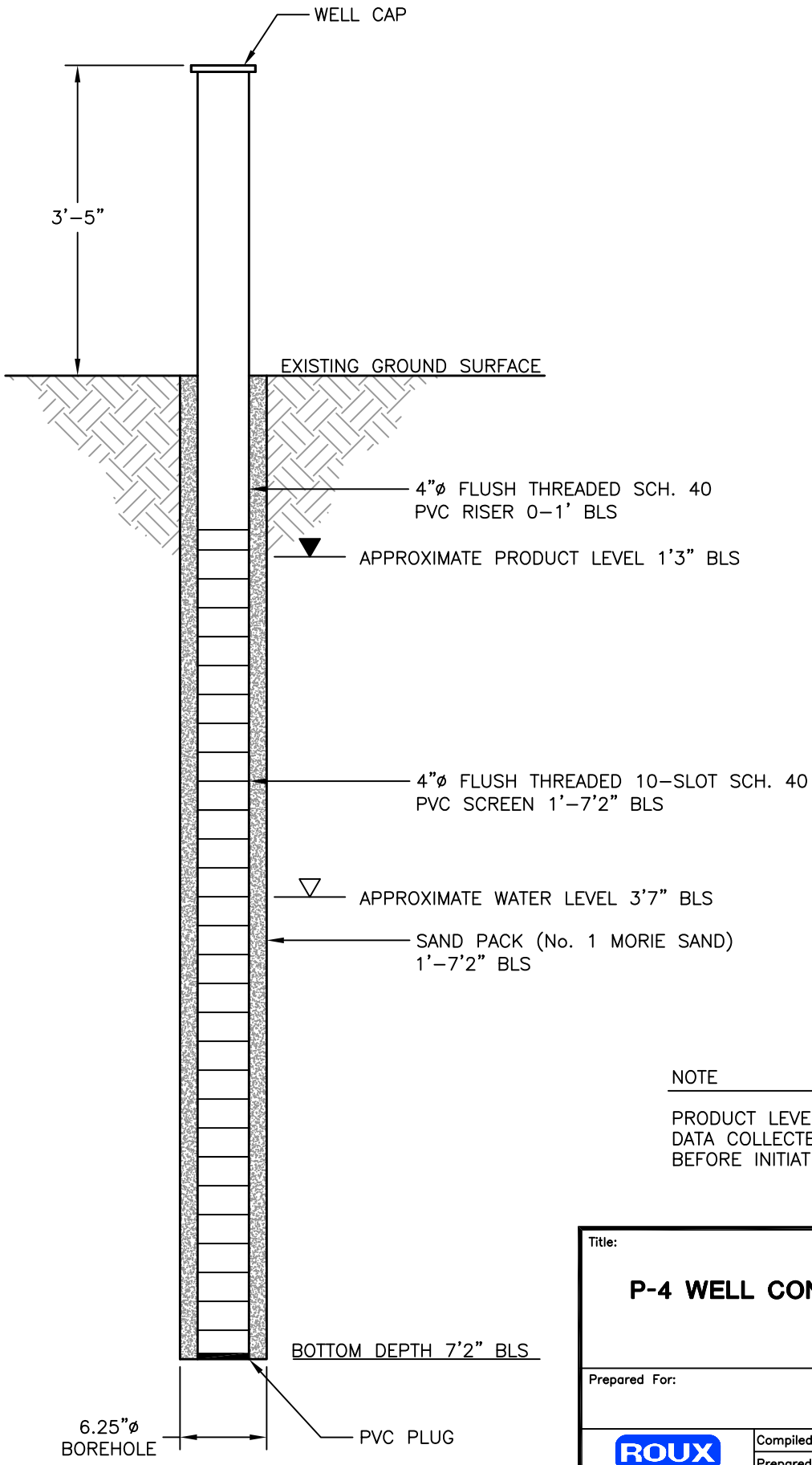

NOTE

PRODUCT LEVEL AND WATER LEVEL DATA COLLECTED ON JULY 27, 2010, BEFORE INITIATING PILOT STUDY.

Title:

P-4 WELL CONSTRUCTION DETAIL

Prepared For:

AMTRAK

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: R.K.	Date: 21DEC10	FIGURE
Prepared by: J.A.D.	Scale: NTS	8
Project Mgr: R.K.	Office: NY	
File No: AM4526001	Project: 05545Y	

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