

From: Henderson, Dave <Dave.Henderson@aecom.com>
Sent: Friday, April 16, 2021 8:42 AM
To: GravelPit; Beggs, Tauren R - DNR; Witte, Edward
Subject: Former Newton Pit - Area Wide VOC 5-year Potable Well Sampling Plan
Attachments: Area Wide VOC 5YR Potable Well Sampling Plan 04162021_final.pdf

Team,

Attached is the *Area Wide VOC 5-year Potable Well Sampling Plan* for the Former Newton Pit.

Tauren, I have also submitted this through the WDNR's portal system.

Thanks
dsh

David Henderson, P.E. (WI)
Senior Project Manager, Environment, Midwest
D +1-414-944-6190
M +1-414-429-8304
Dave.henderson@aecom.com

AECOM
1555 N RiverCenter Drive
Milwaukee, WI 53212, USA
T +1-414-944-6080
aecom.com

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Letter of Transmittal

Attention:	Mr. Tauren Beggs Hydrogeologist, WDNR 2984 Shawano Ave Green Bay, WI 54313	Date:	4/16/21
Project reference:	Former Newton Pit BRRTS No. 02-36-000268	Project number:	60135471

We are sending you the following:

Number of originals:	Number of copies:	Description:
One	Zero	Area Wide VOC Five Year Potable Well Sampling Work Plan

Mr. Beggs,

Attached is the Area Wide VOC Five Year Potable Well Sampling Work Plan for the Former Town of Newton Gravel Pit, Manitowoc Wisconsin.

Please let me know if you have any questions.

Thank you.



David Henderson, P.E.
Senior Project Manager
D 414.944.6190 C 414.429.8304
dave.henderson@aecom.com

Cc: Kathleen M. McDaniel, City Attorney, City of Manitowoc
Dan Koski, Director of Public Infrastructure, City of Manitowoc

April 16, 2021

Mr. Tauren Beggs
Hydrogeologist
Wisconsin Department of Natural
Resources
2984 Shawano Avenue
Green Bay, WI 54313-6727

**Subject: Area Wide VOC Five Year Potable Well Sampling Work Plan
Former Town of Newton Gravel Pit
3130 Hecker Road, Manitowoc, Wisconsin
WDNR BRRTS No. 02-36-000268
AECOM Project No. 60135471 (82518)**

Dear Mr. Beggs,

On behalf of the City of Manitowoc (City), AECOM Technical Services, Inc. (AECOM) is submitting an area wide volatile organic compound (VOC) five year potable well sampling work plan for ongoing monitoring of private potable wells near the Former Town of Newton Gravel Pit (Site). The purpose of the monitoring is to continue the evaluation of the extent of cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride (VC) as contaminants of concern (COCs) over the course of the next five years beginning in May 2021.

These sampling efforts are in response to requests from the Wisconsin Department of Natural Resources (WDNR).

Presented below are background information, a proposed sampling schedule, sampling methods, reporting, and a summary of ongoing activities related to the potable well sampling.

Background Information

Regular monitoring has been ongoing since November 2013, when VOCs were discovered in private potable wells near the Former Town of Newton Gravel Pit. Previous potable well sampling plans include the initial 2014 *Potable Well Monitoring Work Plan*¹ and the 2015 to 2016 *Semi-Annual Potable Well Monitoring Work Plan*². and the May 2017, *Five Year Potable Well Monitoring Work Plan*³. The sampling schedules presented in these work plans have been updated periodically due to sampling results.

As a result of an expanding area of impact, a *VOC Expanded Downgradient Potable Well Sampling Work Plan*⁴ was submitted to the WDNR for a one-time sampling event of potable wells downgradient of the 2017 five year work plan area. The expanded sampling area was bounded on the north by the City of Manitowoc city limits, roughly delineated by Viebahn Street, to the east by the shore of Lake Michigan, to the south by Pheasant Drive, and to the west by South 26th Street and the 2017 Five Year work plan sampling area. The expanded sampling area is shown on Figure 1.

The expanded potable well sampling field activities were initiated in November 2019 and continued through December 2020. The results indicated detections of cis-1,2-DCE and VC mainly along the northern portions of South 26th Street, South 15th Street, and South 19th Street. The expanded sampling results are to be issued under a separate cover.

¹ Potable Well Monitoring Work Plan, BRRTS No. 02-36-000268, AECOM, April 10, 2014.

² 2015 to 2016 Semi-Annual Potable Well Monitoring Work Plan, BRRTS No. 02-36-000268, AECOM, September 22, 2015.

³ *Five Year Potable Well Monitoring Work Plan, Former Town of Newton Gravel Pit*, AECOM, May 8, 2017

⁴ *VOC Expanded Downgradient Potable Well Sampling Work Plan, Former Town of Newton Gravel Pit*, AECOM, August 5, 2019

Results associated with the 2017 Five Year Potable Well Monitoring Work Plan have been published in numerous letter reports. The most recent report, *November 2020 Semi-Annual Potable Well Monitoring Letter Report*⁵ provides the latest sampling results as-well-as summary data tables of historical results.

The Area Wide VOC Five Year Potable Well Sampling Work Plan presented below is an effort to incorporate into one document the wells associated with the 2017 five year work plan and the wells identified during the expanded downgradient sampling into a single comprehensive VOC potable well monitoring plan.

Potable Well Sampling Zones & Sampling Schedule

For the area wide VOC five year sampling plan the potable well sampling zones are categorized as follows:

- Target Zone Wells
- Target Zone Sentinel Wells
- Sentinel Zone 3-Year Wells
- Sentinel Zone 5-Year Wells
- Replacement Wells
- Historically Sampled Wells
- Former Potable Wells Now Connected to City Water

A detailed description of each sampling zone, the proposed zone specific sampling schedule, and an explanation of the proposed changes as compared to the last sampling plan are presented below. This information is also summarized on Table 1 and presented on Figure 1.

Target Zone Wells – color code symbol: ● ●

Target Zone Wells are wells with detectable VOC COCs. Wells identified with a blue circle have VOC COC detects below NR 140 enforcement standards (ES). Wells identified with a red circle have VOC COC detects, typically VC, above respective NR 140 ESs. These wells will be sampled on a semi-annual basis for five years. Currently, this includes a total of 54 wells.

Target Zone Sentinel Wells – color code symbol: ●

These wells are located within the Target Zone but they do not have detectable VOC COCs. The wells will be sampled on an annual basis. Currently, this includes a total of 60 wells.

Included within the Target Zone Sentinel Wells are potable wells that have not been sampled to date. These wells represent homeowners or well users that have not responded to the City's request for sampling. The unsampled wells within the Target Zone will continue to be contacted by the city and will be sampled when the owners or well users respond.

Sentinel Zone 3-Year Wells – color code symbol: ●

Sentinel Zone 3-Year Wells will be sampled on a rotating schedule where each well will be sampled once every three years on a rotation basis, typically based on its last sampling date. Note that the well at 2717 CTH CR (4141 Viebahn St.) is a former potable well that has been retained as a non-potable monitoring well location. We have retained the blue color code symbol for the well to indicate that it's impacted with VOC COCs. Currently, this includes a total of 33 wells, including the 2717 CTH CR (4141 Viebahn St.) non-potable monitoring well location.

⁵ *November 2020 VOC Semi-Annual Potable Well Monitoring Letter Report*, BRRTS No. 02-36-000268, AECOM, March 8, 2021.

Included within the 3-Year Sentinel Zone are potable wells that have not been sampled to date. These wells represent homeowners or well users that have not responded to the City's request for sampling. The unsampled wells within the 3-Year Sentinel Zone will continue to be contacted by the city and will be sampled when the owners or well users respond.

Sentinel Zone 5-Year Wells – color code symbol: ●

Sentinel Zone 5-Year Wells will be sampled on a rotating schedule where each well will be sampled once every five years based on its last sampling date. Currently, this includes a total of 32 wells.

Included within the 5-Year Sentinel Zone are potable wells that have not been sampled to date. These wells represent homeowners or well users that have not responded to the City's request for sampling. The unsampled wells within the 5-Year Sentinel Zone will continue to be contacted by the city and will be sampled when the owners or well users respond.

Replacement Wells – color code symbol: ●

Replacement Wells sampled to date have not had detections of VOC COCs. Therefore, existing replacement wells will be sampled once every five years, typically based on the last sampling date.

The sampling schedule for newly installed Replacement Wells will be as follows; initial sample within one week of installation, second sample at approximately one month post-installation, and a third sample approximately two months post-installation to confirm the new well is not impacted by VOC COCs. The well will then be sampled every five years.

Currently, there are twelve replacement wells as follows:

- 3518 Hecker Road
- 3515 Hecker Road
- 3609 Hecker Road
- 3120 CTH CR
- 3403 CTH CR
- 3023 CTH CR
- 3303 Hecker Road
- 3504 CTH CR
- 4002 Thunder Ridge Road
- 4005 Thunder Ridge Road
- 4010 Thunder Ridge Road
- 2918 South 26th Street

Historically Sampled Wells – color code symbol: ▲

These potable wells previously included wells located up-gradient or side-gradient from the VOC groundwater plume. With the addition of the expanded sampling area wells to the work plan, the historically sampled wells now also include down-gradient wells outside our area of interest. Initial sampling results indicate that the wells have no detections of VOC COCs associated with Newton Pit project. These wells will not be sampled during the five year sample plan period.

Never Been Sampled Wells – color code symbol: ●

These potable wells have not been sampled to date. These wells represent homeowners or well users that have not responded to the City's request for sampling. They include wells within the Target Zone, 3-Year and 5-Year Sentinel Zones, and wells outside our area of interest. The unsampled wells within the Target Zone, 3-Year and 5-Year Sentinel Zones will continue to be contacted by the city and will be sampled when the owners or well users respond.

Former Potable Wells Now Connected to City Water – color code symbol: ○

Nine potable wells located along Viebahn Street and CTH CR were replaced with connections to the City of Manitowoc public water supply. These addresses will no longer require potable well sampling.

- 2717 CTH CR (4141 Viebahn Street)
- 2734 (2804) CTH CR
- 2916 CTH CR
- 2917 CTH CR
- 3617 (3621) Viebahn Street
- 3701 Viebahn Street
- 3815 Viebahn Street
- 4025 Viebahn Street
- 4101 Viebahn Street

Note that the potable well located at 2717 CTH CR (4141 Viebahn Street) was left in-place and will be used as a non-potable groundwater monitoring well classified as a Sentinel Zone 3-Year Well.

Re-Classifying Sampling Zones

If future sampling results indicate that a well is impacted by VOC COCs, the data will be used to reclassify the well's sampling zone. The sampling frequency of the newly impacted well will be adjusted to match the reclassified sampling zone schedule.

If the potable well owner is supplied with city water the resident will be removed from the area wide sampling schedule. The abandonment of potable wells will be determined on a case by case basis.

Sampling Methodology

Potable well owners will be notified by the City that their well is scheduled to be sampled. The City will then work with AECOM and the owners to schedule an appointment for AECOM field technicians to sample the well.

Samples will be collected following purging from a cold water tap or spigot as near to the well as possible, preferably prior to any storage/pressure tanks or physical/chemical treatment system that might be present. The system will be purged for at least 10 minutes immediately prior to sampling. Samples for VOCs will be collected in 40-ml glass vials with Teflon septa. The vials will be filled to the top, leaving no headspace or bubbles and quickly capped. While filling sample containers, water flow will be reduced to a low level to minimize sample disturbance. The samples will be placed on ice in a cooler and transported to the laboratory. The samples will be accompanied with a chain of custody form.

Potable well water samples for quality control will also be collected. The quality control samples will include field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples. The quality control samples will be determined by AECOM field personnel. Laboratory provided trip blanks will accompany the sample containers to evaluate the potential for analytical artifacts associated with container handling in the field and laboratory.

Water samples will be submitted to a Wisconsin Administrative Code (WAC) Chapter NR 149 certified laboratory for analyses of VOCs (EPA Method SW 8260B). The groundwater analytical results will be compared to the WAC Ch. NR 140.10, Table 1, Public Health Groundwater Quality Standards.

Reporting

Reporting of laboratory analytical results will be made to the City, WDNR, and individual potable well owners in general accordance with NR 716.14 *Sample Results Notification Requirements*.

A semi-annual potable well sampling letter report will be submitted to the WDNR. The letter report will include a written summary of the sampling event(s), summarized laboratory results in tabular form, a figure showing the results, and copies of laboratory reports.

Well owner reporting of analytical results will include a cover letter explaining the results with an attached copy of the laboratory report. The WDNR will be copied on the well owner reporting.

Response Actions

Locations with potable wells that have VOC compounds above NR 140 ES limits will receive bottled water provided by the City while alternatives are reviewed for providing a long-term solution for safe clean drinking water.

At this time, we are proceeding with scheduling the May 2021 sampling event. If you have any questions regarding the work plan, please contact Dave Henderson at 414.944.6190 or dave.henderson@aecom.com.

Sincerely,

AECOM Technical Services, Inc.



David Henderson, P.E.
Senior Project Manager
dave.henderson@aecom.com

Cc: Kathleen M. McDaniel, City Attorney, City of Manitowoc
Dan Koski, Director of Public Infrastructure, City of Manitowoc

Attachments: Table 1, Summary of the Area Wide VOC Five-Year Potable Well Sampling Plan
Figure 1, Area Wide VOC Five-Year Potable Well Sampling Locations

Tables



**TABLE 1
SUMMARY OF THE AREA WIDE VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN**

Well Address	Map Color Code	Date of Previous Sampling Event	2021		2022		2023		2024		2025	
			May	October	May	October	May	October	May	October	May	October
Target Zone Wells(semi-annual sampling)												
2201 Elm Road	●	May 2020	1	1	1	1	1	1	1	1	1	1
2322 ELM RD	●	Nov 2020	1	1	1	1	1	1	1	1	1	1
2732 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
2806 S 15TH ST	●	Nov 2020	1	1	1	1	1	1	1	1	1	1
2812 S 15TH ST	●	Feb 2020	1	1	1	1	1	1	1	1	1	1
2820 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
2821 S 19TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
2823 S 15TH ST	●	Dec 2019	1	1	1	1	1	1	1	1	1	1
2824, 2828, 2904 S 19TH ST (Shared Well)	●	Feb 2020	1	1	1	1	1	1	1	1	1	1
2826 S 15TH ST	●	Oct 2020	1	1	1	1	1	1	1	1	1	1
2827 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
2832 and 2904 CTH CR	●	Oct 2019	1	1	1	1	1	1	1	1	1	1
2834 S 15TH ST	●	Dec 2019	1	1	1	1	1	1	1	1	1	1
2908 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
2911 S 15TH ST	●	Dec 2019	1	1	1	1	1	1	1	1	1	1
2912 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
2917 S 19TH ST	●	Dec 2019	1	1	1	1	1	1	1	1	1	1
2918 S 19TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
2930 S 19TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3003 S 19TH ST	●	Oct 2020	1	1	1	1	1	1	1	1	1	1
3006 and 3008 19th ST	●	Oct 2020	1	1	1	1	1	1	1	1	1	1
3008 S 26TH St	●	May 2020	1	1	1	1	1	1	1	1	1	1
3011 S 19TH ST	●	Dec 2019	1	1	1	1	1	1	1	1	1	1
3019 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3019 S 19TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3020 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3027 Orchard Ln	●	May 2020	1	1	1	1	1	1	1	1	1	1
3027 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3028 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3107 S 15TH ST	●	Nov 2020	1	1	1	1	1	1	1	1	1	1
3109 S 19TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3123 S 19TH ST	●	Oct 2020	1	1	1	1	1	1	1	1	1	1
3125 LONE OAK LN	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3126 S 15TH ST	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3127 S 15TH ST	●	Dec 2019	1	1	1	1	1	1	1	1	1	1
3131 S 15TH ST and 3201 S 15TH ST (Shared Well)	●	Dec 2019	1	1	1	1	1	1	1	1	1	1
3202 S 15TH ST	●	Dec 2019	1	1	1	1	1	1	1	1	1	1
3208 LONE OAK LN	●	Oct 2020	1	1	1	1	1	1	1	1	1	1
3209 S 15TH ST and 3217 S 15TH ST (Shared Well)	●	May 2020	1	1	1	1	1	1	1	1	1	1
3327 Hecker Rd	●	May 2020	1	1	1	1	1	1	1	1	1	1
3328 CIMARRON CT	●	Nov 2019	1	1	1	1	1	1	1	1	1	1
3403 CIMARRON CT and 3413 CIMARRON CT (Shared Well)	●	Oct 2020	1	1	1	1	1	1	1	1	1	1
3461(3417) Hecker Rd	●	May 2020	1	1	1	1	1	1	1	1	1	1
3618 CTH CR	●	May 2017	1	1	1	1	1	1	1	1	1	1
3702 Hecker Rd	●	May 2020	1	1	1	1	1	1	1	1	1	1
3817 Viebahn St	●	May 2020	1	1	1	1	1	1	1	1	1	1
3911 Black Hawk Ct	●	May 2020	1	1	1	1	1	1	1	1	1	1
3921 Black Hawk Ct	●	May 2020	1	1	1	1	1	1	1	1	1	1
4024 CTH CR	●	May 2020	1	1	1	1	1	1	1	1	1	1
4027 Thunder Ridge Rd	●	May 2020	1	1	1	1	1	1	1	1	1	1
4101 Thunder Ridge Rd	●	May 2017	1	1	1	1	1	1	1	1	1	1
4111 Thunder Ridge Rd	●	May 2020	1	1	1	1	1	1	1	1	1	1
4127 Thunder Ridge Rd	●	May 2020	1	1	1	1	1	1	1	1	1	1
4159 Silver Creek Rd	●	May 2020	1	1	1	1	1	1	1	1	1	1
Target Zone Wells (Annual sampling)												
1511 and 1513 Lone Oak LN	●	Oct 2020	1		1		1		1		1	
1512 and 1514 Lone Oak LN	●	Feb 2020	1		1		1		1		1	
1521 LONE OAK LN	●	Nov 2019	1		1		1		1		1	
1703 LONE OAK LN	●	Dec 2019	1		1		1		1		1	
1704 LISSA LN	●	Not Sampled Yet	1		1		1		1		1	
1710 LISSA LN	●	Nov 2019	1		1		1		1		1	
1817 VIEBAHN ST	●	Not Sampled Yet	1		1		1		1		1	
1821 VIEBAHN ST	●	Not Sampled Yet	1		1		1		1		1	
2327 BIRCH RD	●	Not Sampled Yet	1		1		1		1		1	
2406 BIRCH RD	●	Not Sampled Yet	1		1		1		1		1	
2407 ELM RD	●	Nov 2019	1		1		1		1		1	
2408 Elm Road	●	Nov 2019	1		1		1		1		1	
2414 Birch Rd	●	Not Sampled Yet	1		1		1		1		1	
2417 Elm Road	●	Dec 2017	1		1		1		1		1	
2501 Nelson Lane	●	Dec 2017	1		1		1		1		1	
2507 NELSON LN	●	Nov 2019	1		1		1		1		1	
2508 NELSON LN	●	Not Sampled Yet	1		1		1		1		1	
2512 BIRCH RD	●	Not Sampled Yet	1		1		1		1		1	
2514 Elm Road	●	Dec 2017	1		1		1		1		1	
2515 NELSON LN	●	Not Sampled Yet	1		1		1		1		1	
2611 VIEBAHN	●	Not Sampled Yet	1		1		1		1		1	
2733 S 19TH ST	●	Dec 2019	1		1		1		1		1	



**TABLE 1
SUMMARY OF THE AREA WIDE VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN**

Well Address	Map Color Code	Date of Previous Sampling Event	2021		2022		2023		2024		2025	
			May	October	May	October	May	October	May	October	May	October
2803 ORCHARD	●	Not Sampled Yet	1		1		1		1		1	
2805 S 19TH ST	●	Nov 2019	1		1		1		1		1	
2811 S 15TH ST	●	March 2020	1		1		1		1		1	
2815 S 15TH ST	●	Oct 2020	1		1		1		1		1	
2833 S 19TH ST	●	Nov 2019	1		1		1		1		1	
2911 CTH CR	●	Oct 2016	1		1		1		1		1	
2915 S 26TH St	●	Dec 2017	1		1		1		1		1	
2929 S 19TH ST	●	Not Sampled Yet	1		1		1		1		1	
3021 S 26TH ST	●	Not Sampled Yet	1		1		1		1		1	
3113 S 15TH ST	●	Nov 2019	1		1		1		1		1	
3202 S 19TH ST	●	Nov 2019	1		1		1		1		1	
3203 S 26TH St	●	Nov 2019	1		1		1		1		1	
3205 LONE OAK LN	●	Nov 2019	1		1		1		1		1	
3205 S 19TH ST	●	Nov 2019	1		1		1		1		1	
3206 LONE OAK LN	●	Dec 2019	1		1		1		1		1	
3207 and 1520 Lone Oak LN	●	Dec 2019	1		1		1		1		1	
3210 S 19TH ST	●	Oct 2020	1		1		1		1		1	
3212 S 26TH ST	●	Not Sampled Yet	1		1		1		1		1	
3224 CTH CR	●	Oct 2016	1		1		1		1		1	
3225 S 26TH ST	●	Dec 2019	1		1		1		1		1	
3304 S 15TH ST	●	Oct 2020	1		1		1		1		1	
3304 S 19TH ST	●	Nov 2019	1		1		1		1		1	
3305 S 15TH ST	●	Oct 2020	1		1		1		1		1	
3307 S 19TH ST	●	Nov 2019	1		1		1		1		1	
3310 S 19TH ST	●	Nov 2019	1		1		1		1		1	
3312 CTH CR	●	Oct 2016	1		1		1		1		1	
3315 and 3327 CIMMARON CT (shared Well)	●	Dec 2019	1		1		1		1		1	
3320 Hecker Rd	●	Oct 2016	1		1		1		1		1	
3322 CTH CR	●	Oct 2016	1		1		1		1		1	
3406 CIMARRON CT and 2328 Jenny Rd (Shared Well)	●	Nov 2019	1		1		1		1		1	
3412 CTH CR	●	Oct 2016	1		1		1		1		1	
3422 CTH CR	●	Oct 2016	1		1		1		1		1	
3523 CTH CR	●	Oct 2016	1		1		1		1		1	
3533 CTH CR	●	Oct 2016	1		1		1		1		1	
3611 CTH CR	●	Oct 2016	1		1		1		1		1	
3626 CTH CR/3626 CTH CR #B	●	Oct 2016	1		1		1		1		1	
3627 CTH CR	●	Oct 2016	1		1		1		1		1	
3825 Viebahn St	●	Oct 2016	1		1		1		1		1	
Sentinel Zone 3-Year Wells (sample every 3rd year)												
1617 LISSA LN	●	Not Sampled Yet	1						1			May 2027
1701 LISSA LN	●	Oct 2020					1					May 2026
1709 LISSA LN	●	Nov 2019			1							1
1718 JENNY RD	●	Nov 2019					1					May 2026
1804 JENNY RD	●	Nov 2019			1							1
1805 LISSA LN	●	Nov 2019					1					May 2026
2403 JENNY RD	●	Nov 2019			1							1
2716 CTH CR	●	May 2020					1					May 2026
3118 S 10TH ST	●	Not Sampled Yet	1						1			May 2027
3128 Orchard Ln	●	Oct 2015	1						1			May 2027
3301 S 15th St	●	June 2020					1					May 2026
3315 S 19TH ST	●	Nov 2019			1							1
3318 Orchard Ln	●	Oct 2016	1						1			May 2027
3319 JENNY RD	●	Nov 2019					1					May 2026
3319 S 19TH ST	●	Nov 2019					1					May 2026
3321 JENNY RD	●	Nov 2019					1					May 2026
3323 S 26TH ST	●	Nov 2019			1							1
3326 S 15TH ST	●	Not Sampled Yet	1						1			May 2027
3407 S 26TH ST	●	Nov 2019					1					May 2026
3425 and 3427 Cimarron CT	●	Oct 2020					1					May 2026
3430 and 3508 CIMARRON CT (Shared Well)	●	Nov 2019			1							1
3509 and 3511 Cimarron CT	●	Not Sampled Yet	1						1			May 2027
3625 Hecker Rd	●	Oct 2016			1							1
3812 Silver Creek Rd	●	Jan 2016	1						1			May 2027
3818 SILVER CREEK RD	●	Not Sampled Yet	1						1			May 2027
3902 Silver Creek Rd	●	Oct 2016			1							1
3904 CTH CR	●	May 2017			1							1
4004 Silver Creek Rd	●	Oct 2015	1						1			May 2027
4101 CTH CR	●	Oct 2015	1						1			May 2027
4156 Silver Creek Rd	●	March 2016			1							1
4236 Silver Creek Rd/4220 Silver Creek Rd/4212 Silver Creek Rd (3 properties share Well)	●	May 2017			1							1
4314 Silver Creek Rd	●	June 2014	1						1			May 2027
4141 Viebahn St. / 2717 CTH CR (non-Potable Well)	○	May 2020					1					May 2026



**TABLE 1
SUMMARY OF THE AREA WIDE VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN**

Well Address	Map Color Code	Date of Previous Sampling Event	2021		2022		2023		2024		2025	
			May	October	May	October	May	October	May	October	May	October
Sentinel Zone 5-Year Wells (sample every 5th year)												
1801 JENNY RD	●	Nov 2019							1			May 2029
1807 JENNY RD	●	Not Sampled Yet	1									May 2026
2505 JENNY RD	●	Not Sampled Yet	1									May 2026
2706 CTH CR	●	Oct 2016			1							May 2027
3121 Hecker Rd	●	Oct 2015			1							May 2027
3405 S 15TH ST	●	Oct 2020									1	
3408 S 15TH ST	●	Nov 2019							1			May 2029
3415 S 15TH ST	●	Nov 2019							1			May 2029
3420 Orchard Ln	●	Oct 2016			1							May 2027
3421 S 15TH ST	●	Dec 2019									1	
3429 S 19TH ST	●	Dec 2019									1	
3503 S 19TH ST	●	Nov 2019							1			May 2029
3505 S 26TH ST	●	Nov 2019							1			May 2029
3510 S 26TH ST	●	Nov 2019							1			May 2029
3511 S 19TH ST	●	Dec 2019									1	
3517 S 26TH ST	●	Not Sampled Yet	1									May 2026
3518 SILVER CREEK RD	●	Dec 2019									1	
3521 and 3523 Cimarron CT	●	Not Sampled Yet	1									May 2026
3524 Orchard Ln	●	Oct 2015			1							May 2027
3526 S 26TH ST	●	Nov 2019							1			May 2029
3529 S 26TH ST	●	Nov 2019									1	
3537 and 3539 Cimarron CT	●	Not Sampled Yet	1									May 2026
3538 CIMARRON CT	●	Not Sampled Yet	1									May 2026
3616 SILVER CREEK RD	●	Not Sampled Yet	1									May 2026
3627 Hecker Rd	●	May 2017					1					May 2028
3710 Silver Creek Rd	●	May 2017					1					May 2028
3720 Hecker Rd	●	March 2016			1							May 2027
3780 Silver Creek Rd	●	May 2017					1					May 2028
3802 Silver Creek Rd	●	May 2017					1					May 2028
4125 CTH CR	●	May 2017					1					May 2028
4219 Viebahn St	●	Oct 2015			1							May 2027
4315 Silver Creek Rd	●	May 2017					1					May 2028
Replacement Wells (sample every 5th year)												
3504 CTH CR	●	Feb 2016		1								May 2026
3023 CTH CR	●	Oct 2016		1								May 2026
3120 CTH CR	●	Oct 2016		1								May 2026
3403 CTH CR	●	Oct 2016				1						May 2027
4002 Thunder Ridge Rd	●	Oct 2016				1						May 2027
4005 Thunder Ridge Rd	●	May 2017				1						May 2027
4010 Thunder Ridge Rd	●	May 2017						1				May 2028
2918 S 26TH St	●	May 2019						1				May 2028
3303 Hecker Rd	●	May 2020								1		May 2029
3515 Hecker Rd	●	May 2020								1		May 2029
3518 Hecker Rd	●	May 2020									1	
3609 Hecker Rd	●	May 2020									1	
Historically Sampled Wells												
1108 CREEK TRL	▲	Nov 2019										
1110 LAKE LN	▲	Nov 2019										
1125 SILVER CREEK RD	▲	Nov 2019										
1202 SILVER CREEK RD	▲	Nov 2019										
1207 CREEK TRL	▲	Nov 2019										
1219 SILVER CREEK RD	▲	Nov 2019										
1315 SILVER CREEK RD	▲	Nov 2019										
1404 and 1412 SILVER CREEK RD (Shared Well)	▲	Nov 2019										
1423 SILVER CREEK RD	▲	Nov 2019										
1428 SILVER CREEK RD	▲	Nov 2019										
1507 SILVER CREEK RD	▲	Nov 2019										
1602 SILVER CREEK RD	▲	Nov 2019										
1702 SILVER CREEK RD	▲	Nov 2019										
1703 SILVER CREEK RD	▲	Nov 2019										
1716 SILVER CREEK RD	▲	March 2020										
1717 SILVER CREEK RD	▲	Nov 2019										
1805 SILVER CREEK RD	▲	Feb 2020										
1811 SILVER CREEK RD	▲	Nov 2019										
1822 SILVER CREEK RD	▲	Nov 2019										
1906 SILVER CREEK RD	▲	Nov 2019										
1909 SILVER CREEK RD	▲	Nov 2019										
2218 SILVER CREEK RD	▲	Nov 2019										
2224 SILVER CREEK RD	▲	Nov 2019										
2304 SILVER CREEK RD	▲	Nov 2019										
2312 SILVER CREEK RD	▲	Nov 2019										
2402 SILVER CREEK RD	▲	Nov 2019										
2408 SILVER CREEK RD	▲	Nov 2019										
2608 SILVER CREEK RD	▲	June 2020										
2706 SILVER CREEK RD	▲	Nov 2019										
2881 CTH CR	▲	Well Out of Service										
2918 SILVER CREEK RD	▲	Nov 2019										
2925 Fricke Dr.	▲	Feb 2013										
3107 Fricke Dr	▲	Dec 2013										
3114 Hecker Rd	▲	May 2020										

Wells are typically non-detected wells that can be upgradient, sidegradient or downgradient wells. Some of the downgradient wells may be added if sentinel wells indicate sampling.



TABLE 1
SUMMARY OF THE AREA WIDE VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN

Well Address	Map Color Code	Date of Previous Sampling Event	2021		2022		2023		2024		2025	
			May	October	May	October	May	October	May	October	May	October
3116 SILVER CREEK RD	▲	Dec 2019										
3222 SILVER CREEK RD	▲	Nov 2019										
3302 SILVER CREEK RD	▲	Nov 2019										
3316 SILVER CREEK RD	▲	Nov 2019										
3406 SILVER CREEK RD	▲	Nov 2019										
3413 S 10TH ST	▲	Nov 2019										
3424 SILVER CREEK RD	▲	Nov 2019										
3523 Orchard Ln	▲	May 2014										
3533 S 10TH ST	▲	Dec 2019										
3602 S 19TH ST	▲	Dec 2019										
3603 10TH ST	▲	Nov 2019										
3604 SILVER CREEK RD	▲	Dec 2019										
3609 M and M Ln	▲	Dec 2013										
3610 Gass Lake	▲	Feb 2013										
3612 S 19TH ST	▲	Dec 2019										
3615 S 15TH ST	▲	Nov 2019										
3615 S 26TH ST	▲	Nov 2019										
3616 S 10TH ST	▲	Feb 2020										
3627 S 15TH ST	▲	Dec 2019										
3627 S 26TH ST	▲	Nov 2019										
3632 S 10TH ST	▲	Dec 2019										
3708 S 15TH ST	▲	Nov 2019										
3709 S 15TH ST	▲	Nov 2019										
3712 S 15TH ST	▲	Dec 2019										
3712 S 10TH ST	▲	Feb 2020										
3717 S 15TH ST	▲	Nov 2019										
3717 M and M Ln	▲	Feb 2013										
3719 S 26TH ST	▲	June 2020										
3720 S 26TH ST	▲	Nov 2019										
3722 S 15TH ST	▲	Nov 2019										
3723 S 19TH ST	▲	Nov 2019										
3727 S 15TH ST	▲	Dec 2019										
3804 S 15TH ST	▲	Dec 2019										
3805 S 15TH ST	▲	Nov 2019										
3809 S 19TH ST	▲	Nov 2019										
3813 S 15TH ST	▲	Nov 2019										
3819 S 15TH ST	▲	Dec 2019										
3821 S 19TH ST	▲	Nov 2019										
3835 S 10TH ST	▲	Nov 2019										
3840 M and M Ln	▲	Feb 2013										
3917 S 18TH ST	▲	Nov 2019										
3917 S 21ST ST	▲	Nov 2019										
3933 S 18TH ST	▲	Nov 2019										
4002 S 21ST ST	▲	Dec 2019										
4007 S 18TH ST	▲	Nov 2019										
4008 S 18TH ST	▲	Nov 2019										
4017 S 26TH ST	▲	Nov 2019										
4018 S 21ST ST	▲	Nov 2019										
4019 S 10TH ST	▲	Nov 2019										
4030 S 21ST ST	▲	Nov 2019										
4031 S 18TH ST	▲	Dec 2019										
4120 S 21ST ST	▲	Nov 2019										
4132 S 26TH ST	▲	Nov 2019										
4201 S 26TH ST	▲	Nov 2019										
4215 S 10TH ST	▲	Nov 2019										
4218 S 10TH ST	▲	Dec 2019										
4219 S 10TH ST	▲	Nov 2019										
4229 S 10TH ST	▲	Nov 2019										
4309 S 10TH ST	▲	Dec 2019										
4316 S 10TH ST	▲	Nov 2019										
4317 S 10TH ST	▲	Nov 2019										
4325 S 10TH ST	▲	Nov 2019										
4403 S 10TH ST	▲	Dec 2019										
4410 S 10TH ST	▲	Nov 2019										
4412 S 10TH ST (Shared Well)	▲	Nov 2019										
4416 S 10TH ST (Shared Well)	▲	Nov 2019										
4422 S 10TH ST (Shared Well)	▲	Nov 2019										
4426 S 10TH ST (Shared Well)	▲	Nov 2019										
4430 S 10TH ST (Shared Well)	▲	Nov 2019										
4432 S 10TH ST (Shared Well)	▲	Nov 2019										
4434 S 10TH ST (Shared Well)	▲	Nov 2019										
4440 S 10TH ST (Shared well)	▲	Nov 2019										
4513 S 10TH ST	▲	Nov 2019										
4609 Silver Creek Rd	▲	June 2014										
4620 Silver Creek Rd (two wells)	▲	May 2014										
4752 Silver Creek Rd	▲	June 2014										
4808 Silver Creek Rd	▲	May 2014										
5107 Viebahn St	▲	Dec 2013										
5202 Silver Creek Rd	▲	Dec 2013										

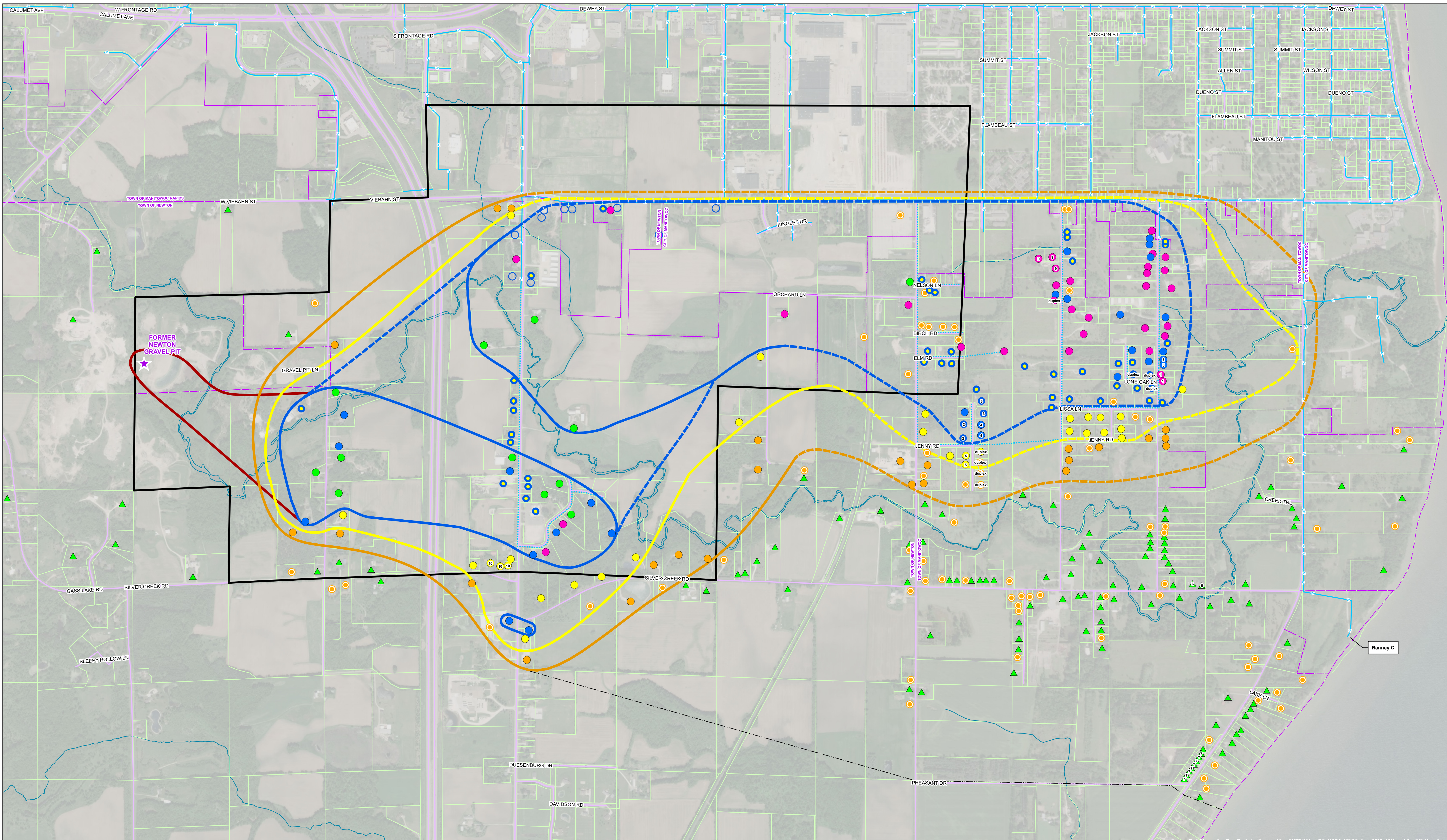
Wells are typically non-detected wells that can be upgradient, sidegradient or downgradient wells. Some of the downgradient wells may be added if sentinel wells indicate sampling.



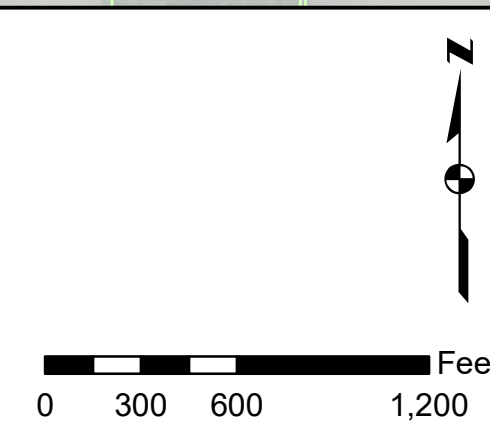
TABLE 1
SUMMARY OF THE AREA WIDE VOC FIVE YEAR POTABLE WELL SAMPLING PLAN
FORMER TOWN OF NEWTON GRAVEL PIT
MANITOWOC, WISCONSIN

Well Address	Map Color Code	Date of Previous Sampling Event	2021		2022		2023		2024		2025	
			May	October	May	October	May	October	May	October	May	October
Former Potable Wells Now Connected to City Water												
2734(2804) CTH CR	○	Oct 2015	City Water Provided - No Potable Well Sampling Required									
2916 CTH CR	○	Oct 2015										
2917 CTH CR	○	Oct 2015										
3617(3621) Viebahn St	○	March 2016										
3701 Viebahn St	○	Oct 2015										
3815 Viebahn St	○	Oct 2015										
4025 Viebahn St	○	Oct 2015										
4101 Viebahn St	○	Oct 2015										
		Wells Sampled Per Event	132	57	131	57	131	56	132	56	131	56

Figures



- Legend**
- Target Zone Well - Vinyl Chloride ES Exceedance
 - Target Zone Well - Cis-1,2-DCE Detection
 - Target Zone Well on City Water
 - Within Target Zone, With No Detects or Not Sampled
 - Within Sentinel Zone - 3 Year, With No Detects or Not Sampled
 - Within Sentinel Zone - 5 Year, With No Detects or Not Sampled
 - Replacement Well Within Target Zone, With No Detects
 - ▲ Historically Sampled Wells, With No Detects
 - Never Been Sampled
 - ★ Site Location
 - Target Zone
 - Inferred Target Zone
 - 3 Year Sentinel Zone
 - Inferred 3 Year Sentinel Zone
 - 5 Year Sentinel Zone
 - Inferred 5 Year Sentinel Zone
 - Former Gravel Pit Zone
 - DNR Special Well Casing Depth Area
 - Expanded Sampling Limits
 - Utility Water Line
 - Proposed Utility Water Line
 - Road Centerlines
 - Municipality Boundaries
 - ▭ Parcels
 - Streams



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 Milwaukee WI

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FORMER NEWTON GRAVEL PIT

AREA WIDE VOC 5-YEAR POTABLE WELL SAMPLING LOCATIONS

Project No. 60135471

Date: April 2021

FIGURE 1

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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community