NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road, Avon, NY 14414-9516
P: (585) 226-5353 I F: (585) 226-8139
www.dec.ny.gov

April 27, 2023

Mr. Warner Golden
Arxada
1200 Bluegrass Lakes Parkway
Alpharetta, Georgia, 30004

Re: Pilot Test Work Plan for Groundwater Extraction and Treatment – HW-1 Well
NYSDEC Site Name: Olin Corporation – Chemicals Group
NYSDEC Site No – 828018A
100 McKee Road, Rochester, Monroe County, New York, 14611

Mr. Golden,

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH), collectively referred to as the Departments, have reviewed the "Pilot Test Work Plan for Groundwater Extraction and Treatment - HW-1 Well" (PTWP) dated April 2023 (received by electronic mail on April 26, 2023) for the active Arch Chemicals, Inc. site (formally the Olin Corporation) prepared by MACTEC Engineering and Geology, P.C.

In accordance with 6 NYCRR Part 375-1.6, the Departments have determined that the Work Plan substantially address the requirements of the Inactive Hazardous Waste Disposal Site Program's Order On Consent and the Pilot Test Work Plan is hereby approved.

Please update the Departments with dates for operation schedule as they become apparent.

Sincerely,
Joshuah J. Klier
Joshuah J. Klier, G.I.T.
Assistant Geologist

ec: Mark Stelmack, MACTEC Engineering and Geology, P.C.
Nelson Breton, MACTEC Engineering and Geology, P.C.
Eric Thompson, MACTEC Engineering and Geology, P.C.
Steven Marchetti, Matrix Environmental
Matt Dillon, Arxada
David Harris, Arxada
Jean Robert, US EPA
David Pratt, NYSDEC
Adam Morgan, NYSDEC
Christopher Budd, NYSDOH
Justin Deming, NYSDOH

Arch Chemicals, Inc.
c/o Arxada
100 Mckee Road
Rochester, NY 14611-2013
USA

April 26, 2023

Mr. Joshuah Klier
Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 8
6274 East Avon-Lima Road
Avon, New York 14414-9519

Subject: Revision 2 - Pilot Test Work Plan for Groundwater Extraction and Treatment - HW-1 Well, Arch Chemicals (Site #828018a) 100 McKee Rd., Rochester, NY

Dear Mr. Klier:

Enclosed is an electronic copy of the subject work plan. This work plan has been revised from the work plan submitted April 4, 2023 based on comments received in your letter dated March 22, 2023 and subsequent communications. The revised work plan is intended to support the operation of a pump and treat system for horizontal well HW-1. This plan also references a completion report, dated March 3, 2023, that provides documentation on well installation details and results of pumping tests performed on this well in 2021 and 2022 at the Arch Chemicals Site in Rochester, New York.

Should you have any questions regarding this work plan, please give me a call at (205)960-4080.

Sincerely,

Warner Golden
Associate Director EHS
Arxada

cc: Christopher Budd, NYSDOH
Jean Robert Jean, US EPA Region 2
David Pratt, NYSDEC
Sean Keenan, MCDES
Ken Smith, MCDES
Matt Dillon, Arxada
David Harris, Arxada
Mark Stelmack, MACTEC
Nelson Breton, MACTEC
Eric Thompson, MACTEC
Steve Marchetti, Matrix

April 25, 2023

Mr. Warner Golden

Arch Chemicals, Inc
Rochester Plant Site
100 McKee Road
Rochester, NY

Subject: Revision 2 - Pilot Test Work Plan for Groundwater Extraction and Treatment - HW-1 Well, Arch Chemicals Inc., 100 McKee Road, Rochester NY

Dear Mr. Golden:

MACTEC Engineering and Geology, P.C. (MACTEC) submits this revised Pilot Test Work Plan for groundwater extraction and treatment at the Arch Chemicals, Inc. (Arch) Rochester Facility in Rochester, New York. This plan has been revised based on comments from the NYSDEC transmitted to us by email on March 22, 2023, and subsequent comments received from the NYSDEC in a conference call on April 24, 2022. Responses to the March 22, 2023 comments and details of revisions are provided as an attachment to this plan.

A groundwater extraction and treatment pilot test is planned for horizontal well HW-1 to evaluate treatment options and the effect of extended pumping conditions on containment of groundwater plumes. For treatment, the feasibility of the long-term use of granular activated carbon (GAC) and effect of the extended pumping on influent contaminant concentrations will be evaluated. Treatment of this water is required as concentrations of site related contaminants exceed permit discharge criteria. The objective of this pilot test is to reduce concentration of volatile organic compounds (VOCs), chloropyridines, and other constituents to levels acceptable for discharge to the VanLare Wastewater Treatment Facility (POTW).

Background

Horizontal well HW-1 (HW-1) was developed in 2021 via flushing, jetting and pumping to remove drilling mud and fine-grained sediment from the surrounding well bore. Approximately 10,000 gallons of water was generated during well development and contained in Frac Tank #2. In December 2021, a short-term variable rate pumping test was performed to measure drawdown in HW-1 in response to different pumping rates and to determine target flow rates for a longer-term constant rate pumping test. Water was pumped from HW-1 at rates from 10 to 30 gallons per minute (gpm). Approximately 9,000 gallons of water were generated during the variable rate pump test and transferred into Frac Tank #1.

In July of 2022, MACTEC prepared a work plan to treat the containerized water through a temporary treatment system employing a submersible pump for transfer of water to and through the system, bag filters for particle filtration, and two granular activated carbon (GAC) vessels plumbed in series for the removal of organic compounds.

In August and September of 2022, a total of approximately 19,000 gallons of water from Frac Tanks #1 and #2 were processed through the temporary treatment system. This effort was conducted to develop the initial loading characteristics of the carbon beds and demonstrate the effectiveness of treating groundwater for a planned constant rate pumping test. Laboratory analytical results from Frac Tank #1 and Frac Tank #2 samples indicated elevated total organic carbon (TOC) levels. These elevated TOC concentrations are believed to be the result of the presence of drilling mud remaining from well development efforts and were not considered representative. However, testing of treated effluent from these frac tanks by Arch indicated that GAC treatment for 2-chloropyridine and other permit parameters was effective in reducing concentrations to meet permit discharge limits. Results of testing can be found in the October 2022 water treatment work plan, referenced below.

In October of 2022, MACTEC prepared a work plan to treat the water from a planned 96-hour constant rate pumping test utilizing the same temporary treatment system (bag filtration and three stage carbon treatment) as the previous temporary treatment system. In November of 2022, the 96-hour constant rate pumping test was conducted on HW-1 at a pumping rate of approximately 19 to 20 gpm and produced approximately 111,000 gallons of water. This effort was intended to determine 1) the drawdown effects in overburden and bedrock groundwater monitoring wells in proximity to HW-1 and, 2) the impact on extracted water quality and representative loading characteristics of the carbon beds. During this test, concentrations for 2-chloropyridine increased from Day 1 to Day 4, the final day, by over a factor of 2. However, the GAC treatment proved effective at reduction of 2-chloropyridine and other contaminants to levels required for discharge to the POTW. Results of these efforts are summarized in the Well Installation and Completion Report (MACTEC, February 2023). In this report, MACTEC recommended longer term pumping to further evaluate GAC as the primary treatment and determine effects of pumping HW-1 on groundwater plume containment and mass removal.

Proposed Pilot Test Setup

The pilot test will be executed by Arch contractor Matrix Environmental under the direction of MACTEC. The operation will be coordinated with Arch staff on-site. Appendix 1 provides project contact information for key personnel engaged in the pilot test.

A pilot groundwater treatment system (see Figure 1 for schematic) will be set up near the east end of HW-1 (or at another location approved by Arch) and will utilize a newly installed electrical service as well as existing onsite compressed air; the exact location of the treatment system will be determined by Arch prior to delivery of the system. HW-1 will be pumped using a surface pump (air lift or electric centrifugal) drawing from an existing intake screen and piping that was used for the for 96-hour pumping test from the east end of the well (MACTEC, February 2023). The pumping rate is expected to be set between 15 to 20 gpm.

The flow rate will be measured using a totalizing meter and adjusted based on continuous level monitoring using a datalogging level transducer placed in the well. A transducer will also be installed in monitoring well BR-111D, a well a located west of the Site and adjacent to the Erie Canal. Water levels in this well track closely with canal water levels and the data collected may be useful in evaluating effects of canal water levels on the performance of the HW-1.

Transducer level measurements will be initiated at least 3 days prior to the start of pumping. Transducer readings will be monitored at intervals needed to allow adjustment of the flow rate to avoid drawing the water level down below the pump intake elevation. To achieve this, water level measurements from the transducers will be recorded at a frequency of 1 hour and downloaded at least once weekly. Measurement frequency for HW-1 may be set at a higher frequency at the start of pumping, if needed.

All other extraction wells will be switched offline one week prior to the start of pumping and will remain off until the week following completion of this pilot test. Arch will send the well shutdown schedule to the NYSDEC in advance for their approval before turning wells off. The GAC treatment equipment setup will follow that shown on Figure 1 and utilize three 2000 lb GAC units plumbed in series based upon an anticipated GAC usage rate of 4,000 to 6,000 pounds per week.

Groundwater will be pumped from HW-1 into an equalization tank via a surface mounted extraction pump. A booster pump will then move water from the equalization tank through 10-micron bag filters and three 2000 lb GAC units plumbed in series (See Figure 1). Instrumentation will be installed within the equalization tank to automatically shut down the extraction pump should the water level reach a high-high setpoint level. Treated effluent from this system will be discharged to an existing conveyance line at extraction well BR-127 that is tied into the existing ground water collection pit (aka Kodak Pit) or transferred directly to the collection pit. This is the same collection pit that receives groundwater discharge from six extraction wells. Water from collection pit will be pumped to the ZAP Building using an existing pump or, alternatively, to the Pre-treatment Area. Discharge to the ZAP building will allow the use of the existing GAC system (up to two 2000 lb units) for additional treatment should that be warranted based on analytical results. A sketch map showing treatment and discharge locations is provided in Appendix 2.

Treatment System Sampling

Analytical samples will be collected from four sample ports installed in the treatment train (influent [post-filter], GAC 1 effluent, GAC 2 effluent and GAC 3 effluent) for on-site analysis by Arch's on-site laboratory for VOCs and pyridines for the following:

Selected VOCs	**Pyridines**
Carbon tetrachloride	2-Chloropyridine
Chloroform	3-Chloropyridine
Methylene chloride	Pyridine

Assuming an influent sample plus one sample after each of the three GAC units, four samples will be collected each day for on-site analysis initially. This sampling frequency is planned for a period of one to two weeks and will be utilized to further develop an understanding of loading characteristics for the carbon beds. Please refer to Table 1 for the proposed treatment system and groundwater sampling program and Figure 1 for treatment system sample port locations.

Sampling frequency may be reduced with NYSDEC approval after two weeks of operation, based on influent contaminant concentrations and GAC loading information collected during the first two weeks. MACTEC will work with Arch and the NYSDEC to determine when to initiate reduced frequency sampling. The reduced frequency testing will consist of on-site analysis up to three times a week (suggested Monday, Wednesday, and Friday) for the selected VOCs and pyridines for the remainder of the test (see Table 1).

Bi-weekly (1 event every 2 weeks) influent and treated effluent samples will also be collected for off-site laboratory analysis for the list of VOCs (Method 8260) and pyridines (Method 8270) that are analysed routinely for semi-annual groundwater monitoring. Total organic carbon analysis will also be performed via method SM 5310. Influent samples will be collected from a sample port after the bag filter (influent [post-filter]). This data will be used to confirm on-site analytical results for the duration of the test (See Table 1).

Groundwater Monitoring

Groundwater monitoring will include both sample collection for off-site analysis and monitoring of water levels from selected wells as depicted in Figure 2. See Table 1 for treatment system and groundwater sampling program.

Groundwater samples from ten selected monitoring wells depicted in Figure 2 will be collected monthly for off-site analysis using low-flow sampling techniques. Prior to sample collection and while purging the monitoring well, water quality parameters including temperature, pH, dissolved oxygen, oxidation reduction potential, and conductivity, will be measured until stabilization is observed, or purge time exceeds 1-hour. These ten wells were selected to represent constituent plume concentrations downgradient of the facility and mainly to the west, in the direction where higher chloropyridine levels have been measured offsite. Monthly influent (pre-filter) samples will also be collected from HW-1. Samples from these wells will also be collected prior to the start of the test (with all site extraction wells off) to establish baseline conditions. The sample from HW-1 will be collected at the start of pumping. Samples will be collected for off-site laboratory analysis for the list of VOCs and pyridines that have been analysed routinely for semi-annual groundwater monitoring (see Table 1 for well list).

Water level monitoring will be conducted throughout the test and consist of HW-1 and the 22 monitoring wells as depicted in Figure 2. As described in the test setup, the water level in HW-1 will be monitored using a transducer with periodic checks during the first several days after the start of the pumping to make adjustments as needed to the flow rate. One initial baseline water level event is planned prior to the start of the pilot test with all extraction wells turned off. The water level in HW-1 will be checked daily for up to two weeks and then three times a week for the duration of the test. Water levels from the 22 wells depicted on Figure 2 will be measured manually on a weekly basis for the duration of the test.

Operation Schedule

The pilot test is planned initially for two months during Spring 2023, but the period of operation may be altered depending on the rate of GAC use and results of groundwater monitoring. Any changes to the length of pilot study will be discussed with and approved by the NYSDEC ahead of time. The following schedule is planned for the setup and the two-month operating period:

Week*	**Activity**
Week 1	Shut down of the 6 operating extraction wells, transducer installation, Baseline water level event, Baseline groundwater sampling event**
Week 2	System Setup and water level event

Week*	Activity
Week 3	System Startup with Initiate daily oversight. Weekly water level event.
Weeks 4-11	Continued operation with treatment system monitoring and groundwater and water level monitoring**

* Extension of the Pilot Test after week 11 to be approved by the NYSDEC.

** Depending on timing, the semi-annual groundwater sampling event scheduled for May 2023 will cover one of the monthly groundwater sampling events (all wells listed for monthly sampling in the pilot test are included in the semi-annual program).

Operation will not occur during colder months unless provisions can be made for winterizing the system setup. Pumping systems for the existing network will be turned back on at the completion of the pilot test. Arch will work with the NYSDEC to determine which extraction wells will be placed back into service in the interim until a final determination is made on number and location of extraction wells needed for long term operation. Historical data and pumping records suggest that some of the wells may be ineffective in containing the constituent plumes.

Waste Management Assumptions

There will be three main sources of investigation derived waste (IDW) generated during the test. These wastes that include solids and liquids remaining within the equalization tank, spent bag filters, and spent GAC. Any solids that may remain in the tank will be stabilized and containerized for disposal. It is assumed that Arch will manage this effort with their waste management contractor(s). IDW that is transported off-site for disposal will be handled by a hauler permitted in accordance with 6 NYCRR Part 364 that governs the transport of regulated waste originating or terminating at a location in New York State.

The GAC and bag filters used within the treatment system will also be contaminated, as these will have removed the contaminants from the extracted water. These wastes have all been profiled during earlier testing events. Disposal/regeneration of the GAC will be the responsibility of Arch's subcontractor Evoqua, consistent with handling of spent GAC for the ongoing treatment of groundwater. Bag filter disposal will be the responsibility of Arch. Arch will also be responsible for providing a forklift and operator for assisting the contracted operator with the placement and removal of the GAC vessels.

Security Plan

The Arch site is secured by a gated fence. Any visitors to the site are required to submit an access request form and complete required site-specific training prior to entry.

Documentation

A log will be completed of treatment activities for each day when measurements or sampling are performed. Information to be recorded will include flow rates, HW-1 water levels, run time, timing of bag filter changes, total daily volume of processed water, and general notes on operation,

including stopping or hold points. At the end of each day of scheduled operator presence, an email will be sent to MACTEC by the designated operator summarizing daily activities. Water level data and analytical results will be shared for review by the NYSDEC on a daily or weekly basis, depending on schedule of activities.

MACTEC will compile data summaries during the pilot test and prepare a summary report at the completion of the test documenting the treatment system performance and results of groundwater monitoring. Arch expects to submit the pilot test report to the NYSDEC for review within eight weeks following completion of field work. Upon your approval and the approval of the NYSDEC, the proposed work will be implemented and is anticipated to commence by May 2023. If you need any additional details or clarifications, please contact us at 207-712-8020.

Sincerely,
MACTEC Engineering and Geology, P.C.

Nelson Breton
Project Manager

Eric Thompson
Technical Lead

Mark Stelmack, PE
Associate Engineer

Cc:

Mr. Matt Dillon- Arch
Mr. David Harris – Arch

Attachments:

Table 1 - HW-1 Pilot Test Analytical Program
Figure 1 – GAC Treatment Setup
Figure 2 – HW-1 Layout and Pilot Test Monitoring Network
Appendix 1 – Project Contact Information
Appendix 2 –Sketch Map for Water Treatment
Attachment 1- Comment Response

Attachments

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Table 1:
HW-1 Pilot Test - Analytical Program

Sample Group	Locations	Frequency	Schedule	Lab	Analyses
Treatment System Sampling*	Influent (post-filter), GAC #1, GAC#2, and GAC #3	Daily	Weeks 1 and 2 (up to 2 weeks)	On-site	Carbon tetrachloride, Chloroform, Methylene chloride, 2-Chloropyridine, 3-Chloropyridine, and Pyridine
	same as above	up to 3 times per week	Week 3 thru Week 8	On-site	Same as above
	Influent (post-filter) and GAC#3 (final effluent)	bi-weekly	duration of test	Off-site	VOCs by 8260, Pyridines by 8270, & TOC by SM 5310. VOCs and Pyridines parameters to match semiannual groundwater monitoring list.
Groundwater Sampling	See well list below	Monthly**	duration of test	Off-site	VOCs by 8260 & Pyridines by 8270 -VOCs and Pyridines parameters to match semiannaul groundwater monitoring list.

* See Figure 1 for treatment system setup

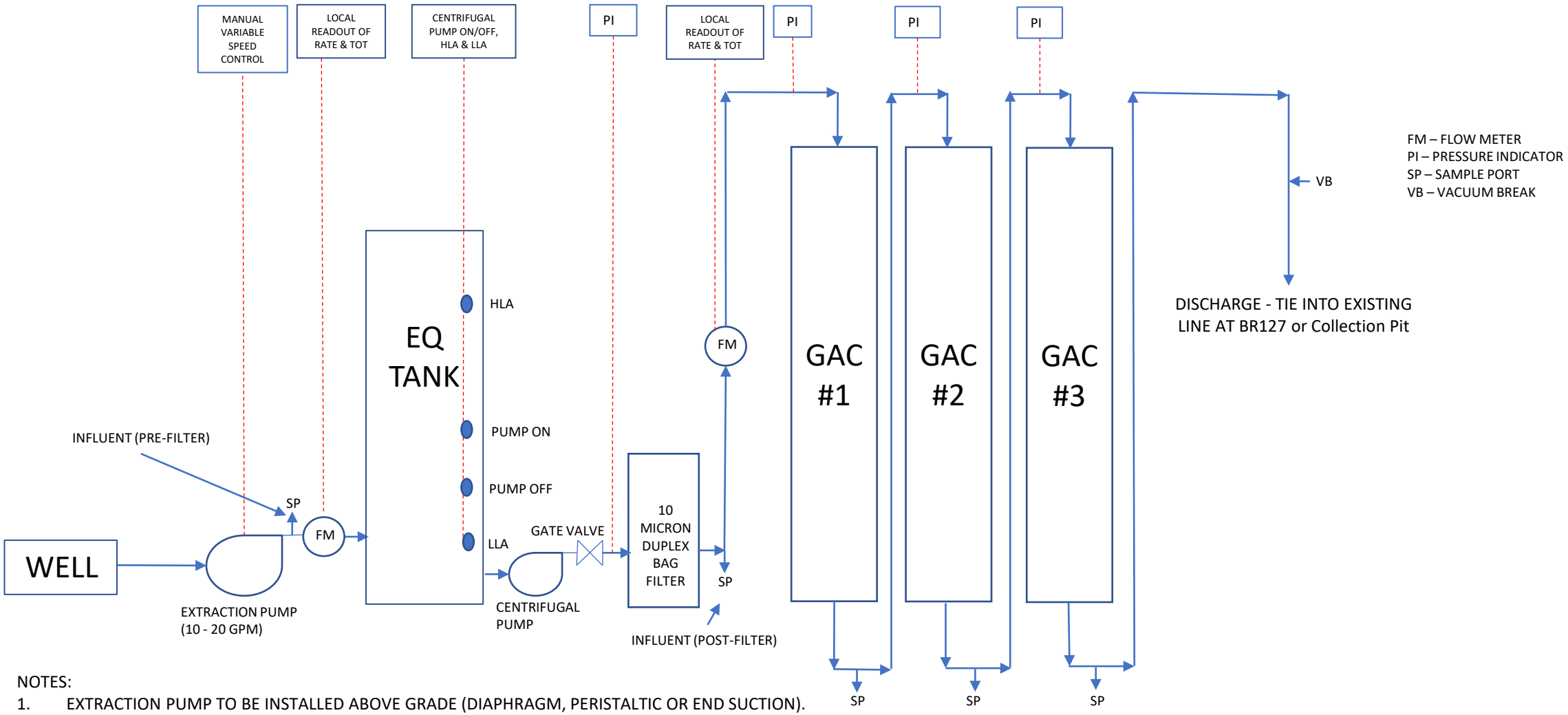
** Monthly groundwater sampling includes baseline sampling prior to start of pilot test and montly sampling thereafter

Well list: (See Figure 2 for locations)

BR-106	PW-12	PZ-103
BR-7A	PW-13	PZ-104
BR-8	PW-16	PZ-107
MW-106	PZ-102	

HW-1 (Influent [pre-filter] - See Figure 1)

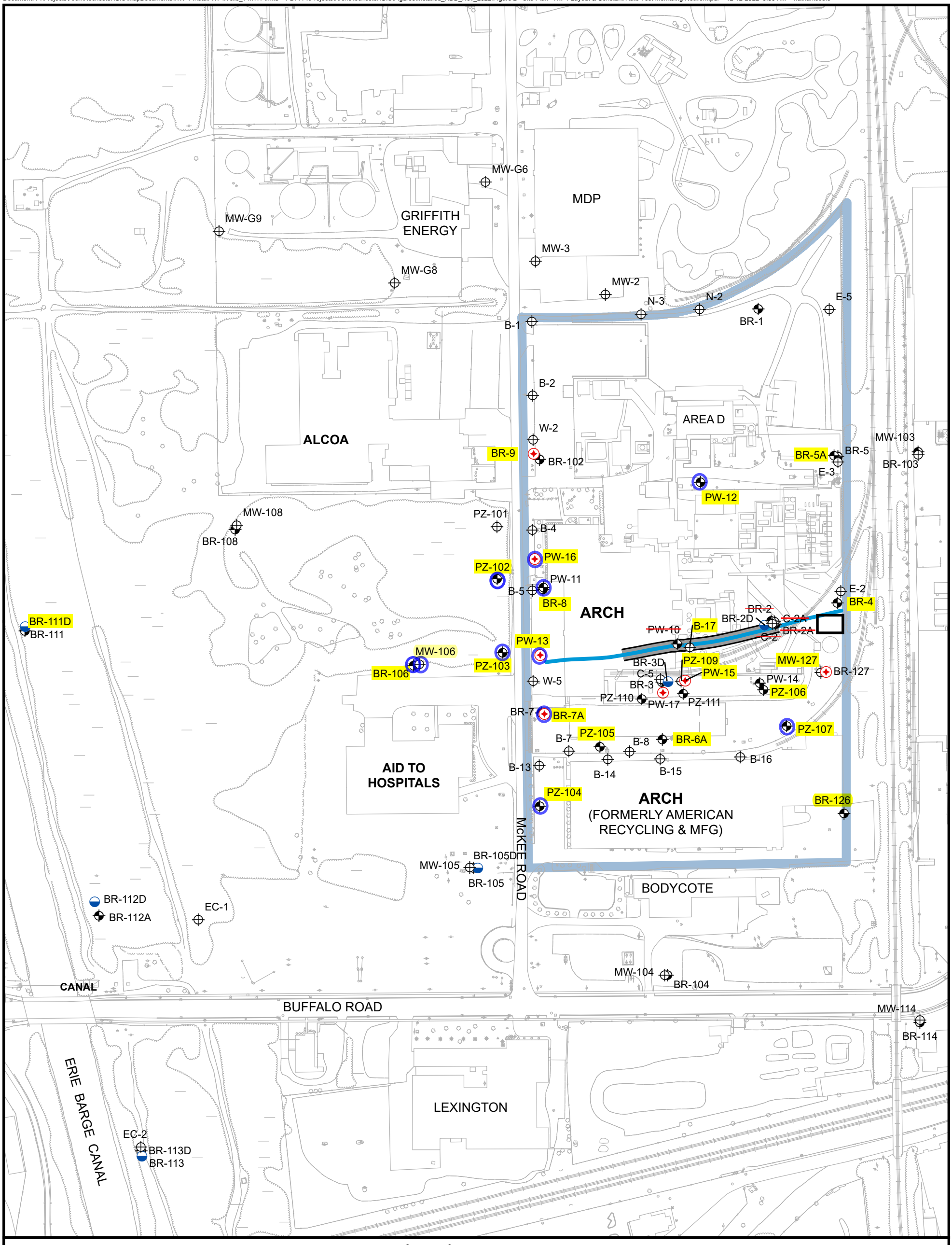
FIGURE 1 - TREATMENT SYSTEM SETUP



NOTES:

1. EXTRACTION PUMP TO BE INSTALLED ABOVE GRADE (DIAPHRAGM, PERISTALTIC OR END SUCTION).
2. ISOLATION VALVES TO BE PROVIDED FOR ALL EQUIPMENT (NOT SHOWN).
3. SCHEMATIC BASED ON THE USE OF 2000 POUND GAC VESSELS (4000# EST. WEEKLY USAGE RATE).
4. EXTERNAL GENERAL ALARM LIGHT TO BE PROVIDED FOR LOCAL INDICATION OF SYSTEM SHUTDOWN.
5. SYSTEM MUST INCLUDE PROVISIONS FOR SECONDARY CONTAINMENT.
6. SYSTEM SHOULD ALSO BE CONFIGURED TO ALLOW WINTERIZATION (HEAT TRACING/INSULATION) SHOULD OPERATING SCHEDULE WARRANT.

Document: P:\Projects\Arch\Rochester\GIS\MapDocuments\HW-1 Install WP\Wells_11x17P.mxd PDF: P:\Projects\Arch\Rochester\GIS\Figures\Installed_HDD_Nov_2022\Figure 2 - Site Plan - Hw-1 Layout & Constant Rate Test Monitoing Network.pdf 12-12-2022 9:36 AM nathan.soule



Note:
Red line strike-through of label indicates well abandoned April 2021

Legend

- Active Pumping Well
- Overburden Monitoring Well
- Bedrock Monitoring Well
- Deep Bedrock Monitoring Well
- BR-5A — Water level monitored manually with water level meters throughout pilot test
- Well to be sampled
- Installed HDD Borehole and Well
- Approximate Well Screen Placement
- Staging Area for Carbon Bed Treatment System
- Property Owned by Arch

0 100 200 Feet

N

MACTEC

Prepared/Date: NES 12-12-22	Checked/Date: NMB 03-31-23

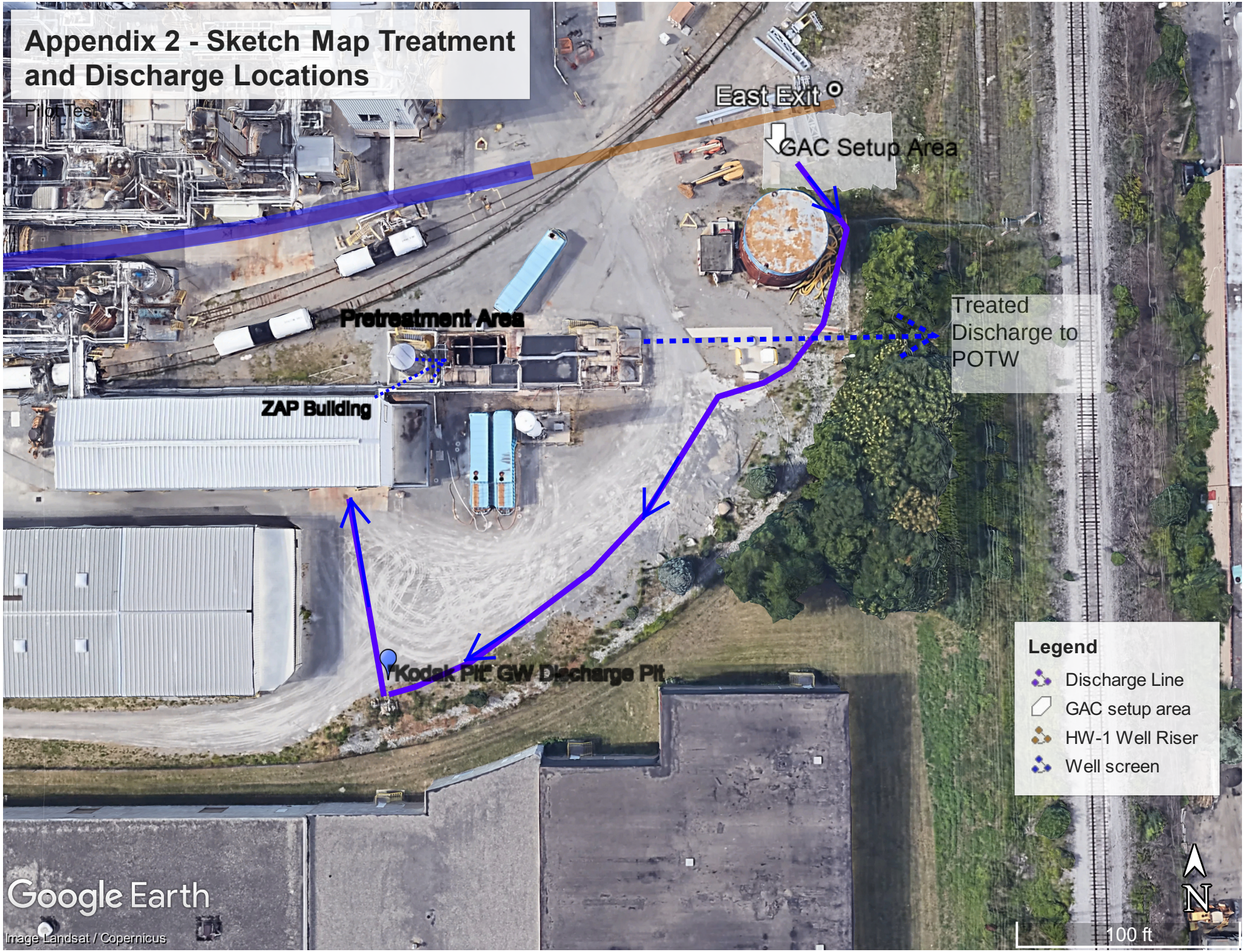
Figure 2- HW-1 Layout and Pilot Test Monitoring Network

Arch Chemicals
Rochester, NY

Arch Chemicals
Rochester NY
NYSDEC Site No. 82801a

Appendix 1:
HW-1 Pilot Test - Project Contacts

Contact	Role	Company	Phone	email
Matt Dillon	Director of Operations (Rochester)	Arch (Arxada)	(385) 469-7566	Brendan.dillon@arxada.com
Warner Golden	Associate Director EHS	Arch (Arxada)	(205)960-4080	warner.golden@arxada.com
Mark Stelmack, PE	Professional Engineer Reviewer	MACTEC E&G	(207) 838-5928	mark.stelmack@wsp.com
Nelson Breton	Remediation Project Manager	MACTEC E&G	(207)712-8020	nelson.breton@wsp.com
Eric Thompson	Remediation Specialist	MACTEC E&G	(207)747-7386	eric.w.thompson@wsp.com
Steve Marchetti	Field Project Manager	Matrix Environmental	(585)770-4332	smarchetti@matrixbiotech.com
Joshuah Klier	NYSDEC DER Region 8 Project Manager	NYSDEC	(585) 226-5357	joshuah.klier@dec.ny.gov
Christopher Budd	NYSDOH BEEI Project Manager	NYSDOH	(518) 402-1769	Christopher.Budd@health.ny.gov


Appendix 2 - Sketch Map Treatment and Discharge Locations
Pilot Test
East Exit
GAC Setup Area
Pretreatment Area
Treated Discharge to POTW
ZAP Building
Kodak Pit GW Discharge Pit
Legend
Discharge Line
GAC setup area
HW-1 Well Riser
Well screen
N
100 ft
Google Earth
Image Landsat / Copernicus

Attachment 1
Response to comments to March 22, 2023 NYSDEC comment letter

1. The Departments would like to see the following well to be added to the monthly sampling program to better understand the efficiency of the extraction well.

    a. PW-12

Response: *PW-12 has been added to the monthly sampling program.*

2. The Departments would like to see the following well to be added to the monthly gauging program to better understand the drawdown of the extraction well.

    a. BR-126

Response*: BR-126 will be added to the weekly gauging program. The current gauging schedule is planned as weekly event for a 2-month period. However, Arch may seek NYSDEC approval to reduce the gauging frequency if the pilot test extends beyond two months.*

3. Per DER-10, section 3.3, subsection B, bullet point number 6, a list of names, contact information and roles of principal personnel who will be participating in the investigation including the project manager, contractor, and subcontractor need to be included as an as appendix to the work plan.

Response*: This information has been added as an appendix.*

4. Per DER-10, section 3.3, subsection E, the workplan must clearly identify provisions for management of Investigation Derived Waste (IDW). Management of the generated waste cannot simply be "assumed" as noted in the Waste Management Assumptions section on page four. Granular Activated Carbon, bag filters, and other remediation derived waste must be treated as IDW.

Response*: See suggested edits to the Waste Management section below:*

Waste Management

There will be three main sources of investigation derived waste (IDW) ~~waste~~ generated during the test: solids and liquids remaining within the equalization tank; spent bag filters; and spent GAC. Any solids that may remain in the tank will be stabilized and containerized for disposal and Arch will manage this effort with their waste management contractor(s). IDW that is transported off-site for disposal will be handled by a hauler permitted in accordance with 6 NYCRR Part 364 that governs the transport of regulated waste originating or terminating at a location in New York State.

The GAC and bag filters used within the treatment system will be contaminated, as these will have removed the contaminants from the extracted water. These wastes have been profiled for earlier testing events. Disposal/regeneration of the GAC will be the responsibility of Arch's Subcontractor Evoqua, consistent with handling of spent GAC for the ongoing treatment of groundwater. Bag filter disposal will be the responsibility of Arch. Arch will also be responsible for providing a forklift and operator for assisting the contracted operator with the placement and removal of the GAC vessels.

5. Revise the sentence “Arch will communicate the well shutdown schedule to the NYSDEC in advance” to “Arch will send the well shutdown schedule to the NYSDEC in advance for their approval prior to well shutdown”.

***Response**: This sentence, in the second paragraph of the Proposed Pilot Test Setup section, has been revised as suggested.*

6. Revise the sentence “The pilot test is planned for 2 months during the Spring 2023, but the period of operation may be shortened or lengthened depending on the rate of GAC use and results of groundwater monitoring” to “The pilot test is planned for 2 months during the Spring 2023 season, but it is anticipated that the length of the pilot test may be altered depending on the rate of GAC use and results of groundwater monitoring. Any changes to the length of pilot study will be discussed with and approved by the NYSDEC ahead of time”.

***Response**: This sentence, under the Operation Schedule, has been revised as suggested.*

7. Revise the sentence “Sampling frequency may be reduced after two weeks of operation, based on influent contaminant concentrations and GAC loading information collected during the first two weeks. MACTEC will work with Arch to determine when to initiate reduced frequency sampling” to “Sampling frequency may be reduced with NYSDEC approval after two weeks of operation, based on influent contaminant concentrations and GAC loading information collected during the first two weeks. MACTEC will work with the Arch and the NYSDEC to determine when to initiate reduced frequency sampling”.

***Response**: This sentence, under Documentation, has been revised as suggested.*

8. Revise the sentence “MACTEC will compile and prepare data summaries during the pilot test. and a summary report at the completion of the test documenting the treatment system performance and results of groundwater monitoring. This report may be provided as standalone report or as a supplement to a design plan” to “MACTEC will compile and prepare data summaries during the pilot test and summary report at the completion of the test documenting the treatment system performance and results of groundwater monitoring. This report will be provided as standalone report and submitted to the NYSDEC for review”.

***Response**: This sentence, under Documentation, has been revised as suggested.*

9. Revise the sentence “At the end of each day of scheduled operator presence, an email will be sent to MACTEC by the designated operator summarizing daily activities. Water level data and analytical results will be shared for review by MACTEC and Arch on a daily or weekly basis, depending on schedule of activities” to “At the end of each day of scheduled operator presence, an email will be sent to MACTEC by the designated operator summarizing daily activities. Water level data and analytical

results will be shared with the NYSDEC on a daily or weekly basis, depending on schedule of activities".

***Response**: The cited sentences under Documentation has been revised as suggested.*

10. Please expand on the process the water will go through after it is extracted from the well and include more information on the collection "kodak" pit system and the ZAP building/pre-treatment area. Is the pit lined?

***Response**: The"kodak" pit is cited in the work plan as the same pit that currently receives untreated groundwater discharge from the six operating wells. This is a concrete lined pit that receives discharge from these extraction wells at a rate greater than that planned for the pilot test. Groundwater will be transferred from this pit to the ZAP Building where groundwater effluent is currently received through underground piping from the kodak pit. The ZAP building is the location of GAC units that currently handle groundwater discharge from the six operating wells. Since these six wells will not be in operation during the pilot test, water may be transferred to the GAC units in the ZAP building should the need arise to divert effluent for additional treatment. No changes to the work plan are proposed.*

11. Within fifteen days of approval of this workplan, a detailed schedule will be required to be submitted which includes timelines and target dates for the start and completion of all field activities and submission of the report.

***Response**: The following is a planned schedule for initial operation and has been added to the Operation Schedule:*

Week*	**Activity**
Week 1	Shut down of the 6 operating extraction wells , transducer installation, Baseline water level event, Baseline groundwater sampling event**
Week 2	System Setup and water level event
Week 3	System Startup with Initiate daily oversight. Weekly water level event.
Weeks 4-11	Continued operation with treatment system monitoring and groundwater and water level monitoring**

* Extension of the Pilot Test after week 11 to be approved by the NYSDEC

** Depending on timing, the semi-annual groundwater sampling event scheduled for May 2023 will cover one of the monthly groundwater sampling events (all wells listed for monthly sampling in the pilot test are included are in the semi-annual program).

In addition, Arch expects to deliver a draft pilot test report to the NYSDEC within eight weeks following completion of field work. The Documentation section has been revised as follows:

Documentation

A log will be completed of treatment activities for each day when measurements or sampling are performed. Information to be recorded will include flow rates, HW-1 water levels, run time, timing of bag filter changes, total daily volume of processed water, and general notes on operation, including stopping or hold points. At the end of each day of scheduled operator presence, an email will be sent to MACTEC by the designated operator summarizing daily activities. Water level data and analytical results will be shared for review by the NYSDEC ~~MACTEC and Arch~~ on a daily or weekly basis, depending on schedule of activities.

MACTEC will compile ~~and prepare~~ data summaries during the pilot test~~.~~ and prepare a summary report at the completion of the test documenting the treatment system performance and results of groundwater monitoring. Arch expects to submit the pilot test report to the NYSDEC for review within eight weeks following completion of field work. ~~This report may be provided as standalone report or as a supplement to a design plan.~~