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of Ecology (SWRO)

**Former Hardel Mutual Plywood Site
1210 West Bay Drive NW
Olympia, Washington**

**Post - Construction Quarterly
Groundwater Monitoring Report**



March 23, 2011

Prepared For: Hardel Mutual Plywood Corporation

Prepared By:



GREYLOCK CONSULTING LLC

GC Project No. 0401.3

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1.0 INTRODUCTION

This report documents the results of the second round of quarterly compliance monitoring for groundwater at the former Hardel Mutual Plywood Site, located at 1210 West Bay Drive NW in Olympia, Washington (Figure 1).

The goal of the quarterly groundwater monitoring is to evaluate the long-term effectiveness of the Interim Action cleanup that was completed in October, 2010. Nine monitoring wells from within and downgradient of excavated areas were sampled, and groundwater flow direction and gradient were assessed.

1.1 Site Description

The Former Hardel Mutual Plywood Site (Site) is located at 1210 West Bay Drive NW in Olympia, Washington (Thurston County tax parcel numbers 72600200100 & 91013100000). The property is 17.8 acres in size, consisting of approximately 6.7 acres of uplands and 11.1 acres of tide lands. The upland portion of the property consists primarily of crushed concrete surfacing and asphalt pavement. The property is generally level. It is bordered to the north by Budd Inlet and the former Delson Lumber Site, to the south by the former Reliable Steel Site, to the west by West Bay Drive NW and residential/commercial properties, and to the east by Budd Inlet. The Site is presently vacant.

1.2 Project Background

An Interim Action cleanup which included the excavation of diesel/heavy oil-impacted soils at the Site, was conducted between June and October of 2010 (Greylock, 2010). Greylock staff observed the direct excavation by Wyser Construction of diesel/heavy oil-impacted soils from a total of three areas on the Site in July-September 2010.

Approximately 23,331 tons of diesel/heavy oil-impacted soil and debris was excavated and transported off-site by Envirocon Trucking and Rock-On Trucking to Weyerhaeuser's permitted landfill in Cowlitz County, Washington.

Treated water from the work area was discharged to the sanitary sewer system between July 9th and September 21st, 2010 in accordance with the LOTT "Discharge Authorization Letter".

The Interim Action report concluded that the removal of free product, the removal of contaminated groundwater, and the removal of diesel/heavy oil-impacted soil in the three

excavated areas was successful in achieving compliance with the Model Toxics Control Act (MTCA) target soil cleanup levels.

Six of the groundwater monitoring wells previously installed at the site by Greylock were decommissioned by ESN Northwest during the Interim Action to accommodate soil excavation activities. The decommissioned wells included MW-1, MW-4, MW-5, MW-7, MW-8, and MW-9. The previously installed monitoring wells MW-2, MW-3, and MW-6 remained intact at the Site. Five new compliance monitoring wells were installed at the site in November, 2010 for post-construction groundwater monitoring (MW-10, through MW-15). Approximate monitoring well locations are shown on Figure 2.

1.3 Purpose

The purpose of this assessment was to acquire groundwater samples from the nine wells for laboratory analyses using low flow purging techniques, to determine groundwater flow direction and gradient, and to determine if groundwater analytical results were in compliance with site cleanup standards. Groundwater samples were submitted to the ESN Northwest's laboratory for the following analyses:

- Total Petroleum Hydrocarbons as Diesel and Motor Oil using Method NWTPH-Dx and
- Polyaromatic Hydrocarbons (PAHs) using EPA Method 8270.

2.0 FIELD ACTIVITIES

2.1 Water Level Measurements

Water levels were measured using a well probe at all nine well locations on February 22, 2011. Water level measurements are provided in Table 1. Shallow groundwater at the site occurred at depths ranging from 1.13 to 3.31 ft below the top of casing (TOC) of monitoring wells.

With the exception of MW-11 and MW-13 all the monuments were filled with surface water upon removing the monument's lids. Surface water was removed from the monument until the water level was below the top of the well casing prior to removing the well cap.

Figure 3 shows the groundwater flow direction across the site on February 22, 2011. In general, groundwater flow is from west to east/northeast across the site.

At the northern part of the site, groundwater flow is to the east-northeast with a gradient of approximately 0.02 ft per ft near MW-13. At the southern part of the site, groundwater flow is

to the east with a gradient of approximately 0.005 ft per ft near MW-3. The groundwater gradient is steepest along the western boundary of the site, and flattens out across the center of the site.

2.2 Groundwater Sampling

Groundwater samples were collected from eight of the on-site monitoring wells on February 22, 2011 using a peristaltic pump and disposable tubing under low flow conditions. We were unable to sample MW-6 (the upgradient well) on February 22nd due to extreme weather conditions. It was sampled early the following day on February 23rd.

All samples were collected in accordance with standard operating and decontamination procedures. Prior to collecting groundwater samples, groundwater was purged from each monitoring well until temperature, turbidity, conductivity, dissolved oxygen, and pH generally stabilized. Groundwater samples were collected using a peristaltic pump and tubing. New tubing was used for each groundwater sample. Samples were collected with gloved hands. New nitrile gloves were worn at each sample location. Samples were placed in preconditioned sterilized-containers provided by ESN Northwest, an Ecology accredited analytical laboratory. Samples were stored on ice in a sealed cooler and transported directly to ESN Northwest in Olympia, Washington in this condition.

No sediment was observed in any of the groundwater samples collected.

3.0 ANALYTICAL LABORATORY RESULTS

Groundwater samples were submitted to ESN Northwest for laboratory testing as outlined below.

1. Total Petroleum Hydrocarbons by Ecology Method NWTPHD-Dx, and
2. Polyaromatic Hydrocarbons by EPA Method 8270.

Analytical test reports are included in Appendix A. Table 2 compares the results against published Model Toxics Control Act (MTCA) Method A or Method B Cleanup Levels (CLARC, 2011). MTCA Method A cleanup levels were used for screening when available. MTCA Method B cleanup levels were used for screening when no Method A levels were available.

3.1 NWTPH-Dx Results

The NWTPH-Dx Method provides analytical results for diesel and heavy oil range total petroleum hydrocarbons. All nine of the collected groundwater samples analyzed by this method revealed no detectable concentrations above the laboratory's lower reporting limits.

3.2 PAH Results

The EPA 8270 Method provides analytical results for polyaromatic hydrocarbons (PAHs). Ground water samples from the wells indicated that eight wells had no detectable concentrations above the laboratory's reporting limit of 0.1 ug/L. At MW-10, acenaphthene was detected at 11ug/L. This reported PAH concentration was well below the published WDOE target Method B cleanup standard of 960 ug/L.

No carcinogenic PAHs by test method 8270 were detected above the laboratory's lower reporting limit of 0.1 ppb for all nine of the analyzed groundwater samples.

4.0 CONCLUSIONS

Based on the results of laboratory testing, groundwater at the nine monitoring well locations sampled during this second quarterly "compliance monitoring" event is compliant with Ecology's target Method A or Method B groundwater cleanup levels for diesel/heavy oil-range total-petroleum hydrocarbons and polynuclear aromatic hydrocarbons (PAHs). No carcinogenic PAHs were detected in the nine lab tested groundwater samples collected in the course of this sampling event.

The low concentration of non-carcinogenic PAHs detected in groundwater sampled from well MW-10 may be attributable to the presence of remaining buried treated timber piling supports which were historically installed to provide building foundation and floor support for the former on-site plywood/lumber mill structures.

5.0 LIMITATIONS

We have prepared this report for the exclusive use of Hardel Mutual Plywood Corp. and their authorized agents and regulatory agencies as part of their evaluation of the environmental conditions of the site. This report is not intended for use by others, and the information contained herein is not applicable to other sites. No one except Hardel Mutual Plywood Corp. and their authorized agents should rely on this report without first conferring with Greylock.


Greylock personnel performed this study in accordance with generally accepted standards of care that existed in the state of Washington at the time of this study. We make no other warranty, either expressed or implied.

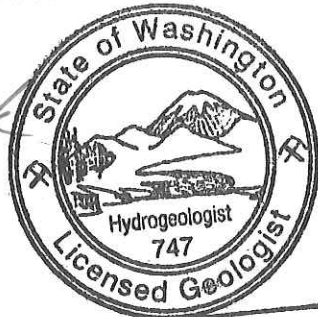
This report is based on conditions that existed at the time the study was completed. The findings of this report may be affected by the passage of time or events such as a change in property use or occupancy, or by natural events, such as floods, earthquakes, or groundwater fluctuations.

If you have any questions regarding this report, please call us at (253) 661-3520.

Sincerely,

GREYLOCK CONSULTING LLC


Suzanne Dudziak, L.H.G.
Principal Hydrogeologist



Suzanne Dudziak

6.0 REFERENCES

CLARC, 2011. *Cleanup Levels and Risk Calculations (CLARC) Washington State Department of Ecology.*

Greylock, 2010. *Interim Action Closure Report, Former Hardel Mutual Plywood Site, 1210 NW West Bay Drive, Olympia, Washington.* December 2010.

FIGURES



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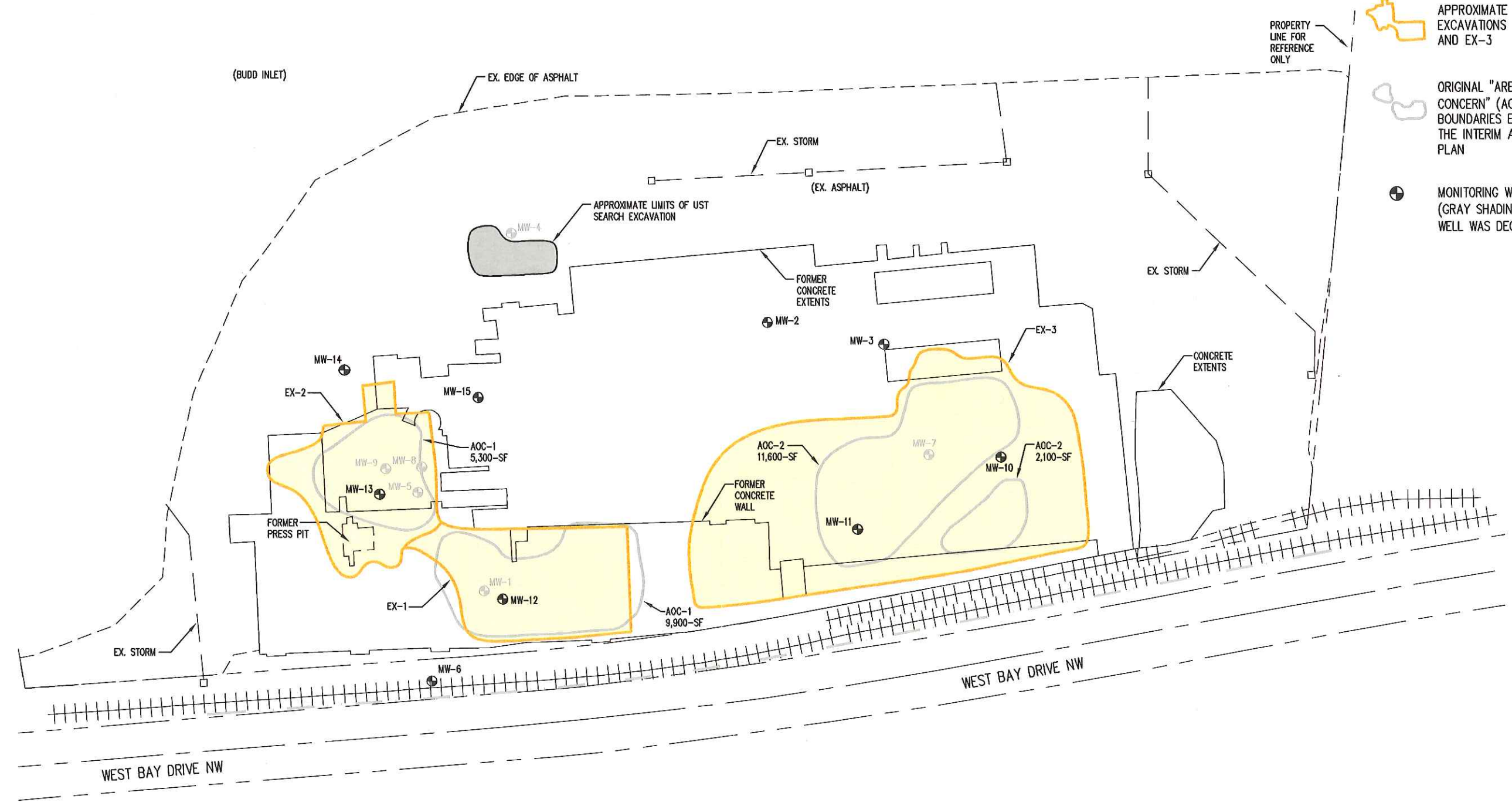
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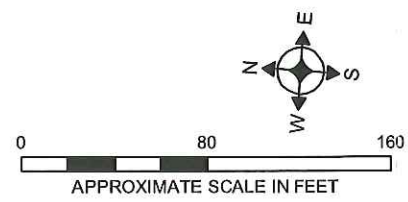
Data Zoom 13-1

LEGEND

-  APPROXIMATE EXTENTS OF EXCAVATIONS EX-1, EX-2, AND EX-3
-  ORIGINAL "AREA OF CONCERN" (AOC) BOUNDARIES ESTIMATED IN THE INTERIM ACTION WORK PLAN
-  MONITORING WELL LOCATIONS (GRAY SHADING INDICATES WELL WAS DECOMMISSIONED)







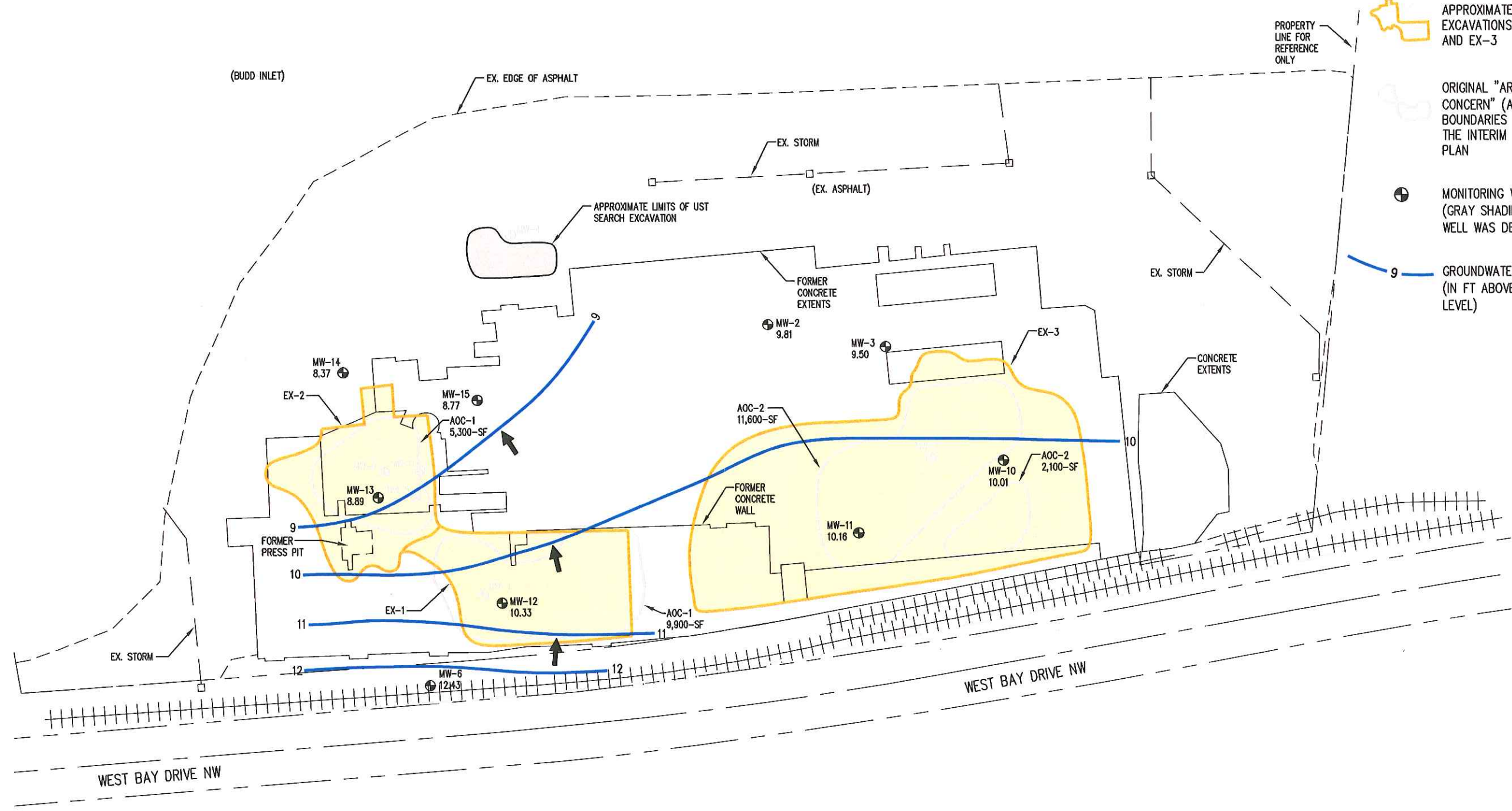

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Modified from KPFF Demolition and Site Plan, March 2010
FIGURE 2 : APPROXIMATE MONITORING WELL LOCATIONS
 Project : Hardel Mutual Plywood Site
 Location : Olympia, Washington
 Client : Hardel Mutual Plywood Corp.
 Project No : 0401.2

LEGEND

-  APPROXIMATE EXTENTS OF EXCAVATIONS EX-1, EX-2, AND EX-3
-  ORIGINAL "AREA OF CONCERN" (AOC) BOUNDARIES ESTIMATED IN THE INTERIM ACTION WORK PLAN
-  MONITORING WELL LOCATIONS (GRAY SHADING INDICATES WELL WAS DECOMMISSIONED)
-  9 GROUNDWATER ELEVATION (IN FT ABOVE MEAN SEA LEVEL)



Modified from KPFF Demolition and Site Plan, March 2010



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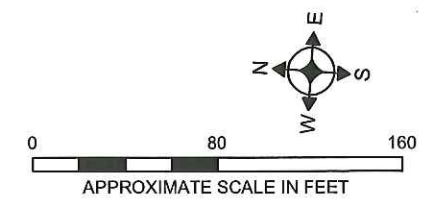


FIGURE 3 : INFERRED & GENERALIZED GROUNDWATER CONTOURS

Project : Hardel Mutual Plywood Site
Location : Olympia, Washington
Client : Hardel Mutual Plywood Corp.
Project No : 0401.2

TABLES

Table 1. Groundwater Elevations

Hardel Mutual Plywood Site: 1210 West Bay Drive NW, Olympia, WA

22-Feb-2011

High Tide +13.19 ft MLLW @ 07:22 AM

Station	Time	MW Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
MW-2	9:20	11.68	1.87	9.81
MW-3	9:18	11.40	1.90	9.50
MW-6	9:32	15.74	3.31	12.43
MW-10	9:38	11.14	1.13	10.01
MW-11	9:35	11.32	1.16	10.16
MW-12	9:29	12.25	1.92	10.33
MW-13	9:26	10.95	2.06	8.89
MW-14	9:24	10.53	2.16	8.37
MW-15	9:22	11.51	2.74	8.77

Table 2: Groundwater Sampling Analytical Results

February 22 & 23, 2011 Sampling Event
 Former HardeI Mutual Plywood Site, 1210 West Bay Drive NW, Olympia, WA
 Test Methods: NWTPH-DX/DX Extended & EPA 8270
 All results and limits in parts-per-billion (ppb) or ug/L

Test Method NWTPH-DX Extended / EPA 8270	MTCA Method A or Method B Criteria ¹ (ug/L)	Sample ID: Date Sampled: Results (ug/L):	MW-2 02/22/11 < 250 < 500	MW-3 02/22/11 < 250 < 500	MW-6 02/23/11 < 250 < 500	MW-10 02/22/11 < 250 < 500	MW-11 02/22/11 < 250 < 500	MW-12 02/22/11 < 250 < 500	MW-13 02/22/11 < 250 < 500	MW-14 02/22/11 < 250 < 500	MW-15 02/22/11 < 250 < 500
Diesel	500	Results (ug/L):	< 0.1	< 0.1	< 0.1	11.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Heavy Oil	500	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	960	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	NP ²	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	4,800	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	0.1	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	640	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	640	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	160	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1-Methylnaphthalene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	NP	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	480	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Notes: 1- Method A soil cleanup level for unrestricted land use as published in the Model Toxics Control Act (MTCA), Chapter 173-340 WAC.

2- MTCA Method B cleanup levels were used for screening when no Method A were available.

NP- Not Published: No Method A or Method B standard formula value published in CLARC database for the listed analyte.

APPENDIX A

Analytical Report

ESN NORTHWEST CHEMISTRY LABORATORY

Greylock Consulting
Hardel Mutual Plywood PROJECT
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Analysis of Diesel Range Organics & Lube Oil Range Organics in Water by Method NWTPH-Dx

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (ug/L)	Lube Oil Range Organics (ug/L)
Method Blank	2/28/2011	2/28/2011	97%	nd	nd
MW-3	2/28/2011	2/28/2011	92%	nd	nd
MW-10	2/28/2011	2/28/2011	112%	nd	nd
MW-11	2/28/2011	2/28/2011	82%	nd	nd
MW-12	2/28/2011	2/28/2011	116%	nd	nd
MW-2	2/28/2011	2/28/2011	87%	nd	nd
MW-15	2/28/2011	2/28/2011	134%	nd	nd
MW-14	2/28/2011	2/28/2011	87%	nd	nd
MW-13	2/28/2011	2/28/2011	110%	nd	nd
MW-6	2/28/2011	2/28/2011	111%	nd	nd
Reporting Limits				250	500

"nd" Indicates not detected at the listed detection limits.

"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

ESN NORTHWEST CHEMISTRY LABORATORY

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Analysis of Polynuclear Aromatic Hydrocarbons in Water by Method 8270

Analytical Results

	Reporting	MTH BLK	LCS	MW-3	MW-10	MW-11	MW-12	MW-2
Date extracted	Limits	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11
Date analyzed	(ug/L)	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11
Acenaphthene	0.1	nd	123%	nd	11	nd	nd	nd
Acenaphthylene	0.1	nd	90%	nd	nd	nd	nd	nd
Anthracene	0.1	nd	110%	nd	nd	nd	nd	nd
Benzo(a)anthracene*	0.1	nd	130%	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.1	nd	115%	nd	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.1	nd	118%	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.1	nd	93%	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.1	nd	115%	nd	nd	nd	nd	nd
Chrysene*	0.1	nd	113%	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.1	nd	97%	nd	nd	nd	nd	nd
Fluorene	0.1	nd	148%	nd	nd	nd	nd	nd
Fluoranthene	0.1	nd	124%	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.1	nd	100%	nd	nd	nd	nd	nd
Naphthalene	0.1	nd	119%	nd	nd	nd	nd	nd
1-Methylnaphthalene	0.1	nd	ns	nd	nd	nd	nd	nd
2-Methylnaphthalene	0.1	nd	ns	nd	nd	nd	nd	nd
Phenanthrene	0.1	nd	113%	nd	nd	nd	nd	nd
Pyrene	0.1	nd	123%	nd	nd	nd	nd	nd
Total Carcinogens				nd	nd	nd	nd	nd
Surrogate recoveries:								
2-Fluorobiphenyl		126%	70%	53%	60%	57%	135%	100%
p-Terphenyl-d14		106%	72%	105%	97%	93%	94%	77%

Data Qualifiers and Analytical Comments

- * - Carcinogenic Analyte
- nd - not detected at listed reporting limits
- na - not analyzed
- C - coelution with sample peaks
- M - matrix interference
- J - estimated value
- Results reported on dry-weight basis
- Acceptable Recovery limits: 50% TO 150%
- Acceptable RPD limit: 35%
- ns-not in the spiking solution

ESN NORTHWEST CHEMISTRY LABORATORY

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 lab@esnnw.com

Analysis of Polynuclear Aromatic Hydrocarbons in Water by Method 8270

Analytical Results

	Reporting	MW-15	MW-14	MW-13	MW-6
Date extracted	Limits	02/28/11	02/28/11	02/28/11	02/28/11
Date analyzed	(ug/L)	02/28/11	02/28/11	02/28/11	02/28/11
Acenaphthene	0.1	nd	nd	nd	nd
Acenaphthylene	0.1	nd	nd	nd	nd
Anthracene	0.1	nd	nd	nd	nd
Benzo(a)anthracene*	0.1	nd	nd	nd	nd
Benzo(a)pyrene*	0.1	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.1	nd	nd	nd	nd
Benzo(ghi)perylene	0.1	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.1	nd	nd	nd	nd
Chrysene*	0.1	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.1	nd	nd	nd	nd
Fluorene	0.1	nd	nd	nd	nd
Fluoranthene	0.1	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.1	nd	nd	nd	nd
Naphthalene	0.1	nd	nd	nd	nd
1-Methylnaphthalene	0.1	nd	nd	nd	nd
2-Methylnaphthalene	0.1	nd	nd	nd	nd
Phenanthrene	0.1	nd	nd	nd	nd
Pyrene	0.1	nd	nd	nd	nd
Total Carcinogens		nd	nd	nd	nd
Surrogate recoveries:					
2-Fluorobiphenyl		71%	84%	66%	60%
p-Terphenyl-d14		100%	103%	82%	127%

Data Qualifiers and Analytical Comments

* - Carcinogenic Analyte
 nd - not detected at listed reporting limits
 na - not analyzed
 C - coelution with sample peaks
 M - matrix interference
 J - estimated value
 Results reported on dry-weight basis
 Acceptable Recovery limits: 50% TO 150%
 Acceptable RPD limit: 35%
 ns-not in the spiking solution

APPENDIX B

Well Monitoring Data Sheets

Handel Water Levels

3

(2-22-11)

Well Time DTW (ft)

MW-3	918	1.90
MW-2	920	1.87
MW-15	922	2.74
MW-14	924	2.16
MW-13	926	2.06
MW-12	929	1.92
MW-6	932	3.31
MW-11	935	1.16
MW-10	938	1.13