HydroCon

TECHNICAL MEMORANDUM

To: Mr. Ken Groat
From: Jonathan Horowitz, PE
Date: September 11, 2015
Subject: **Third Quarter Groundwater Monitoring Results**

INTRODUCTION

HydroCon Environmental, LLC (HydroCon) is submitting this technical memorandum to Groat Brothers, Inc. to document the work completed at 608 West Scott Avenue in Woodland, Washington (the site) in August 2015. The work was conducted according to our proposal, dated February 10, 2015 and the work plan submitted to the Washington Department of Ecology (Ecology).

FIELD ACTIVITIES

On August 18, 2015, HydroCon personnel mobilized to the site to collect a round of groundwater levels (MW-1 through MW-7), and perform the second quarterly groundwater monitoring (MW-4 through MW-7).

Upon arrival at the site, the well cap on each well was removed and the water level was allowed to equilibrate prior to measuring the depth to water (DTW). The depth to water in each well was measured using a clean electronic water level indicator. Water levels were measured at the scribed reference mark (north end of the top of the PVC casing) at each well. A table detailing the groundwater levels and elevations and a figure indicating the groundwater flow direction are included in the attachments. Depth to water in the wells ranged from 8.71 to 12.4 feet below top of casing. Groundwater elevations were calculated based on an arbitrary measuring point. Based on the measured groundwater elevations, the groundwater flows towards the southeast at an approximate gradient of 0.0014 feet/foot.

HydroCon purged monitoring wells MW-4 through MW-7 with a low flow peristaltic pump equipped with new length of LDPE tubing attached to a new length of silicone tubing. Field parameters (pH, temperature and specific conductivity) were measured and recorded on a Groundwater Sample Collection field form along with the depth to water measurements (included in the attachment). Purging was completed when the field parameters had stabilized.

Samples were collected immediately after purging and placed in labeled laboratory-prepared sample bottles. The samples were shipped in an iced cooler along with chain-of-custody documentation to the project laboratory for analysis.

A total of four groundwater samples were collected for laboratory analysis. Each sample was analyzed for the following set of parameters:

- Diesel Range Organics (DRO) and Motor Oil Range Organics (ORO) by Northwest Method NWTPH-Dx.

SAMPLING RESULTS

DRO and/or ORO were detected at concentrations above the laboratory Method Reporting Limits (MRLs) in all of the samples submitted; however, the detected concentrations were below the applicable MTCA Method A Cleanup Levels. A summary data table and the laboratory report are included in the attachments.

DISCUSSION

Based on the analytical results, HydroCon recommends the following:

- The next round of monitoring should be conducted during the fourth quarter of 2015.
- Provided that the results from subsequent sampling events remain below the MTCA Method A Cleanup Levels, monitoring well MW-5 should be sampled a fifth time to provide Ecology with four consecutive quarters of compliance monitoring.

QUALIFICATIONS

HydroCon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. HydroCon makes no warranties, either express or implied, regarding the findings, conclusions or recommendations. Please note that HydroCon does not warrant the work of laboratories, regulatory agencies, or other third parties supplying information used in the preparation of the report.

Findings and conclusions resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, nondetectable or not present during these services, and we cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this monitoring. Subsurface conditions may vary from those encountered at specific sampling locations or during other surveys, tests, assessments, investigations, or exploratory services; the data, interpretations and findings are based solely upon data obtained at the time and within the scope of these services.

This report is intended for the sole use of **Groat Brothers, Inc.** This report may not be used or relied upon by any other party without the written consent of HydroCon. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations is at the risk of said user.

The conclusions presented in this report are, in part, based upon subsurface sampling performed at selected locations and depths. There may be conditions between borings or samples that differ significantly from those presented in this report and which cannot be predicted by this study.

CLOSING

We appreciate the opportunity to perform these services for Groat Brothers, Inc. Please contact the undersigned at (360) 703-6079 if you have any questions regarding the information provided in this letter report.

Sincerely,

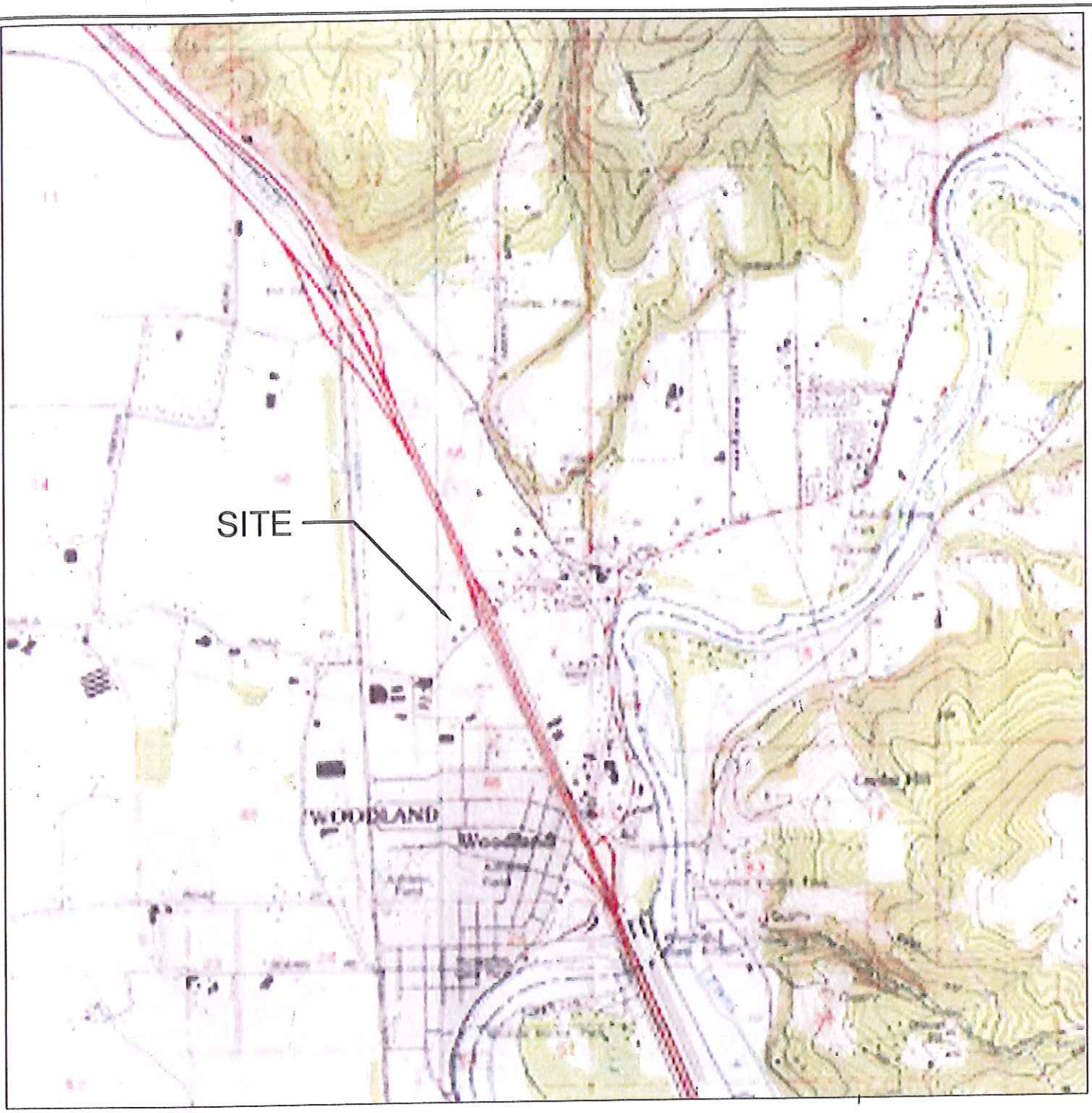
HydroCon

Jonathan Horowitz, PE
Project Engineer

Figures
Figure 1 – Site Location Map
Figure 2 – Site Features Map
Figure 3 – Groundwater Analytical Results
Figure 4 – Groundwater Elevations and Contour Map

Tables
Table 1 – Summary of Groundwater Elevations
Table 2 – Summary of 3rd Quarter Groundwater Analytical Results
Table 3 – Summary of Historical Groundwater Analytical Results

Attachments
Attachment A - Groundwater Sample Collection Field Forms
Attachment B - Laboratory Report and Chain-of-Custody Documentation



NOTE(S):

1. USGS, DEER ISLAND/WOODLAND QUADRANGLE
   WASHINGTON
   7.5 MINUTE SERIES (TOPOGRAPHIC)

N
W E
S

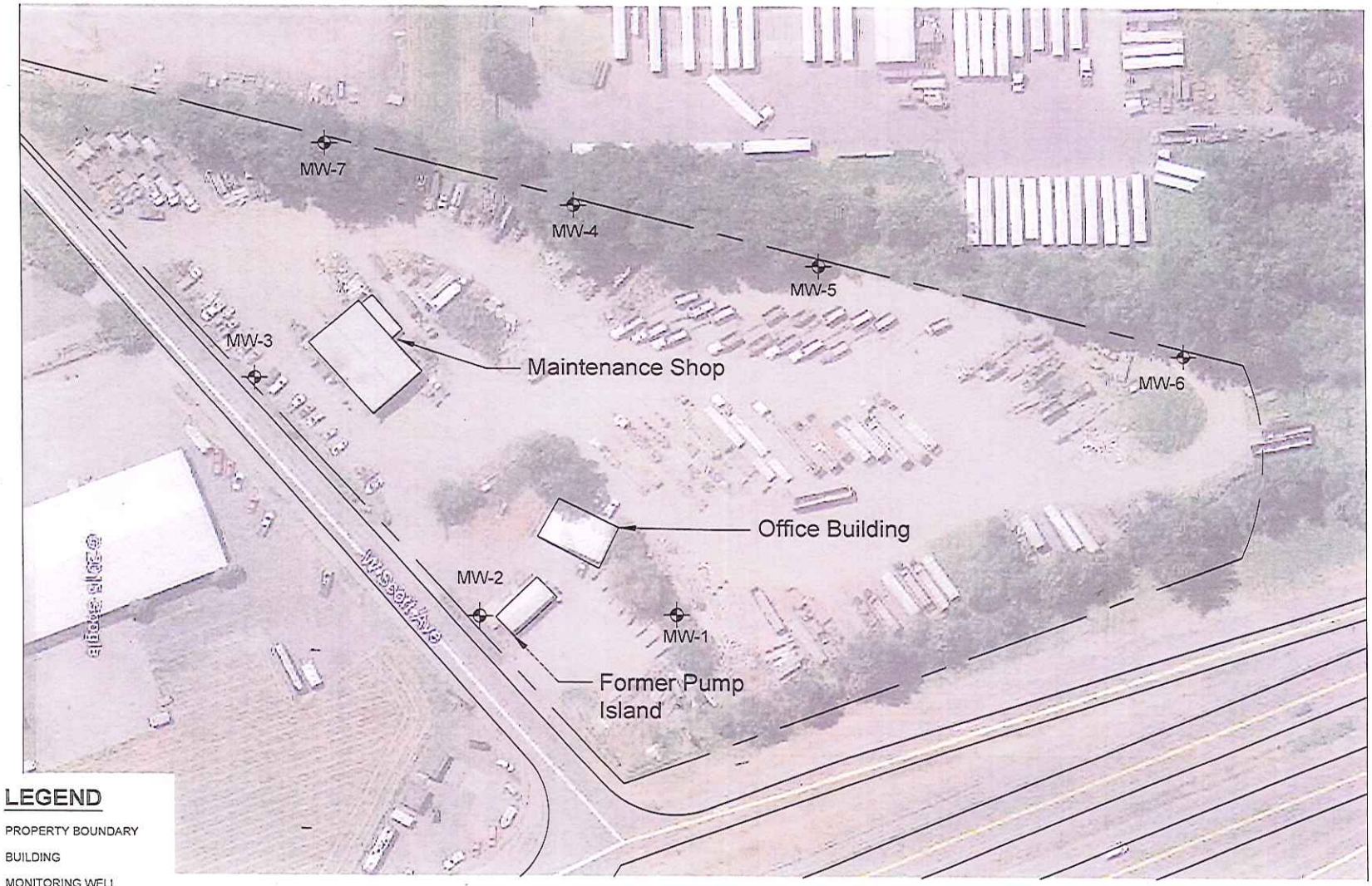
0 2000 4000
SCALE IN FEET
1" = 2000'

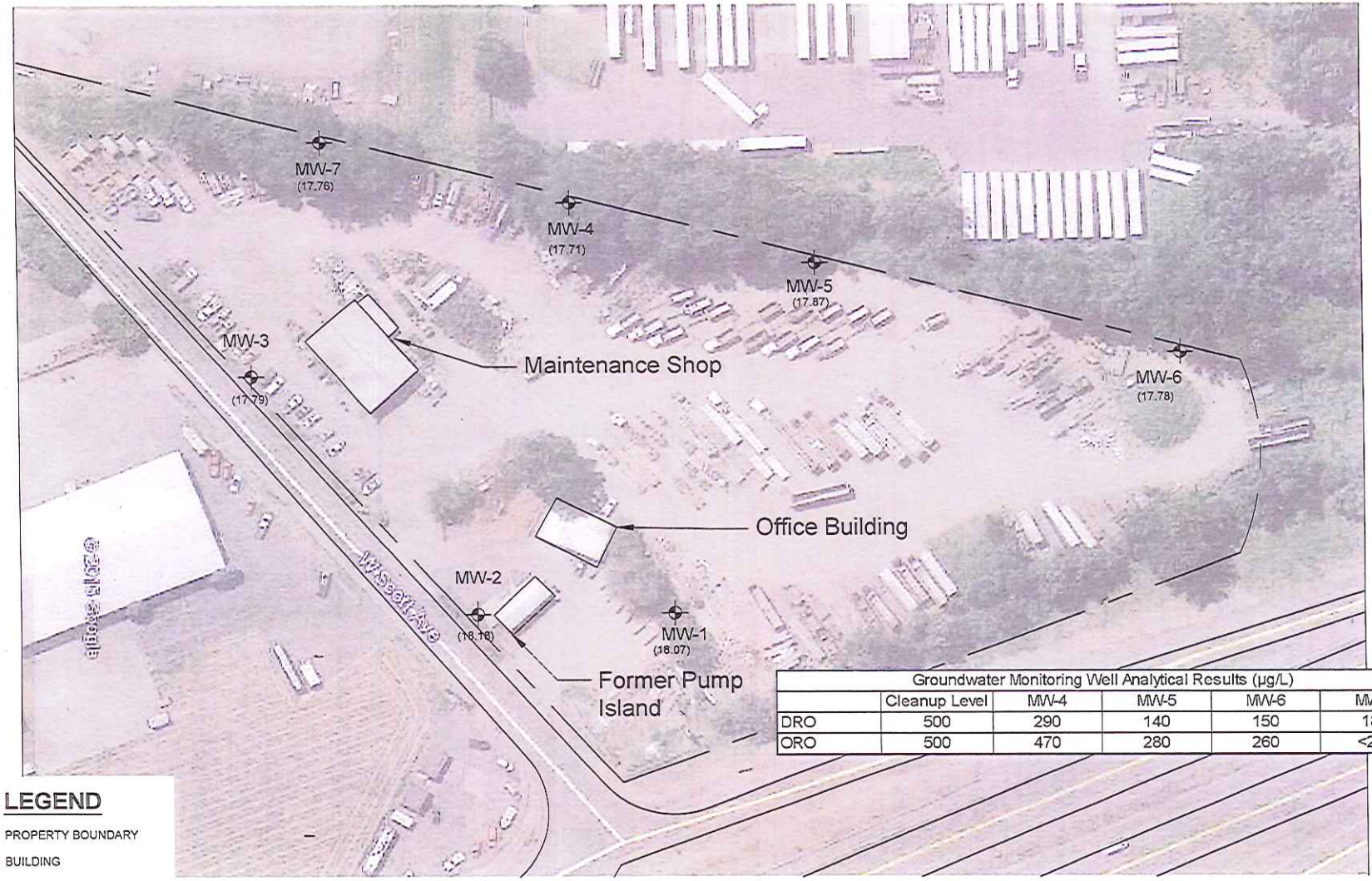
HydroCon
501 Allen St Suite B, Kelso WA Ph (360) 703-6079

DATE:09-04-15
DWN: MG
CHK: JH
APPROVED:
PRJ. MGR: DB
PROJECT NO:
2015-006

FIGURE 1

SITE LOCATION
GROAT BROTHERS, INC.
608 WEST SCOTT AVE
WOODLAND, WA


MW-7
MW-4
MW-5
MW-3
Maintenance Shop
MW-6
Office Building
MW-2
MW-1
Former Pump Island
Industrial Ave
LEGEND
PROPERTY BOUNDARY
BUILDING
MW-01
MONITORING WELL
W
S
E
0
80
160
SCALE IN FEET
1" = 80'
Hydro Con
501 Allen St Suite B, Kelso WA 98626
DATE: 09-04-15
DWN: MG
CHK: JH
APPROVED:
PRJ. MGR: CH
PROJECT NO: 2015-006
FIGURE 2
SITE FEATURES
GROAT BROTHERS, INC.
608 INDUSTRIAL WAY
WOODLAND, WA



Groundwater Monitoring Well Analytical Results (µg/L)					
	Cleanup Level	MW-4	MW-5	MW-6	MW-7
DRO	500	290	140	150	180
ORO	500	470	280	260	<250

LEGEND

- PROPERTY BOUNDARY
- BUILDING
- MW-01 (XX.XX) MONITORING WELL (GROUNDWATER ELEV. NAVD88)

W S E

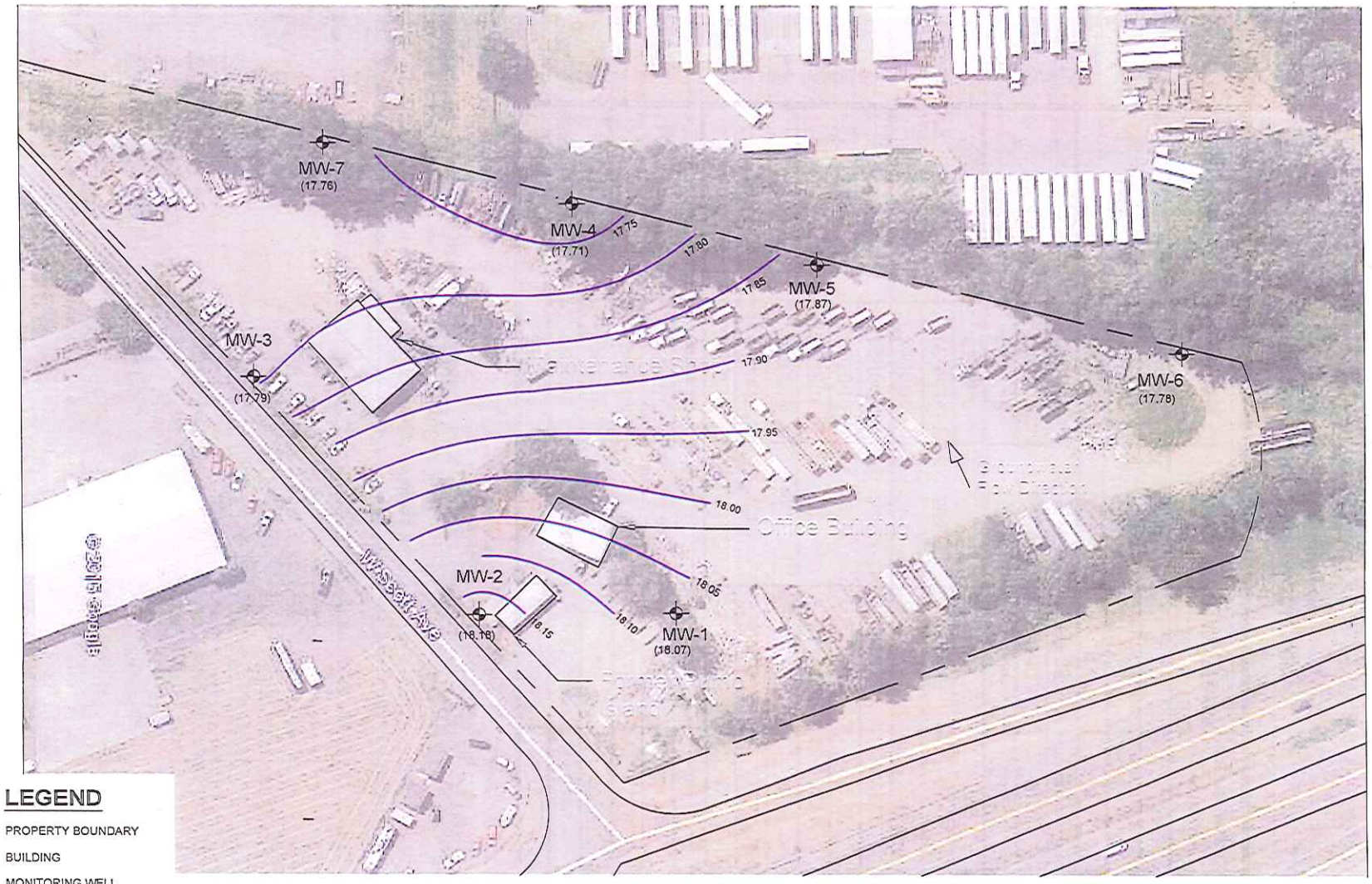
0 80 160
SCALE IN FEET
1" = 80'

Hydro Con
501 Allen St Suite B, Kelso WA 98626

DATE: 06-09-15
DWN: MG
CHK: JH
APPROVED:
PRJ. MGR: CH
PROJECT NO: 2015-006

FIGURE 3
GROUNDWATER ANALYTICAL RESULTS

GROAT BROTHERS, INC.
608 INDUSTRIAL WAY
WOODLAND, WA



LEGEND

- PROPERTY BOUNDARY
- BUILDING
- MW-01 (XX.XX) — MONITORING WELL (GROUNDWATER ELEV. NAVD88)

*Note: Groundwater elevation of MW-6 was not utilized for the flow direction calculation

N W E S

0 80 160

SCALE IN FEET
1" = 80'

HydroCon
501 Allen St Suite B, Kelso WA 98626

DATE: 09-04-15
DWN: MG
CHK: JH
APPROVED:
PRJ. MGR: CH
PROJECT NO: 2015-006

FIGURE 4
GROUNDWATER ELEVATIONS & COUNTOUR MAP

GROAT BROTHERS, INC.
608 INDUSTRIAL WAY
WOODLAND, WA

Table 1
Summary of Groundwater Elevations
Groat Brothers, Inc.
Woodland, Washington
HydroCon Project Number 2015-006

Monitoring Well ID	Date	MPE*	Depth to Water	Groundwater Elevation
MW-1	03/19/15	30.47	7.06	23.41
	05/20/15		7.87	22.60
	08/18/15		12.4	18.07
MW-2	03/19/15	28.07	4.82	23.25
	05/20/15		6.43	21.64
	08/18/15		9.92	18.15
MW-3	03/19/15	26.5	NM	NA
	05/20/15		4.98	21.52
	08/18/15		8.71	17.79
MW-4	03/19/15	28.96	4.81	24.15
	05/20/15		7.40	21.56
	08/18/15		11.25	17.71
MW-5	03/19/15	27.90	3.55	24.35
	05/20/15		6.13	21.77
	08/18/15		10.03	17.87
MW-6	03/19/15	27.97	3.66	24.31
	05/20/15		6.26	21.71
	08/18/15		10.19	17.78
MW-7	03/19/15	30.06	5.85	24.21
	05/20/15		8.99	21.07
	08/18/15		12.30	17.76

Notes:
MPE = Measuring Point Elevation
* = Elevation measured relative to MPE
NM = Well not measured dues to inability to locate it
NA = Not applicable

Table 2

Summary of 3rd Quarter Groundwater Analytical Results
Groat Brothers, Inc.
Woodland, Washington
HydroCon Project Number 2015-006

Sample ID				MW-4		MW-5		MW-6		MW-7	
Lab Sample ID				508323-01		508323-02		508323-03		508323-04	
Collection Date				3/26/15		3/26/15		3/26/15		3/26/15	
Parameter	Method	Unit	Ecology MTCA Level A	Value	Q	Value	Q	Value	Q	Value	Q
Total Petroleum Hydrocarbons (TPH)											
TPH Diesel Range (DRO)	NWTPH-Dx	µg/L	500	290	x	140	x	150	x	180	x
TPH Motor Oil Range (ORO)	NWTPH-Dx	µg/L	500	470	x	280	x	260	x	<250	

Notes and Qualifiers: (Q; only shown in Table if reported by laboratory)
< = Compound not detected above the laboratory Method Reporting Limits (MRLs).
µg/L = micrograms per liter (parts per billion)
x = The sample chromatographic pattern does no resemble the fuel standard used for quantitation.
Color highlighted cells indicate reported concentration exceeds corresponding MTCA Level A Cleanup Value.

Table 3
Summary of Historical Groundwater Analytical Results
Groat Brothers Inc.
Woodland, Washington
HydroCon Project Number 2015-006

Monitoring Well ID	Sample Date	Diesel	Motor Oil
MW-4	10/16/2014	130	<325
	3/26/2015	350	490
	8/18/2015	290	470
MW-5	4/16/2015	70	550
	3/26/2015	240	410
	8/18/2015	140	280
MW-6	1/14/2015	<50	<250
	3/26/2015	120	<250
	8/18/2015	150	260
MW-7	10/16/2014	260	330
	3/26/2015	240	360
	8/18/2015	180	<250
Ecology MTCA Method A Cleanup Level		500	500

Notes:

TPH as Diesel and Oil by NWTPH-Dx.

< = Compound not detected above the laboratory Method Reporting Limits (MRLs).

µg/L = micrograms per liter (parts per billion)

Color highlighted cells indicate reported concentration exceeds corresponding MTCA Level A Cleanup Value.

ATTACHMENTS

GROUNDWATER MONITORING FIELD FORMS

GROUNDWATER PURGE AND SAMPLE COLLECTION

Hydro Con

Well I.D. Number: MW-4

Project Name (Number): Grant Bros. Sample I.D.: MW-4 Time: 1120
Hydrocon Project Number: 2015-006 Field Duplicate I.D.: - Time: -
Date: 8/18/15 Personnel: SPH

WELL INFORMATION

Monument condition: ☒ Good ☐ Needs repair: ☐ Water in Monument
Well cap condition: ☒ Good ☐ Replaced ☐ Needs Replacement ☐ Surface Water Well Infiltration
Headspace reading: ☒ Not measured PID Reading ____ ppm ☐ Odor:
Well diameter: ☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other:
Comments

PURGING INFORMATION

Total well depth: ____ ft Bottom: ☒ Hard ☐ Soft ☐ Not measured Screen Interval(s):
Depth to product: - ft
Depth to water: 11.25 ft Intake Depth (BTOC): Begin Purging Well:
Casing volume: ____ ft (H_2O) X 0.16 gal/ft = ____ gal. X 3 = ____ gal.
Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type ☒ Peristaltic ☐ Centrifugal ☐ Dedicated Bladder ☐ Non-Dedicated Bladder Other
Bailer type: Water Disposal: ☒ Drummed ☐ Remediation System ☐ Other

FIELD PARAMETERS

Odor and/or Sheen:

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (°C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)
1110	11.25		16.1	0.145		5.85	87	
1115	11.28		17.8	0.146		5.89	92	
1120	11.34		19.6	0.147		5.80	98	

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.
Purging Comments:

SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
500 mL amber	1	none	(No) 0.45 0.10	DX
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments:

GROUNDWATER PURGE AND SAMPLE COLLECTION

Well I.D. Number: MW-5

Project Name (Number): Goat Bros.
Hydrocon Project Number: 2015-006
Date: 8/13/15
Sample I.D.: MW-5 Time: 12:55
Field Duplicate I.D.: — Time: —
Personnel: JPH

WELL INFORMATION

Monument condition: ☒ Good ☐ Needs repair: ☐ Water in Monument
Well cap condition: ☒ Good ☐ Replaced ☐ Needs Replacement ☐ Surface Water Well Infiltration
Headspace reading: ☒ Not measured PID Reading ____ ppm ☐ Odor:
Well diameter: ☒ 2-inch ☐ 4-inch ☐ 6-inch ☐ Other:
Comments

PURGING INFORMATION

Total well depth: ____ ft Bottom: ☒ Hard ☐ Soft ☐ Not measured Screen Interval(s):
Depth to product: — ft
Depth to water: 10.63 ft Intake Depth (BTOC): Begin Purging Well:
Casing volume: ____ ft (H_2O) X ____ gal/ft = ____ gal. X 3 = ____ gal.
Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type ☒ Peristaltic ☐ Centrifugal ☐ Dedicated Bladder ☐ Non-Dedicated Bladder Other
Bailer type: Water Disposal: ☒ Drummed ☐ Remediation System ☐ Other

FIELD PARAMETERS

Odor and/or Sheen:

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (°C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)
12:40	10.03		16.5	0.132		5.86	92	
12:45	10.05		15.5	0.128		5.80	99	
12:50	10.05		15.2	0.129		5.78	96	

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.
Purging Comments:

SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
500ml amber	1	none	(No) 0.45 0.10	Dx
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments:

GROUNDWATER PURGE AND SAMPLE COLLECTION

Hydro Con

Well I.D. Number: MW-6

Project Name (Number): Great Bros.
Hydrocon Project Number: 2015-606
Date: 8/18/15

Sample I.D.: MW-6 Time: 12:30
Field Duplicate I.D.: - Time: -
Personnel: JPH

WELL INFORMATION

Monument condition: ☒ Good ☐ Needs repair: ☐ Water in Monument
Well cap condition: ☒ Good ☐ Replaced ☐ Needs Replacement ☐ Surface Water Well Infiltration
Headspace reading: ☒ Not measured PID Reading ____ ppm ☐ Odor:
Well diameter: ☒ 2-inch ☐ 4-inch ☒ 6-inch ☐ Other:
Comments

PURGING INFORMATION

Total well depth: ____ ft Bottom: ☒ Hard ☐ Soft ☐ Not measured Screen Interval(s):
Depth to product: - ft
Depth to water: 10.19 ft Intake Depth (BTOC): Begin Purging Well:
Casing volume: ____ ft (H_2O) X 0.16 gal/ft = ____ gal. X 3 = ____ gal.
Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type ☒ Peristaltic ☐ Centrifugal ☐ Dedicated Bladder ☐ Non-Dedicated Bladder Other
Bailer type: Water Disposal: ☒ Drummed ☐ Remediation System ☐ Other

FIELD PARAMETERS

Odor and/or Sheen:

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (°C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)
12:15	10.19		16.3	0.115		5.93	90	
12:20	10.25		16.1	0.119		5.61	93	
12:25	10.26		15.8	0.116		5.55	90	
12:30	10.26		15.7	0.115		5.53	87	

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.

Purging Comments:

SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
600mL amber	1	None	(No) 0.45 0.10	Dx
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments:

GROUNDWATER PURGE AND SAMPLE COLLECTION

Hydro Con

Well I.D. Number: MW-7

Project Name (Number): Great Bros. | Sample I.D.: MW-7 | Time: ____
Hydrocon Project Number: 2015-006 | Field Duplicate I.D.: — | Time: —
Date: 8/18/15 | Personnel: JPH

WELL INFORMATION

Monument condition: [X] Good [ ] Needs repair: ____ [ ] Water in Monument
Well cap condition: [X] Good [ ] Replaced [ ] Needs Replacement [ ] Surface Water Well Infiltration
Headspace reading: [X] Not measured PID Reading ____ ppm [ ] Odor: ____
Well diameter: [X] 2-inch [ ] 4-inch [ ] 6-inch [ ] Other: ____
Comments ____

PURGING INFORMATION

Total well depth: ____ ft Bottom: [X] Hard [ ] Soft [ ] Not measured Screen Interval(s): ____
Depth to product: — ft
Depth to water: 12.30 ft Intake Depth (BTOC): ____ Begin Purging Well: ____
Casing volume: ____ ft (H_2O) X ____ gal/ft = ____ gal. X 3 = ____ gal.
Volume Conversion Factors: 3/4"=0.02 gal/ft 1"=0.04 gal/ft 2"=0.16 gal/ft 4"=0.65 gal/ft 6"= 1.47 gal/ft

PURGING/DISPOSAL METHOD

Pump type [X] Peristaltic [ ] Centrifugal [ ] Dedicated Bladder [ ] Non-Dedicated Bladder Other ____
Bailer type: ____ Water Disposal: [X] Drummed [ ] Remediation System [ ] Other ____

FIELD PARAMETERS

Odor and/or Sheen: ____

Time	Water Level (BTOC)	Purge Rate (L/min)	Temp. (°C)	Sp. Cond. (mS/cm) (±3%)	Dissolved Oxygen (±10% or ≤1.00 ±0.2)	pH (SU) (±0.1)	ORP (mV)	Turbidity (NTU) (± 10% or ≤10)
1:30	12.30		21.5	0.282		5.67	111	
1:35	12.35		18.0	0.283		5.62	117	
1:40	12.32		17.4	0.279		5.60	119	

Stabilization achieved if three successive measurements for pH, Conductivity and Turbidity and/or Dissolved Oxygen are recorded within their respective stabilization criteria. A minimum of six measurements should be recorded.
Purging Comments: ____

SAMPLE INFORMATION

Container Type	Bottle Count	Preservative	Field Filtered?	Analysis
500mL amber	1	none	(No) 0.45 0.10	Dx
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	
			No 0.45 0.10	

Sampling Comments: ____