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August 28, 2017 ***Via Email***

Mr. James Moras, P.E.
Section Chief
Section C, Remedial Bureau B
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7015
james.moras@dec.ny.gov

RE: IRM Concept Plan
Groundwater Interception Design
Saint-Gobain, McCaffrey Street Site
14 McCaffrey Street
Village of Hoosick Falls, Rensselaer County
DEC Site No.: 442046

Dear Mr. Moras:

The purpose of this letter is to outline the proposed next steps in evaluating fate and transport and potential interim remedial measures (IRMs) at the Saint-Gobain Performance Plastics (SGPP) McCaffrey Street facility in Hoosick Falls, New York (the Site). As previously discussed with the Department, IRMs would be considered once sufficient site data had been developed as necessary to screen and evaluate such efforts. Based on the work completed to date, we believe that an IRM can be considered at this time.

The groundwater interception IRM under evaluation may consist of a series of recovery wells or a drain, depending on the resolution of property access issues and the results of the scope of work described below. In order to gather sufficient data for design of these IRMs to capture, contain and treat groundwater and to foster regulatory approval, the following initial tests are proposed:

1. **Accelerated Column Test**
2. **Water Treatment Demonstration Test**
3. **Multiple-Well Pumping Tests**

The tests described in this letter are conceptual. Detailed interim remedial action work plans will be developed for both the water treatment demonstration test and the multiple-well pumping tests upon concept approval by the New York State Department of Environmental Conservation (NYSDEC).

Accelerated Column Test

Accelerated column testing (ACT) will be performed by Calgon to simulate the performance of a full-scale granular activated carbon (GAC) water treatment system to remove PFAS from extracted groundwater. An ACT is a test to estimate the carbon usage rate based on the adsorptive capacity of materials and kinetics of adsorption for a given application by scaling-down the conventional column testing hardware. Calgon recommends that the groundwater sent for testing be as representative as possible of the groundwater that will be extracted and treated as part of the full-scale system, including the same potential upstream pretreatment that would be completed in the field, to the extent possible. Since the carbon particles used in ACT are ground to a fine mesh, they will not exhibit the same filtration properties as the full-scale system or the pressure drop that would occur. Therefore, Calgon recommends that the groundwater sent for testing be free of any suspended solids.

Calgon has developed an accurate model of the column adsorption process that is used to calculate the breakthrough curves for full-scale adsorption systems. ACT simulates 1-2 years of run time over approximately one month of testing. Results will inform:

- Recommended empty-bed contact time (EBCT) for larger-scale vessels
- Rate of carbon adsorption
- Estimate of carbon replacement frequency
- Estimates of the carbon use rate at breakthrough and when anticipated breakthrough would occur

Approximately 55 gallons of groundwater are required to complete the ACT. Groundwater will be collected from an existing monitoring well or combination of wells pending further recommendation from Calgon on suitable PFAS concentration for the ACT to be representative considering the wide range of observed PFAS concentrations at the site. Groundwater collection from MW-10 and other wells located on the southeastern portion of the Site is preliminarily being considered.

Water Treatment Demonstration Test

The demonstration test will consist of a small-scale GAC treatment test to supplement the ACT completed by Calgon. The purpose of the demonstration test will be to verify the results of the ACT and the water treatment approach planned for the multiple-well pumping tests described in the next section. The demonstration test will utilize water from the two newly-developed pumping wells (PW-04 and PW-19) described in the next section. Water will be pumped from the new pumping wells, into a frac tank for storage (and incidental aeration and settling of solids) prior to treatment. At this time, it is anticipated that the demonstration test treatment will incorporate Calgon F400AW carbon, however, the exact volume of groundwater to be treated and GAC to be utilized is still under design consideration. The treated discharge will be routed to a second frac tank to allow for sampling and analysis prior to discharge to the Hoosic River, discharge to the Village of Hoosick Falls publicly owned treatment works, or offsite disposal, whichever is deemed appropriate based on analytical testing and results, and regulatory approval. Both discharge and offsite disposal options will be evaluated.

If the demonstration test is effective at treating groundwater from PW-04 and PW-19 to appropriate discharge limits, the multiple-well pumping tests will follow using a larger-scale treatment system that can accommodate the anticipated flow, without storage of the pumped water. Analytical results from the demonstration test combined with the ACT will be used to obtain regulatory approval and necessary permits for discharge or disposal of groundwater generated during the multiple-well pumping test and for discharge of groundwater generated as part of full-scale interim remedial measures (IRMs). A detailed demonstration test plan will be prepared that includes test methods and recommended analytical sampling. If accepted by the regulators, a mobile laboratory may be brought onsite to shorten the turn-around time for analytical results.

Multiple-Well Pumping Tests

Two or three pumping tests will be performed to assess the variability in aquifer properties in the unconsolidated deposits, to assess the hydraulic connection between the unconsolidated deposits and bedrock, and to provide information for designing the groundwater interception IRM using a groundwater flow model. Pumping wells will be installed near existing monitoring wells MW-04, which is completed at the base of the unconsolidated deposits, and MW-19, which is completed in the bedrock. The testing plan outlined below is subject to change based on field conditions. For example, if it is determined that there would be significant advantage to pumping the two proposed wells simultaneously, the test may proceed in that manner.

The new pumping wells are shown as PW-04 and PW-19 on Figure 1. The pumping wells will be installed approximately 15 feet away from the existing monitoring wells, offset as indicated in Figure 1 to maximize the chances these wells can be retained if a remedial drain is eventually installed. In addition, a new observation well in the unconsolidated materials will be installed as close as practical to the bedrock monitoring well MW-19.

The new pumping wells will be 6-inch diameter wells that will be installed in unconsolidated materials above the bedrock with 15-foot long, stainless steel wire-wrapped screens with a slot size determined by materials encountered in the field and a total depth as close to the top of bedrock as possible. All well materials will be evaluated to be free of perfluorinated compounds per existing standard procedures. The screens of these wells will penetrate most or all of the saturated thickness of the unconsolidated materials at these locations. The new observation well near MW-19 will be installed in a manner similar to existing wells at the Site. The new pumping wells may also serve as permanent recovery wells if they are not removed for construction of other IRMs.

Each pumping test will include a step-drawdown test up to 8 hours in duration to determine the maximum pumping rate that is likely to be sustainable from each pumping well over a constant-rate pumping period, followed by an aquifer recovery period of equal or greater length or until 95% recovery has been achieved, followed by a constant-rate pumping test of up to 72 hours in duration. As noted above, the second unconsolidated aquifer pumping test may be staged to overlap the first test in order to maximize the stress on the aquifer system. In addition, if a measureable response to pumping of PW-19 does not occur in MW-19, a step-drawdown test and up to 24-hour constant-rate pumping test will also be considered for the bedrock monitoring well (MW-19). MW-19 will have more available drawdown than PW-19 and slug testing results at MW-19 indicate a hydraulic conductivity of 2.3 ft/day.

During the pumping tests, it is anticipated that all groundwater will be pumped through a mobile water treatment system that includes GAC vessels (filled with Calgon F400 carbon) for PFAS removal prior to discharge, if the ACT and demonstration test described in the previous sections indicates this is acceptable and the necessary approvals are received.

A pumping test of similar scope may be performed between the Site and the Village well field if it is determined that the groundwater interception IRM must include

vertical wells to capture and treat groundwater between the Site and the Village well field. The location and specifications for this testing would be based on information gathered during the supplemental field investigation in this area.

Summary and Next Steps

Accelerated Column Testing

Calgon has been engaged to determine lab availability and to schedule the ACT. Calgon is planning to complete an ACT that simulates one year of full-scale operation of the lead bed in a lead-lag treatment system. The test will last approximately one month, and samples will be collected frequently to capture breakthrough of PFAS compounds and total organic carbon (TOC). ACT results will be used to design GAC water treatment and pretreatment for the multiple-well pumping tests and the full-scale IRM water treatment system.

Water Treatment Demonstration Test

The water treatment demonstration test will be conducted prior to the multiple-well pumping test, using water from newly-developed pumping wells PW-04 and PW-19, to assist with design considerations for the water treatment system that will be used during the multiple-well pumping tests and potentially for water generated as part of the IRMs.

Multiple-Well Pumping Tests

The yield of the proposed pumping well for the aquifer test is currently hard to predict based on the highly variable hydraulic conductivity measurements estimated from slug testing of monitoring wells onsite and the limited saturated thickness of unconsolidated material in the area of interest. If a pumping test is completed using a well with low yield, the pumping test will provide information on a small portion of the aquifer through which the interim measure would be installed. For this reason, two pumping test locations have been identified to provide information on variability of aquifer properties. Aquifer testing features will be designed and located such that they also have utility as recovery wells or long-term IRM monitoring points. A groundwater interception remedial design plan will be developed and executed based on the results of the pumping tests and resolution of property access issues.

Once the Department has reviewed this plan, we would be pleased to schedule and attend a meeting to further discuss the plan and address any questions or comments you may have. If you have any questions in the meantime, please feel free to contact me at your convenience.

Respectfully submitted,

C.T. MALE ASSOCIATES

Daniel Reilly, P.E.
Division Manager, Environmental Services

Attachment: Figure 1

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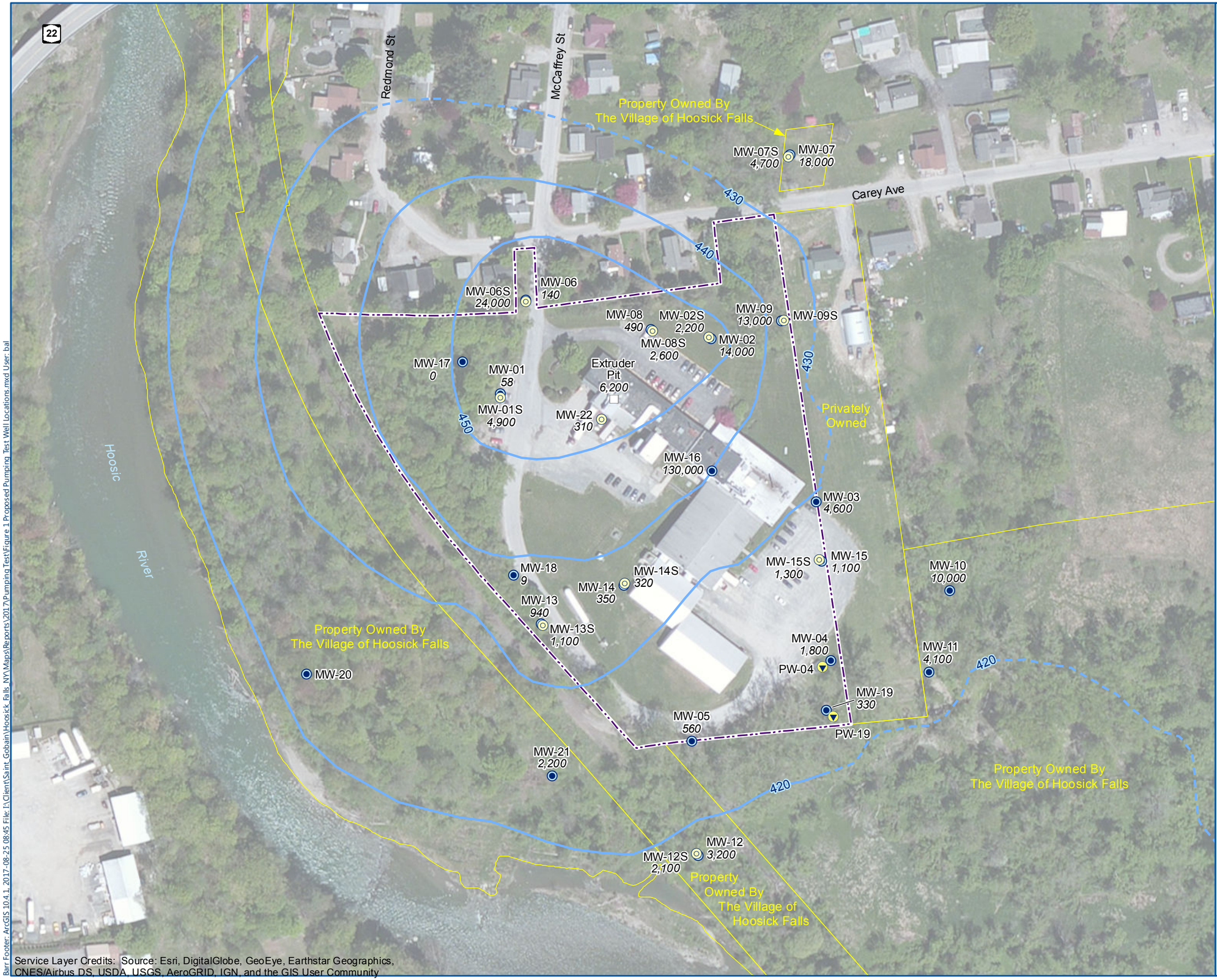

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- Proposed Pumping Well
- Shallow Monitoring Well PFOA concentration (ng/L)
- Deep Monitoring Well PFOA concentration (ng/L)
- Extruder Pit
- Shallow Groundwater Contour (feet) Dashed where inferred
- Saint Gobain Property Boundary
- Boundary of Adjacent Parcel

Note – An additional unconsolidated monitoring well will be installed by PW-19.

N

0 120 240

Feet

PROPOSED PUMPING TEST WELL LOCATIONS
Saint-Gobain
Hoosick Falls, NY

FIGURE 1

Barr Footer: ArcGIS 10.4.1, 2017-08-25 08:45 File: I:\Client\Saint_Gobain\Hoosick_Falls_NY\Maps\Reports\2017\Pumping Test\Figure 1 Proposed Pumping Test Well Locations.mxd User: bal