Waite-Heindel
Environmental Management

October 8, 2014

Mr. William Young
28 North Williams Street
Burlington, VT 05401

RE: August 2014 Quarterly Monitoring Report
Young Residence
28 North Williams Street
Burlington, VT 05401
SMS Site #2013-4436

Dear Mr. Young:

Waite-Heindel Environmental Management (WHEM) is pleased to present the *August 2014 Groundwater Monitoring Report* for your property at 28 North Williams Street in Burlington, Vermont.

Do not hesitate to contact me if you have questions. I can be reached at (802) 860-9400 ext. 101 or by email at mwaite@waiteenv.com

Sincerely,

Miles E. Waite, Ph.D.
Senior Hydrogeologist

Cc: Hugo Martinez-Cazón, VDEC Site Manager

Enclosure

GROUNDWATER MONITORING REPORT
YOUNG RESIDENCE
28 NORTH WILLIAMS STREET
BURLINGTON, VERMONT

SMS SITE #2013-4436

October 8, 2014

Prepared for:

Mr. William Young
28 North Williams Street,
Burlington, Vermont 05401

Prepared by:

Waite - Heindel
Environmental Management

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1.0 INTRODUCTION

Waite-Heindel Environmental Management (WHEM) of Burlington, Vermont conducted a round of groundwater quality monitoring and sump sampling during August 2014 at the Young residence (SMS #2013-4436), located at 28 North Williams Street in Burlington, VT. The work described in this report was performed per WHEM's July 16, 2014 scope of work. This was the second round of groundwater monitoring conducted since 1.4 cubic yards (cy) of contaminated soils were removed from beneath the Sump South location. For this sampling event, all three monitoring wells were sampled as well as the two sump pits. The volume pumped from each sump was also calculated using the installed wattage meters.

In addition to the monitoring event, WHEM has been working with the Burlington Department of Public Works (DPW) in an effort to develop a means of treating and legally discharging contaminated the sump water. This work included the installation of wattage meters to track volume pumped, meeting with an excavator on-site to determine the feasibility of a dry-well installation, and ongoing correspondence with Burlington DPW personnel to obtain a permit for discharging the treated water into the sanitary sewer. Currently, contaminated sump water is discharged, untreated, into the sanitary sewer system. As of August 11, 2014, the cumulative volume pumped since April 21, 2014 is 14,274 gallons.

The work performed was requested and approved by the Vermont DEC in response to WHEM's *Investigation Report*, issued April 21, 2014. Details of both the monitoring event and treatment system design progress to-date are included in the following sections.

1.1 Property History

William and Sally Young have owned this property since 1991 and were reportedly unaware of the presence of a fuel oil UST on the property upon purchase. The heating system at the time of purchase was, and still is, natural gas. Also at the time of purchase, a 275-gallon aboveground oil tank was present in the basement but not hooked up, so it was assumed to have been formerly used for the previous oil-burning furnace.

The building is located on the hill section of Burlington, north of Pearl Street (see USGS Map). Based on surrounding topography, groundwater flow under the subject property is predicted to be toward the west. Groundwater across the property is shallow, ranging from approximately 3 to 7 feet below grade based on monitoring wells and sump volumes.

The presence of the UST was first suspected on September 10, 2013 after inspection by WHEM to assess the source of fuel oil odors emanating from a newly installed basement dewatering system. The UST closure was overseen by WHEM on September 20, 2013. The UST was observed to be in very poor condition with significant pitting and too many holes to count. The holes were present throughout most of the body of the tank, suggesting that the entire tank was likely submerged below the seasonal high water table. A secondary excavation was conducted to maximize the removal of contaminated soils from the source area. Approximately 15.4 tons of contaminated soil was removed from the source area and, on September 25, 2013, shipped to Environmental Soils Management, Inc. (ESMI) of Loudon, NH for destruction by thermal treatment.

In December 2013, WHEM oversaw the installation of two groundwater monitoring wells on the east side of the house to complement the existing MW-1 (installed in the tank grave) and sumps. A round of groundwater sampling was performed on December 21, 2013, and revealed no detections of petroleum VOCs in the newly installed downgradient monitoring wells. Both sumps and MW-1 were also sampled on December 21, 2013 and Naphthalene exceeded its VGES in sump samples.

On January 9, 2014, WHEM oversaw the removal of approximately 1.4 cy of contaminated soils from beneath the crawlspace where Sump South is located. Excavated soils ranged from 79.1 ppm to 31.9 ppm VOCs by PID screening. Following excavation, the sump area was sealed via polyethylene vapor barrier and the sump pit was reinstalled. No sample was collected from the heavily disturbed sump at that time. PID readings a week after excavation was completed revealed VOC concentrations in the immediate sump south area to be 0.3 ppm; basement VOC concentrations were reported at background levels (0.0 ppm). The obvious petroleum odors have subsided in the basement, but a formal air quality test has not yet been conducted.

2.0 GROUNDWATER SAMPLING

2.1 Sump Sampling

On April 29, 2014, and again on August 11, 2014, WHEM conducted a sump sampling from Sump South and Sump North for VOC analysis via Method 8021B (PCF List). Sump locations are shown on the Site Plan in Appendix 1. On both occasions, sump water produced a mild petroleum odor and field staff reported petroleum sheen in both sumps. Water in Sump South was noticeably stronger-smelling, with a more noticeable sheen. Both sump pumps were

engaged, purging the sump pits and allowing for the collection of fresh sump water. Samples were kept on ice and delivered to Endyne Laboratories for analysis on the day of sampling. Results are discussed in Section 2.3.

2.2 Groundwater Sampling

On August 11, 2014, WHEM performed groundwater monitoring from the three (3) existing monitoring wells, identified on the Site Plan as MW-1, MW-2, and MW-3. Prior to sampling, wells were gauged for depth to groundwater, which ranged from 3.10 ft below top of casing (BTOC) in MW-1 to 7.04 ft BTOC in MW-2. Groundwater elevations, tabulated in Table 1 in Appendix 2, ranged from a high of 96.90 ft (MW-1) to a low of 92.16 ft (MW-2). Groundwater elevations have been mapped and contoured as shown in Figure 2 in Appendix 1. As the contours show, groundwater flow appears to flow northwestward across the Site toward North Williams Street. The horizontal hydraulic gradient is calculated at 0.14 ft/ft, or 14% (calculated from MW-1 to MW-2). It should be noted that the water level in MW-2 may be influenced by the home's French drain system, which lowers the groundwater elevation immediately surrounding the house.

All wells were purged and sampled via peristaltic pump. Low-flow parameters were not collected, but the pump rate was set at a non-turbid rate of approximately 200 ml/min. Each well was pumped of three well volumes or, in the case of MW-2, was pumped dry. All wells were allowed to recharge prior to sampling.

Purged groundwater from MW-2 had a detectable septic odor, though there is no sign of a leaking sewer line from inside the house. Purged groundwater from MW-1 had a detectable petroleum odor and faint sheen. Groundwater from MW-3 possessed no odor or sheen.

Quality Assurance/Quality Control (QA/QC) samples included a duplicate and trip blank, which was prepared at Endyne Laboratories on August 8. The duplicate sample was collected in conjunction with the sample from MW-1, using the same sampling methodology. Results of the QA/QC sampling, shown in the lab report in Appendix 3, indicate that that results for all compounds reported at least twice the practical quantitation limit (PQL) were below 20% relative percent difference (RPD), indicating acceptable analytical results and sample parity. No contaminants were detected in the trip blank.

2.3 Groundwater and Sump Results

The groundwater results are presented in Table 2 of Appendix 2. The full laboratory report is provided in Appendix 3. All concentrations have been compared to the Vermont Groundwater Enforcement Standards (VGES). These results, shown in micrograms per liter (ug/L), are summarized below:

- Results from the April 2014 Sump sampling event revealed Naphthalene in exceedance of the VGES (20 ug/L) in both Sump North and Sump South (29.6 ug/L and 70.1 ug/L, respectively). The concentration detected in Sump North was consistent with the previous two sampling events, while the concentration in Sump South was markedly higher (compared to 4.9 ug/L in December 2013). The mobilization of contaminated groundwater caused by excavating and removing the compacted source soils was the likely cause of this spike in concentration. There were no other exceedances reported in April 2014.

- Results from the August 11, 2014 Sump sampling event were consistent with previous monitoring events. Both Sump North and Sump South reported a typical suite of petroleum VOCs, with Naphthalene exceeding the VGES in both locations (24.5 ug/L and 38.3 ug/L, respectively). VOC concentrations in Sump South continue to be elevated compared to pre-excavation sampling events, attributable to the mobilization of contaminated compounds following sump excavation.

- Results from the August 11, 2014 monitoring well sampling event were consistent with previous monitoring events. A suite of petroleum VOCs was detected in MW-1, but no contaminants were reported in exceedance of VGES. No VOCs were detected in downgradient wells MW-2 or MW-3.

- Based on the reported concentrations in groundwater, it continues to be unlikely that VGES is exceeded for any compounds at the downgradient property line.

3.0 SUMP DISCHARGE AND TREATMENT SYSTEM EVALUATION

3.1 Sump Metering

On April 21, 2014, Kill-a-Watt™ brand wattage meters were installed at both Sump North and Sump South pumps in order to monitor approximate pumping volumes. Clean water was added to each sump pit until the pumps were activated, and the wattage meters were monitored for changes. Based on volumes pumped during each cycle, calculated by change in water thickness and sump volume, and the number of pump cycles per 0.01 KW-h, it was determined that Sump North pumps approximately 1900 gallons/KW-h and Sump South pumps approximately 1800 gallons/KW-h. The slight difference between the two pumps, which are the same model, is in the float; the float at Sump South is set lower, and so the sump pump activates more often but pumps a smaller volume.

WHEM returned on April 29, a week after installing the meters, to check metering functionality and to get an initial estimate of pumping rates during high-water periods. At this time, samples were also collected from the sumps. Sump North, which is set lower in elevation and collects significantly more water than Sump South, had pumped approximately 988 gallons (0.52 KW-h). Sump South had pumped only 72 gallons (0.04 KW-h).

The most recent meter check was on August 11, 2014. At that time, 13,680 gallons had been pumped from Sump North and 594 gallons had been pumped from Sump South, for a cumulative 14,274 gallons of sump water from April 21 to August 11. Averaged over this period, approximately 127.45 gallons per day of sump water is collected and discharged into the sanitary sewer system. These calculations, although approximate, are valuable in designing appropriate treatment tools and selecting appropriate discharge methods. At this time, both wattage meters are installed at the sumps for continued monitoring of discharge volumes.

3.2 Dry Well Feasibility Survey

On August 1, 2014, WHEM field staff met with Alan Marcelino of A. Marcelino & Co. Excavating to walk the site and assess the feasibility of installing a dry well for the disposal of treated sump water as an alternative to discharging it to the City sewer system.

Installation of a dry well in front of the house was deemed inappropriate due to the slope of the front lawn and the location of sewer and utility lines. The shallow water table along the southern

portion of the property, as determined by MW-3, suggested to Mr. Marcelino that there would be no assurance of system functionality during heavy precipitation events. Pumping the water upgradient into the back yard would be effective as a temporary measure, but would cost substantively more energy in the long run and made little common sense.

At the end of the meeting, Mr. Marcelino asserted that the property was not suitable for a dry well installation. During high water events, especially flashy precipitation events, the possibility of overloading the dry well and causing flooding or other property damage makes these locations unsuitable for dry well installation. At that time, WHEM began to more aggressively pursue a permit from the Burlington DPW for continued discharge to the sanitary sewer.

3.3 Correspondence with Burlington DPW

After sharing the above discharge calculations and meeting conclusions with Burlington DPW personnel Steve Roy and Megan Moir on August 21, 2014 via e-mail, WHEM received correspondence from the Burlington DPW on September 19, 2014 outlining requirements that would allow for at least temporary discharge of treated sump water into the sanitary sewer. The correspondence notes that the conditions of such an agreement are as follows:

- Mr. Young will need to obtain and follows all requirements of *General Permit 3-9016, Discharges From Petroleum Related Remediation Activities to Publically Owned Treatment Works*.
- Burlington DPW receives copies of all monitoring reports submitted to DEC.
- DPW is notified of any system failure that would lead to higher concentrations being sent to the wastewater treatment plant.
- Discharge metering is compatible with DPW's radio-read system for water and sewer, and the owner agrees to pay the wastewater rate for this discharge (currently $5.44/ft^3).
- There is no guarantee that continued discharge will be permitted once treatment of contaminated water is complete.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results presented in this report, WHEM reaches the following conclusions:

1. Following excavation of contaminated soils located beneath the Sump South crawlspace, detected VOC concentrations in Sump South rose considerably and continue to be elevated compared to original results. This is likely due to the mobilization of contaminated groundwater following the removal of compacted source material, and will help in more rapidly treating existing groundwater contamination. Naphthalene exceeded the VGES in Sump South in April and August 2014 sampling events.
2. Contaminant concentrations remained stable in Sump North, where Naphthalene exceeded the VGES in both April and August 2014 sampling events.
3. Based on August 2014 data, groundwater flow across the site is towards the northwest and North Williams Street, at a calculated gradient of approximately 0.14 ft/ft. The water table near MW-2 may be artificially low due to its proximity to the sewer line, as evidenced by the reported septic odor of purged groundwater from that well.
4. A suite of VOCs was detected below VGES in MW-1, near the former tank grave. No petroleum VOCs were detected in downgradient wells MW-2 and MW-3, which is consistent with previous data.
5. Between April 21, 2014 and August 11, 2014, approximately 14,274 gallons of water was pumped from Sump North and Sump South combined. Most of this water (13,680 gallons) was pumped from Sump North. This is equivalent to a cumulative pumping rate of 127.45 gallons per day.
6. Following a site survey with an excavator and review of groundwater elevation data, there does not appear to be a suitable on-property location for the installation of a dry well for sump discharge. Correspondence with the Burlington DPW suggests that the City may be amenable to allowing discharge of treated sump water to the sanitary sewer in accordance with General Permit 3-9016, with reporting and metering requirements. After treatment is complete, however, continued discharge may not be allowed from the illegally installed sumps.
7. There remains some concern of the potential for vapor intrusion due to the continued influx of contaminated groundwater into the basement.

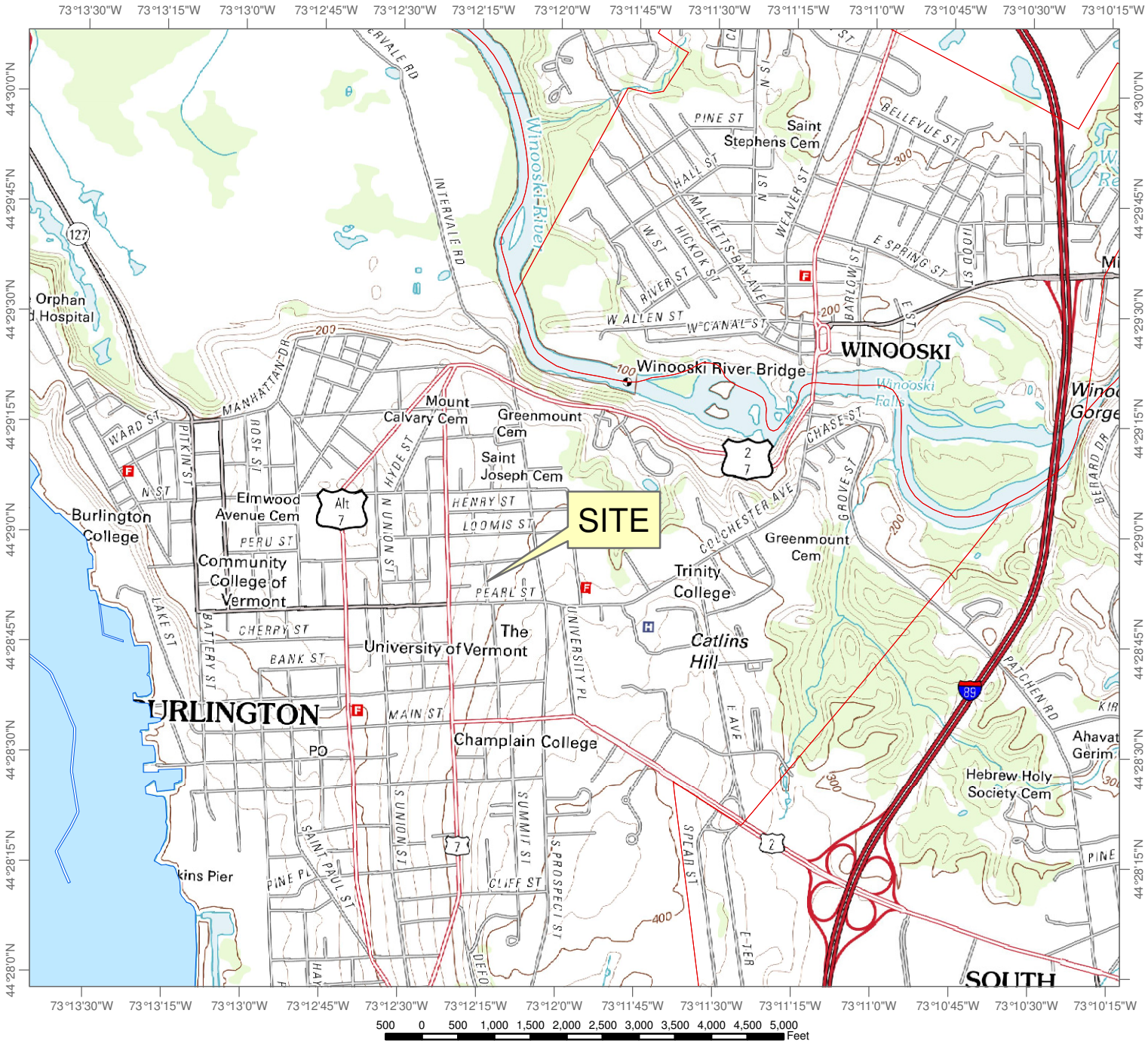
Based on these conclusions, and requests from Mr. Martinez-Cazón to consider air indoor testing, sump sealing, estimating remaining contaminant mass, and Corrective Action Plan (CAP) development, WHEM recommends the following:

1. Drafting of design plans for treatment system to be installed. The treatment system installation will involve re-routing the discharge from Sump South toward Sump North, where the combined stream will go into a settling chamber, pumped through an activated carbon drum for treatment, installation of influent and effluent sampling points, installation of radio-read meter, and discharge to sanitary sewer. The sumps would also be sealed to limit vapor intrusion.
2. Applying for GP 3-9016.
3. Following sump sealing and treatment system construction, a round of indoor air monitoring for contaminants of concern via EPA Method TO-15.
4. Use of existing soil and groundwater sampling data to estimate the remaining contaminant mass.
5. Bimonthly sampling from treated discharge, with reporting to state and city in accordance with GP 3-9016.
6. Quarterly or semi-annual influent sampling to track changes in contaminant concentration over time. The next sump monitoring event is scheduled for November 2014.
7. Quarterly or semi-annual groundwater sampling to track contaminant trends in groundwater monitoring wells. The next groundwater monitoring event is scheduled for November 2014, in conjunction with sump sampling.
8. Generating an As-Built Report for the treatment system, following the first round of post-installation monitoring.

WHEM will develop a Corrective Action Plan to further describe the scope of work above, and develop a cost estimate for the work. WHEM assumes that most of the work described above will be eligible for reimbursement by the Petroleum Cleanup Fund (PCF).

APPENDIX 1

FIGURES



USGS

Young Property
28 N. Williams Street
Burlington, Vermont

October 1, 2013
Map produced by:
C:\Users\MILESW~1\AppData\Local\Temp\~DFE51841EF9C75B4E3.TMP

Subject Area
Town Boundary

Site Coordinates:
Geographic (Degrees Minutes Seconds):
Northing: 0
Easting: 0
VT State Plane Meters:

Circle Radius: 0.5 mile(s)

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• Hydrogeology • Environmental Services •
• Water and Wastewater Design •
Burlington, Vermont • (802) 860-9400

References:

United States Geological Survey xxxx Vermont Quadrangle. Computer file, USGS. Distributed through Vermont Center for Geographic Information, April 2007.
Town boundary, best sources. Computer file, bndhash, Vermont Center for Geographic Information, Waterbury, VT. Distributed through Vermont Center for Geographic Information, Inc. 2007.

GARAGE

ASPHALT DRIVEWAY

ADDITION

JANUARY 2014 EXCAVATION LIMITS

SIDEWALK

RELICT U.S.T. REMOVED SEPTEMBER 2013

SEPTEMBER 2013 EXCAVATION LIMITS

MW-1

FRENCH DRAIN

SUMP SOUTH

SUMP NORTH

ASSUMED AREA OF REMAINING CONTAMINATED SOIL (HATCHED)

YOUNG RESIDENCE
28 N. WILLIAMS STREET
SITE #2013-4436

UNUSED A.S.T. REMOVED IN JANUARY 2014

HUDDLE RESIDENCE
34 N. WILLIAMS STREET
SITE #2011-4316

20 N. WILLIAMS STREET

MW-2

MW-3

WATER LINE (APPROX)

SEWER LINE (APPROX)

ASPHALT DRIVE

SIDEWALK

N. WILLIAMS STREET

LEGEND

- PROPERTY LINE FROM TAX MAP (APPROX)
- SUMP PUMP INSTALLED BY OWNER
- MW-1 MONITORING WELL INSTALLED BY WHEM

0 5 10 20

GRAPHIC SCALE: 1"=10'

NOTES:
1. BASE PLAN IS ORIGINAL BLUEPRINT OF HOUSE PROVIDED BY OWNER.
2. ALL LOCATIONS APPROXIMATE. THIS IS NOT A SURVEYED PLAN.

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1

DATE: 10/3/14
PROJECT NO.
DRAWN BY: D.W.F.
PROJ. MGR: C.P.
APPROVED: M.E.W.

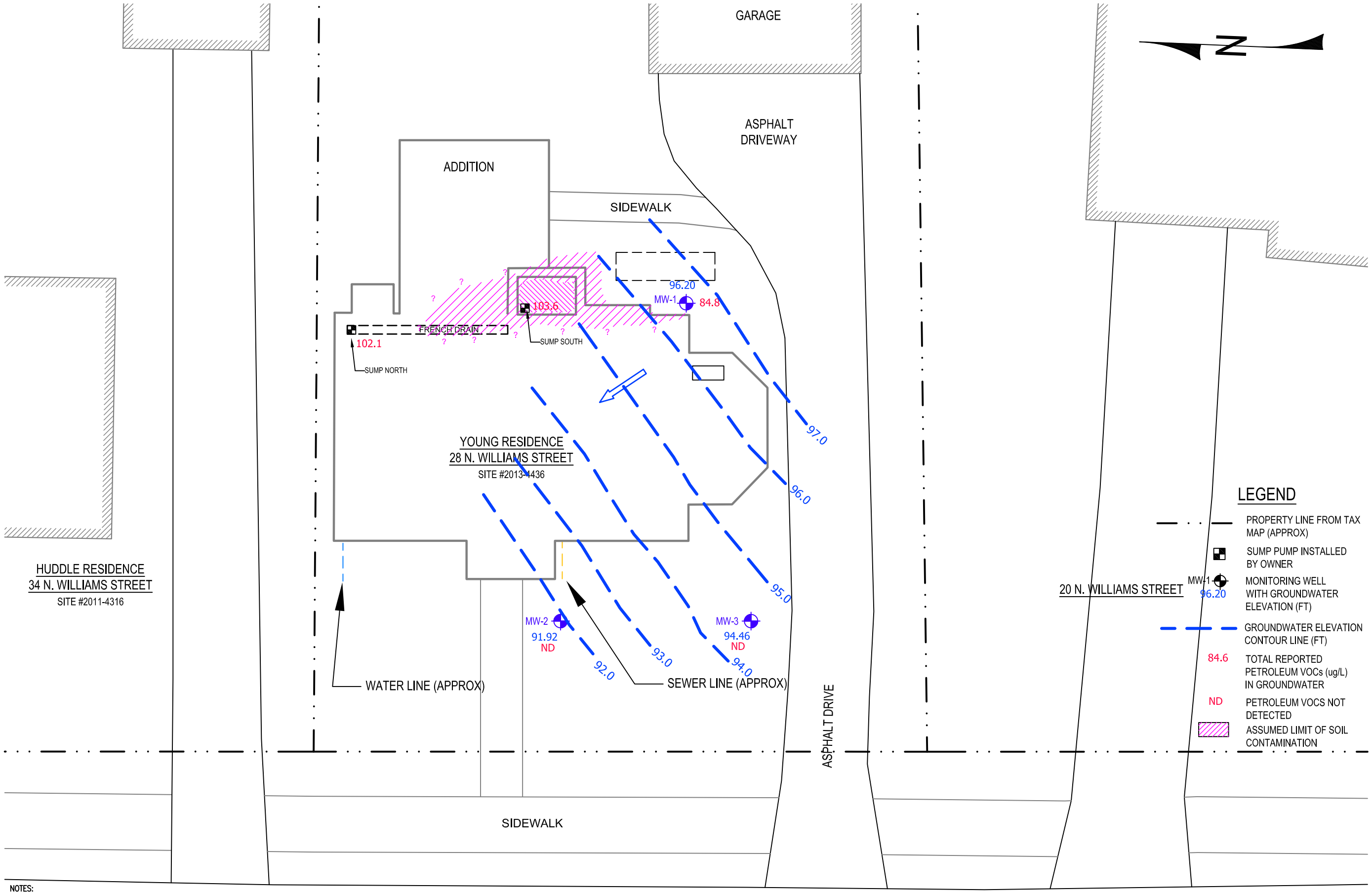
☐ DRAFT ☒ FINAL

YOUNG
28 NORTH WILLIAMS STREET
BURLINGTON, VERMONT

SITE PLAN

FILE: Young Williams Street.dwg

SCALE: 1" = 10'



NOTES:
1. GROUNDWATER ELEVATIONS ARE RELATIVE TO THE ELEVATION OF THE TOP-OF-CASING (TOC) OF WELL MW-1, ABRITRARILY SET AT 100.0 FT. SURVEY CONDUCTED BY WHEM IN DECEMBER 2013.
2. GROUNDWATER ELEVATIONS ARE FROM AUGUST 11, 2014.
3. TOTAL PETROLEUM VOCS IS CALCULATED AS SUM OF CONCENTRATIONS OF THE COMPOUNDS BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, TRIMETHYLBENZENES, NAPTHALENE, AND MTBE. SAMPLES COLLECTED ON AUGUST 11, 2014.

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2

DATE: 10/3/14
PROJECT NO.
DRAWN BY: D.W.F.
PROJ. MGR: C.P.
APPROVED: M.E.W.

☐ DRAFT ☒ FINAL

YOUNG
28 NORTH WILLIAMS STREET
BURLINGTON, VERMONT

GROUNDWATER ELEVATION AND CONTAMINANT CONCENTRATION MAP - AUGUST 2014

FILE: Young Williams Street.dwg

SCALE: 1" = 10'

APPENDIX 2

TABLES

TABLE 1.0
Groundwater Elevation Measurements:
Young Residence
28 N. Williams Street, Burlington
SMS Site #2013-4436

Well ID	Measuring Point (ft)	Measuring Point Elevation (ft)	Date	Depth to Water (ft btoc)	Groundwater Elevation (ft)
MW-1	TOC	100.00	12/23/13	3.80	96.20
			8/11/14	3.10	96.90
MW-2	TOC	99.20	12/23/13	7.28	91.92
			8/11/14	7.04	92.16
MW-3	TOC	98.54	12/23/13	4.08	94.46
			8/11/14	3.87	94.67

Notes:
-All elevations in feet, relative to arbitrary benchmark (MW-1 top of casing)
-"<"= less than bottom elevation of well, signifiying that the well dry during monitoring event; "NA" =not available;
blank = not sampled.

TABLE 2.0
Groundwater Quality Data
Young Residence
28 N. Williams St, Burlington, Vermont

Well	Units	VGES	Sump South			
Sample Date			9/12/2013	12/23/2013	4/29/2014	8/11/2014
Depth to water (feet below top of casing)			na	na	na	na
PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8021B)						
MTBE	ug/L (ppb)	40	ND / < 10.0	ND / < 2.0	ND / < 2.0	ND / < 2.0
Benzene	ug/L (ppb)	5.0	ND / < 5.0	ND / < 1.0	**2.5**	ND / < 5.0
Toluene	ug/L (ppb)	1,000	ND / < 5.0	ND / < 1.0	ND / < 1.0	ND / < 1.0
Ethylbenzene	ug/L (ppb)	700	ND / < 5.0	**2.5**	**13.6**	**16.9**
Xylenes	ug/L (ppb)	10,000	**18.9**	**2.5**	**22.9**	**14.0**
1,3,5-Trimethylbenzene	ug/L (ppb)	350	**5.3**	ND / < 1.0	**22.8**	**8.0**
1,2,4-Trimethylbenzene	ug/L (ppb)		**8.7**	**1.7**	**27.0**	**26.4**
Naphthalene	ug/L (ppb)	20	**15.8**	**4.9**	**70.1**	**38.3**
TOTAL PETROLEM VOCS	*ug/L (ppb)*	--	***48.7***	***11.6***	***156.4***	***103.6***
Unidentified Peaks	#	--	>10	>10	>10	>10
NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)						
Acetone	ug/L (ppb)	700		ND / < 10.0		
Bromodichloromethane	ug/L (ppb)	80		ND / < 0.5		
Chloroform	ug/L (ppb)			ND / < 1.0		
2-Butanone	ug/L (ppb)	4200		ND / < 10.0		
TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)						
TPH-DRO	mg/L (ppm)		**15.8**			

Well	Units	VGES	Sump North			
Sample Date			9/12/2013	12/23/2013	4/29/2014	8/11/2014
Depth to water (feet below top of casing)			na	na	na	na
PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8021B)						
MTBE	ug/L (ppb)	40	ND / < 2.0	ND / < 2.0	ND / < 2.0	ND / < 2.0
Benzene	ug/L (ppb)	5.0	ND / < 1.0	**1.4**	**1.6**	**2.1**
Toluene	ug/L (ppb)	1,000	ND / < 1.0	ND / < 1.0	ND / < 1.0	ND / < 1.0
Ethylbenzene	ug/L (ppb)	700	ND / < 1.0	**4.2**	**8.6**	**11.2**
Xylenes	ug/L (ppb)	10,000	**9.3**	**14.4**	**25.3**	**26.4**
1,3,5-Trimethylbenzene	ug/L (ppb)	350	**6.3**	**8.4**	**11.6**	**9.8**
1,2,4-Trimethylbenzene	ug/L (ppb)		**8.6**	**17.5**	**20.0**	**28.1**
Naphthalene	ug/L (ppb)	20	**22.7**	**23.3**	**29.6**	**24.5**
TOTAL PETROLEM VOCS	*ug/L (ppb)*	--	***46.9***	***69.2***	***96.7***	***102.1***
Unidentified Peaks	#	--	>10	>10	>10	>10
NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)						
Acetone	ug/L (ppb)	700		ND / < 10.0		
Bromodichloromethane	ug/L (ppb)	80		ND / < 0.5		
Chloroform	ug/L (ppb)			ND / < 1.0		
2-Butanone	ug/L (ppb)	4200		ND / < 10.0		
TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)						
TPH-DRO	mg/L (ppm)		**10.8**			

Well	Units	VGES	MW-1			
Sample Date				12/23/2013		8/11/2014
Depth to water (feet below top of casing)				3.80		3.10
PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8021B)						
MTBE	ug/L (ppb)	40		ND / < 4.0		ND / < 2.0
Benzene	ug/L (ppb)	5.0		**3.7**		ND / < 5.0
Toluene	ug/L (ppb)	1,000		**5.4**		**5.4**
Ethylbenzene	ug/L (ppb)	700		**7.1**		**10.6**
Xylenes	ug/L (ppb)	10,000		**26.4**		**34.7**
1,3,5-Trimethylbenzene	ug/L (ppb)	350		**8.9**		**7.9**
1,2,4-Trimethylbenzene	ug/L (ppb)			**19.0**		**15.9**
Naphthalene	ug/L (ppb)	20		**16.2**		**10.3**
TOTAL PETROLEM VOCS	*ug/L (ppb)*	--		***86.7***		***84.8***
Unidentified Peaks	#	--		>10		>10
NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)						
Acetone	ug/L (ppb)	700		**268**		
Bromodichloromethane	ug/L (ppb)	80		ND / < 1.0		
Chloroform	ug/L (ppb)			ND / < 2.0		
2-Butanone	ug/L (ppb)	4200		**812**		
TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)						
TPH-DRO	mg/L (ppm)					

TABLE 2.0
Groundwater Quality Data
Young Residence
28 N. Williams St, Burlington, Vermont

Well	Units	VGES	MW-2			
Sample Date				12/23/2013		8/11/2014
Depth to water (feet below top of casing)				7.28		7.04
PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8021B)						
MTBE	ug/L (ppb)	40		ND / < 2.0		ND / < 2.0
Benzene	ug/L (ppb)	5.0		ND / < 1.0		ND / < 1.0
Toluene	ug/L (ppb)	1,000		ND / < 1.0		ND / < 1.0
Ethylbenzene	ug/L (ppb)	700		ND / < 1.0		ND / < 1.0
Xylenes	ug/L (ppb)	10,000		ND / < 2.0		ND / < 2.0
1,3,5-Trimethylbenzene	ug/L (ppb)	350		ND / < 1.0		ND / < 1.0
1,2,4-Trimethylbenzene	ug/L (ppb)			ND / < 1.0		ND / < 1.0
Naphthalene	ug/L (ppb)	20		ND / < 2.0		ND / < 2.0
TOTAL PETROLEM VOCS	*ug/L (ppb)*	--		*ND / < 5.0*		*ND / < 5.0*
Unidentified Peaks	#	--		0		1
NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)						
Acetone	ug/L (ppb)	700		**67.3**		
Bromodichloromethane	ug/L (ppb)	80		**1.4**		
Chloroform	ug/L (ppb)			**18.2**		
2-Butanone	ug/L (ppb)	4200		ND / < 10.0		
TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)						
TPH-DRO	mg/L (ppm)					

Well	Units	VGES	MW-3			
Sample Date				12/23/2013		8/11/2014
Depth to water (feet below top of casing)				4.04		3.87
PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8021B)						
MTBE	ug/L (ppb)	40		ND / < 2.0		ND / < 2.0
Benzene	ug/L (ppb)	5.0		ND / < 1.0		ND / < 1.0
Toluene	ug/L (ppb)	1,000		ND / < 1.0		ND / < 1.0
Ethylbenzene	ug/L (ppb)	700		ND / < 1.0		ND / < 1.0
Xylenes	ug/L (ppb)	10,000		ND / < 2.0		ND / < 2.0
1,3,5-Trimethylbenzene	ug/L (ppb)	350		ND / < 1.0		ND / < 1.0
1,2,4-Trimethylbenzene	ug/L (ppb)			ND / < 1.0		ND / < 1.0
Naphthalene	ug/L (ppb)	20		ND / < 2.0		ND / < 2.0
TOTAL PETROLEM VOCS	*ug/L (ppb)*	--		*ND / < 5.0*		*ND / < 5.0*
Unidentified Peaks	#	--		0		1
NON-PETROLEUM VOLATILE ORGANIC COMPOUNDS (VOCs) (EPA Method 8260)						
Acetone	ug/L (ppb)	700		ND / < 10.0		
Bromodichloromethane	ug/L (ppb)	80		ND / < 0.5		
Chloroform	ug/L (ppb)			ND / < 1.0		
2-Butanone	ug/L (ppb)	4200		ND / < 10.0		
TOTAL PETROLEUM HYDROCARBONS - DIESEL RANGE ORGANICS (EPA Method 8015B)						
TPH-DRO	mg/L (ppm)					

NOTES:
1. ND = not detected above any of the estimated reporting limits.
2. VGES = Vermont Groundwater Enforcement Standards, February 2005.
3. Results reported above the method detection limit are indicated in bold.
5. Shaded results are above guideline.
6. NA = Compound not analyzed

TABLE 3.0
Sump Flow Data
Young Residence
28 N. William Street, Burlington, VT

Gallons per kW-h (approximate):
Sump N: **1900**
Sump S: **1800**

Location	Date	Time	Meter reading kW-h	Gallons Pumped per Cycle	Gallons Pumped Cumulative	Hours elapsed		GPD		Sample Collected?
						Since Previous Reading	Since Meter Installation	Since Previous Reading	Since Meter Installation	
Meter installed	21-Apr	12:00	0.00	0	0	0	0			no
Sump N	29-Apr	10:00	0.52	988	988	190	190	124.80	124.80	yes
Sump N	8-May	17:30	1.14	1,178	2,166	224	413	126.50	125.72	no
Sump N	11-Aug	12:00	7.20	11,514	13,680	2,275	2,688	121.49	122.14	yes
Meter installed	21-Apr	12:00	0.00	0	0	0	0			no
Sump S	29-Apr	10:00	0.04	72	72	190	190	9.09	9.09	yes
Sump S	8-May	17:30	0.09	90	162	224	413	9.66	9.40	no
Sump S	11-Aug	12:00	0.33	432	594	2,275	2,688	4.56	5.30	yes
				TOTAL	14,274				127.45	

APPENDIX 3

LABORATORY REPORTS

ENDYNE Inc.
Environmental Laboratories

WaiteHeindel Environmental Mgt	
7 Kilburn Street	100675
Suite 301	
Burlington, VT 05406	
Atten: Miles Waite	

PROJECT: Young
WORK ORDER: **1404-07467**
DATE RECEIVED: April 29, 2014
DATE REPORTED: May 03, 2014
SAMPLER: Chris Page

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 05/03/2014

CLIENT: WaiteHeindel Environmental Mgt
PROJECT: Young

WORK ORDER: **1404-07467**
DATE RECEIVED: 04/29/2014

001 Site: Sump N Date Sampled: 4/29/14 Time: 10:06

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Vt Petroleum List 8021B							
Methyl-t-butyl ether (MTBE)	< 2.0	ug/L	EPA 8021B	5/1/14	W SJM	N	
Benzene	1.6	ug/L	EPA 8021B	5/1/14	W SJM	N	
Toluene	< 1.0	ug/L	EPA 8021B	5/1/14	W SJM	N	
Ethylbenzene	8.6	ug/L	EPA 8021B	5/1/14	W SJM	N	
Xylenes, Total	25.3	ug/L	EPA 8021B	5/1/14	W SJM	N	
1,3,5-Trimethylbenzene	11.6	ug/L	EPA 8021B	5/1/14	W SJM	N	
1,2,4-Trimethylbenzene	20.0	ug/L	EPA 8021B	5/1/14	W SJM	N	
Naphthalene	29.6	ug/L	EPA 8021B	5/1/14	W SJM	N	
Surr. 1 (Bromobenzene)	105	%	EPA 8021B	5/1/14	W SJM	N	
Unidentified Peaks	>10		EPA 8021B	5/1/14	W SJM	N	

002 Site: Sump S Date Sampled: 4/29/14 Time: 10:17

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Vt Petroleum List 8021B							
Methyl-t-butyl ether (MTBE)	< 2.0	ug/L	EPA 8021B	5/1/14	W SJM	N	
Benzene	2.5	ug/L	EPA 8021B	5/1/14	W SJM	N	
Toluene	< 1.0	ug/L	EPA 8021B	5/1/14	W SJM	N	
Ethylbenzene	13.6	ug/L	EPA 8021B	5/1/14	W SJM	N	
Xylenes, Total	22.9	ug/L	EPA 8021B	5/1/14	W SJM	N	
1,3,5-Trimethylbenzene	22.8	ug/L	EPA 8021B	5/1/14	W SJM	N	
1,2,4-Trimethylbenzene	27.0	ug/L	EPA 8021B	5/1/14	W SJM	N	
Naphthalene	70.1	ug/L	EPA 8021B	5/1/14	W SJM	N	
Surr. 1 (Bromobenzene)	113	%	EPA 8021B	5/1/14	W SJM	N	
Unidentified Peaks	>10		EPA 8021B	5/1/14	W SJM	N	

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: Young - Williams Street 2013-51 No 69156

Project Name: Young	Client/Contact Name: Miles Waite	Sampler Name: Chris Page
State of Origin: VT X NY __ NH __ Other __	Phone #: 802 860 9400 x101	Phone #: 802 860 9400 x104
Endyne WO # 1404-07467	Mailing Address: WHEM	Billing Address: WHEM

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	FieldResults/Remarks	Due Date
Sump N	H2O	X		4/29/14 1006	2	40ml	HCl	19		
Sump S	↓	↓		↓ 1017	↓	↓	↓	↓		

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
[signature]	4/29/14 15:25			Eileen Cooney	4/29/14 @ 15:25

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY
Delivery: Client
Temp: 7.1
Comment: on ice

(White - Laboratory / Yellow - Client)

Page ____ of ____

ENDYNE Inc.
Environmental Laboratories

Laboratory Report

WaiteHeindel Environmental Mgt	100675
7 Kilburn Street	
Suite 301	
Burlington, VT 05406	
Atten: Miles Waite	

PROJECT: Young Residence
WORK ORDER: **1408-15944**
DATE RECEIVED: August 11, 2014
DATE REPORTED: August 15, 2014
SAMPLER: Chris

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corresponding NELAC and Qual fields.

The NELAC column also denotes the accreditation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation for that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as they were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

CLIENT: WaiteHeindel Environmental Mgt
PROJECT: Young Residence
REPORT DATE: 8/15/2014

WORK ORDER: **1408-15944**
DATE RECEIVED: 08/11/2014

TEST METHOD: EPA 8021B

001 Site: Trip Blank Date Sampled: 8/8/14 09:50 Analysis Date: 8/13/14 W MHM

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Methyl-t-butyl ether (MTBE)	< 2.0	ug/L	N		Benzene	< 1.0	ug/L	N	
Toluene	< 1.0	ug/L	N		Ethylbenzene	< 1.0	ug/L	N	
Xylenes, Total	< 2.0	ug/L	N		1,3,5-Trimethylbenzene	< 1.0	ug/L	N	
1,2,4-Trimethylbenzene	< 1.0	ug/L	N		Naphthalene	< 2.0	ug/L	N	
Surr. 1 (Bromobenzene)	107	%	N		Unidentified Peaks	0		N	

TEST METHOD: EPA 8021B

002 Site: MW-2 Date Sampled: 8/11/14 10:40 Analysis Date: 8/13/14 W MHM

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Methyl-t-butyl ether (MTBE)	< 2.0	ug/L	N		Benzene	< 1.0	ug/L	N	
Toluene	< 1.0	ug/L	N		Ethylbenzene	< 1.0	ug/L	N	
Xylenes, Total	< 2.0	ug/L	N		1,3,5-Trimethylbenzene	< 1.0	ug/L	N	
1,2,4-Trimethylbenzene	< 1.0	ug/L	N		Naphthalene	< 2.0	ug/L	N	
Surr. 1 (Bromobenzene)	112	%	N		Unidentified Peaks	1		N	

TEST METHOD: EPA 8021B

003 Site: MW-3 Date Sampled: 8/11/14 11:05 Analysis Date: 8/13/14 W MHM

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Methyl-t-butyl ether (MTBE)	< 2.0	ug/L	N		Benzene	< 1.0	ug/L	N	
Toluene	< 1.0	ug/L	N		Ethylbenzene	< 1.0	ug/L	N	
Xylenes, Total	< 2.0	ug/L	N		1,3,5-Trimethylbenzene	< 1.0	ug/L	N	
1,2,4-Trimethylbenzene	< 1.0	ug/L	N		Naphthalene	< 2.0	ug/L	N	
Surr. 1 (Bromobenzene)	110	%	N		Unidentified Peaks	1		N	

TEST METHOD: EPA 8021B

004 Site: MW-1 Date Sampled: 8/11/14 11:25 Analysis Date: 8/13/14 W MHM

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Methyl-t-butyl ether (MTBE)	< 10.0	ug/L	N		Benzene	< 5.0	ug/L	N	
Toluene	5.4	ug/L	N		Ethylbenzene	10.6	ug/L	N	
Xylenes, Total	34.7	ug/L	N		1,3,5-Trimethylbenzene	7.9	ug/L	N	
1,2,4-Trimethylbenzene	15.9	ug/L	N		Naphthalene	10.3	ug/L	N	
Surr. 1 (Bromobenzene)	103	%	N		Unidentified Peaks	> 10		N	

TEST METHOD: EPA 8021B

005 Site: Sump-N Date Sampled: 8/11/14 11:42 Analysis Date: 8/13/14 W MHM

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Methyl-t-butyl ether (MTBE)	< 2.0	ug/L	N		Benzene	2.1	ug/L	N	
Toluene	< 1.0	ug/L	N		Ethylbenzene	11.2	ug/L	N	
Xylenes, Total	26.4	ug/L	N		1,3,5-Trimethylbenzene	9.8	ug/L	N	
1,2,4-Trimethylbenzene	28.1	ug/L	N		Naphthalene	24.5	ug/L	N	
Surr. 1 (Bromobenzene)	98	%	N		Unidentified Peaks	> 10		N	

CLIENT: WaiteHeindel Environmental Mgt
PROJECT: Young Residence
REPORT DATE: 8/15/2014

WORK ORDER: **1408-15944**
DATE RECEIVED: 08/11/2014

TEST METHOD: EPA 8021B

006 Site: Sump-S Date Sampled: 8/11/14 11:55 Analysis Date: 8/13/14 W MHM

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Methyl-t-butyl ether (MTBE)	< 10.0	ug/L	N		Benzene	< 5.0	ug/L	N	
Toluene	< 5.0	ug/L	N		Ethylbenzene	16.9	ug/L	N	
Xylenes, Total	14.0	ug/L	N		1,3,5-Trimethylbenzene	8.0	ug/L	N	
1,2,4-Trimethylbenzene	26.4	ug/L	N		Naphthalene	38.3	ug/L	N	
Surr. 1 (Bromobenzene)	105	%	N		Unidentified Peaks	> 10		N	

TEST METHOD: EPA 8021B

007 Site: Duplicate Date Sampled: 8/11/14 Analysis Date: 8/13/14 W MHM

Parameter	Result	Unit	Nelac	Qual	Parameter	Result	Unit	Nelac	Qual
Methyl-t-butyl ether (MTBE)	< 10.0	ug/L	N		Benzene	< 5.0	ug/L	N	
Toluene	< 5.0	ug/L	N		Ethylbenzene	9.9	ug/L	N	
Xylenes, Total	32.5	ug/L	N		1,3,5-Trimethylbenzene	6.9	ug/L	N	
1,2,4-Trimethylbenzene	16.3	ug/L	N		Naphthalene	12.2	ug/L	N	
Surr. 1 (Bromobenzene)	106	%	N		Unidentified Peaks	> 10		N	

ENDYNE, INC.
160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

Special Reporting Instructions/PO#: Young - Williams Street

№ 70990

Project Name: Young Residence	Client/Contact Name: Chris Page	Sampler Name: Chris Page
State of Origin: VT X NY __ NH __ Other __	Phone #: 802-860-9400 x104	Phone #: WHEM x 104
Endyne WO # 1408-15944	Mailing Address: 7 Kilburn Street Burlington, VT 05401	Billing Address: WHEM

Sample Location	Matrix	GRAB	COMP	Date/Time Sampled	Sample Containers No.	Sample Containers Type/Size	Sample Preservation	Analysis Required	FieldResults/Remarks	Due Date
Trip Blank	H2O	X		8/8/14 0950	1	40ml	HCl	19		
MW-2				8/11/14 1040	2	40ml	HCl			
MW-3				1105						
MW-1				1125						
Sump-N				1142						
Sump-S				1155						
Dup				—						

Relinquished by:	Date/Time	Received by:	Date/Time	Received by:	Date/Time
[signature]	8/4/14 13:30			Eileen Mooney	8/11/14 @ 13:30

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH Only
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	8081 Pest
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	8082 PCB
4	Nitrite N	9	BOD	14	Turbidity	19	VT PCF	24	8260B	29	PP13 Metals
5	Nitrate N	10	Alkalinity	15	Conductivity	20	VOC Halocarbons	25	8270 B/N or Acid	30	Total RCRA8
31	Metals (Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, U, V, Zn										
32	TCLP (volatiles, semi-volatiles, metals, pesticides, herbicides)					33	Other				
34	Corrosivity	35	Ignitability	36	Reactivity	37	Other				
38	Other										

LAB USE ONLY
Delivery: Client
Temp: 23.5
Comment: Cooler -4.7

(White - Laboratory / Yellow - Client)