



July 7, 2017

Mr. Dan Koski
Director of Public Infrastructure
City of Manitowoc
900 Quay Street
Manitowoc, WI 54220

SUBJECT: Approval of Revised Remedial Action Options Report & Conceptual Design Report for Manitowoc City / Former Newton TN Gravel Pit, 3130 Hecker Rd, Manitowoc, WI DNR BRRTS Activity # 02-36-000268

Dear Mr. Koski:

On June 20, 2017, the Department of Natural Resources (DNR) received the *Revised Remedial Action Options Report and Conceptual Design Report* (Revised RAOR), dated June 12, 2017, submitted by AECOM on behalf of the City of Manitowoc (City), for the Manitowoc City / Former Newton TN Gravel Pit site, located at 3130 Hecker Road in Manitowoc, Wisconsin (the Property). Please refer to attached Figure No. 1: Site Location from the Revised RAOR for the Property location.

The initial *Remedial Action Options Report and Conceptual Design Report*, dated August 18, 2016, was received by the DNR on August 26, 2016. The initial report did not address soil management and other revisions were needed. The DNR provided comments on the initial report via email in September 2016. The City of Manitowoc also decided to pursue potential responsible parties (PRPs) under the local government cost recovery process, Wis. Stat. § 292.35, so the report could not be finalized until the requirements in the cost recovery process were followed. Therefore, review and approval of the report was delayed until the above items were completed.

Based on the site investigation on the Property, the City and AECOM determined that the unsaturated soil in the groundwater treatment pond area was clean; however, DNR still recommended some soil sampling be conducted. Groundwater contaminated with volatile organic compounds (VOCs) is present in the proposed groundwater treatment area, which could have potentially contaminated the soil below the water table (saturated) that will be excavated for the proposed groundwater treatment pond. Therefore, DNR required sampling be conducted to characterize the saturated soil. A plan was submitted in November 2016 for characterization of unsaturated soil and saturated soil within the footprint of the proposed groundwater treatment pond area. The plan included VOC sampling for unsaturated soil across the proposed pond footprint and hill cut needed to facilitate the pond construction. Sampling of saturated soil included total VOC analysis and toxicity characteristic leaching procedure (TCLP) of soil in the area of elevated groundwater contamination to determine if the soil was a solid or hazardous waste. The sampling results were submitted to the DNR in a technical memorandum in May 2017. No VOCs were detected in unsaturated soil samples. VOCs did not exceed TCLP regulatory levels in Wis. Admin. § NR 661.24, so the saturated soil proposed to be excavated did not exhibit a toxicity characteristic and is not considered hazardous waste.

The local governmental unit cost recovery process was initiated by the City under Wis. Stat. § 292.35 in January 2017. The City already had the initial RAOR as their draft remedial action plan. The City identified the PRPs and sent them letters in January 2017 and again in March 2017 requesting information related to the hazardous

substance discharges on the Property and notifying the PRPs of the scheduled public hearing. The City hosted a public hearing on March 13, 2017, then sent letters to the PRPs on March 16, 2017 outlining the 30 day written comment period. The City received written comments in April 2017 and responded to those comments. These actions were required by the City under Wis. Stat. § 292.35(2r)(b). AECOM, on behalf of the City, took into account the comments received by the PRPs and incorporated them into the Revised RAOR, where applicable. Soil management, cost recovery process comments and the other revisions required by the DNR were incorporated into the Revised RAOR. The Revised RAOR was submitted to the DNR to meet the requirement of Wis. Stat. § 292.35(2r)(c).

The recommended remedial action option includes:

Western Source Area (west end of the Property) and Groundwater Treatment Area (down gradient of the source area). Please refer to the attached figures from the Revised RAOR: Figure No. 2: Site Features, Figure No. 3: Site Layout and Interpreted VOC Isoconcentration Lines, Figure No. 4: Cross Section Y-Y', Figure No. 5: Potable Well Sampling Locations, Figure No. 6: Proposed Free Product Recovery Well Locations/SVE Well Locations/Cap Area, Figure No. 7: Proposed Topographic Map and Pond Location, Figure No. 8: Cross Section Y-Y' with Proposed Pond Location, Figure No. 9: Conceptual Site Plan and Figure No. 10: Grading Plan – Cut/Fill Plan that shows the details of the recommended remedial action option and private well sampling area.

- Engineered cap to address direct contact and groundwater infiltration pathways and meet United States Environmental Protection Agency (EPA) Toxic Substances Control Act (TSCA) regulatory requirements. Per discussion with EPA, a deed restriction and signage around the engineered cover is required, but fencing is not.
- Soil vapor extraction system for contaminant mass removal of VOCs.
- Light non-aqueous phase liquid (LNAPL) recovery system to remove LNAPL mixture of petroleum compounds, chlorinated VOCs and polychlorinated biphenyls (PCBs).
- Engineered pond to treat chlorinated VOCs in groundwater through volatilization, aerobic-bioremediation and solar oxidation with eventual discharge to Silver Creek.
- Phytoremediation of contaminated groundwater utilizing trees surrounding the groundwater treatment pond through a partnership with the United States Department of Agriculture (USDA) Forest Service under an EPA Great Lakes Restoration Initiative Action Plan grant.
- Management of soil excavated for the pond construction and existing investigation derived waste in drums:
 - Saturated soil from the designated South Pond Cut Zone (area with highest VOC concentrations in groundwater within the proposed pond footprint) will be placed under the engineered cap in the source area.
 - Saturated soil from the designated North Pond Cut Zone will be placed under the engineered cap and within the West Pond Fill Zone.
 - If necessary, saturated soil may be temporarily stockpiled in the East Pond Fill Zone, within the footprint of the groundwater contaminant plume.
 - Unsaturated soil from the Pond Cut Above El. 685' will be used in the Cap Fill Zone, Fricke Fill Zone, North of Cap Fill Zone, West Pond Fill Zone, East Pond Fill Zone, and pond channel for capping, grading, stabilization and proper drainage purposes. The rest of the unsaturated soil excavated for pond construction will be stockpiled on the Property. Since the City and AECOM determined the soil to be clean based on the site investigation and the sampling completed did not have any VOC detections, the unsaturated soil is not regulated under Wis. Admin. ch. NR 718.
 - Soil in drums at the Property is investigation derived waste and will be placed under the engineered cap in the source area.

The chlorinated VOC contamination in groundwater from the Property migrated off-site and impacted the drinking water aquifer in the Town of Newton. Clean water supply replacement consisting of private well

replacement or connecting properties to the City's municipal water supply, has been ongoing to provide clean/safe drinking water at locations with impacts above Wis. Admin. ch. NR 140 enforcement standards (ES). Long-term monitoring of the private wells has been ongoing to ensure groundwater for potable use remains below ES standards. Clean water supply replacement activities and long-term monitoring will continue to address any water supply concerns from migration of chlorinated VOC contamination from the Property. A *Special Well Casing Pipe Depth Area* was also established by the DNR on December 7, 2015 that outlines well construction and/or reconstruction standards and sample analysis requirements in a defined area within the Town of Newton to reduce and/or eliminate the risk of wells to produce water contaminated with chlorinated VOCs. Please refer to the attached *Special Well Casing Pipe Depth Area* memorandum. Remediation at the Western Source Area and Groundwater Treatment Area is intended to reduce contaminant mass and further migration of chlorinated VOCs to the drinking water aquifer.

The continuing obligations based on the approval of the Revised RAOR for the Property are:

- Groundwater contamination is present at or above ch. NR 140, Wis. Adm. Code enforcement standards.
- Residual soil contamination exists that must be properly managed should it be excavated or removed.
- An engineered cover must be maintained over contaminated soil and the DNR must be notified and approve any changes to this barrier.
- Remaining contamination could result in vapor intrusion if future construction activities occur on-site. Vapor control technologies will be required for occupied buildings, unless the property owner assesses the potential for vapor intrusion, and the DNR agrees that vapor control technologies are not needed.
- A deed restriction and signage to meet TSCA requirements is required for residual PCBs under the engineered cover.

Database fees for soil and groundwater have been submitted to place documentation on the public database in BRRTS. The documentation will include: this approval letter, the property deed with legal description, a certified survey map (if applicable), detailed site maps to show areas covered by the continuing obligations and the special well casing depth area memorandum. Database fees will be assessed again at the time of closure.

Approval of the remedial action is subject to regulation and applicable permits/approvals from the following programs: Remediation & Redevelopment (and regulation per the One Cleanup Program Memorandum of Agreement for PCBs between DNR and EPA), Air Management, Watershed Management, Water Quality, and the United States Army Corps of Engineers (USACE). Therefore, the approval of this remedial action options report is contingent on the other applicable permits/approvals from the programs stated above.

Plans, reports and specifications are required to be submitted by Wis. Admin. ch. NR 724. This includes an operation and maintenance plan under Wis. Admin. § NR 724.13(2) that outlines the operation, monitoring and maintenance activities prior to initiating remedial system operations. The operation and maintenance plan shall include: the number and location of replacement groundwater monitoring wells and piezometers, a long-term monitoring plan required under Wis. Admin. § NR 724.17, cap maintenance and methods to verify effectiveness of the Western Source Area and Groundwater Treatment Area systems.

Per Wis. Admin. § NR 724.15, please submit the required construction documentation or as-built report within 60 days after the date that construction of the remedial action is completed.

This letter refers only to the conditions described for the remedial action and does not constitute completion of the site investigation. The site investigation is not complete based on the available information and data that has been submitted to the DNR to date. At this time, it is more important to focus resources on the remedial action to reduce significant source contamination from further migrating to the groundwater aquifer. In the future, if the DNR becomes aware of new information concerning the presence of existing or new contaminants discovered as

part of additional investigation activities, the DNR will evaluate that information to determine if any additional response actions are required.

The Bureau for Remediation and Redevelopment Tracking System (BRRTS) identification number for this activity is shown at the top of this letter. The Department tracks information on all case determinations such as this letter in a Department database that is available on the Internet at:

<http://dnr.wi.gov/topic/Brownfields/botw.html>.

If you have any questions, please contact Tauren Beggs at 920-662-5178, by writing to the address at the top of this letter or by email to Tauren.Beggs@wisconsin.gov.

Sincerely,

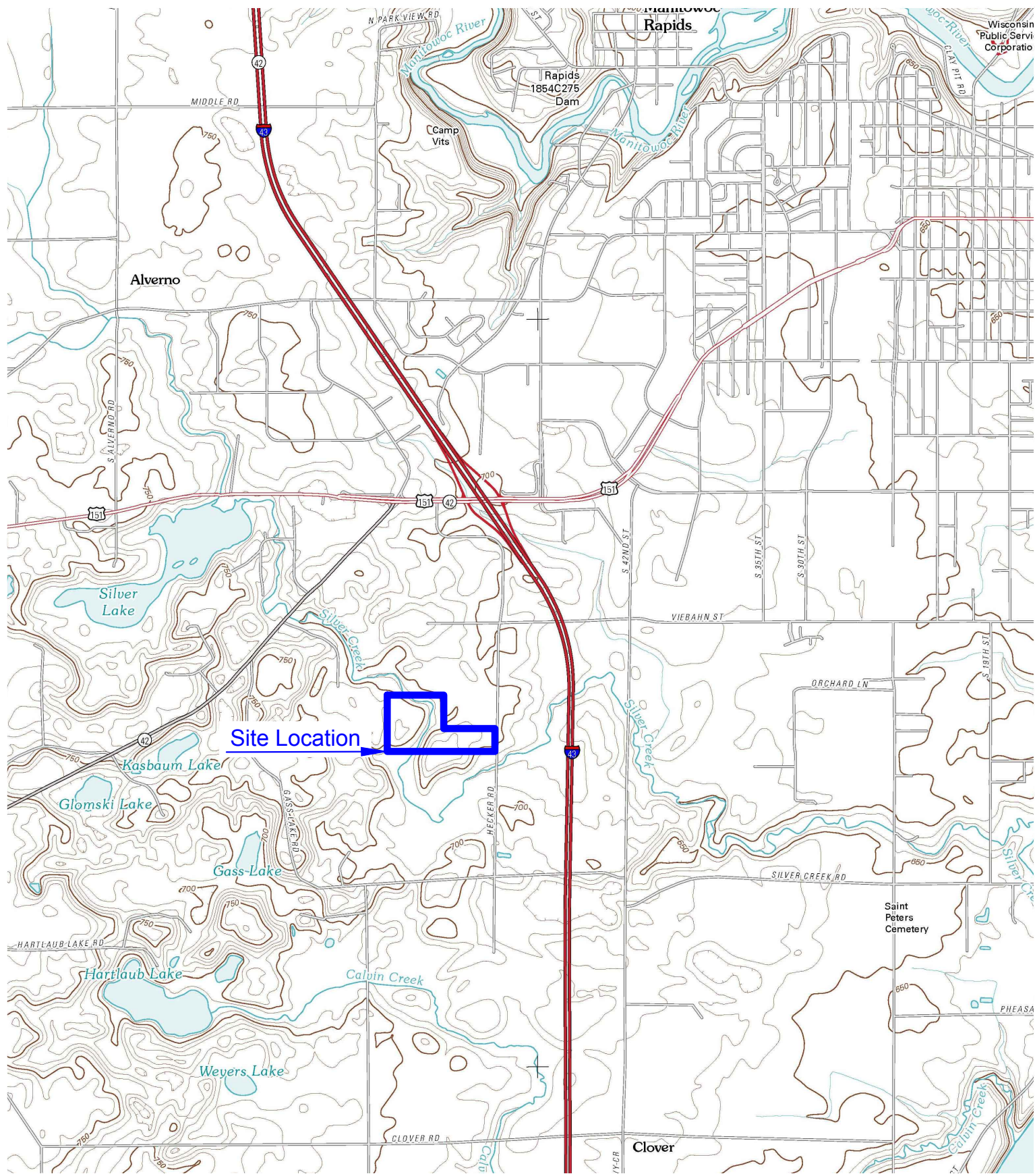


Roxanne N. Chronert
Team Supervisor, Northeast Region
Remediation & Redevelopment Program

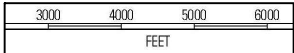
ec: Dave Henderson, AECOM
Kathleen McDaniel, City of Manitowoc
JaNelle Merry, DNR

Attachments:

- Figure No. 1: Site Location
- Figure No. 2: Site Features
- Figure No. 3: Site Layout and Interpreted VOC Isoconcentration Lines
- Figure No. 4: Cross Section Y-Y'
- Figure No. 5: Potable Well Sampling Locations
- Figure No. 6: Proposed Free Product Recovery Well Locations/SVE Well Locations/Cap Area
- Figure No. 7: Proposed Topographic Map and Pond Location
- Figure No. 8: Cross Section Y-Y' with Proposed Pond Location
- Figure No. 9: Conceptual Site Plan
- Figure No. 10: Grading Plan – Cut/Fill Plan
- Special Well Casing Depth Area



Site Location



APPROXIMATE SCALE



NOTES:
Toographic Map of the United
State Geological Survey
Map Date: 2010

AECOM
Milwaukee Office
1555 RiverCenter Dr
Milwaukee, WI
414.944.6080

FORMER NEWTON GRAVEL PIT
2016 RAOR AND CONCEPTUAL DESIGN REPORT

SITE LOCATION



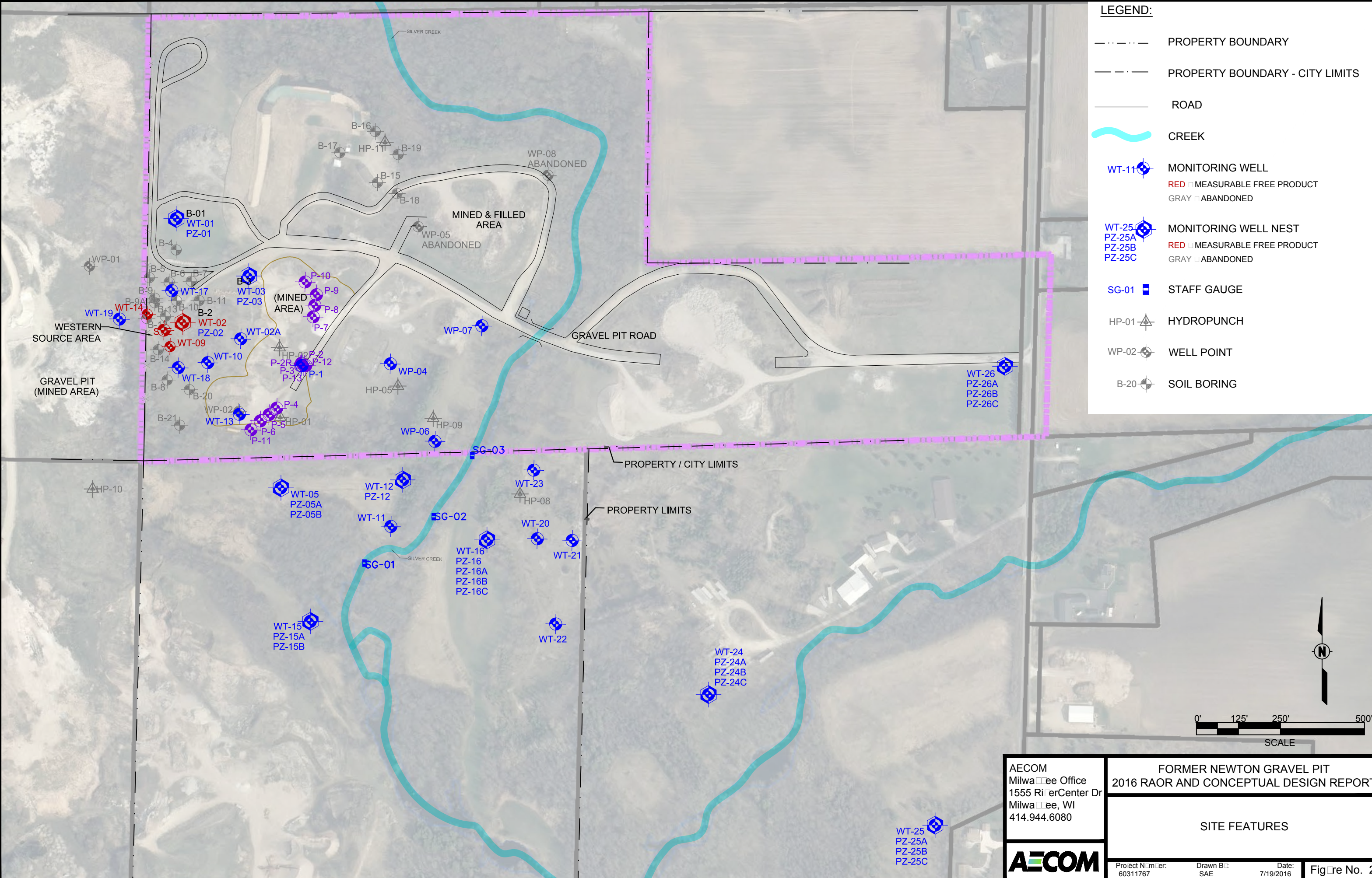
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Drawn By: SAE

Date: 7/14/2016

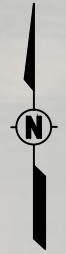
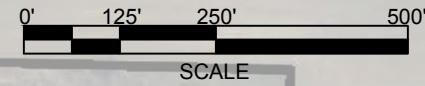
Figure No. 1

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LEGEND:

- PROPERTY BOUNDARY
- PROPERTY BOUNDARY - CITY LIMITS
- ROAD
- ~ CREEK
- WT-11 MONITORING WELL
 - RED MEASURABLE FREE PRODUCT
 - GRAY ABANDONED
- WT-25 MONITORING WELL NEST
 - RED MEASURABLE FREE PRODUCT
 - GRAY ABANDONED
- SG-01 STAFF GAUGE
- HP-01 HYDROPUNCH
- WP-02 WELL POINT
- B-20 SOIL BORING

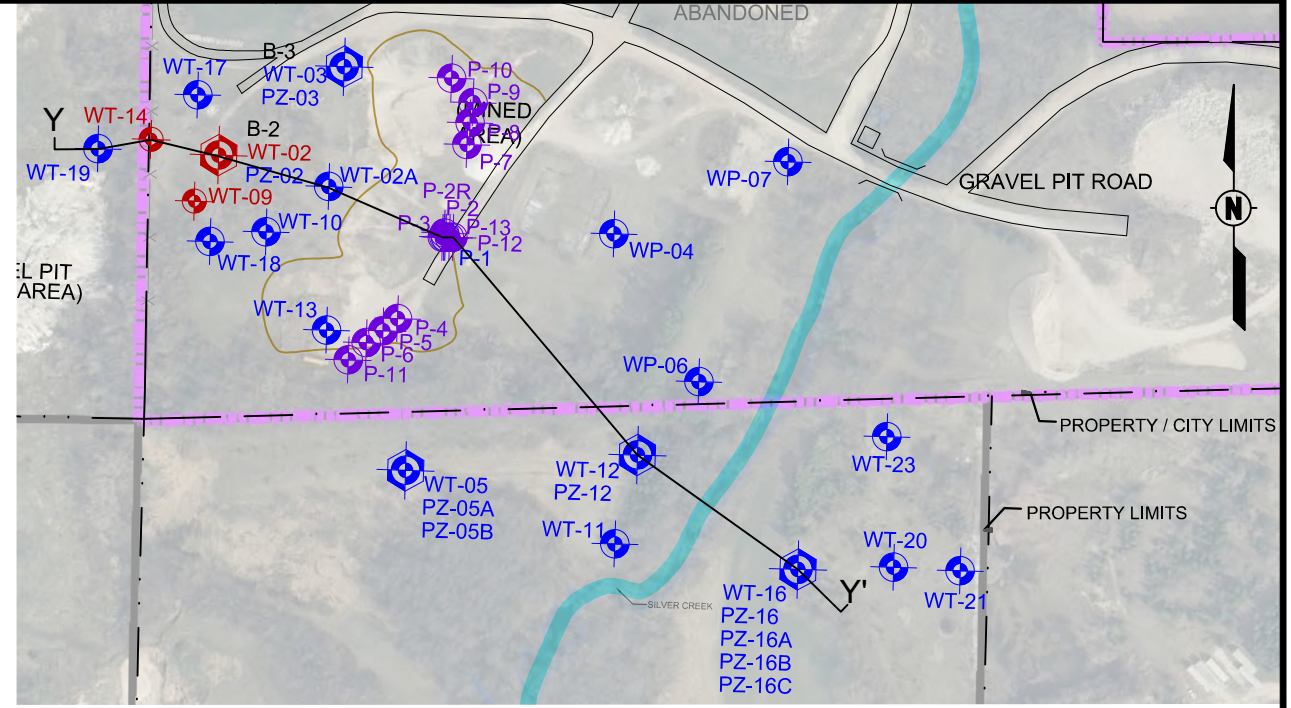
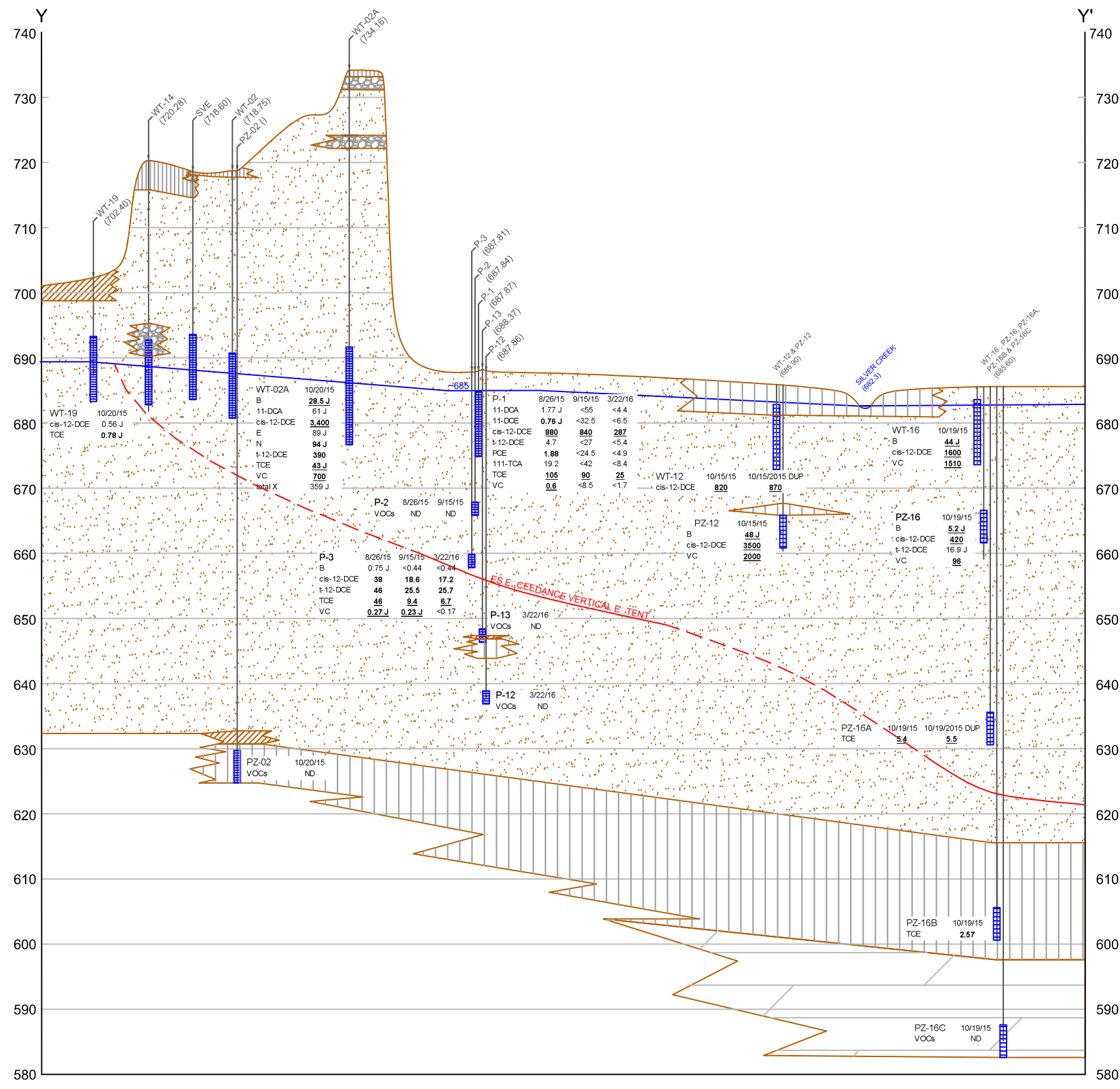


AECOM Milwaukee Office 1555 RiverCenter Dr Milwaukee, WI 414.944.6080	FORMER NEWTON GRAVEL PIT 2016 RAOR AND CONCEPTUAL DESIGN REPORT	
	SITE FEATURES	
Project Number: 60311767	Drawn By: SAE	Date: 7/19/2016

Figure No. 2



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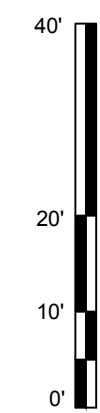
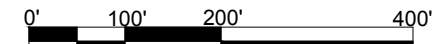


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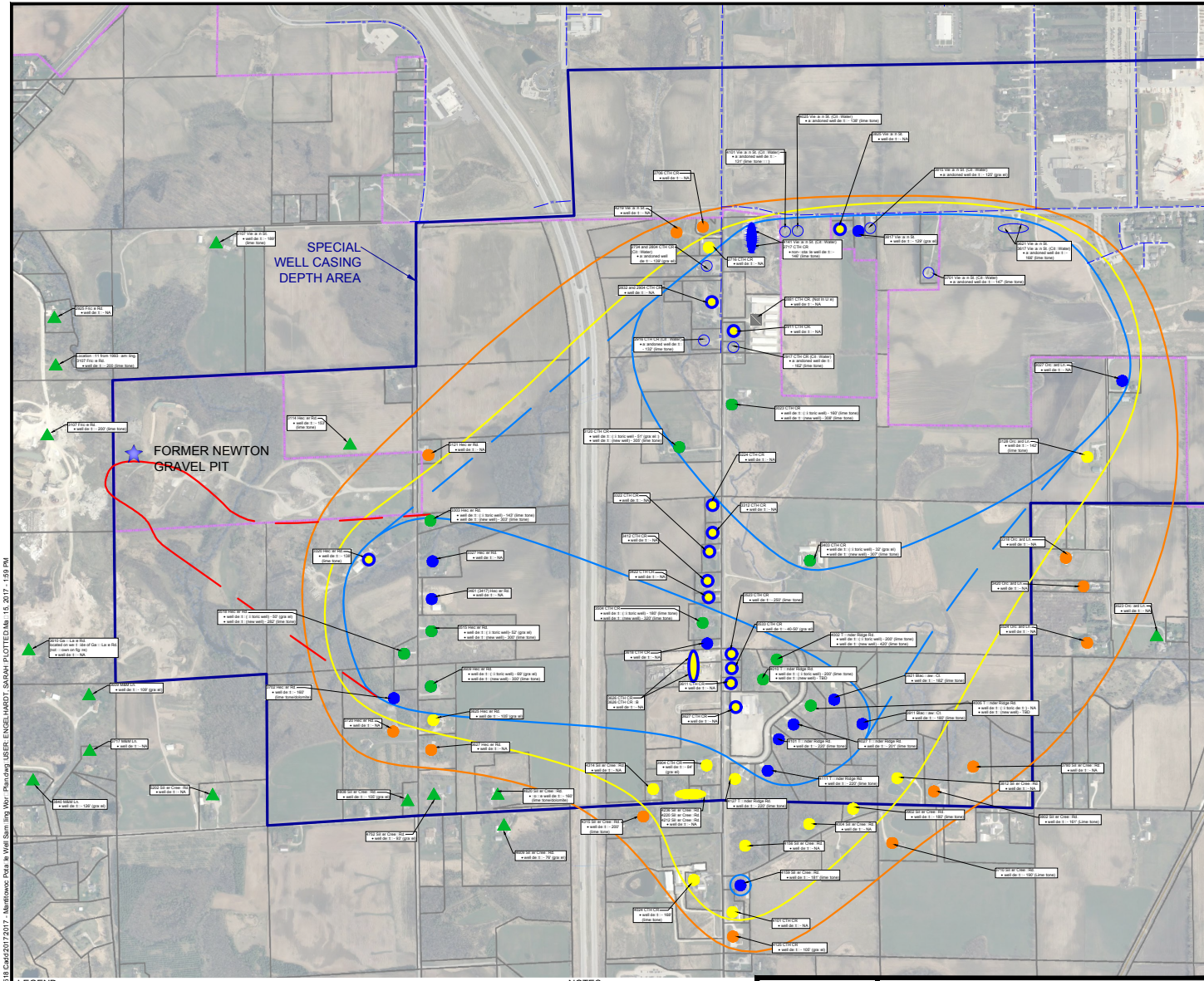
- GRAVEL
- SAND
- SILT
- CLAY
- BEDROCK (SILURIAN DOLOMITE)
- MONITORING WELL - SCREEN INTERVAL
- POTABLE WELL - CASING
- CASING DEPTH
- OPEN BOREHOLE DEPTH

NOTES:

- VOC □ VOLATILE ORGANIC COMPOUNDS MEASURED IN MICROGRAMS PER LITER (UG/L)
- B □ BENZENE
- C □ CHLOROMETHANE
- 11-DCA □ 1,1-DICHLOROETHANE
- 11-DCE □ 1,1-DICHLOROETHENE
- ci-12-DCE □ CIS-1,2-DICHLOROETHENE
- t-12-DCE □ TRANS-1,2-DICHLOROETHENE
- E □ ETHYLBENZENE
- N □ NAPHTHALENE
- n-P □ N-PROPYLBENZENE
- PCE □ TETRACHLOROETHENE
- T □ TOLUENE
- 111-TCA □ 1,1,1-TRICHLOROETHANE
- TCE □ TRICHLOROETHENE
- VC □ VINYL CHLORIDE
- total □ TOTAL OYLENES
- □ COMPOUND WAS DETECTED AT A CONCENTRATION BETWEEN THE LIMIT OF DETECTION AND THE LIMIT OF QUANTITATION
- BOLD** INDICATES A PREVENTIVE ACTION LIMIT (PAL) □ CEEDANCE
- BOLD AND UNDERLINED** INDICATES AN ENFORCEMENT STANDARD (ES) □ CEEDANCE
- APPROXIMATE VERTICAL EXTENT OF ES IMPACTS IN GROUNDWATER



AECOM Milwaukee Office 1555 RiverCenter Dr Milwaukee, WI 414.944.6080	FORMER NEWTON GRAVEL PIT 2016 RAOR AND CONCEPTUAL DESIGN REPORT	
	CROSS SECTION Y - Y'	
Project Number: 60311767	Drawn By: SAE	Date: 7/14/2016
		Figure No. 4



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LEGEND:

- PROPERTY BOUNDARY
- - - PROPERTY BOUNDARY - CITY LIMITS
- UTILITIES:
 - POTABLE WATER SUPPLY (from City of Manitowish)
- POTABLE WELL SAMPLE LOCATIONS
 - - WITHIN TARGET ZONE
 - - WITHIN TARGET ZONE WITH NO DETECTS
 - - WITHIN SENTINEL ZONE-3 YEAR

POTABLE WELL SAMPLE LOCATIONS (CONTINUED)

- - WITHIN SENTINEL ZONE-6 YEAR
- - REPLACEMENT WELL WITHIN TARGET ZONE
- ▲ - UPGRADIENT AND HISTORICALLY SAMPLED WELLS
- - FORMER TARGET ZONE WELL, NOW ON CITY WATER
- - WELL OUT OF SERVICE

SAMPLING ZONES

- TARGET ZONE
- SENTINEL ZONE-3 YEAR
- SENTINEL ZONE-5 YEAR
- FORMER GRAVEL PIT ZONE

NOTES:

- NA - NOT AVAILABLE
- TBD - TO BE DETERMINED



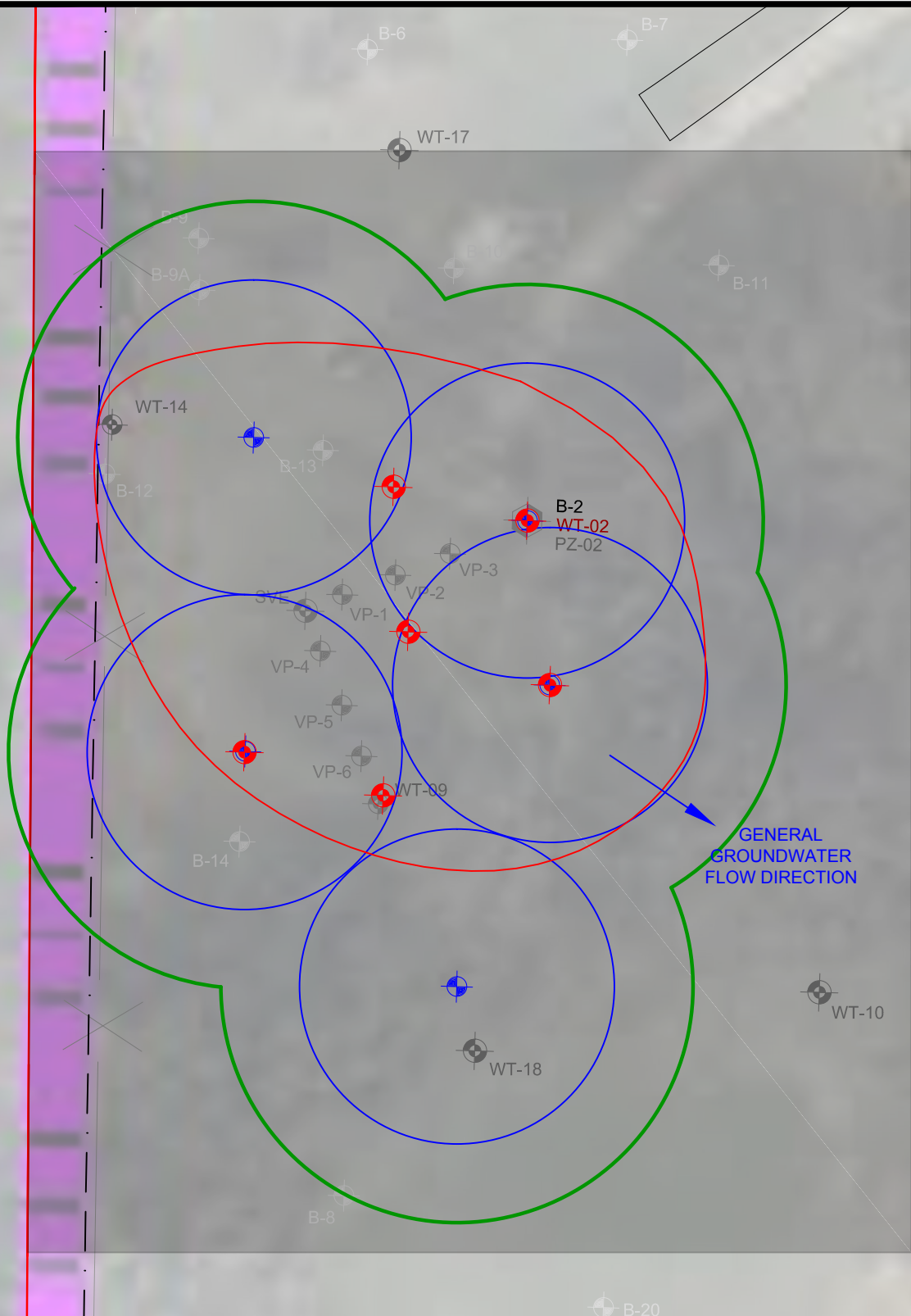
AECOM
 Milwaukee Office
 1555 RiverCenter Dr
 Milwaukee, WI
 414.944.6080

FORMER NEWTON GRAVEL PIT

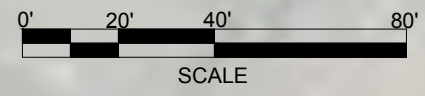
POTABLE WELL SAMPLING LOCATIONS

Project Number: 60311767 Drawn By: SAE/ANS Date: 4/28/2017 Figure No. 5

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LEGEND:	
	PROPERTY BOUNDARY
	PROPERTY BOUNDARY - CITY LIMITS
	ROAD
	MONITORING WELL
	RED □ MEASURABLE FREE PRODUCT
	MONITORING WELL NEST
	RED □ MEASURABLE FREE PRODUCT
	SVE SAMPLE LOCATIONS (2015)
	PROPOSED FREE PRODUCT RECOVERY WELL
	APPROXIMATE AREA OF FREE PRODUCT
	PROPOSED SVE EXTRACTION WELL
	SVE 40' RADIUS OF INFLUENCE
	SVE 60' RADIUS OF INFLUENCE
	PROPOSED CAP AREA



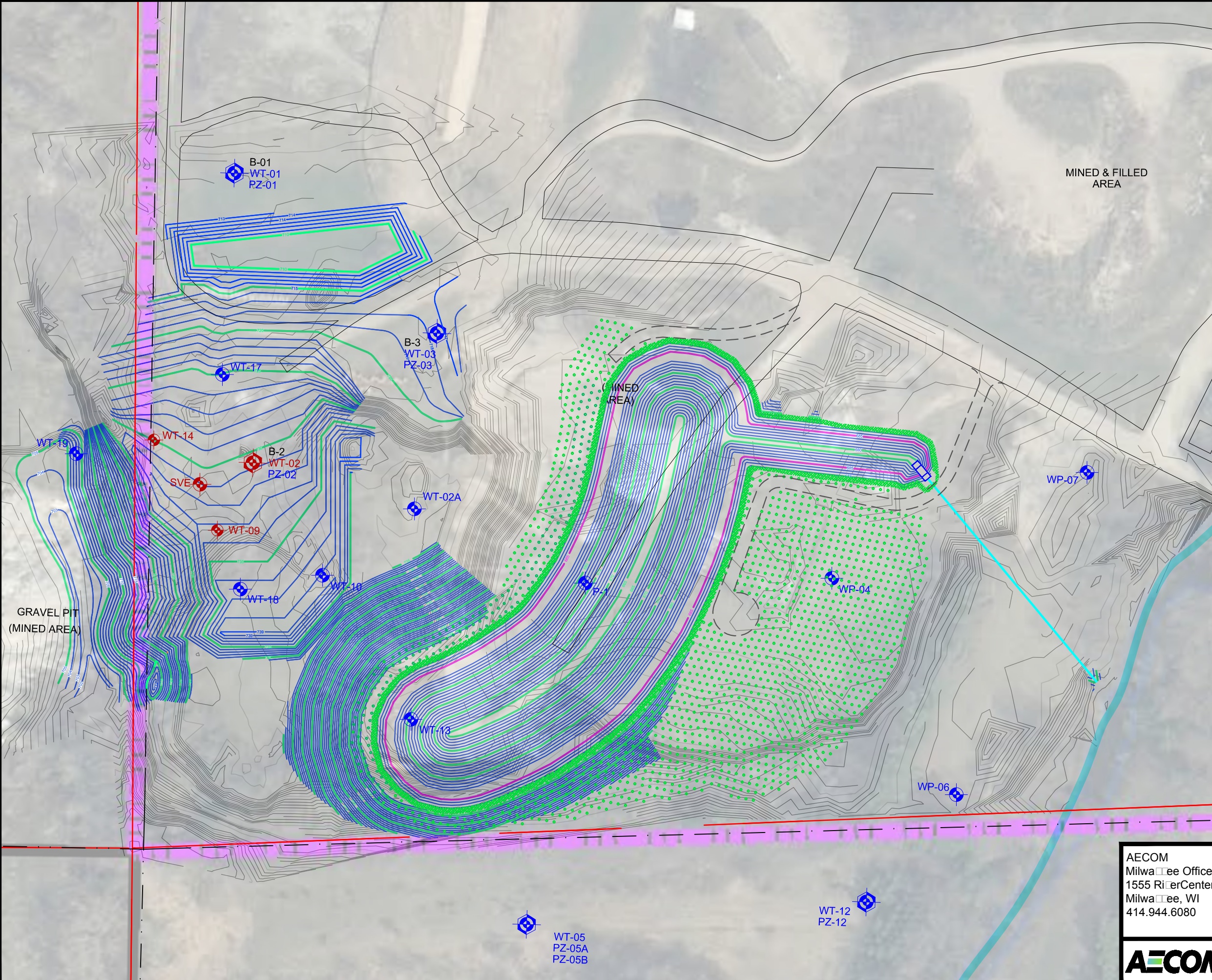
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 Milwaukee, WI
 414.944.6080

**FORMER NEWTON GRAVEL PIT
 2016 RAOR AND CONCEPTUAL DESIGN REPORT**

**PROPOSED FREE PRODUCT RECOVERY
 WELL LOCATIONS / SVE WELL LOCATIONS /
 CAP AREA**

Project Number: 60311767	Drawn By: SAE	Date: 7/15/2016	Figure No. 6
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LEGEND:

- PROPERTY BOUNDARY
- PROPERTY BOUNDARY - CITY LIMITS
- ROAD
- CREEK
- MONITORING WELL
 - MEASURABLE FREE PRODUCT
 - ABANDONED
- MONITORING WELL NEST
 - MEASURABLE FREE PRODUCT
 - ABANDONED
- WELL POINT
- EXISTING TOPOGRAPHIC CONTOURS
- PROPOSED TOPOGRAPHIC CONTOURS

0' 50' 100' 200'
SCALE

N

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1555 RiverCenter Dr
Milwaukee, WI
414.944.6080

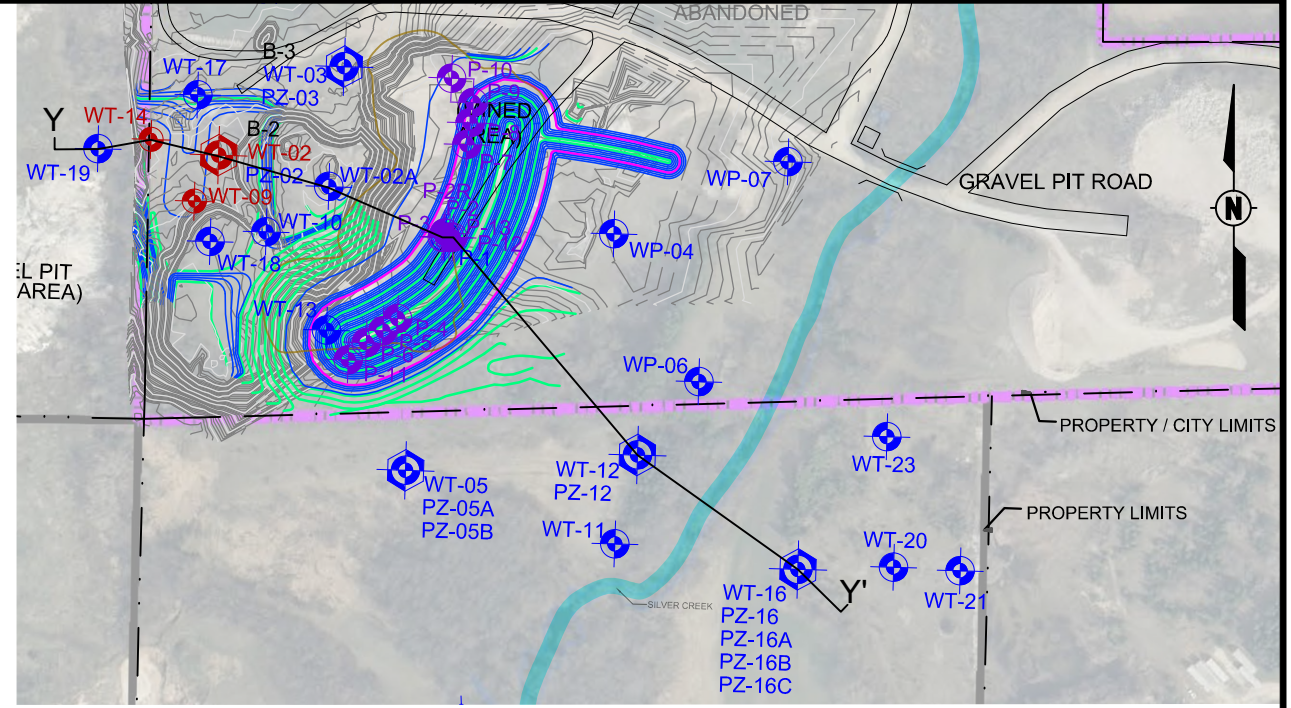
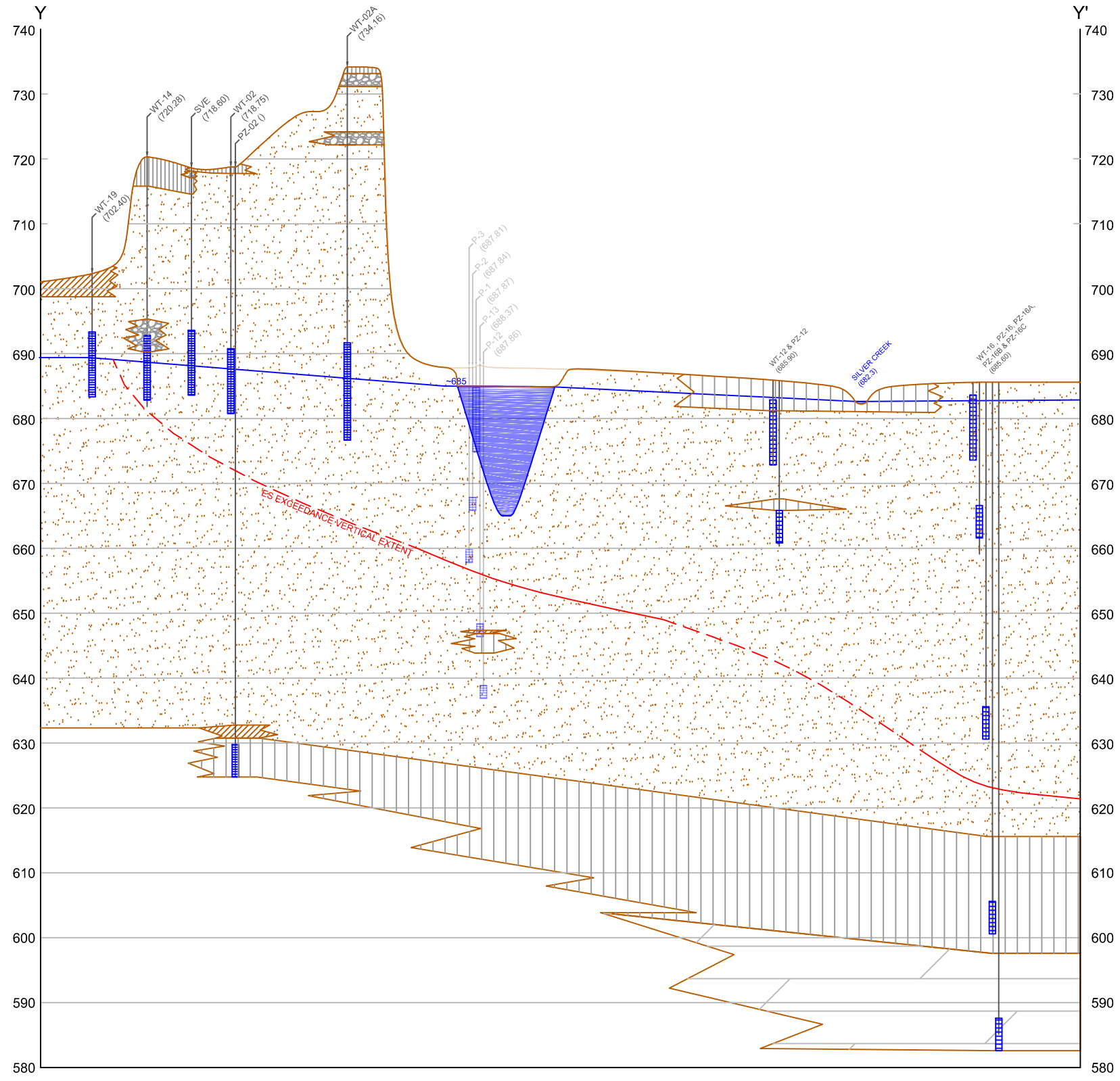
FORMER NEWTON GRAVEL PIT
2016 RAOR AND CONCEPTUAL DESIGN REPORT

PROPOSED TOPOGRAPHIC MAP
AND POND LOCATION

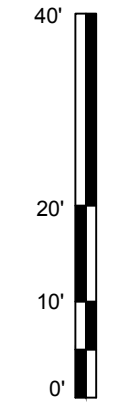


Project Number: 60311767 Drawn By: SAE Date: 5/12/2017 Figure No. 7

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- LEGEND:**
- GRAVEL
 - SAND
 - SILT
 - CLAY
 - BEDROCK (SILURIAN DOLOMITE)
 - MONITORING WELL
- SCREEN INTERVAL
 - POTABLE WELL
- CASING
- CASING DEPTH
- OPEN BOREHOLE DEPTH
 - APPROXIMATE VERTICAL EXTENT OF ES IMPACTS IN GROUNDWATER



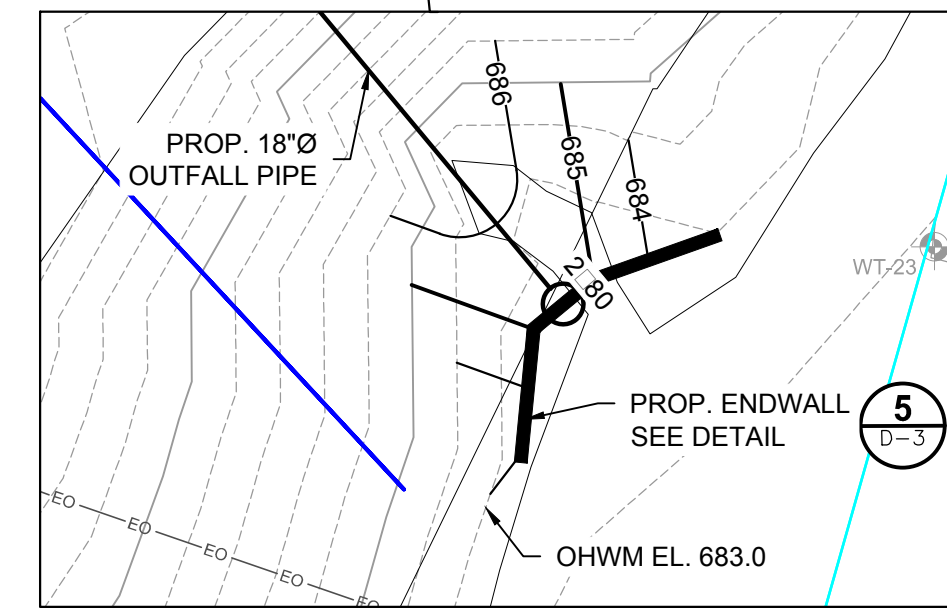
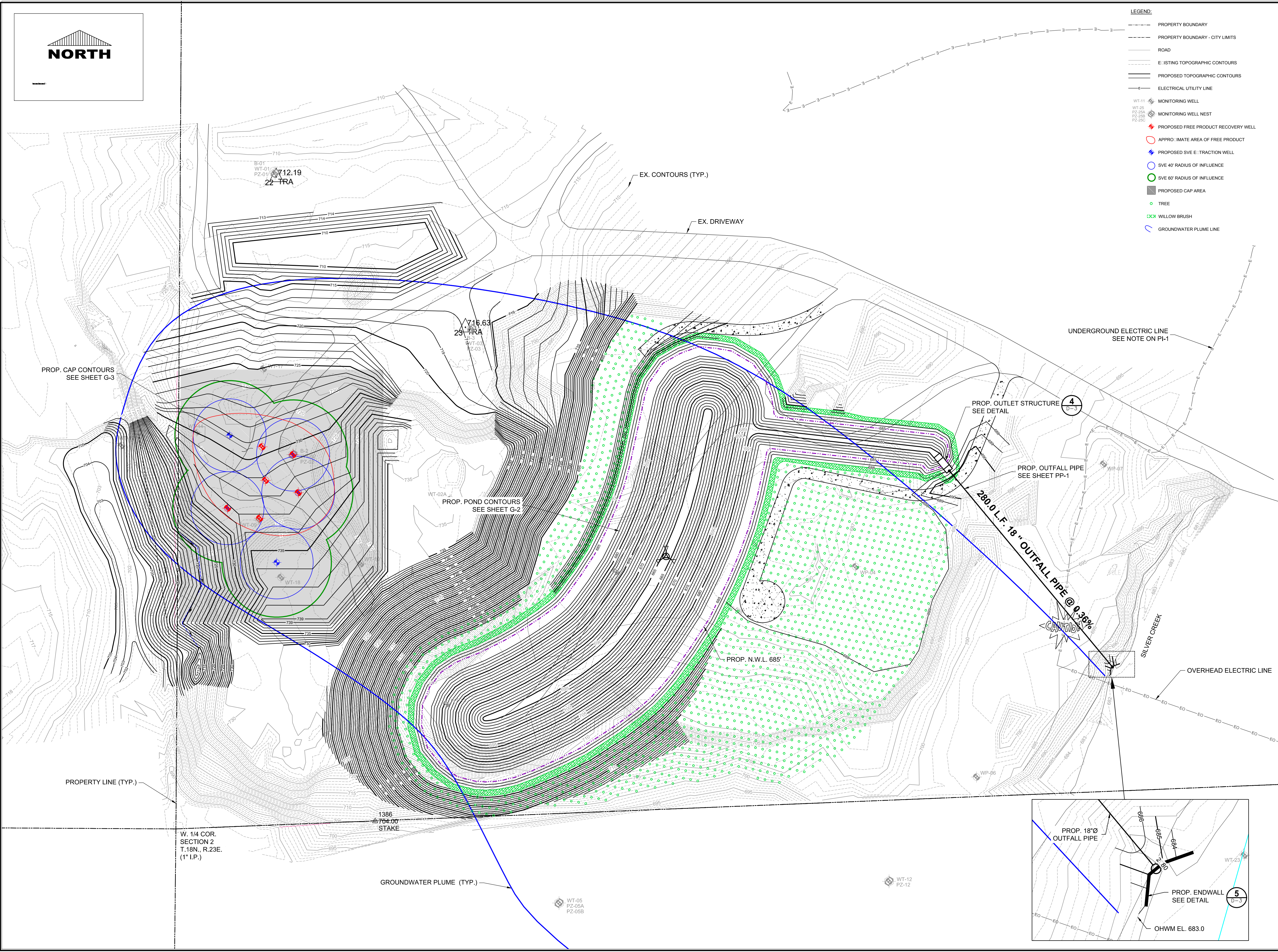
AECOM Milwaukee Office 1555 RiverCenter Dr Milwaukee, WI 414.944.6080	FORMER NEWTON GRAVEL PIT 2016 RAOR AND CONCEPTUAL DESIGN REPORT	
	CROSS SECTION Y - Y' WITH PROPOSED POND LOCATION	
Project Number: 60311767	Drawn By: SAE	Date: 7/14/2016
		Figure No. 8



- LEGEND:**
- PROPERTY BOUNDARY
 - - - - PROPERTY BOUNDARY - CITY LIMITS
 - == ROAD
 - EX. LISTING TOPOGRAPHIC CONTOURS
 - PROPOSED TOPOGRAPHIC CONTOURS
 - ELECTRICAL UTILITY LINE
 - WT-11 MONITORING WELL
 - PZ-25A MONITORING WELL NEST
 - PZ-25B
 - PZ-25C
 - PROPOSED FREE PRODUCT RECOVERY WELL
 - APPROXIMATE AREA OF FREE PRODUCT
 - PROPOSED SVE EXTRACTION WELL
 - SVE 40' RADIUS OF INFLUENCE
 - SVE 60' RADIUS OF INFLUENCE
 - PROPOSED CAP AREA
 - TREE
 - WILLOW BRUSH
 - GROUNDWATER PLUME LINE

Layout-Sheet Name: RAOR FIG-9

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PROJECT
 FORMER NEWTON
 GRAVEL PIT -
 CAP & POND DESIGN
 MANITOWOC, WISCONSIN

CLIENT
 CITY OF
 MANITOWOC
 900 QUAY ST.
 MANITOWOC, WI 54220
 920-686-6910 tel
 www.manitowoc.org

CONSULTANT
 AECOM
 1555 RIVERCENTER DRIVE, SUITE 214
 MILWAUKEE, WI 53212
 414-944-6080 tel 414-944-6081 fax
 www.aecom.com

SUB CONSULTANT

REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
I	05/05/17	BID SET

KEY PLAN

PROJECT NUMBER

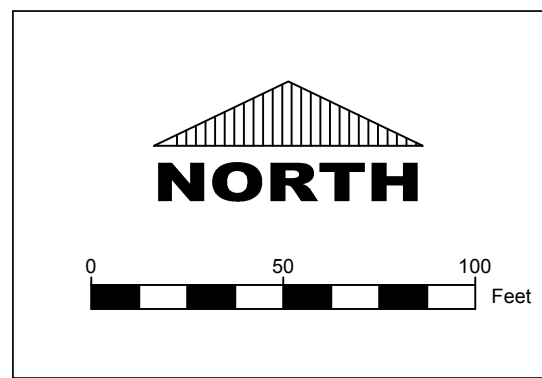
60135471

FIGURE TITLE

CONCEPTUAL SITE PLAN

FIGURE NUMBER

FIGURE 9



NOTES:
 ALL QUANTITIES ARE ESTIMATES. CONTRACTOR RESPONSIBLE FOR CONFIRMING QUANTITIES.
 CUT VOLUME FROM POND ABOVE EL. 685' TO BE PLACED IN ORDER OF:
 1. ALONG WEST PROPERTY LINE AS SUPPORT FOR THE CAP (FRICKE FILL ZONE)
 2. CAP ROOTING ZONE
 3. NORTH OF CAP FILL ZONE
 4. WEST POND FILL ZONE
 5. EAST POND FILL ZONE
 6. STOCKPILE ON PROPERTY AS DIRECTED BY OWNER

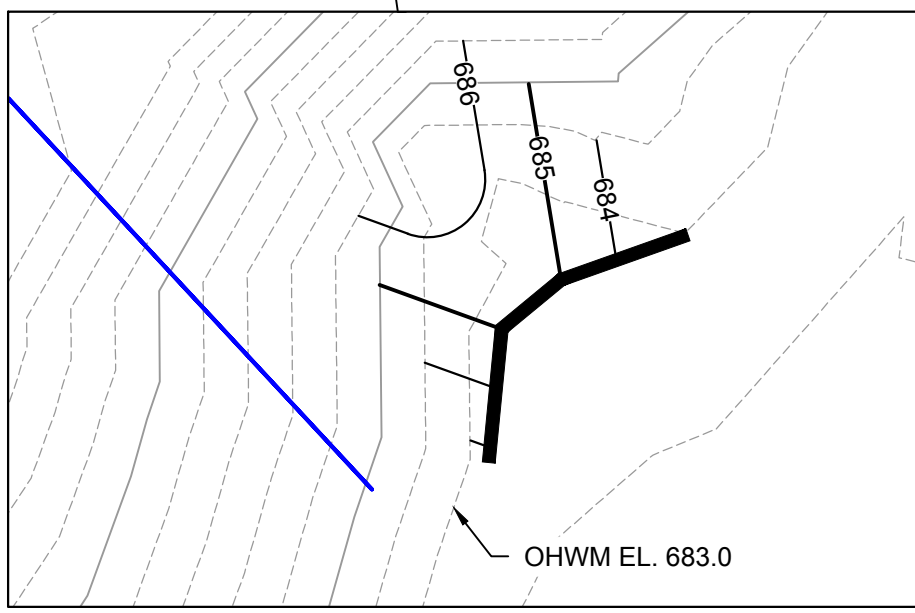
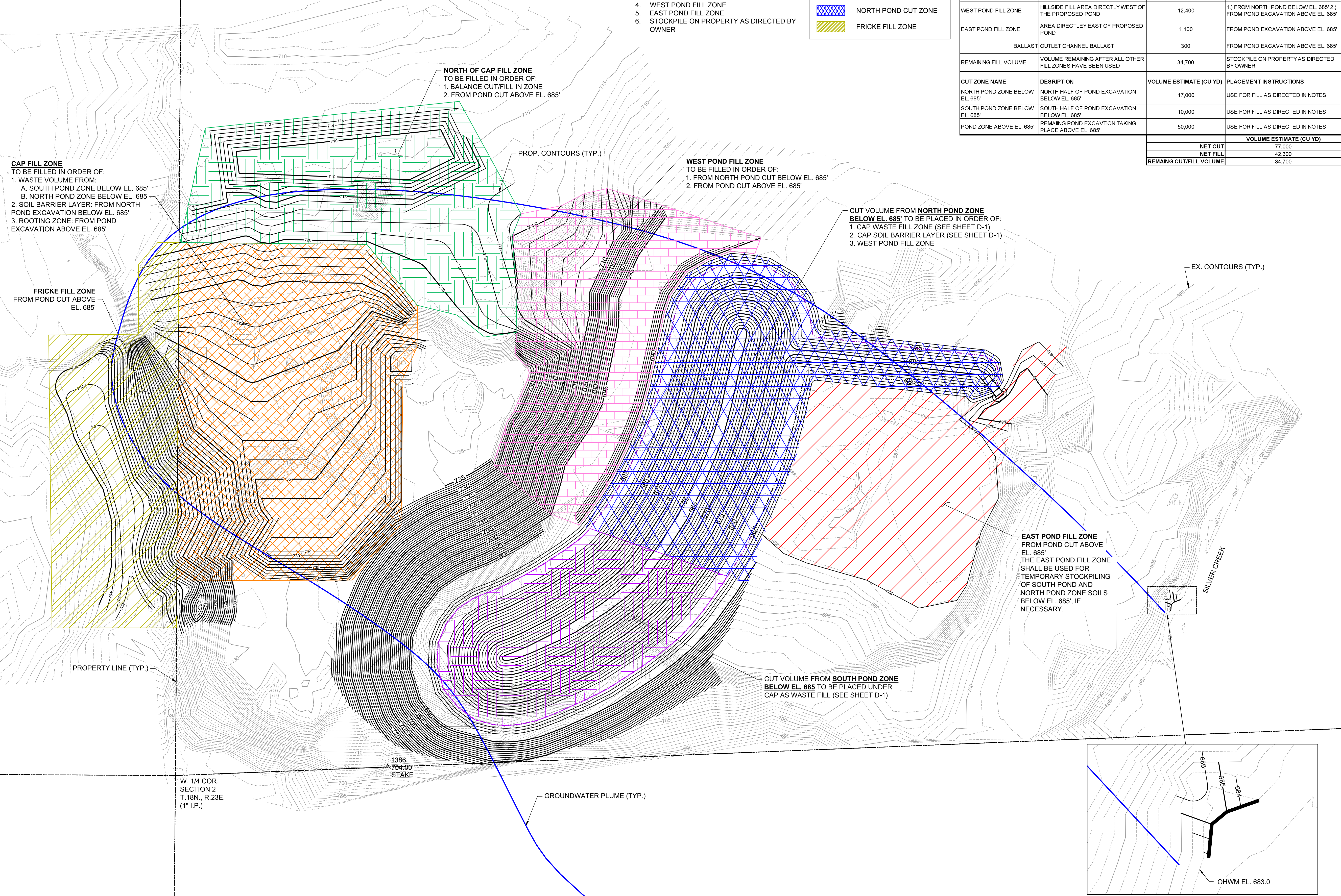
LEGEND

- CAP FILL ZONE
- NORTH OF CAP FILL ZONE
- WEST POND FILL ZONE
- EAST POND FILL ZONE
- SOUTH POND CUT ZONE
- NORTH POND CUT ZONE
- FRICKE FILL ZONE

FILL ZONE NAME	DESCRIPTION	VOLUME ESTIMATE (CU YD)	PLACEMENT INSTRUCTIONS
FRICKE FILL ZONE	FILL ZONE ALONG WESTERN PROPERTY LINE	3,400	CLEAN SOIL FROM POND EXCAVATION ABOVE EL. 685'
CAP FILL ZONE	ROOTING ZONE	7,000	CLEAN SOIL FROM POND EXCAVATION ABOVE EL. 685'
	SOIL BARRIER LAYER	4,500	FROM NORTH POND EXCAVATION BELOW EL. 685'
	WASTE VOLUME	12,200	FROM NORTH AND SOUTH POND ZONE BELOW EL. 685'
NORTH OF CAP FILL ZONE	FILL AREA DIRECTLY NORTH OF PROPOSED CAP	1,400	FROM POND CUT ABOVE EL. 685'
WEST POND FILL ZONE	HILLSIDE FILL AREA DIRECTLY WEST OF THE PROPOSED POND	12,400	1) FROM NORTH POND BELOW EL. 685' 2) FROM POND EXCAVATION ABOVE EL. 685'
EAST POND FILL ZONE	AREA DIRECTLY EAST OF PROPOSED POND	1,100	FROM POND EXCAVATION ABOVE EL. 685'
	BALLAST	300	FROM POND EXCAVATION ABOVE EL. 685'
REMAINING FILL VOLUME	VOLUME REMAINING AFTER ALL OTHER FILL ZONES HAVE BEEN USED	34,700	STOCKPILE ON PROPERTY AS DIRECTED BY OWNER

CUT ZONE NAME	DESCRIPTION	VOLUME ESTIMATE (CU YD)	PLACEMENT INSTRUCTIONS
NORTH POND ZONE BELOW EL. 685'	NORTH HALF OF POND EXCAVATION BELOW EL. 685'	17,000	USE FOR FILL AS DIRECTED IN NOTES
SOUTH POND ZONE BELOW EL. 685'	SOUTH HALF OF POND EXCAVATION BELOW EL. 685'	10,000	USE FOR FILL AS DIRECTED IN NOTES
POND ZONE ABOVE EL. 685'	REMAINING POND EXCAVATION TAKING PLACE ABOVE EL. 685'	50,000	USE FOR FILL AS DIRECTED IN NOTES

VOLUME ESTIMATE (CU YD)	
NET CUT	77,000
NET FILL	42,300
REMAINING CUT/FILL VOLUME	34,700



PROJECT
 FORMER NEWTON
 GRAVEL PIT -
 CAP & POND DESIGN
 MANITOWOC, WISCONSIN

CLIENT
 CITY OF
 MANITOWOC
 900 QUAY ST.
 MANITOWOC, WI 54220
 920-686-6910 tel
 www.manitowoc.org

CONSULTANT
 AECOM
 1555 RIVERCENTER DRIVE, SUITE 214
 MILWAUKEE, WI 53212
 414-944-6080 tel 414-944-6081 fax
 www.aecom.com

SUB CONSULTANT

REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
I	05/15/17	BID SET

KEY PLAN

PROJECT NUMBER
 60135471
FIGURE TITLE
 GRADING PLAN - CUT/FILL PLAN

FIGURE NUMBER
 G-4

Plotted By: jacckj
 Plot File Date Created: May/15/2017 12:57 PM
 Filename: L:\WORK\82518\CADD\2017\NEWTON_GRAVEL_PIT_CUT_FILL_PLAN.DWG
 Layout-Street Name: CUT-FILL PLAN

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: December 7, 2015

TO: Wisconsin Licensed Well Drillers

FROM: Liesa Lehmann, Private Water Supply Section Chief
Bureau of Drinking Water and Groundwater



SUBJECT: **SPECIAL WELL CASING PIPE DEPTH AREA**

Manitowoc City / Former Newton Town Gravel Pit and surrounding area:
Including parts of Sections 1 and 2, Town of Newton and parts of Sections 35 and 36,
City of Manitowoc, Manitowoc County

A "Special Well Casing Pipe Depth Area" is hereby established for the area including and surrounding the City of Manitowoc Newton Gravel Pit described in detail below. Within this area new wells shall be constructed, or existing wells reconstructed, to more stringent standards. In addition, a water sample shall be collected from each newly constructed or reconstructed well and the sample shall be analyzed at a certified laboratory for Volatile Organic Compounds, as indicated below.

EFFECTIVE DATE: This "Special Well Casing Pipe Depth Area" is effective December 15, 2015.

LOCATION

This "Special Well Casing Pipe Depth Area" includes an area approximately 2 square miles in extent and includes parts of four land survey sections, and is shown on the attached map. The area is located southwest of the City of Manitowoc, adjacent to and surrounding the Manitowoc City / Former Town of Newton Gravel Pit located at 3130 Hecker Road in the Town of Newton. The area contains portions within the Town of Newton and the City of Manitowoc and includes the following:

Town of Newton - T18N-R23E

Section 1

- N 1/2
- SW 1/4

Section 2

- E 1/2
- S 1/2 of NW 1/4
- E 1/2 of SW
- NW 1/4 of the SW 1/4

City of Manitowoc - T19N-R23E

Section 35

- SE 1/4 of the SE 1/4

Section 36

- SW 1/4 of the SW 1/4
- SE 1/4 of the SW 1/4
- SE 1/4 of the SE 1/4
- SW 1/4 of the SE 1/4

JUSTIFICATION

This "Special Well Casing Pipe Depth Area" is established to reduce the risk of wells constructed or reconstructed within this area to produce water contaminated with chemical compounds. This area is established under the authority provided by section NR 812.12(3), Wis. Admin. Code, and is based on the following information:

1. Vinyl chloride and cis-1,2-Dichloroethylene (DCE) and other Volatile Organic Compounds have been found in water samples from private supply wells and from monitoring wells in the area near the Manitowoc City / Former Newton Town Gravel Pit.
2. NR 140, Wis. Adm. Code establishes the following drinking water standards:
 - Vinyl chloride: Enforcement Standard = 0.2 ug/L, Preventative Action Limit = 0.02 ug/L
 - DCE: Enforcement Standard = 70.0 ug/L, Preventative Action Limit = 7.0 ug/L
 - 1,2-Dichloroethane: Enforcement Standard = 5.0 ug/L, Preventative Action Limit = 0.5 ug/L

3. Of approximately 100 wells sampled, 15 have exceeded the Enforcement Standard for Vinyl Chloride, 3 wells exceeded a PAL for DCE and/or DCA, and 14 had detects of other chlorinated solvents. The highest concentration of vinyl chloride found in a private well was 102 ug/L.
4. Chlorinated solvent contamination has been detected both in gravel wells and in bedrock wells up to 200 feet deep.
5. The plume of contaminants has migrated in both the surficial aquifer and bedrock to the east northeast over a mile from the site.
6. The establishment of this "Special Well Casing Pipe Depth Area" is based on contamination of the groundwater in this area, primarily by vinyl chloride and cis-1,2-Dichloroethylene (DCE). Both of these chemicals are Volatile Organic Compounds (VOCs). These compounds have been found in the groundwater of both the unconsolidated surficial aquifer and the limestone bedrock aquifer in this area.

NEW WELL CONSTRUCTION & GROUTING REQUIREMENT SPECIFICATIONS

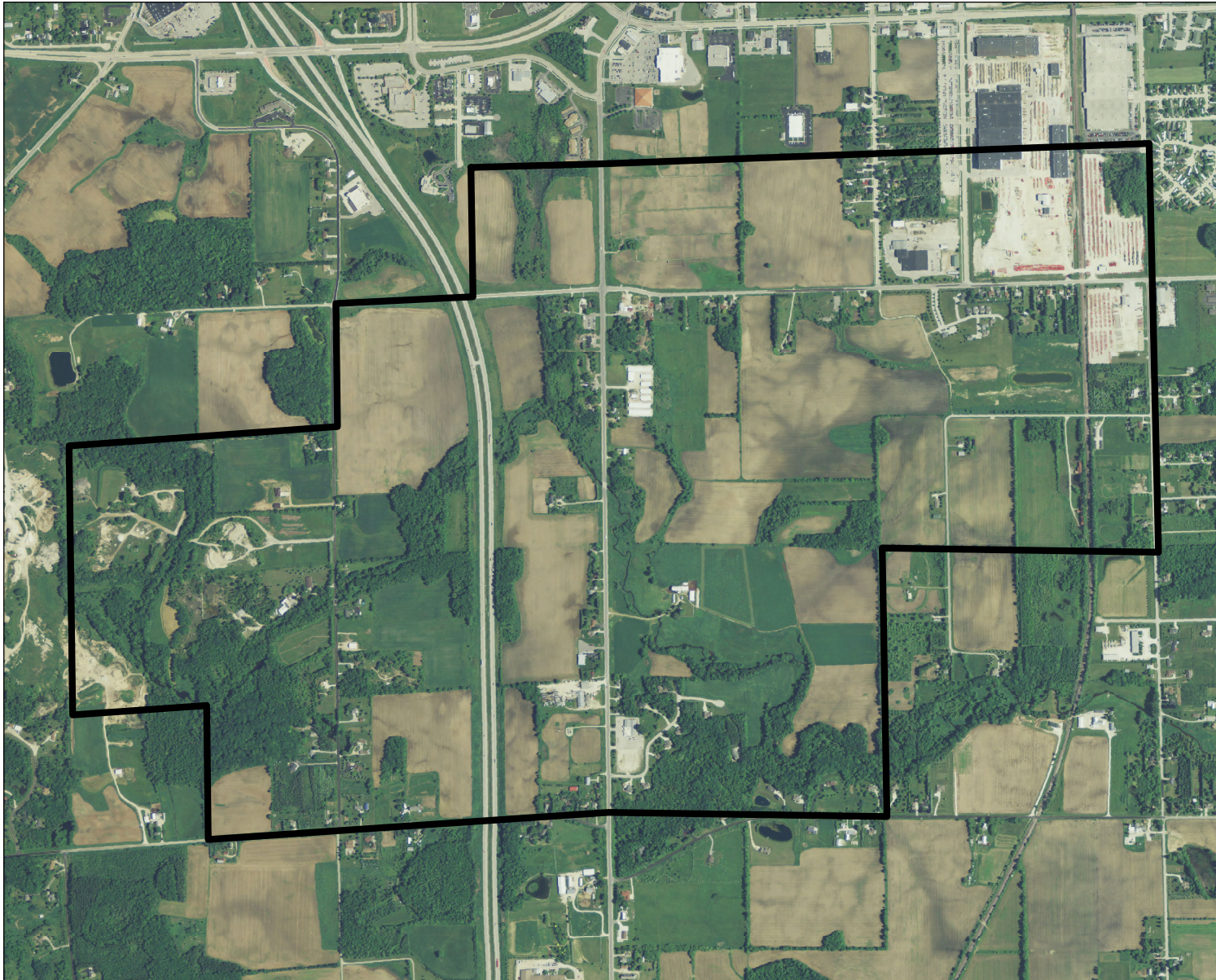
Any new well construction, or existing well reconstruction, within this area on or after the effective date shall be constructed with the following specifications:

1. The well shall be cased and cement-grouted to a minimum depth of **275 feet**, and set to a firm seat in competent bedrock.
2. For these 6-inch diameter wells, the upper-enlarged drillhole (UED) shall have a minimum diameter of 10 inches.
3. The UED may be constructed using rotary-air, rotary mud-circulation or cable-tool methods. If rotary mud-circulation methods are used the diameter of the UED may be reduced to 8 ¾ inches, but the mud pit shall have a volume large enough to provide for efficient removal of drill cuttings. This volume is typically three times the total volume of the hole to be drilled. In addition, a centrifuge sand separator shall be installed with the mud circulation system to remove sand-sized drill cuttings.
4. If rotary mud-circulation methods are used, the water used to mix the drilling mud slurry shall have a pH between 7 and 8.5. If the pH is below 7 it shall be slowly treated with soda ash to achieve a pH within the acceptable range.
5. For cement grouting the annular space a grout shall be ordered from a commercial concrete company, be ordered free of aggregate and shall have a slurry density of at least 15.2 lbs./gallon, but preferably a density of 15.6 lbs./gallon. The grout density shall be measured with a mud balance at the grout pump hopper before being pumped. The grout shall be adequately screened to remove any unexpected aggregate before it enters the grout pump hopper.
6. The cement grout shall be pumped into the annular space using either the "Bradenhead" or "Grout Shoe" method and the grouting operation shall be done in a manner according to the requirements of s. NR 812.20, Wis. Adm. Code.
7. At completion of the grouting procedure, the grout shall flow out the top of the annular space with the same density as the grout being pumped from the hopper and shall have a density of at least 15.2 lbs./gal. The grout density shall have a density of at least 15.2 lbs./gal. The grout density shall be measured with a mud balance.
8. The cement grout shall be allowed to set for at least 24 hours before construction of the lower bedrock drillhole is commenced. Any new water supply well constructed or an existing water supply well reconstruction shall be sampled within 30 days of completion and tested for volatile organic compounds (VOCs) using EPA Method 502.2 or 524.2 with all results forwarded to the DNR. The cost of sampling is a responsibility of the well owner unless other parties volunteer or are ordered by DNR to sample.

Newton Gravel Pit, Manitowoc County
Special Well Casing Depth Area

Portions of Sec. 1 and Sec. 2, T18N R23E and Portions of Sec. 35 and Sec. 36, T19N R23E

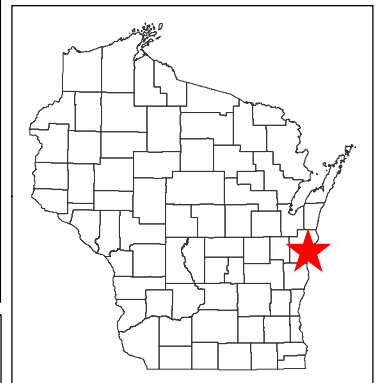
February 5, 2015



 Special Area
Boundary

Refer to the attached
document:

Well Construction
Specifications,
Replacement Wells,
Newton Gravel Pit
Special Well
Casing Depth Area



The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. Users of these maps should confirm the ownership of land through other means in order to avoid trespassing. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness or legality of the information depicted on this map.

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Scott Walker, Governor
Cathy Stepp, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711



December 7, 2015

Parcel ID: 1400200100300

ANGELBECK BRADLEY E & CHERIK
2231 CHADWICK WAY
MUNDELEIN IL 60060

Subject: Special Well Casing Pipe Depth Area, Town of Newton and
City of Manitowoc, Manitowoc County

The Department of Natural Resources (department) is establishing a Special Well Casing Pipe Depth Area, in response to groundwater contamination in the Town of Newton, Manitowoc County. This letter is sent to you because you are listed as a landowner within this area.

Special Well Casing Pipe Depth Areas are identified geographic areas where wells are required to have specific casing depths and/or be constructed in a specific manner. Special Well Casing Pipe Depth Areas are authorized by NR 812.12(3), Wis. Adm. Code, and are intended to provide additional protection from a known contaminant or in areas where the geology is highly susceptible to groundwater contamination, when new wells are constructed.

The new Special Well Casing Pipe Depth Area for the parts of the Town of Newton and City of Manitowoc is shown on the attached map. Well sampling is occurring around the City of Manitowoc Newton Gravel Pit. Groundwater contamination is being monitored and remediation efforts are under way. So far, six wells have been replaced, nine wells will be connected to the municipal water system and four wells are expected to be replaced and/or permanently filled and sealed.

To protect future wells and well owners, and to minimize the risk of further migration of the contamination, special well construction requirements will apply to any new or reconstructed wells that will be constructed within the area boundary as shown on the attached map. This will require that new or reconstructed wells be constructed with deeper well casing pipe, and constructed with stricter protocols, than the minimum requirements in state well code. Attached is a summary of the justification and construction specifications, which will be sent to all area well drillers. Please note that establishing this Special Well Casing Pipe Depth Area does not require you to replace the well you are using now. It applies to any new or reconstructed wells constructed within the area.

If you have any question about the Special Well Casing Pipe Depth Area, contact Liz Heinen, DNR Private Water Specialist, at (920) 993-7056.

Sincerely,

Liesa Lehmann
Private Water Supply Section Chief
Bureau of Drinking Water and Groundwater
(608) 267-7649

cc: Liz Heinen, DNR-Appleton

Newton Gravel Pit

ParcelID#	Owner Name	Street Address	City, State	Zip
01400100300200	ALTERGOTT EMILY % ALEX AUGUSTINE	3515 ORCHARD LANE	MANITOWOC WI	54220-0000
01400200100300	ANGELBECK BRADLEY E & CHERIK	2231 CHADWICK WAY	MUNDELEIN IL	60060-0000
01400201300300	ANHALT CHAD J	3224 CTH CR	MANITOWOC WI	54220-0000
05280110101000	ATS SPECIALIZED INC	725 OPORTUNITY DR	SAINT CLOUD MN	56301
01400100100601	ATS SPECIALIZED INC	PO BOX 1377	ST CLOUD MN	56302-1864
01400101200300	AUKAMP RICHARD J & SUSAN J	3802 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
05283640302000	BACKHAUS ERIC J	2407 S 35TH ST	MANITOWOC WI	54220
05283630405000	BAUMANN HENRY S	2440 S 35TH ST	MANITOWOC WI	54220
01400101200200	BENTS GARY E & ANN M	3518 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
05280120203000	BEY SHERYL L	4025 VIEBAHN ST	MANITOWOC WI	54220
01400100300300	BIRINGER BRENDA	3027 ORCHARD LANE	MANITOWOC WI	54220-0000
05280110103000	BLANCHARD DEREK E	2913 VIEBAHN ST	MANITOWOC WI	54220
01400201200200	BREUNIG RICHARD V & CYNTHIA M	3504 COUNTY ROAD CR	MANITOWOC WI	54220-0000
05280110105000	CANTU MANUEL & SUSAN	2907 VIEBAHN ST	MANITOWOC WI	54220
01400201600101	COMCAST CORPORATION	ONE COMCAST CENTER	PHILADELPHIA PA	19103-0000
01400200400100	CR VENTURE LLC	3504 CTH CR	MANITOWOC WI	54220-0000
01400100600400	EBERHARDT JAMES H & CAROL A	2911 CTH CR	MANITOWOC WI	54220-0000
01400100700100	EBERHARDT RONALD A & CORINNA M	3023 CTH CR	MANITOWOC WI	54220-0000
01400100400600	FISHER THOMAS W	1725 VIEBAHN STREET	MANITOWOC WI	54220-0000
05283540101000	FOREST CREEK LLC	100 MARITIME DR STE	MANITOWOC WI	54220
01400102000000	FOX VALLEY & WESTERN	ONE O'HARE CENTRE	ROSEMONT IL	60017-0000
01400101100400	GADZINSKI STEVEN R	3611 CTH CR	MANITOWOC WI	54220-0000
01400101101900	GENTILE REVOC TRUST MATTHEW K & NOELLE N	4010 THUNDER RIDGE ROAD	MANITOWOC WI	54220-0000
01400201500500	GRUMANN ET AL CAROL	4752 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
01400201600400	GRUNEWALD JANET	4212 SILVER CREEK RD	MANITOWOC WI	54220-0000
01400201300400	GUETSCHOW GLEN R	3312 CO CR	MANITOWOC WI	54220-0000
01400101100300	GUY & RICK PROPERTIES LLC	3627 CTH CR	MANITOWOC WI	54220-0000
05283630401100	HALL JOSEPH	2414 S 35TH ST	MANITOWOC WI	54220
01400101100700	HANSON JONATHAN M & TIFFANY L	3902 SILVER CREEK RD	MANITOWOC WI	54220-0000
01400101100200	HARDOW MICHAEL J % JOHN & DIANNE MONKA	3523 CTH CR	MANITOWOC WI	54220-0000
01400101100500	HARDOW MICHAEL J	3533 CTH CR	MANITOWOC WI	54220-0000
01400100600600	HAUPT ET UX JEROME E	2717 CTH CR	MANITOWOC WI	54220-0000
01400100600300	HENNEMAN JR TIMOTHY J	3815 VIEBAHN STREET	MANITOWOC WI	54220-0000
01400200100302	HER NYAJTOUA	838 S 37TH ST	MILWAUKEE, WI	53215
01400200100500	HINTZ LUANN LUEBKE	2916 S CTH CR	MANITOWOC WI	54220-0000
01400201300500	HYDE SCOTT A	3322 CTH CR	MANITOWOC WI	54220-0000
05283640301000	IGNERA ROBERT	2405 S 35TH ST	MANITOWOC WI	54220
05283630403000	JACQUART JAMES F	850 LAWTON TER	MANITOWOC WI	54220
01400201500300	KADERABEK JASON J & MELLISA K	3625 HECKER ROAD	MANITOWOC WI	54220-0000
01400100601000	KAKATSCH JR LAWRENCE & DEBRA	3825 VIEBAHN STREET	MANITOWOC WI	54220-0000
01400101200100	KAUTH CHARLES & LINDA L	3780 SILVER CREEK RD	MANITOWOC WI	54220-0000
05283640306000	KEMPFERT ET AL LAURA	2501 S 35TH ST	MANITOWOC WI	54220
01400100400300	KENNEDY PATRICK T & TAMMY J	3021 S 26TH ST	MANITOWOC WI	54220-0000
01400201300200	KNIER MARY S % ROBERT FLAIM	3618 CTH CR	MANITOWOC WI	54220-0000
05280110104000	KOPIDLANSKY JAY P	2911 VIEBAHN ST	MANITOWOC WI	54220
05283630402000	KRAEMER ANTHONY & POLLY	2422 S 35TH ST	MANITOWOC WI	54220
01400201200500	LALLENSACK ALLAN E	4904 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
01400100800100	LCR DEVELOPMENT LLC	2435 W PROSPECT AVE	APPLETON WI	54915-3716
01400200800100	LEIKER CHARLES W & SANDRA L	3114 HECKER RD	MANITOWOC WI	54220-0000
05280110203000	LINDHOLM DAVID A	3109 VIEBAHN ST	MANITOWOC WI	54220
01400101101100	LINSMEIER HOWARD & SHAWN	4027 THUNDER RIDGE ROAD	MANITOWOC WI	54220-8873
01400100601200	LOK-SAFE LLC	PO BOX 28133	GREEN BAY WI	54324-0000
01400201400300	LONZO-SKARDA DANA M	3150 S STONEGATE CIRCLE	NEW BERLIN WI	53151-0000
01400101101000	MAES JEREMY A & JESSICA B	4101 THUNDER RIDGE ROAD	MANITOWOC WI	54220-0000
01400201500100	MALONEY THOMAS & LORI	4620 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
01400200900100	MANCHESKI JR ET UX JOSEPH	3320 HECKER ROAD	MANITOWOC WI	54220-0000
01400200300200	MANCHESKI JR JOSEPH	3302 HECKER ROAD	MANITOWOC WI	54220-0000
05283540102300	MANITOWOC CINEMA LLC	100 MARITIME DR SUITE 3C	MANITOWOC WI	54220
05280110205000	MANITOWOC CITY OF	900 QUAY ST	MANITOWOC WI	54220
05283630301000	MANITOWOC CO INC	PO BOX 66	MANITOWOC WI	54221
01400200300100	MANITOWOC COUNTY (COUNTY HOSPITAL)	1010 S 8TH ST	MANITOWOC WI	54220-0000
05283640103000	MANITOWOC CRANES LLC	2401 S 30TH ST	MANITOWOC WI	54221
05283640102000	MANITOWOC FSG OPERATIONS INC	2110 S 26TH ST	MANITOWOC WI	54221
01400100601100	MAURER BRIAN L	3817 VIEBAHN STREET	MANITOWOC WI	54220-0000
01400101101800	MCFARLANE MATTHEW	4002 THUNDER RIDGE RD	MANITOWOC WI	54220-0000
05283630407000	MENDEZ JUAN JR & MADELENE	2502 S 35TH ST	MANITOWOC WI	54220
01400101100900	MESSMAN KURT M & MARTINA	4111 THUNDER RIDGE ROAD	MANITOWOC WI	54220-0000
01400101200400	MILLEN MICHAEL G & SHERRY L	3812 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
01400201400400	MILLER EDWARD G & LINDA M	3327 HECKER ROAD	MANITOWOC WI	54220-0000
01400200800300	MONKA STEVE & JEAN	3018 HECKER ROAD	MANITOWOC WI	54220-0000
01400100400400	MOORE ROBERT L & ANITA	3008 S 26TH STREET	MANITOWOC WI	54220-0000
01400201600501	NELSON ET UX JEFFREY P	3626 CTH CR	MANITOWOC WI	54220-0000
01400201300700	NELSON JEFFREY P	3422 CO CR	MANITOWOC WI	54220-0000
05283640305000	NELSON MICHAEL	2427 S 35 ST	MANITOWOC WI	54220
01400100100800	NOVY STEVEN L & DEBORAH J	2918 S 26TH STREET	MANITOWOC WI	54220-0000
01400201500200	ORP REAL ESTATE HOLDINGS	1746 EXECUTIVE DRIVE	OCONOMOWOC WI	53066-0000
01400100500400	PHILLIP KENNETH J	3701 VIEBAHN STREET	MANITOWOC WI	54220
05283640303000	PLACE WILLIAM J	2413 S 35TH ST	MANITOWOC WI	54220
01400201600600	POPP RONALD C & JOANNE L	4220 SILVER CREEK ROAD	MANITOWOC WI	54220-0000

01400201300100	PRIORITY IAC INC	3504 CTH CR	MANITOWOC WI	54220-0000
01400201600100	PROWLS KRISTEN M	3904 CTH CR	MANITOWOC WI	54220-0000
01400201600500	RADEY AL	3626 CO CR	MANITOWOC WI	54220-0000
01400100600200	RADZINSKE RICHARD C & RHONDA A	935 S 19TH STREET	MANITOWOC WI	54220-0000
01400200300300	RAETHER ET LIX ALLAN L	3121 HECKER ROAD	MANITOWOC WI	54220-0000
01400100300100	RATAJCZAK WILLIAM % BRENDA BIRRRINGER	3027 ORCHARD LANE	MANITOWOC WI	54220-0000
01400200100301	RATHSACK PAUL J	4722 W WHITETAIL	MANITOWOC WI	54220-8305
01400201000000	ROBERTS ANTHONY E & CATHERINE	5202 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
01400201400200	ROGERS MICHAEL D	3308 GASS LAKE RD	MANITOWOC WI	54220-0000
01400101101400	ROGERS STEVEN L & JENNIFER M	786 GARLAND RD	WATERVILLE MA	04901-0000
01400201500400	ROHR RANDY S	3627 HECKER ROAD	MANITOWOC WI	54220-0000
01400201300600	ROPP LOUISE E	3412 CTH CR	MANITOWOC WI	54220-0000
05283640304000	RYAN PATRICK C	2423 S 35TH ST	MANITOWOC WI	54220
05280120202000	SALTA RICK L	PO BOX 294	MANITOWOC WI	54221
01400100900000	SCHNUELLE FARMS LLC	S107 W36608 ANNICE LANE	EAGLE WI	53119-0000
01400101101500	SCHNUELLE JAMES M	3403 CTH CR	MANITOWOC WI	54220-0000
01400201500101	SCHRANK GARY E & DENISE	4752 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
01400201600300	SCHRANK JASON J % GARY & DENISE SCHRANK	4752 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
05280110203300	SCHWEDE JEFFREY D & BETTY L	3115 VIEBAHN ST	MANITOWOC WI	54220
05280120201000	SEHAFER BROADCASTING CORPORATION	3730 MANGIN ST	MANITOWOC WI	54220
05280110102000	SEIDLER JAMES & BARBARA	3011 VIEBAHN ST	MANITOWOC WI	54220
01400200400200	SHOOP JOHN C	3120 CO CR	MANITOWOC WI	54220-0000
05280110107000	SOBEL CHARLOTTE	2903 VIEBAHN ST	MANITOWOC WI	54220
01400200100400	THOMPSON GLORIA J	2904 CTH CR	MANITOWOC WI	54220-0000
01400200101100	THOMPSON GLORIA J	2904 CTH CR	MANITOWOC WI	54220-0000
05280120105000	TREMBLEY JEROME	3617 VIEBAHN ST	MANITOWOC WI	54220
01400101101300	TULACH JEFFREY G & CATHI L	3921 BLACKHAWK COURT	MANITOWOC WI	54220-8869
05283630406000	UNDERWOOD-BONK KELLY M	406 EAGLE HEIGHTS #A	MADISON WI	53705
01400201600200	URBANEC ROBERT T	4314 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
05280110202000	VAN SHANNON M	3021 VIEBAHN ST	MANITOWOC WI	54220
01400100600500	VANNE RYAN L	2917 CTH CR	MANITOWOC WI	54220-0000
01400201600700	VOCKE THOMAS P & SUSAN M	4236 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
01400200100100	VOGEL ANTHONY L	4318 GOODWIN ROAD	MANITOWOC WI	54220-0000
01400201400100	VOGEL DENNIS R & KAREN A	3515 HECKER ROAD	MANITOWOC WI	54220-0000
01400200100200	VOGEL THOMAS J	2706 CTH CR	MANITOWOC WI	54220-0000
05283630401000	WAZNY CHERYL L	2406 S 35TH ST	MANITOWOC WI	54220
01400101101200	WEIER PATRICK & DEANNE	4005 THUNDER RIDGE ROAD	MANITOWOC WI	54220-0000
05280110108000	WISCONSIN CENTRAL LTD	1 ADMINISTRATION RD FLOOR 1	CONCORD ON	L4K
05280110201000	WOOLSEY CRYSTAL R	3015 VIEBAHN ST	MANITOWOC WI	54220
01400201200400	YINDRA LUANN M	3518 HECKER ROAD	MANITOWOC WI	54220-0000
01400201200100	ZIARNIK RANDALL J	4808 SILVER CREEK ROAD	MANITOWOC WI	54220-0000
01400101100100	ZIMMER PAUL J & ROSE E	4127 THUNDER RIDGE ROAD	MANITOWOC WI	54220-0000