16-0537

AECOM

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May 9, 2016

Ms. Jennifer Hudon
City Clerk
City of Manitowoc
900 Quay Street
Manitowoc, Wisconsin 54220

Subject: Notification of Residual Contamination and Continuing Obligations
Flambeau Street Right-of-Way, Manitowoc, Wisconsin
WDNR BRRTs No. 02-36-553420
AECOM Project No. 60134830 (113845)

Dear Ms. Hudon:

This notification is being submitted in accordance with requirements in Wisconsin Administrative Code (WAC), Chapter NR 726 for the Wisconsin Department of Natural Resources (WDNR) to review a case closure request for the above referenced project. With this letter, the City of Manitowoc (City) is notifying you that a release containing petroleum volatile organic compounds (PVOCs) that originated within the Flambeau Street right-of-way, now the responsibility of the City, remains within the Flambeau Street right-of-way. As a result, soil and/or groundwater within the Flambeau Street right-of-way has been impacted with PVOCs.

Soil contamination was discovered in 2001 during new home construction activities at 2410 S. 18th Street and reported to the WDNR. Investigation and remedial activities were completed in 2002 including limited soil excavation within the Flambeau Street right-of-way. In June 2009 the City retained AECOM to conduct Phase II Site Investigation activities at the 2418 S. 18th Street property and/or within the Flambeau Street right-of-way. Additional investigation activities have been conducted at the site between 2011 and 2016. Based on the investigation results groundwater contamination that appears to have originated in the Flambeau Street right-of-way continues to exist within the Flambeau Street right-of-way. Levels of benzene, ethylbenzene, methyl tert butyl ether (MTBE), naphthalene, toluene, 1,2,4-trimethylbenzene (TMB), 1,3,5-TMB, xylenes, and lead contamination in the groundwater within the Flambeau Street right-of-way are above the state groundwater enforcement standards (ESs) and/or preventive action limits (PALs) found in chapter NR 140, Wisconsin Administrative Code. The estimated extent of PVOC concentrations in groundwater currently exceeding the ESs or PALs is illustrated on the attached Figure B.3.b. The groundwater analytical results are presented in the attached Table A.1.

Residual soil contamination also continues to exist within the Flambeau Street right-of-way. The remaining contaminants include benzene, ethylbenzene, methyl-tert-butyl ether, naphthalene, toluene, trimethylbenzenes, and xylenes, and gasoline range organics (GRO). The following steps have been taken to address any exposure to the remaining soil contamination. Based on the investigation results it appears the majority of contaminated soil remaining on site is located beneath the paved surface of Flambeau Street. A small volume of contaminated soil may exist within the top 4 feet within the Flambeau St. right-of-way in the grass areas north and south of the paved surface, however, contaminate concentrations do not exceed direct contact residual

contaminant levels (RCLs) and it appears that no direct contact threat exists. It is AECOMs opinion that small volumes of contaminated soil may also exist within the top 4 feet on impacted private properties located north and south of the Flambeau St. right-of-way, however, there appears to be no direct contact threat in shallow soils. The estimated extent of impacted soil is illustrated on the attached Figure B.2.b. The analytical results for residual soil contamination are presented on the attached Table A.3.

As part of the remedial response, the City is proposing a final remedy including natural attenuation of groundwater, maintenance of a concrete barrier in the Flambeau Street right-of-way, and a clean soil cover within the Flambeau Street right-of-way and private properties to the north and south.

Since the source of the soil and groundwater contamination is located within the Flambeau Street right-of-way, the City will be held responsible for additional investigation or cleanup if required in the future. The fact sheet "Continuing Obligations for Environmental Protection" (DNR publication RR 819) has been included with this letter, to help explain the responsibilities the City may have. Continuing obligations proposed for the site include maintenance of the concrete barrier and soil cover within the Flambeau Street right-of-way by the City and maintenance of the soil cover on the adjacent residential properties north and south of Flambeau Street.

As stated above, PVOCs may be present in the groundwater within the Flambeau Street right-of-way at concentrations above Chapter NR 140 ESs and/or PALs. AECOM believes that allowing natural attenuation to complete the cleanup within the Flambeau Street right-of-way will meet the requirements for case closure found in Chapter NR 726 of the WAC. AECOM will be requesting that the WDNR accept natural attenuation as the final remedy for the Flambeau Street right-of-way and grant case closure. Closure means the WDNR will not require any further investigation or cleanup action to be taken, other than the reliance on natural attenuation. The fact sheet "Using Natural Attenuation to Clean Up Contaminated Groundwater" (WDNR publication RR 671) has been included with this letter, to help explain the use of natural attenuation at impacted sites.

If soil in the specific locations described above is excavated, the property owner at the time of excavation must sample and analyze the excavated soil to determine if residual contamination remains. If sampling confirms that contamination is present the property owner at the time of excavation will need to determine whether the material would be considered solid or hazardous waste and ensure that any storage, treatment or disposal is in compliance with applicable statutes and rules. In addition, all current and future owners and occupants of the property need to be aware that excavation of the contaminated soil may pose an inhalation or other direct contact hazard and as a result special precautions may need to be taken during excavation activities to prevent a health threat to humans.

The soil cover that exists within the Flambeau Street right-of-way in the area of remaining soil contamination must be maintained in order to prevent direct contact with residual soil contamination that might otherwise pose a threat to human health. If you choose to remove any portion of the soil cover, you will need to notify the WDNR, in order to determine what additional cleanup actions may be needed.

The WDNR will not review the closure request for at least 30 days after the date of this letter. As an affected property owner, you have a right to contact the WDNR to provide any technical information that you may have that indicates that closure should not be granted for this site. If you would like to submit any information to the WDNR relevant to this closure request, you should mail that information to:

Mr. Tom Verstegen, Hydrogeologist
Wisconsin Department of Natural Resources
625 E County Rd Y, STE 700
Oshkosh, WI 54901

If this case is closed, all properties where groundwater contamination exceeds Chapter NR 140 groundwater ESs or soil contamination exceeds Chapter NR 720 direct contact or groundwater pathway RCLs will be listed on the WDNR GIS Registry of Closed Remediation Sites. The information on the GIS Registry includes maps showing the location of properties in Wisconsin where soil contamination exceeds Chapter NR 720 RCLs and where groundwater contamination exceeds Chapter NR 140 ESs which were found at the time that the case was closed.

Once the WDNR makes a decision on the closure request, it will be documented in a closure letter. If the WDNR grants closure to the City, you may obtain a copy of this letter by requesting a copy from the WDNR, by writing the agency address given above, or by accessing the WDNR GIS Registry of Closed Remediation Sites on the internet at http://dnr.wi.gov/topic/brownfields/rrsm.html A copy of the closure letter will be included as part of the site file on the GIS Registry of Closed Remediation Sites. You also will receive a letter which defines the specific continuing obligations on your property.

The attached "Notification of Continuing Obligations and Residual Contamination" (WDNR Form 4400-286) provides a summary of the information provided above and should be kept with your property records. In addition, please review the attached legal description of your property and notify me within the next 30 days if the legal description is incorrect. Should you have any questions regarding this information, please contact either Dean Fenske at (715) 342-3043 – dean.fenske@aecom.com or David Senfelds at (715) 342-3039 – david.senfelds@aecom.com.

Yours sincerely,

AECOM Technical Services, Inc.

Dean W. Fenske
Project Manager

D. S. Henderson

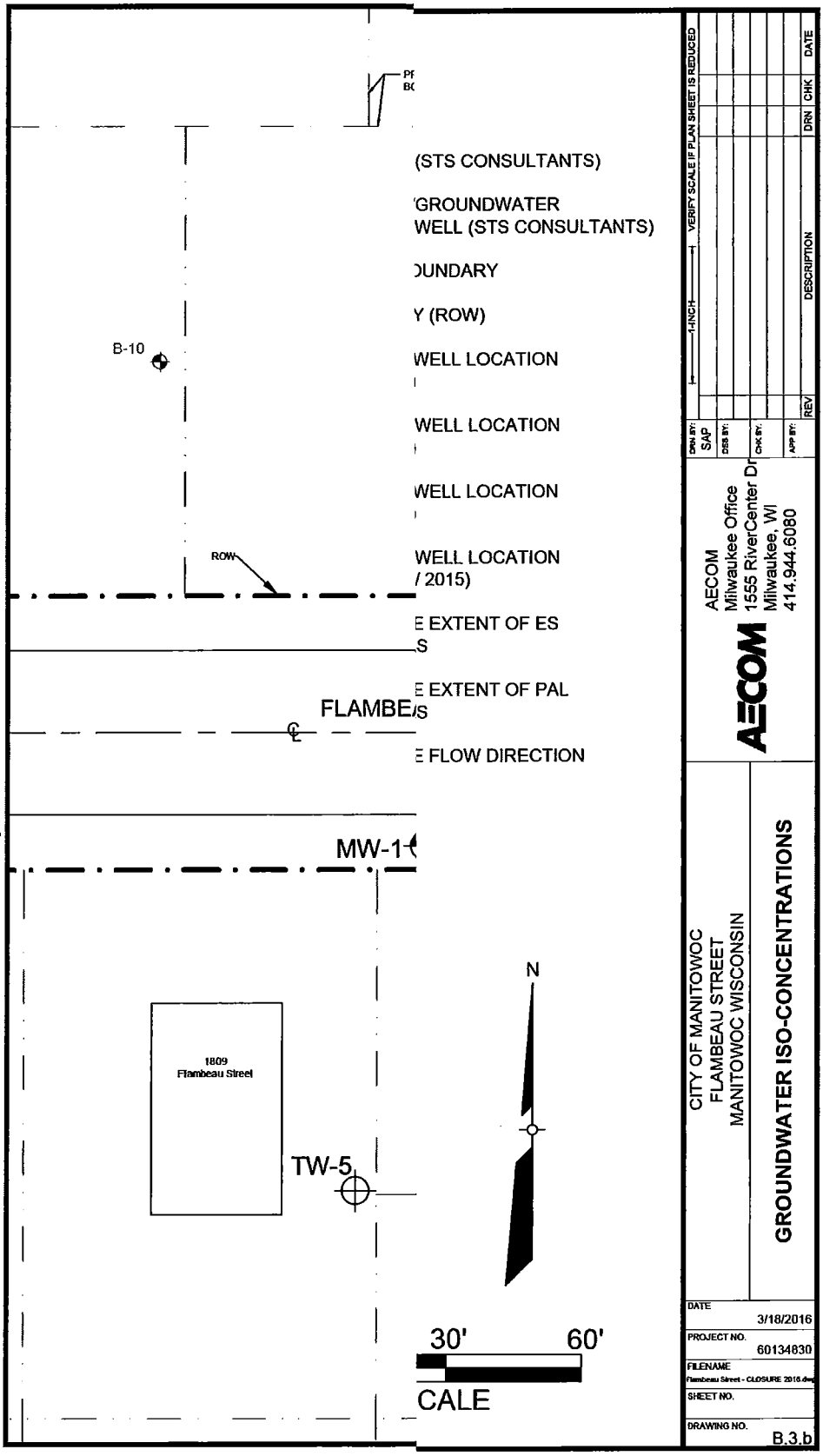
David Henderson, P.E.
Senior Project Manager/Director, Environment

Attachments:

Figure B.3.b – Groundwater Isoconcentration Map
Table A.1 – Groundwater Analytical Table
Figure B.2.b – Residual Soil Contamination Map
Table A.3 – Residual Soil Contamination Table
Continuing Obligations for Environmental Protection (WDNR publication RR 819)
Using Natural Attenuation to Clean Up Contaminated Groundwater (WDNR publication RR 671)
Notification of Continuing Obligations and Residual Contamination (WDNR Form 4400-286)

cc: Mr. Greg Minikel, P.E., Engineering Division Manager, City of Manitowoc, 900 Quay Street, Manitowoc, WI 54220

Mr. Tom Verstegen, Hydrogeologist, WDNR, 625 E County Rd Y, STE 700
Oshkosh, WI 54901



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VERIFY SCALE IF PLAN SHEET IS REDUCED
1-INCH

REV	DESCRIPTION	DRN	CHK	DATE

DRN BY: SAP
DES BY:
CHK BY:
APP BY:

AECOM
Milwaukee Office
1555 RiverCenter Dr
Milwaukee, WI
414.944.6080

CITY OF MANITOWOC
FLAMBEAU STREET
MANITOWOC WISCONSIN

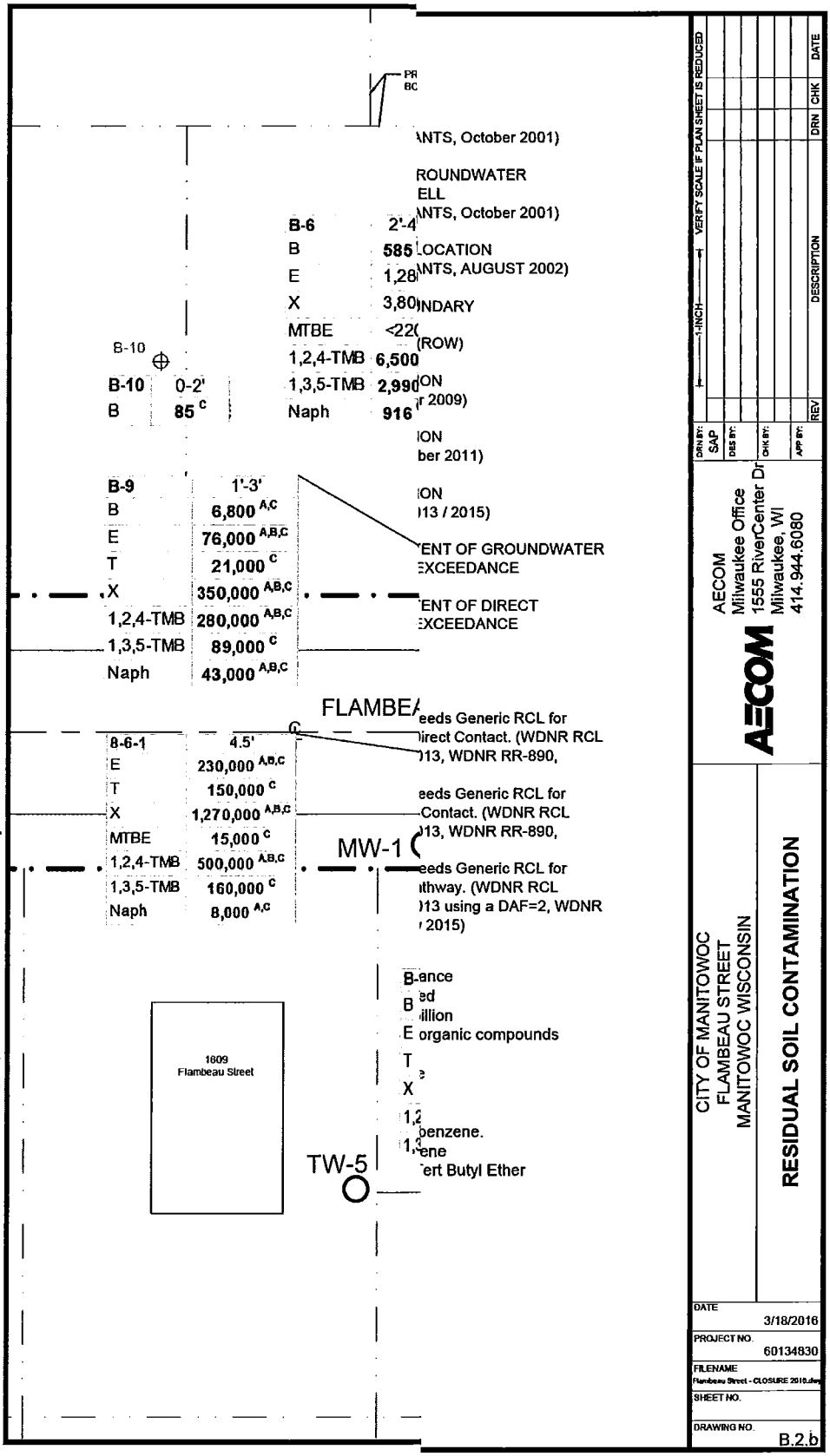
GROUNDWATER ISO-CONCENTRATIONS

DATE 3/18/2016
PROJECT NO. 60134830
FILENAME Flambeau Street - CLOSURE 2016.dwg
SHEET NO.
DRAWING NO. B.3.b

AECOM

Detected VOCs		PAL	ES	TW- 10/22	MW-5 5/7/13	MW-6 11/5/15	MW-6 2/11/16	PZ-6 11/5/15	PZ-6 2/11/16
Benzene	µg/L	0.5	5	*0.52*	<0.50	169	110	39.8	33.9
1,2-Dichloroethane	µg/L	0.5	5	NA	<0.48	<6.7	NA	<3.4	NA
Chloromethane	µg/L	3	30	NA	<0.39	<20.0	NA	<10.0	NA
Ethylbenzene	µg/L	140	700	0.86	<0.50	1,870	1,720	1,340	892
Isopropylbenzene	µg/L	NS	NS	NA	<0.34	46.7	NA	50.5	NA
MTBE	µg/L	12	60	<0.4	<0.49	<7.0	*13.3 J*	<3.5	<9.7
Naphthalene	µg/L	10	100	NA	<2.5	327	269	304	332
Toluene	µg/L	160	800	1.6	<0.44	3,200	2,480	987	735
1,2,4-Trimethylbenzene	µg/L	Combined limit (see next row)		–	<0.57	1,360	1,320	1,500	1,660
1,3,5-Trimethylbenzene	µg/L	Combined limit (see next row)		–	<2.5	340	385	411	471
Total Trimethylbenzenes	µg/L	96	480	1.9	<3.07	1,700	1,705	1,911	2,131
n-Propylbenzene	µg/L	NS	NS	NA	<0.50	134	NA	145	NA
Xylenes, m + p	µg/L	Combined limit (see next row)		–	<0.82	6,850	6,060	5,270	5,790
Xylene, o	µg/L	Combined limit (see next row)		–	<0.50	2,400	2,150	1,710	1,870
Total Xylenes	µg/L	400	2,000	5.24	<1.32	9,250	8,210	6,980	7,660
Detected PAHs									
Acenaphthene	µg/L	NS	NS	NA	<0.0040	0.55 J	<0.057	0.36 J	<0.056
Acenaphthylene	µg/L	NS	NS	NA	<0.0036	0.15 J	<0.056	0.11 J	<0.056
Anthracene	µg/L	600	3000	NA	<0.0050	<0.11	<0.046	<0.076	<0.046
Benzo(a)anthracene	µg/L	NS	NS	NA	<0.0049	<0.14	<0.059	<0.096	<0.058
Benzo(a)pyrene	µg/L	0.02	0.2	NA	<-0.0051	*0.19 J*	<0.051	*0.12 J*	<0.050
Benzo(b)fluoranthene	µg/L	0.02	0.2	NA	<0.0069	0.35 J	<0.061	0.21 J	<0.060
Benzo(g,h,i)perylene	µg/L	NS	NS	NA	<0.0083	<0.098	<0.040	<0065	<0.040
Benzo(k)fluoranthene	µg/L	NS	NS	NA	<0.011	<0.16	<0.064	0.11 J	<0.064
Chrysene	µg/L	0.02	0.2	NA	<0.0064	0.35 J	<0.048	0.28 J	<0.048
Fluoranthene	µg/L	80	400	NA	<0.0054	0.83 J	<0.11	0.58 J	<0.11
Fluorene	µg/L	80	400	NA	<0.0040	0.38 J	<0.046	0.28 J	<0.046
1-Methylnaphthalene	µg/L	NS	NS	NA	0.0046 J	19.4	13.3	17.9	14.8
2-Methylnaphthalene	µg/L	NS	NS	NA	<0.0063	44.6	26.8	41.2	30.5
Naphthalene	µg/L	10	100	NA	<0.0034	198	130	153	118
Phenanthrene	µg/L	NS	NS	NA	0.011 J	1.4	<0.068	1.0	<0.087
Pyrene	µg/L	50	250	NA	<0.0055	0.66 J	<0.088	0.46 J	<0.087
RCRA Metals									
Arsenic	µg/L	1	10	NA	*5.9 J*	<7.2	*8.0 J*	11.2 J	*9.5 J*
Barium	µg/L	400	2,000	NA	90.4 J	67.8	60.8	73.5	133
Cadmium	µg/L	0.5	5	NA	<0.38	<0.60	<0.60	*0.61 J*	<0.60
Chromium	µg/L	10	100	NA	<1.2	<2.1	<2.1	<2.1	<2.1
Lead	µg/L	1.5	15	89.5	<1.2	*12.3*	*6.0 J*	23.7	17.2
Mercury	µg/L	0.2	2	NA	<0.10	<0.10	<0.10	<0.10	<0.10
Selenium	µg/L	10	50	NA	*14.3 J*	7.9 J	<6.7	8.0 J	<6.7
Silver	µg/L	10	50	NA	1.9 J	<2.7	<2.7	3.5 J	<2.7

Notes:
Temporary wells TW-1 through TW-4 were installed by AECOM in October 2009.
MW-1, MW-2, MW-3, and TW-5 installed by AECOM in November 2011
* = Total Lead: Insufficient groundwater available to field filter samples
** = Insufficient groundwater available to analyze sample for lead
*** = PAH sample bottle broken by laboratory during boil down process; unable to recover eno
ppb = parts per billion
VOCs = Volatile organic compounds
MTBE = Methyl tert Butyl Ether
TMBs = Combined 1,2,4 and 1,3,5-Trimethylbenzenes
PAL = Preventive Action Limit
ES = Enforcement Standard
NA = Not analyzed
J = Analyte detected between the limit of detection (LOD) and limit of quantitation (LOQ)
B = Analyte was detected in the associated method blank
Results above the PAL are in italics
Results above the ES are bold



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DESCRIPTION	DRN	CHK	DATE

VERIFY SCALE IF PLAN SHEET IS REDUCED 1-INCH

DRN BY: SAP | DES BY: | CHK BY: | APP BY: | REV

AECOM
Milwaukee Office
1555 RiverCenter Dr
Milwaukee, WI
414.944.6080

CITY OF MANITOWOC
FLAMBEAU STREET
MANITOWOC WISCONSIN

RESIDUAL SOIL CONTAMINATION

DATE 3/18/2016
PROJECT NO. 60134830
FILENAME Flambeau Street - CLOSURE 2016.dwg
SHEET NO.
DRAWING NO. B.2.b

VOCs (ppb)	Non-Industrial A	2011 OM -2 3'	11/11/2011 AECOM MW-3 4-5' Unsat	11/11/2011 AECOM TW-5 5-6' Sat
Benzene	1,490	C	<25	<25
Ethylbenzene	7,470		<25	<25
Isopropylbenzene	--		<25	<25
MTBE	59,400		<25	<25
n-Butylbenzene	108,000		<40.4	<40.4
n-Propylbenzene	264,000		<25	<25
Naphthalene	5,150		<25	<25
p-Isopropyltoluene	162,000		<25	<25
sec-Butylbenzene	145,000		<25	<25
Toluene	818,000		<25	<25
1,2,4-TMB	89,800		<25	<25
1,3,5-TMB	182,000		<25	<25
Xylenes	258,000 [2]		<75	<75
PAHs (ppb)				
Naphthalene	5,150		<3.3	3.5 J
RCRA Metals (ppm)				
Arsenic	0.613		2.3	1.0 J
Barium	15,300		16.3	6.2
Cadmium	70		<0.019	0.028 J
Chromium	100,000		12.1	4.7
Lead	400		2.2	1.4
Mercury	3.13		0.019	<0.0025
Selenium	391		<0.33	<0.31
Silver	391		<0.099	<0.093

Notes:

VOCs = Volatile Organic Compounds
PAHs = Polynuclear Aromatic Hydroca
PCBs = PolyChlorinated Biphenyls
MTBE = Methyl tert butyl ether
TMB = Trimethylbenzene

[J] Estimated concentration above the a
[1] Standards are for 1,2,4- and 1,3,5-Tr
[2] Standards are for m&p- and o-Xylen
NA = Not analyzed
– No Generic RCL established.

Concentrations above the generic RCL

[A] Parameter exceeds Generic RCL for
[B] Parameter exceeds Generic RCL for
[C] Parameter exceeds Generic RCL for
Direct contact criteria apply to soils col
B-1 though B-8 = Borings completed by
Unsat = Unsaturated
Sat = Saturated

Continuing Obligations for Environmental Protection

Responsibilities of Wisconsin Property Owners

PUB-RR-819 November 2013

This fact sheet is intended to help property owners understand their legal requirements under s. 292.12, Wis. Stats., regarding continuing obligations that arise due to the environmental condition of their property.

The term "continuing obligations" refers to certain actions for which property owners are responsible following a completed environmental cleanup. They are sometimes called environmental land use controls or institutional controls. These legal obligations, such as a requirement to maintain pavement over contaminated soil, are most often found in a cleanup approval letter from the state.

Less commonly, a continuing obligation may apply where a cleanup is not yet completed but a cleanup plan has been approved, or at a property owned by a local government that is exempt from certain cleanup requirements.

What Are Continuing Obligations?

Continuing obligations are legal requirements designed to protect public health and the environment in regard to contamination that remains on a property.

Continuing obligations still apply after a property is sold. Each new owner is responsible for complying with the continuing obligations.

Background

Wisconsin, like most states, allows some contamination to remain after cleanup of soil or groundwater contamination (residual contamination). This minimizes the transportation of contamination and reduces cleanup costs while still ensuring that public health and the environment are protected.

The Department of Natural Resources (DNR), through its Remediation and Redevelopment (RR) Program, places sites or properties with residual contamination on a public database in order to provide notice to interested parties about the residual contamination and any associated continuing obligations. Please see the "Public Information" section on page 3 to learn more about the database. (Prior to June 3, 2006, the state used deed restrictions recorded at county courthouses to establish continuing obligations, and those deed restrictions have also been added into the database.)

Wisconsin Department of Natural Resources
P.O. Box 7921, Madison, WI 53707
dnr.wi.gov, search "brownfield"

Types of Continuing Obligations

1. **Manage Contaminated Soil that is Excavated**
   If the property owner intends to dig up an area with contaminated soil, the owner must ensure that proper soil sampling, followed by appropriate treatment or disposal, takes place. Managing contaminated soil must be done in compliance with state law and is usually done under the guidance of a private environmental professional.

2. **Manage Construction of Water Supply Wells**
   If there is soil or groundwater contamination and the property owner plans to construct or reconstruct a water supply well, the owner must obtain prior DNR approval to ensure that well construction is designed to protect the water supply from contamination.

Other Types of Continuing Obligations
Some continuing obligations are designed specifically for conditions on individual properties. Examples include:

- keeping clean soil and vegetation over contaminated soil;
- keeping an asphalt "cover" over contaminated soil or groundwater;
- maintaining a vapor venting system; and
- notifying the state if a structural impediment (e.g. building) that restricted the cleanup is removed. The owner may then need to conduct additional state-approved environmental work.

It is common for properties with approved cleanups to have continuing obligations because the DNR generally does not require removal of all contamination.

Property owners with the types of continuing obligations described above will find these requirements described in the state's cleanup approval letter or cleanup plan approval, and *must*:

- comply with these property-specific requirements; and
- obtain the state's permission before changing portions of the property where these requirements apply.

The requirements apply whether or not the person owned the property at the time that the continuing obligations were placed on the property.

Changing a Continuing Obligation

A property owner has the option to modify a continuing obligation if environmental conditions change. For example, petroleum contamination can degrade over time and property owners may collect new samples showing that residual contamination is gone. They may then request that DNR modify or remove a continuing obligation. Fees are required for DNR's review of this request and for processing the change to the database ($1050 review fee, $300/$350 database fee). Fees are subject to change; current fees are found in Chapter NR 749, Wis. Adm. Code, on the web at www.legis.state.wi.us/rsb/code/nr/nr749.pdf.

Public Information

The DNR provides public information about continuing obligations on the Internet. This information helps property owners, purchasers, lessees and lenders understand legal requirements that apply to a property. DNR has a comprehensive database of contaminated and cleaned up sites, *BRRTS on the Web.* This database shows all contamination activities known to DNR. Site specific documents are found under the *Documents* section. The information includes maps, deeds, contaminant data and the state's closure letter. The closure letter states that no additional environmental cleanup is needed for past contamination and includes information on property-specific continuing obligations. If a cleanup has not been completed, the state's approval of the remedial action plan will contain the information about continuing obligations.

Properties with continuing obligations can generally be located in DNR's *GIS Registry*, part of the *RR Sites Map.* RR Sites Map provides a map view of contaminated and cleaned up sites, and links to BRRTS on the Web.

If a completed cleanup is shown in *BRRTS on the Web* but the site documents cannot be found in the Documents section, DNR's closure letter can still be obtained from a regional office. For assistance, please contact a DNR Environmental Program Associate (see the RR Program's Staff Contact web page at dnr.wi.gov/topic/Brownfields/Contact.html).

BRRTS on the Web and *RR Sites Map* are part of **CLEAN** (the Contaminated Lands Environmental Action Network) at dnr.wi.gov/topic/Brownfields/clean.html

Off-Site Contamination: When Continuing Obligations Cross the Property Line

An off-site property owner is someone who owns property that has been affected by contamination that moved through soil, sediment or groundwater from another property. Wisconsin law, s. 292.13, Wis. Stats., provides an exemption from environmental cleanup requirements for owners of "off-site" properties. The DNR will generally not ask off-site property owners to investigate or clean up contamination that came from a different property, as long as the property owner allows access to his or her property so that others who are responsible for the contamination may complete the cleanup.

However, off-site property owners are legally obligated to comply with continuing obligations on their property, even though they did not cause the contamination. For example, if the state approved a cleanup where the person responsible for the contamination placed clean soil over contamination on an off-site property, the owner of the off-site property must either keep that soil in place or obtain state approval before disturbing it.

Property owners and others should check the *Public Information* section above if they need to:

- determine whether and where continuing obligations exist on a property;
- review the inspection, maintenance and reporting requirements, and
- contact the DNR regarding changing that portion of the property. The person to contact is the person that approved the closure or remedial action plan.

Option for an Off-Site Liability Exemption Letter

In general, owners of off-site properties have a legal exemption from environmental cleanup requirements. This exemption does not require a state approval letter. Nonetheless, they may request a property-specific liability exemption letter from DNR if they have enough information to show that the source of the contamination is not on their property. This letter may be helpful in real estate transactions. The fee for this letter is $700 under Chapter NR 749, Wis. Adm. Code. For more information about this option, please see the RR Program's Liability web page at dnr.wi.gov/topic/Brownfields/Liability.html.

Legal Obligations of Off-Site Property Owners

- Allow access so the person cleaning up the contamination may work on the off-site property (unless the off-site owner completes the cleanup independently).
- Comply with any required continuing obligations on the off-site property.

Required Notifications to Off-Site Property Owners

1. The person responsible for cleaning up contamination must notify affected property owners of any proposed continuing obligations on their off-site property **before** asking the DNR to approve the cleanup. This is required by law and allows the off-site owners to provide the DNR with any technical information that may be relevant to the cleanup approval.

   When circumstances are appropriate, an off-site neighbor and the person responsible for the cleanup may enter into a "legally enforceable agreement" (i.e. a contract). Under this type of private agreement, the person responsible for the contamination may also take responsibility for maintaining a continuing obligation on an off-site property. This agreement would not automatically transfer to future owners of the off-site property. The state is not a party to the agreement and can not enforce it.

2. If a cleanup proposal that includes off-site continuing obligations is approved, DNR will send a letter to the off-site owners detailing the continuing obligations that are required for their property. Property owners should inform anyone interested in buying their property about maintaining these continuing obligations. For residential property, this would be part of the real estate disclosure obligation.

More Information

For more information, please visit the RR Program's Continuing Obligations web site at dnr.wi.gov/topic/Brownfields/Residual.html.

Using Natural Attenuation to Clean Up Contaminated Groundwater:
What Landowners Should Know

RR-671 August 2014

What Is Natural Attenuation?
Natural attenuation makes use of natural processes in soil and groundwater to contain the spread of contamination and to reduce the amount of contamination from chemical releases.

Natural attenuation is an *in-situ* treatment method. This means that contaminants are left in place while natural attenuation works on them. Natural attenuation is relied upon to clean up contamination that remains after the source of the contamination is removed. An example of a source of contamination would be a leaking underground petroleum tank.

How Does Natural Attenuation Work?
Natural attenuation processes work at many sites, but the rate and degree of effectiveness varies from property to property, depending upon the type of contaminants present and the physical, chemical and biological characteristics of the soil and groundwater.

Natural attenuation processes can be divided into two broad categories – destructive and non-destructive. Destructive processes destroy
contaminants. The most common destructive process is **biodegradation**.

Non-destructive processes do not destroy the contaminant, but reduce contaminant concentrations in groundwater through **dilution, dispersion** or **adsorption**.

Biodegradation
Biodegradation is a process in which micro-organisms that naturally occur in soil and groundwater (e.g. yeast, fungi, or bacteria), break down, or degrade, hazardous substances to less toxic or non-toxic substances. Microorganisms, like humans, eat and digest organic compounds for nutrition and energy (organic compounds contain carbon and hydrogen atoms).

Some types of microorganisms can digest organic substances such as fuels or solvents that are hazardous to humans. Microorganisms break down the organic contaminants into harmless products – mainly carbon dioxide and water. Once the contaminants are degraded, the microorganism populations decline because they have used their food sources. These small populations of microorganisms pose no contaminant or health risk.

Many organic contaminants, like petroleum, can be biodegraded by microorganisms in the underground environment. For example, biodegradation processes can effectively cleanse soil and groundwater of hydrocarbon fuels such as gasoline and benzene, toluene, ethylbenzene, and xylene – known as the BTEX compounds, under certain conditions.

Biodegradation can also breakdown other contaminants in groundwater such as trichloroethylene (TCE), a chlorinated solvent used in metal cleaning. However, the processes involved are harder to predict and are less effective at contaminant removal compared to petroleum-contaminated sites

Wisconsin Department of Natural Resources
P.O. Box 7921, Madison, WI 53707
dnr.wi.gov, search "brownfield"

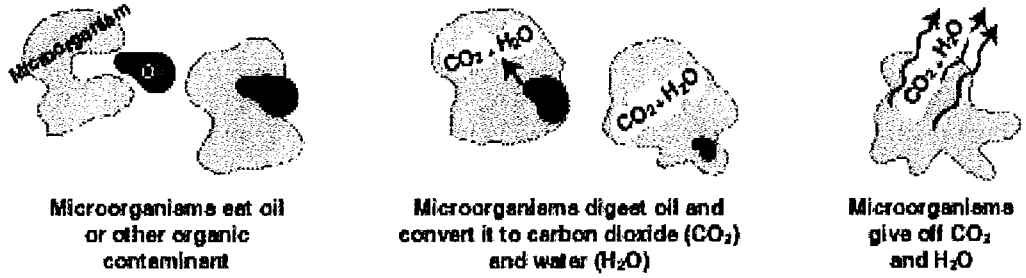


Figure 1. Schematic Diagram of Aerobic Biodegradation in Soil

Dilution and Dispersion

The effects of dilution and dispersion reduce contaminant concentrations but do not destroy contaminants. Clean water from the surface seeps underground to mix with and dilute contaminated groundwater.

Other processes that lead to reduced concentrations of contaminants include clean groundwater flowing into contaminated areas, and the dispersion of pollutants as they spread out and away from the main path of the contaminated plume.

Adsorption

Adsorption occurs when contaminants attach or "sorb" to underground particles. Most oily substances (like petroleum compounds) repel water and escape from the groundwater by attaching to organic matter and clay minerals in the subsurface.

This process holds back or retards contaminant movement and reduces the concentration of contaminants in the groundwater. However, like dilution and dispersion, adsorption does not destroy contaminants.

Why Consider Natural Attenuation To Clean Up Soil And Groundwater?

In certain situations, natural attenuation is an effective, inexpensive cleanup option and the most appropriate way to remediate some contamination problems. Natural attenuation focuses on confirming and monitoring natural remediation processes rather than relying on engineered or "active" technologies (such as pumping groundwater, treating it above ground, then disposing of the treated water).

Contaminants from petroleum are good candidates for natural attenuation because they are among the most easily destroyed by biodegradation. Natural attenuation is non-invasive, which allows treatment to go on below ground, while the surface can continue to be used.

Natural attenuation can also be less costly than active engineered treatment options, and requires no special equipment, energy source, or disposal of treated soil or groundwater.

Will Natural Attenuation Work At My Property?

Whether natural attenuation will work at a particular location is determined by investigating the soil and groundwater. These investigations determine the type of contaminants present, the levels of contamination, and the physical and chemical conditions that lead to biodegradation of the contaminants.

In order to rely on natural attenuation, responsible parties are required to confirm that natural attenuation processes are working by monitoring the soil and groundwater over a period of time to show that the contaminant concentrations are decreasing and that the contamination is no longer spreading.

Those conducting the cleanup need to know whether natural attenuation, or any proposed remedy, will reduce the contaminant concentrations in the soil and groundwater to legally acceptable limits within a reasonable period of time.

Natural attenuation may be an acceptable option for sites where active remediation has occurred and has reduced the concentration of contaminants (for instance, removing leaking underground tanks and contaminated soil).

However, natural attenuation is not an appropriate option at all sites. If the contamination has affected a drinking water well, or has entered a stream or lake, active cleanup options may be necessary to make sure people and the environment are protected from direct contact with the contamination.

The speed or rate of natural attenuation processes is typically slow. Monitoring is necessary to show that concentrations decrease at a sufficient rate to ensure that contaminants will not become a health threat in the future.

Closure Of Contaminated Sites Using Natural Attenuation As A Final Remedy

When contamination is discovered at a property (such as a gas station with leaking underground tanks), the person who is responsible for causing the contamination, and persons having possession or control of hazardous substances that have been discharged, have the responsibility to remove the source of contamination and investigate and clean up the contamination that has escaped into the soil and groundwater.

The contaminant release must be reported to the Wisconsin Department of Natural Resources (DNR) and the site investigation and cleanup are overseen by a state agency. Depending on the type of contaminant, the oversight agency could be the Department of Agriculture, Trade and Consumer Protection or Department of Natural Resources.

When the cleanup has complied with state standards, the person responsible for the contamination will ask the state agency for closure of the case. If natural attenuation is relied upon to finish cleaning up a contaminated property after closure, the responsible person will need to show that contaminant concentrations are not spreading, that contaminant concentrations are stable or decreasing, and that the concentrations will decrease in the future until state groundwater standards are met.

Because natural attenuation processes are slow, it may take many years before the properties with contamination are clean. State rules require that all owners of properties where groundwater contamination has spread must be informed of the contamination below their property.

In addition, the properties with groundwater contamination exceeding state groundwater enforcement standards must be listed on a database to notify future owners and developers of the presence of contamination. If future monitoring occurs and shows that natural attenuation processes have removed the contaminants to state-required cleanup levels, then the properties can be removed from the database.

The state agency will grant closure if the site investigation and monitoring shows that natural attenuation will clean up groundwater to state standards within a reasonable period of time. All state rules for cleanup must be met and the person who is responsible for the contamination must comply with all conditions of the state's closure approval.

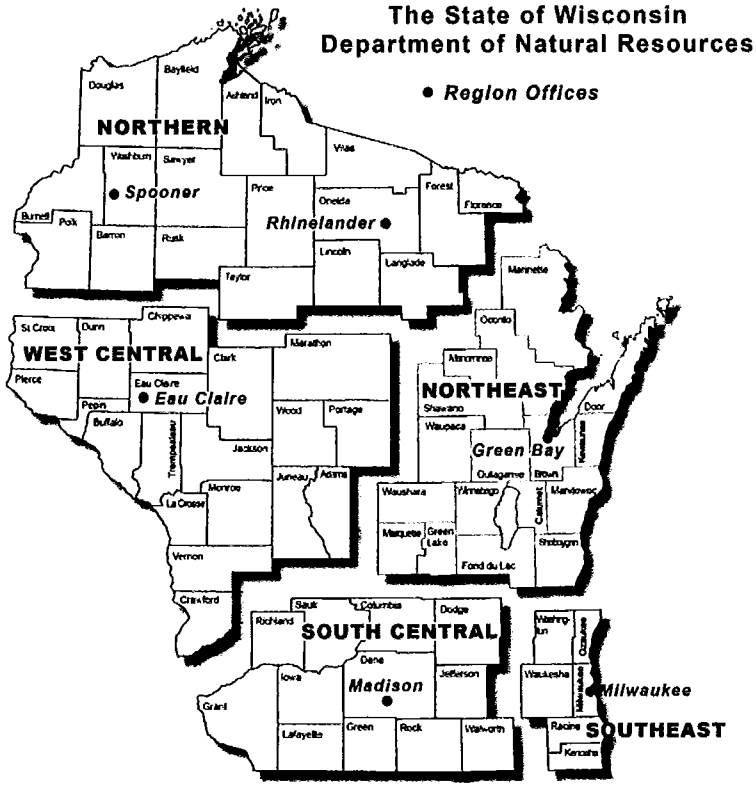
Publications

The following publications provide additional information on natural attenuation. Websites where these can be downloaded free of charge are also listed.

- *A Citizen's Guide to Bioremediation*, September 2012, EPA 542-F-12-003; www.epa.gov/tio/download/citizens/a_citizens_guide_to_bioremediation.pdf
- *Commonly Asked Questions Regarding the Use of Natural Attenuation for Petroleum-Contaminated Sites at Federal Facilities,* www.clu-in.org/download/techfocus/na/na-petrol.pdf
- *Monitored Natural Attenuation of Petroleum Hydrocarbons: U.S. EPA Remedial Technology Fact Sheet,* May 1999, EPA 600-F-98-021; www.clu-in.org/download/remed/pet-hyd.pdf
- *Monitored Natural Attenuation of Chlorinated Solvents*, May 1999, EPA 600-F-98-0022; www.clu-in.org/download/remed/chl-solv.pdf
- *Guidance on Natural Attenuation for Petroleum Releases, WI DNR, Bureau for Remediation and Redevelopment*, March 2003, PUB-RR-614; dnr.wi.gov/files/PDF/pubs/rr/RR614.pdf

Contact Information

If you have questions about natural attenuation contact a DNR Environmental Program Associate (EPA) in your local DNR regional office. The EPA can direct you to a project manager.



Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.

The affected property is:

- ○ the source property (the source of the hazardous substance discharge), but the property is not owned by the person who conducted the cleanup (a deeded property)
- ○ a deeded property affected by contamination from the source property
- ◉ a right-of-way (ROW)
- ○ a Department of Transportation (DOT) ROW

Include this completed page as an attachment with all notifications provided under sections A and B.

Contact Information

Responsible Party: The person responsible for sending this form, and for conducting the environmental investigation and cleanup is:

Responsible Party Name City of Manitowoc

Contact Person Last Name	First	MI	Phone Number (include area code)
Minikel	Greg		(414) 286-8268

Address	City	State	ZIP Code
900 Quay Street	Manitowoc	WI	54220

E-mail gminikel@manitowoc.org

Name of Party Receiving Notification:

Business Name, if applicable: City Clerk

Title	Last Name	First	MI	Phone Number (include area code)
Ms.	Hudon	Jennifer		(920) 686-6950

Address	City	State	ZIP Code
900 Quay Street	Manitowoc	WI	54220

Site Name and Source Property Information:

Site (Activity) Name Flambeau Street ROW

Address	City	State	ZIP Code
the Flambeau Street right-of-way	Manitowoc	WI	54220

DNR ID # (BRRTS#)	(DATCP) ID #
02-36-553420	

Contacts for Questions:

If you have any questions regarding the cleanup or about this notification, please contact the Responsible Party identified above, or contact:

Environmental Consultant: AECOM

Contact Person Last Name	First	MI	Phone Number (include area code)
Fenske	Dean	W	(715) 342-3043

Address	City	State	ZIP Code
200 Indiana Avenue	Stevens Point	WI	54481

E-mail dean.fenske@aecom.com

Department Contact:

To review the Department's case file, or for questions on cleanups or closure requirements, contact:

Department of: Natural Resources (DNR)

Address	City	State	ZIP Code
625 E County Rd Y STE 700	Oshkosh	WI	54901

Contact Person Last Name	First	MI	Phone Number (include area code)
Verstegen	Thomas		(920) 424-0025

E-mail (Firstname.Lastname@wisconsin.gov) Thomas.verstegen@wisconsin.gov

Notification of Continuing Obligations and Residual Contamination
Form 4400-286 (9/15)

Section B: ROW Notification: Residual Contamination and/or Continuing Obligations - Non-DOT ROWs

KEEP THIS DOCUMENT WITH YOUR PROPERTY RECORDS

900 Quay Street
Manitowoc, WI, 54220

Dear Ms. Hudon:

I am providing this notification to inform you of the location and extent of contamination remaining in a right-of-way for which you are responsible, and of certain long-term responsibilities (continuing obligations) for which city of Manitowoc may become responsible. I investigated a release of:
Petroleum volatile organic compounds (PVOCs)
on the Flambeau Street right-of-way, Manitowoc, WI, 54220 that has shown that contamination remains in the right-of-way for which city of Manitowoc is responsible.
I have responded to the release, and will be requesting that the Department of Natural Resources (DNR) grant case closure. Closure means that the DNR will not be requiring any further investigation or cleanup action to be taken. However, continuing obligations may be imposed as a condition of closure approval.

You have 30 days to comment on the proposed closure request:

The DNR will not review my closure request for at least 30 days after the date of this letter. As an affected right-of-way holder, you have a right to contact the DNR to provide any technical information that you may have that indicates that closure should not be granted for this site. If you would like to submit any information to the DNR that is relevant to this closure request, you should mail that information to the DNRcontact: 625 E County Rd Y STE 700, Oshkosh, WI, 54901, or at Thomas.verstegen@wisconsin.gov.

Residual Contamination:

Groundwater Contamination:
Groundwater contamination originated at the property located at: the Flambeau Street right-of-way, Manitowoc, WI, 54220 .
The levels of
PVOC
contamination in the groundwater on your property are above the state groundwater enforcement standards found in ch. NR 140, Wis. Adm. Code.

Soil Contamination:
Soil contamination remains at:
Soil borings B-3, B-4, B-5, B-6, B-9, 8-6-1, B-104, B-106, and MW-2
The remaining contaminants include :
PVOCs
at levels which exceed the soil standards found in ch. NR 720, Wis. Adm. Code. The following steps have been taken to address any exposure to the remaining soil contamination.
In June 2009 the City of Manitowoc retained AECOM to conduct Phase II Site Investigation activities at the 2418 S. 18th Street site and/or within the Flambeau Street right-of-way. Site investigation activities have been completed at the site between 2001 and 2016. Based on the results of the investigation(s) soil and groundwater contamination exists at levels above regulatory standards in the Flambeau Street right-of-way and likely extends to the north and south onto private properties. However, petroleum contaminated soils generally exist in the Flambeau Street right-of-way at depths ranging between 2 and 6 feet bgs. The majority of contaminated soil remaining on site is located beneath the paved surface of Flambeau St. eliminating the direct contact threat. A small volume of contaminated soil may exist within the top 4 feet within the Flambeau St. right-of-way in the grass area south of the paved surface, however, contaminate concentrations do not exceed direct contact standards.

If residual soil or groundwater contamination is likely to affect water collected in a pit/trench that requires dewatering, a general permit for Discharge of Contaminated Groundwater from Remedial Action Operations may be needed. If you or any other person plan to conduct utility or building construction for which dewatering will be necessary, you or that person must contact the DNR's Water Quality Program, and if necessary, apply for the necessary discharge permit. Additional information regarding discharge permits is available at http://dnr.wi.gov/topic/wastewater/GeneralPermits.html.

Continuing Obligations on the Right-of-Way (ROW) : As part of the response actions, I am proposing that the following continuing obligations be used at the affected ROW. If my closure request is approved, you will be responsible

for the following continuing obligations:

Residual Soil Contamination:

If soil is excavated from the areas with residual contamination, the right-of-way holder at the time of excavation will be responsible for the following:

- determine if contamination is present,
- determine whether the material would be considered solid or hazardous waste,
- ensure that any storage, treatment or disposal is in compliance with applicable statutes and rules. Contaminated soil may be managed in-place, in accordance with s. NR 718, Wis. Adm. Code, with prior Department approval.

The right-of-way holder needs to be aware that excavation of the contaminated soil may pose an inhalation or other direct contact hazard and as a result special precautions may need to be taken during excavation activities to prevent a health threat to humans from ingestion, inhalation or dermal contact.

Depending on site-specific conditions, construction over contaminated soils or groundwater may result in vapor migration of contaminants into enclosed structures or migration along newly placed underground utility lines. The potential for vapor inhalation and means of mitigation should be evaluated when planning any future redevelopment, and measures should be taken to ensure the continued protection of public health, safety, welfare and the environment at the site.

GIS Registry and Well Construction Requirements:

If this site is closed, all properties within the site boundaries where contamination remains, or where a continuing obligation is applied, will be listed on the Bureau for Remediation and Redevelopment Tracking System (BRRTS) on the Web, at http://dnr.wi.gov/topic/Brownfields/clean.html. Inclusion on this database provides public notice of remaining contamination and of any continuing obligations. Documents can be viewed on this database, and include final closure letters, site maps and any applicable maintenance plans. The location of the site may also be viewed on the Remediation and Redevelopment Sites Map (RR Sites Map), on the "GIS Registry" layer, at the same internet address listed above.

DNR approval prior to well construction or reconstruction is required for all sites included in the GIS Registry, in accordance with s. NR 812.09 (4) (w), Wis. Adm. Code. This requirement applies to private drinking water wells and high capacity wells. Special well construction standards may be necessary to protect the well from the remaining contamination. Well drillers need to first obtain approval from a regional water supply specialist in DNR's Drinking Water and Groundwater Program. The well construction application, form 3300–254, is on the internet at http://dnr.wi.gov/topic/wells/documents/3300254.pdf.

If you have any questions regarding this notification, I can be reached at: (715) 342-3043
dean.fenske@aecom.com

Signature of responsible party/environmental consultant for the responsible party	Date Signed

Attachments

Contact Information

Legal Description for each Parcel: