

# Technical Memorandum

## IRAM Status Update – 4Q 2020

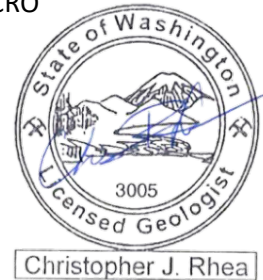
To: Kyle Parker, Toxics Cleanup Program, WA Department of Ecology CRO

Copies: Brandon Christensen & Cassandra Adams, Christensen Inc.  
Dianne K. Conway, Gordon Thomas Honeywell LLP

From: Chris Rhea LG, and Daniele Peters, PE

Date: December 22, 2020

Regarding: Former DeBock's Texaco  
100 West Wine Country Road, Grandview, Washington  
Ecology Facility ID #94369212, Cleanup Site ID #6910, Voluntary Cleanup ID #CE0488  
EES Project 2093-02



This memorandum summarizes product removal work conducted through October 2020 at the former DeBock's Texaco (Site, Figure 1). This work is being conducted as an interim remedial action measure (IRAM), in accordance with WAC 173-340. Site maps, summary tables, and charts are attached for reference.

### PRODUCT RECOVERY

Floating free-phase hydrocarbon product (LNAPL) has been observed since October 2017 at well MW-2 near abandoned fuel transmission piping (Figure 2). As a general observation, observed LNAPL accumulation at MW-2 tends to increase during seasonal low water periods, which are typically lowest in March-April each year (just before the six-month summer irrigation cycle begins). Conversely, relatively lower LNAPL accumulation occurs as the water table rises during irrigation season. This pattern is illustrated on Charts 1 and 2, and has been discussed separately (see the EES Remedial Investigation Report dated November 23, 2020).

Product removal and rebound observation activities have been routinely conducted by EES since February 2018, including periodic total fluid recovery (TFR, February 2018-January 2019) and passive product recovery (February 2019-present). Product thicknesses at MW-2 have decreased since initiation of the product removal in early 2018 (see Chart 1) but LNAPL persists. Product thickness measurements are summarized in Table 1.

During the eight TFR events, a total of approximately six gallons of emulsified fuel and water was removed from MW-2. Due to relatively low yield and slow recharge rates, product removal by total fluids extraction was discontinued after the January 2019 recovery event. In February 2019, EES initiated passive product recovery by deploying hydrocarbon-absorbent socks in MW-2. The absorbent sock is inspected on a quarterly basis and replaced as needed. A summary of passive product removal is

provided in Table 2 and shown on Chart 3.

Since installation of the absorbent socks in February 2019, approximately 1.9 gallons of floating free product have been removed from MW-2. Free product generally does not exceed the passive recovery sock's capacity between monitoring events. When observed (typically during low-water periods around April when LNAPL accumulation rates increase), floating free product exceeding absorbent capacity is manually removed before installing new absorbents (Charts 1 and 3).

## ONGOING IRAM ACTIVITIES

As an interim action, EES will inspect and evaluate product removal performance on a quarterly basis unless/until the LNAPL fluctuations stabilize, at which time the frequency of this effort may be reduced. EES is working with the Property owner to develop a long-term cleanup action plan.

Note that groundwater monitoring wells MW-4, MW-5, and MW-7 located on the western adjoining property were recently paved over and are now inaccessible. As discussed and agreed upon with the current property owner, Rodolfo Mora, EES plans to restore the wells at a later date.

## ATTACHMENTS

Figure 1: Site Vicinity Map

Figure 2: Site Features

Table 1: Groundwater Elevation and Product Thickness Data

Table 2: LNAPL Removal Estimates since Installation of Absorbent Socks (02/19/2019)

Chart 1: LNAPL Thickness at Well MW-2

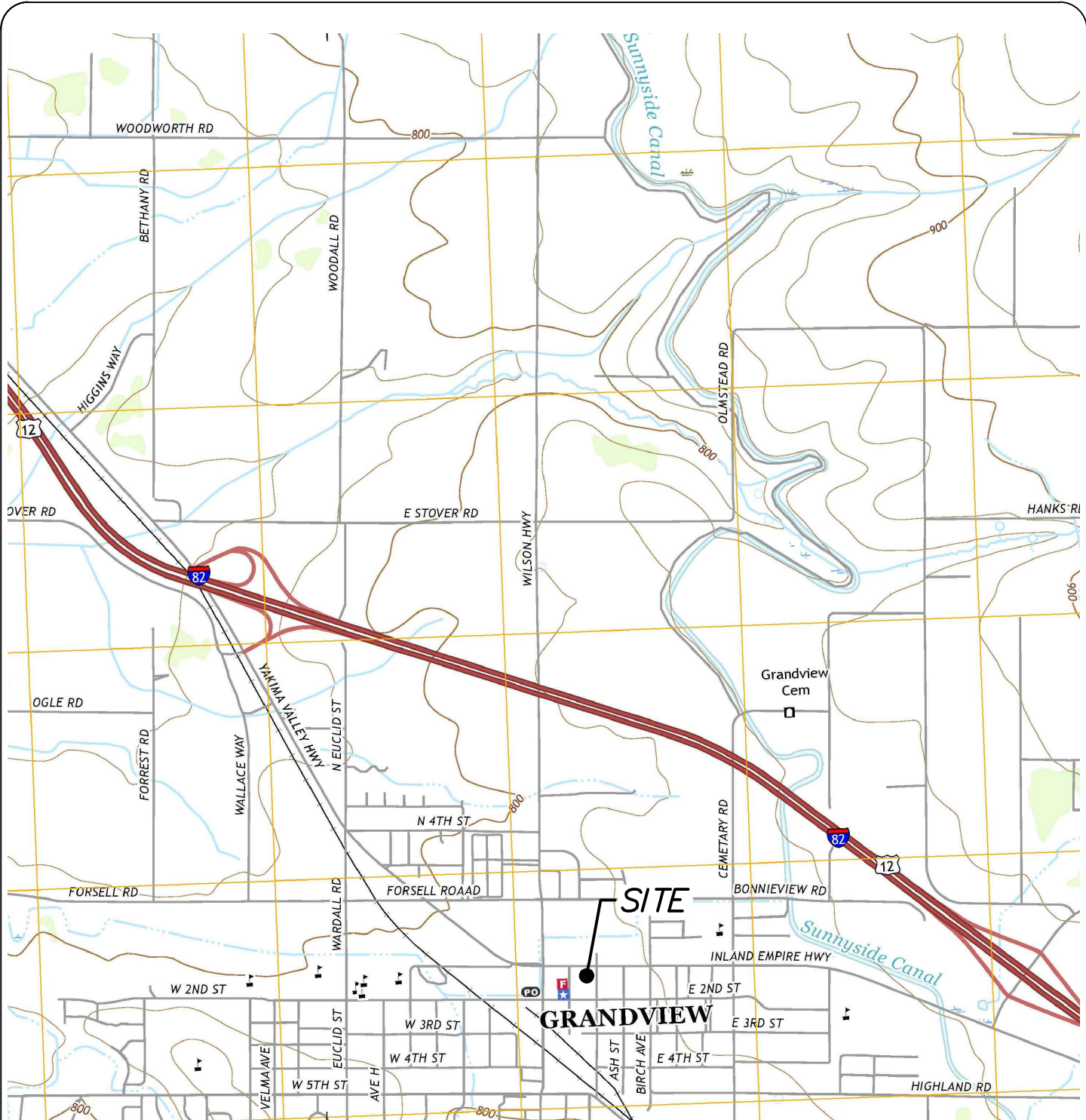
Chart 2: Quarterly LNAPL Removal at Well MW-2 since 02/19/2019

Chart 3: Cumulative LNAPL Removal at Well MW-2 since 2/19/2019

## Figures

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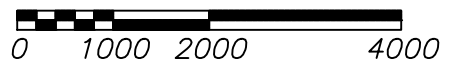
C:\Users\Josh\Desktop\Autocad Files\EES-Autocad\2093-01 DeBock's Texaco\2020\Aug 2020\2093-01\_BM-082820.dwg



SOURCE:  
 USGS, GRANDVIEW QUADRANGLE  
 WASHINGTON-YAKIMA CO.  
 7.5 MINUTE SERIES (TOPOGRAPHIC)



APPROXIMATE SCALE IN FEET



**EES** Environmental Consulting, Inc.





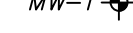


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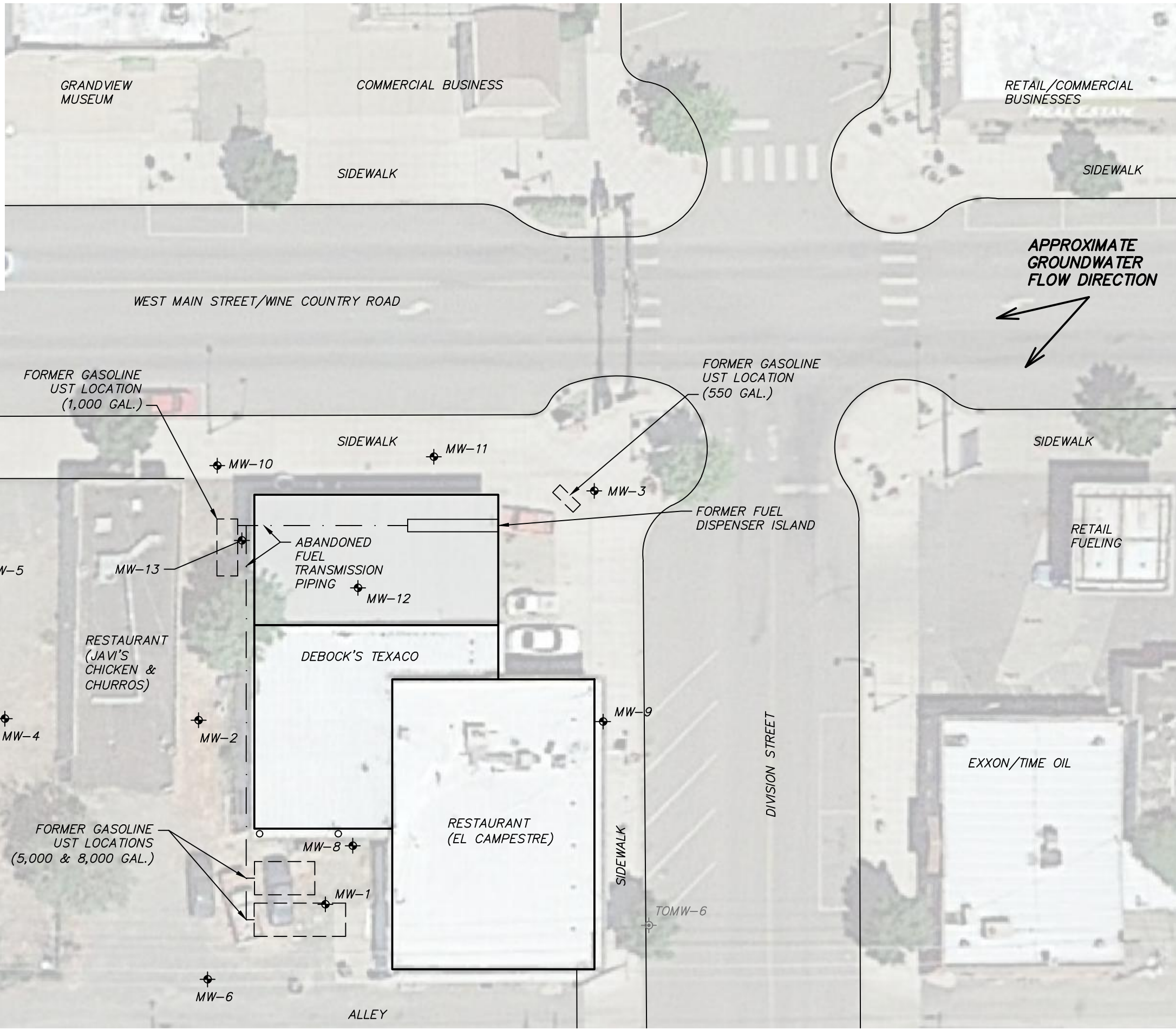
SITE VICINITY MAP

DEBOCK'S TEXACO  
 100 WEST MAIN ST.  
 GRANDVIEW, WA.

DATE: 11-24-20	PROJECT NO. 2093-01
FILE: 2093-01	2093-01
DRAWN: JJT	FIGURE NO. 1
APPROVED: CR	

**LEGEND**

-  PROPERTY LINE
  -  BUILDING
  -  ROADWAY
  -  MW-1 **MONITORING WELL**
  -  TOMW-6 **TIME OIL MONITORING WELL**  
(DECOMMISSIONED BY OTHERS, 2019)
  -  UST FILL PORT
  -  FORMER UST LOCATIONS
- SITE FEATURES ARE APPROXIMATE.



**APPROXIMATE  
GROUNDWATER  
FLOW DIRECTION**



PROJECT NO.	2093-01	FIGURE NO.	2
DATE:	8-28-20	DRAWN:	JJT
FILE:	2093-01	APPROVED:	CR

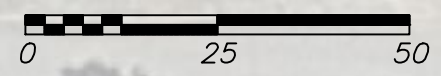
SITE FEATURES

DEBOCK'S TEXACO  
100 WEST MAIN ST.  
GRANDVIEW, WA.

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APPROXIMATE SCALE IN FEET



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## Tables

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**TABLE 1**  
**Groundwater Elevation and Product Thickness Data**  
 DeBock's Texaco  
 Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-1	99.08	04/01/1998	17.34	-	0	81.74
		09/27/2000	14.26	-	0	84.82
		10/25/2017	18.59	-	0	80.49
		11/07/2017	18.88	-	0	80.20
		02/02/2018	20.18	-	0	78.90
	812.37	03/06/2018	20.59	-	0	791.78
		03/16/2018	20.71	-	0	791.66
		04/02/2018	20.93	-	0	791.44
		04/05/2018	20.96	-	0	791.41
		04/24/2018	21.14	-	0	791.23
		07/17/2018	20.40	-	0	791.97
		10/22/2018	19.07	-	0	793.30
		01/22/2019	20.64	-	0	791.73
		08/08/2019	19.36	-	0	793.01
		10/29/2019	18.66	-	0	793.71
		01/16/2020	20.22	-	0	792.15
		02/19/2020	20.73	-	0	791.64
04/24/2020	21.59	-	0	790.78		
07/21/2020	20.48	-	0	791.89		
10/28/2020	19.20	-	0	793.17		
MW-2	99.55	04/01/1998	17.93	-	0	81.62
		09/27/2000	14.66	-	0	84.89
		10/25/2017	19.91	19.05	0.86	80.27
		11/07/2017	20.13	19.22	0.91	80.08
		02/01/2018	21.81	20.67	1.14	78.57
	812.91	02/02/2018	21.31	21.18	0.13	78.33
		02/03/2018	21.14	20.89	0.25	78.59
		03/06/2018	21.61	21.22	0.39	791.58
		03/16/2018	21.73	21.32	0.41	791.48
		04/02/2018	22.03	21.53	0.50	791.24
		04/05/2018	22.03	21.56	0.47	791.22
		04/24/2018	22.32	21.73	0.59	791.02
		05/04/2018	22.42	21.83	0.59	790.92
		06/05/2018	21.80	21.67	0.13	791.20
		07/17/2018	21.00	-	0	791.91
		08/17/2018	20.53	20.40	0.13	792.47
		09/10/2018	19.86	19.78	0.08	793.11
		10/22/2018	19.73	19.63	0.10	793.25
		11/13/2018	20.13	20.06	0.07	792.83
		12/11/2018	20.65	20.57	0.08	792.32
01/22/2019	21.32	21.26	0.06	791.63		
02/19/2019	21.62	21.56	0.06	791.33		
04/23/2019	22.08	21.60	0.48	791.18		
07/23/2019	20.21	20.20	0.01	792.71		
10/29/2019	19.38	-	0	793.53		
01/16/2020	20.97	-	0	791.94		
04/24/2020	22.59	22.40	0.19	790.46		
07/21/2020	21.23	-	0	791.68		
10/28/2020	19.99	-	0	792.92		
MW-3	99.23	04/01/1998	16.29	-	0	82.94
		09/27/2000	13.01	-	0	86.22

**TABLE 1**  
**Groundwater Elevation and Product Thickness Data**  
 DeBock's Texaco  
 Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-3 (cont'd)	812.74	10/25/2017	17.92	-	0	81.31
		11/07/2017	18.18	-	0	81.05
		02/02/2018	19.58	-	0	79.65
		03/06/2018	19.99	-	0	792.75
		03/16/2018	21.02	-	0	791.72
		04/05/2018	20.38	-	0	792.36
		04/24/2018	20.62	-	0	792.12
		07/17/2018	19.83	-	0	792.91
		10/22/2018	18.40	-	0	794.34
		01/22/2019	20.05	-	0	792.69
		08/08/2019	18.72	-	0	794.02
		10/29/2019	17.92	-	0	794.82
		01/16/2020	19.56	-	0	793.18
		02/19/2020	20.20	-	0	792.54
		04/24/2020	19.99	-	0	792.75
07/21/2020	19.80	-	0	792.94		
10/28/2020	18.42	-	0	794.32		
MW-4	811.94	03/16/2018	21.04	-	0	-
		04/02/2018	21.27	-	0	-
		04/05/2018	21.30	-	0	-
		04/24/2018	21.48	-	0	790.46
		07/17/2018	20.66	-	0	791.28
		10/22/2018	19.27	-	0	792.67
		01/22/2019	20.90	-	0	791.04
		08/08/2019	19.59	-	0	792.35
		10/29/2019	18.90	-	0	793.04
		01/16/2020	20.27	-	0	791.67
		02/19/2020	20.96	-	0	790.98
04/24/2020	21.89	-	0	790.05		
07/21/2020			Well Inaccessible - Paved Over			
MW-5	811.64	04/05/2018	20.83	-	0	-
		04/24/2018	20.99	-	0	790.65
		07/17/2018	19.91	-	0	791.73
		10/22/2018	18.56	-	0	793.08
		01/22/2019	20.40	-	0	791.24
		08/08/2019	18.82	-	0	792.82
		10/29/2019	18.35	-	0	793.29
		01/16/2020	19.98	-	0	791.66
		02/19/2020	20.49	-	0	791.15
		04/24/2020	21.40	-	0	790.24
07/21/2020			Well Inaccessible - Paved Over			
MW-6	811.99	04/05/2018	20.96	-	0	-
		04/24/2018	21.10	-	0	790.89
		07/17/2018	20.34	-	0	791.65
		10/22/2018	19.02	-	0	792.97
		01/22/2019	20.60	-	0	791.39
		08/08/2019	19.31	-	0	792.68
		10/29/2019	18.62	-	0	793.37
		01/16/2020	20.15	-	0	791.84
02/19/2020	20.63	-	0	791.36		



**TABLE 1**  
**Groundwater Elevation and Product Thickness Data**  
DeBock's Texaco  
Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-6 (cont'd)		04/24/2020	21.51	-	0	790.48
		07/21/2020	20.42	-	0	791.57
		10/28/2020	19.11	-	0	792.88
MW-7	811.92	04/05/2018	22.82	-	0	-
		04/24/2018	21.75	-	0	790.17
		07/17/2018	20.99	-	0	790.93
		10/22/2018	19.65	-	0	792.27
		01/22/2019	21.20	-	0	790.72
		08/08/2019	19.93	-	0	791.99
		10/29/2019	19.24	-	0	792.68
		01/16/2020	20.78	-	0	791.14
		02/19/2020	21.27	-	0	790.65
		04/24/2020	22.14	-	0	789.78
		07/21/2020	Well Inaccessible - Paved Over			
MW-8	812.28	04/05/2018	20.77	-	0	-
		04/24/2018	20.94	-	0	791.34
		07/17/2018	20.20	-	0	792.08
		10/22/2018	18.84	-	0	793.44
		1/22/20019	20.41	-	0	791.87
		08/08/2019	19.15	-	0	793.13
		10/29/2019	18.42	-	0	793.86
		01/16/2020	20.01	-	0	792.27
		02/19/2020	20.49	-	0	791.79
		04/24/2020	21.38	-	0	790.90
		07/21/2020	20.26	-	0	792.02
		10/28/2020	18.95	-	0	793.33
MW-9	812.76	04/05/2018	21.02	-	0	-
		04/24/2018	20.69	-	0	792.07
		07/17/2018	19.92	-	0	792.84
		10/22/2018	18.56	-	0	794.20
		01/22/2019	20.15	-	0	792.61
		08/08/2019	18.81	-	0	793.95
		10/29/2019	18.15	-	0	794.61
		01/16/2020	19.73	-	0	793.03
		02/19/2020	20.24	-	0	792.52
		04/24/2020	21.13	-	0	791.63
		07/21/2020	20.00	-	0	792.76
		10/28/2020	18.67	-	0	794.09
MW-10	812.05	04/05/2018	20.91	-	0	-
		04/24/2018	20.70	-	0	791.35
		07/17/2018	19.79	-	0	792.26
		10/22/2018	18.38	-	0	793.67
		01/22/2019	20.10	-	0	791.95
		08/08/2019	18.70	-	0	793.35
		10/29/2019	18.02	-	0	794.03
		01/16/2020	19.71	-	0	792.34
		02/19/2020	20.21	-	0	791.84
		04/24/2020	21.13	-	0	790.92
		07/21/2020	19.85	-	0	792.20
		10/28/2020	18.60	-	0	793.45

**TABLE 1**  
**Groundwater Elevation and Product Thickness Data**  
 DeBock's Texaco  
 Grandview, Washington

Well Identification	TOC Elevation (feet)	Date Measured	Depth to Water (feet below TOC)	Depth to Product (feet below TOC)	Product Thickness (feet)	Groundwater Elevation <sup>a</sup> (feet)
MW-11	812.13	04/05/2018	-	-	0	-
		04/24/2018	20.29	-	0	791.84
		07/17/2018	19.47	-	0	792.66
		10/22/2018	18.05	-	0	794.08
		01/22/2019	19.68	-	0	792.45
		08/08/2019	18.40	-	0	793.73
		10/29/2019	17.63	-	0	794.50
		01/16/2020	19.29	-	0	792.84
		02/19/2020	19.81	-	0	792.32
		04/24/2020	20.72	-	0	791.41
		07/21/2020	19.49	-	0	792.64
		10/28/2020	18.24	-	0	793.89
MW-12	812.81	04/05/2018	-	-	0	-
		04/24/2018	21.18	-	0	791.63
		07/17/2018	20.38	-	0	792.43
		10/22/2018	18.93	-	0	793.88
		01/22/2019	20.62	-	0	792.19
		08/08/2019	19.31	-	0	793.50
		01/16/2020	20.18	-	0	792.63
		02/19/2020	20.51	-	0	792.30
		04/24/2020	21.58	-	0	791.23
		07/21/2020	20.43	-	0	792.38
10/28/2020	19.13	-	0	793.68		
MW-13	812.72	08/08/2019	19.40	-	0	793.32
		02/19/2020	20.85	-	0	791.87
		04/24/2020	22.17	-	0	790.55
		07/21/2020	20.55	-	0	792.17
		10/28/2020	19.23	-	0	793.49

**Notes:**

<sup>a</sup> Groundwater elevation is adjusted to account for floating gasoline product, where present, using the typical specific gravity of gasoline at 15°C of 0.729 (How to Effectively Recover Free Product At Leaking Underground Storage Tank Sires, United States Environmental Protection Agency, 1996).

Data prior to 2017 was obtained from historical reports.

Wells surveyed on 3/6/2018, 4/24/2018, and 8/7/2019 by PLSA of Yakima, Washington.

TOC = Top of Casing

- = Not measured

**TABLE 2**  
**LNAPL Removal Estimates since Installation of Absorbent Socks (02/19/2019)**  
 DeBock's Texaco  
 Grandview, Washington

Well Identification	Specific Gravity <sup>a</sup> (unitless)	Date Measured	Product Thickness <sup>b</sup> (feet)	Weight of Product Removed with Absorbent Sock during Monitoring Period (pounds)	Calculated Volume of Product Removed with Absorbent Sock during Monitoring Period <sup>c</sup> (gallons)	Volume of Product Bailed/Pumped from Well during Monitoring Event (gallons)	Total Estimated Volume of Product Removed per Monitoring Period (gallons)	Cumulative Estimated Volume of Product Removed <sup>d</sup> (gallons)
MW-2	0.729	2/19/2019	0.06	NA	NA	0.00	0.00	0.00
		4/23/2019	0.48	1.21	0.20	0.30	0.50	0.50
		7/23/2019	0.01	0.94	0.15	0.00	0.15	0.65
		10/29/2019	0.00	1.46	0.24	0.00	0.24	0.89
		1/16/2020	0.00	1.15	0.19	0.00	0.19	1.08
		4/24/2020	0.19	1.46	0.24	0.04	0.28	1.36
		7/21/2020	0.00	1.68	0.28	0.00	0.28	1.64
		10/28/2020	0.00	1.55	0.25	0.00	0.25	1.89

**Notes:**

<sup>a</sup> Typical specific gravity of gasoline shown at 15°C (How to Effectively Recover Free Product At Leaking Underground Storage Tank Sires, United States Environmental Protection Agency, 1996).

<sup>b</sup> Product thickness measured after removing absorbent assembly from the well during each monitoring event.

<sup>c</sup> Based on typical specific gravity of gasoline and the measured product weight.

<sup>d</sup> Volume shown is the total LNAPL removed since absorbent sock installation (February 19, 2019).

NA = Not Applicable

**Sample Calculation:**

$$\text{Specific Gravity} = \frac{\rho_{\text{product}}}{\rho_{\text{water}}}$$

$$\text{Specific Gravity} = \frac{m_{\text{product}}/V_{\text{product}}}{\rho_{\text{water}}}$$

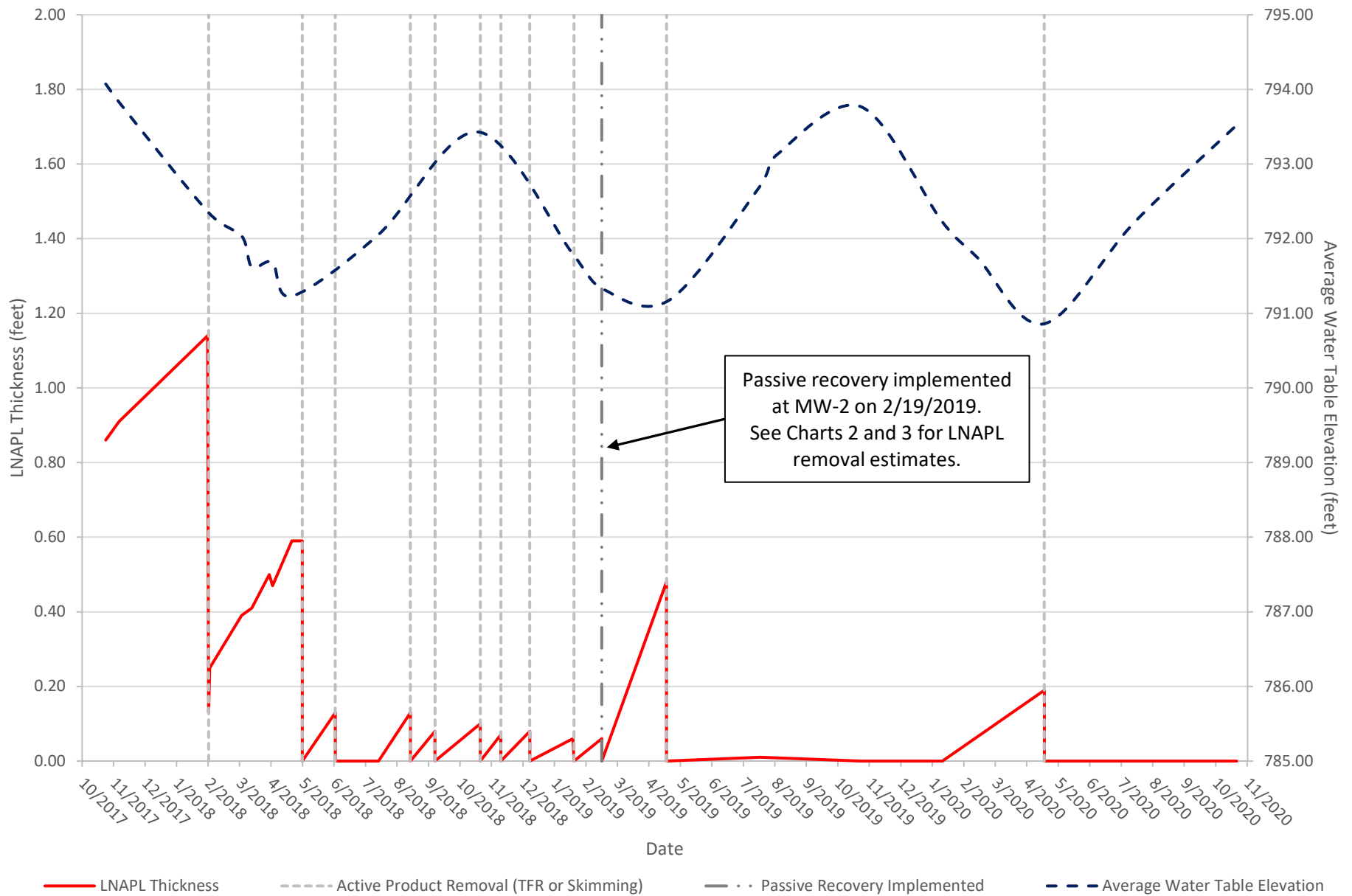
$$V_{\text{product}} = \frac{m_{\text{product}}}{\text{Specific Gravity} \times \rho_{\text{water}}}$$

$$V_{\text{product}} = \frac{1.41 \text{ lbs}}{0.729 \times 8.34 \text{ lbs/gal}} = 0.20 \text{ gal}$$

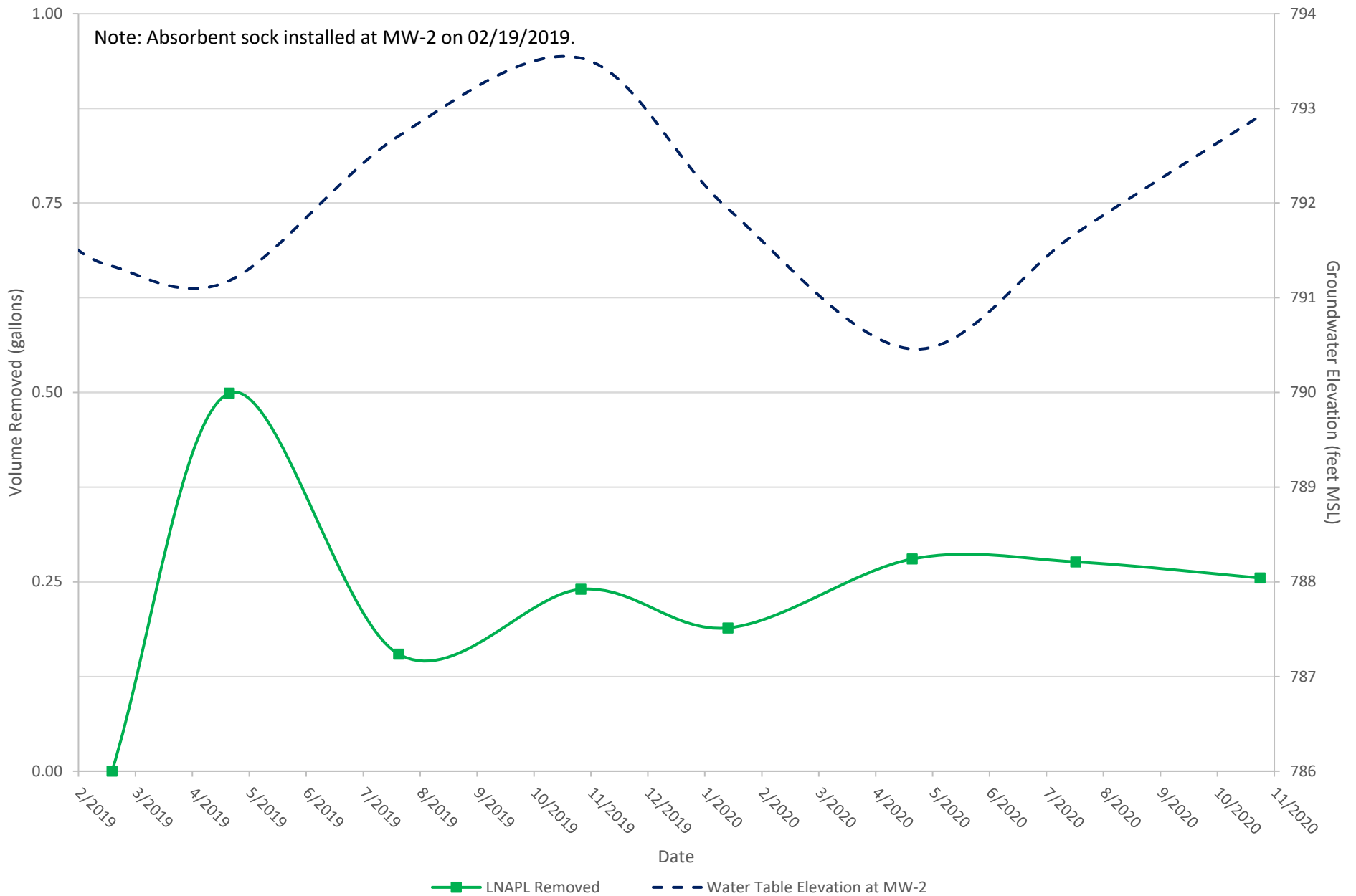
# Charts

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**CHART 1**  
**LNAPL Thickness at Well MW-2**  
 DeBock's Texaco  
 Grandview, Washington



**CHART 2**  
**Quarterly LNAPL Removal at Well MW-2 since 02/19/2019**  
 DeBock's Texaco  
 Grandview, Washington



**CHART 3**  
**Cumulative LNAPL Removal at Well MW-2 since 02/19/2019**  
 DeBock's Texaco  
 Grandview, Washington

