FINAL

Phase 1 Interim Investigation Deliverable
Taconic Site
NYSDEC Site No. 442047

Taconic
Petersburgh, New York

November 8, 2019

OBG
Part of Ramboll

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1. INTRODUCTION

This Phase 1 Interim Deliverable has been developed by Ramboll on behalf of Tonoga, Inc. d/b/a Taconic (Taconic) for the Taconic Site (Site) located in the Town of Petersburgh (Town), Rensselaer County, New York (Figures 1 and 2). A phased investigation approach was included in the Remedial Investigation/Feasibility Study (RI/FS) Work Plan approved by the New York State Department of Environmental Conservation (NYSDEC). The purpose of this document is to summarize the work performed during, and the analytical findings of, the first phase of the RI to facilitate development of the scope for the second phase. The tasks/activities performed during Phase 1 are described, summary tables and figures are provided, and appendices are included with backup information. Although the analytical results are included in summary tables, the full analytical packages and data validation reports are not included.

2. RI/FS WORK PLAN AND RELATED DOCUMENTS

The RI/FS Work Plan summarized available information for the Site, provided a preliminary conceptual site model (CSM), and proposed a phased approach to investigating the nature and extent of constituents of potential concern (COPCs) at the Site in various environmental media. In addition, scope and methods for the first phase of the RI were provided in the RI/FS Work Plan, which includes three associated documents, namely, a Field Sampling and Analysis Plan (FSAP), a Quality Assurance Project Plan (QAPP), and a Health and Safety Plan (HASP).

3. PHASE 1 SCOPE

As presented in the RI/FS Work Plan, limited groundwater and surface water samples had already been collected as an accelerated RI activity and analyzed for per- and polyfluoroalkyl substances (PFAS), Target Compound List/Target Analyte List (TCL/TAL) constituents,[1] and cyanide (CN). The results (which were included in the RI/FS Work Plan) demonstrated that PFAS (primarily perfluorooctanoic acid [PFOA]) are the dominant COPCs at the Site. Nevertheless, the Phase 1 scope included additional analyses for TCL/TAL constituents and CN.

Phase 1 included the sampling of environmental media on the site and nearby Taconic-owned properties, and laboratory analysis for PFAS, TCL/TAL constituents, CN, Total Organic Carbon, (TOC), Major Cations/Anions, grain size, and pH. The environmental media sampled included groundwater, surface water, sediment, surface soil, and subsurface soil. Wastewater and sludge in tanks were also sampled during Phase 1 for laboratory analysis.

Phase 1 field activities were implemented from April 2018 through October 2019. The initial activities were performed by or under the supervision of Sterling Environmental Engineering, P.C. (Sterling). The subsequent Phase 1 activities were performed by or under the observation of O'Brien & Gere Engineers, Inc. (OBG, a Ramboll company). The Phase 1 field activities included:

- Subsurface utility location and mark-out;
- Collection and analysis of surface water samples (two events, one in May 2018 and the other in March 2019);
- Collection and analysis of sediment samples;
- Collection and analysis of surface soil samples;
- Collection and analysis of wastewater and sludge samples;
- Installation of two exploratory boreholes (with completion as open shallow bedrock monitoring wells);

[1] TCL/TAL constituents include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, and metals.

- Borehole geophysical testing and concurrent depth-discrete groundwater profiling;
- Direct-push overburden investigation, including:
  - Direct sensing;
  - Collection and analysis of discrete-interval groundwater samples;
  - Collection and analysis of subsurface soil samples;
- Installation of 24 overburden monitoring wells at 15 locations;
- Well development;
- Hydraulic conductivity testing;
- Collection and analysis of groundwater samples (two exploratory boreholes, 24 overburden monitoring wells, and two existing Site wells); and
- Surveying.

In addition to the field activities and the associated laboratory analyses, Phase 1 also included data validation activities. Data validation was performed in accordance with Section 2.11 of the RI/FS Work Plan and associated QAPP by Data Validation Services, Inc.

In addition, although the results are not included in this Phase 1 Interim Deliverable, the following two activities/tasks have also been completed:

- Collection of surface water samples in August 2019 for PFAS analyses; and
- Collection of surface water samples in October 2019 for PFAS analyses, and analyses for TCL/TAL constituents and CN in one of the samples

These results will be transmitted under separate cover to the NYSDEC once validated for consideration in the scoping and implementation of Phase 2.

A few of the Phase 1 activities were not completed and should be discussed as part of the Phase 2 scoping. Specifically, the following Phase 1 activities were not performed:

- Direct sensing at one of the five planned locations (i.e. in the alleyway between buildings 2 and 5,) was not performed as underground electrical utilities were encountered at this location.
- High-resolution transmissivity profiling in an open bedrock borehole using the Flexible Underground Technology (FLUTe™) method;
- Water level measurements on three additional occasions (measurements were collected in May 2019 during the groundwater sampling event); and
- Installation of an upgradient overburden monitoring well (MW-2) was not completed as groundwater was not encountered at the proposed location.

4. PHASE 1 ACTIVITIES AND FINDINGS

4.1 SURFACE WATER

In accordance with the RI/FS Work Plan (Section 2.2), surface water samples were collected on four occasions during Phase 1. The first event was the largest. The subsequent events were smaller, with the objective of exploring seasonal variability. Per the work plan, these sampling events were not quarterly, but rather were based the hydrologic cycle (using the data for a gage on the Hoosic River [see Appendix A]).[2]

[2] There are no gages on the Little Hoosic River.

Twelve surface water samples were collected from 11 locations in May 2018 by Sterling for PFAS, TOC, and cation/anion analysis. In addition, one surface water sample (designated SW-14) was analyzed for TCL/TAL constituents and CN.

Surface water samples were collected from three of the 11 locations (Unnamed Stream 1, Unnamed Pond 3, and the Little Hoosic River) on three other occasions (March 2019, August 2019, and October 2019) for PFAS, TOC, and cation/anion analysis. In addition, one surface water sample (designated SW-6) was also collected during the October 2019 event for analysis of TCL/TAL constituents and CN. Also, during the October 2019 event, at the request of the NYSDEC, an additional surface water sample (designated SW-15) was collected in the runoff in the roadside swale on Coonbrook Road just north of Russel Road for PFAS analysis.

Surface water samples were collected and managed in accordance with the FSAP and QAPP. The surface water sampling logs are provided in Appendix B. The surface water analytical results for the first two events are presented on Table 1 and Figures 3 and 4. Once validated, the data from the August and October sampling events will be transmitted to the NYSDEC.

4.2 SEDIMENT

In accordance with the RI/FS Work Plan (Section 2.3), sediment samples were collected at 12 locations for PFAS and TOC analysis. Sterling collected sediment samples at 11 locations in conjunction with the May 2018 surface water sampling event. A sediment sample was also collected by OBG at one location during the surface water sampling event in December 2016. All of the sediment sampling locations were co-located with surface water sampling locations. In addition to the PFAS and TOC analyses, two sediment samples (designated SED-1 and SED-3) were also analyzed for TCL/TAL constituents and CN.

Sediment samples were collected and managed in accordance with the FSAP and QAPP. The sediment sample analytical results are presented on Table 2 and Figures 3 and 4.

4.3 GROUNDWATER INVESTIGATION ACTIVITIES

4.3.1 Borehole Geophysical Testing

In accordance with the RI/FS Work Plan (Section 2.4.2), four existing wells (production well PW-1, residential wells RW-46 and RW-159, and Town Well No. 6) were logged using a suite of downhole geophysical methods in June 2018. This work was performed by Hager-Richter Geoscience, Inc. (Hager-Richter) under the supervision of Sterling. The borehole geophysical testing is described in a report prepared by Hager-Richter, which is included in Appendix C.

It was not possible to complete the full suite of planned geophysical logging in RW-46 and Town Well No. 6 as these wells were constructed with PVC risers and screens. To address this data-gap, Taconic installed a new production well (PW-4) in August 2019. Geophysical logging of this well was completed by Hager-Richter in September 2019 under the supervision of Taconic. The borehole geophysical logging of PW-4 is described in a report prepared by Hager-Richter, which is included in Appendix C.

4.3.2 Depth-Discrete Groundwater Profiling

During the borehole geophysical testing of production well PW-1 and residential well RW-159 in June 2018, and in accordance with the RI/FS Work Plan (Section 2.4.3), depth-discrete groundwater samples were collected by Sterling at select depths. The depths were selected based on the results of the heat pulse flow meter testing (under ambient and dynamic conditions) and the total depth of each well. Five samples were collected from PW-1 and three samples were collected from RW-159 for PFAS and TOC analysis.

The depth-discrete groundwater samples were collected and managed in accordance with the FSAP and QAPP. The groundwater analytical results are presented on Table 3 and Figure 5.

4.3.3 Exploratory Boreholes

In accordance with the RI/FS Work Plan (Section 2.4.5), two exploratory boreholes were installed at the Site in September and October 2018 by Cascade Environmental, LLC (Cascade) under the supervision of OBG. The exploratory boreholes were advanced 25 feet into bedrock using sonic drilling techniques. The soil boring and core logs are provided in Appendix D.

The two boreholes were completed as open shallow bedrock monitoring wells and developed. Well completion logs are provided in Appendix E. The well development logs are provided in Appendix F.

4.3.4 Direct-Push Investigation

In accordance with the RI/FS Work Plan (Section 2.4.6), direct-push methods were used to (a) collect continuous soil cores for visual observations, (b) perform direct sensing, (c) collect discrete-interval groundwater samples, and (d) collect subsurface soil samples (discussed in a different section). The direct-push investigation was performed by Cascade under the supervision of OBG from September 19 to October 5, 2018.

Soil cores were obtained at 11 locations and were described by an OBG geologist. The soil boring logs are included in Appendix D.

A total of 33 discrete-interval groundwater samples were collected from 16 locations for PFAS and TOC analysis. In addition, four discrete-interval groundwater samples were collected from the overburden at exploratory borehole EXB-2 for PFAS and TOC analysis. Discrete-interval groundwater samples were not collected at exploratory borehole EXB-1 because the overburden at that location was dry (EXB-1 is located near production well PW-1).

Discrete-interval groundwater samples were collected and managed in accordance with the FSAP and QAPP. The discrete-interval groundwater results are presented on Table 4 and Figure 6.

Direct sensing was performed using a Waterloo APS™ vertical aquifer profiling tool at four of the 16 locations. A fifth location for direct sensing was planned in the alleyway between buildings 2 and 5, however this location was abandoned as underground electrical utilities were encountered. The results of the direct-sensing survey are presented in a report prepared by Cascade, which is included in Appendix G.

4.3.5 Overburden Monitoring Wells

OBG reviewed the results of the direct-push investigation (including the analytical data from the discrete-interval groundwater sampling) and provided recommendation for the number and depths of overburden monitoring wells. A conference call was held with NYSDEC and Taconic to discuss the recommendations, and changes were made based on NYSDEC's input.

In accordance with the RI/FS Work Plan (Section 2.4.7), 24 overburden monitoring wells were installed by Cascade at 15 locations from April 11 through 29, 2019 and on June 3, 2019. The well locations are shown on Figure 7. The overburden monitoring wells were typically installed as pairs, with one well screened in the shallow sand and gravel unit and the other screened in the deeper sand and gravel unit. Soil cores were obtained continuously at each location, and the cores from the deepest boring at each location were logged by an OBG geologist, except in locations were a co-located DPT boring had been previously logged by an OBG geologist. The soil boring logs are provided in Appendix D.

The monitoring wells were installed by Cascade under the supervision of OBG and developed by OBG.[3] Well completion logs are provided in Appendix E. Well development logs are provided in Appendix F.

[3] Monitoring well MW-4S is approximately five feet deep and was installed on June 3, 2019 by Cascade under the supervision of Taconic.

Upgradient well(s) were not installed in the planned location behind Building 1 (MW-2) since overburden/shallow bedrock groundwater was not encountered at this location.

4.3.6 Hydraulic Conductivity Testing

OBG performed hydraulic conductivity testing in June 2019. This testing was performed on each overburden monitoring well and the two exploratory boreholes to estimate the hydraulic conductivity of the geologic materials immediately surrounding each well. The hydraulic conductivity testing was performed in accordance with Section 2.7.4 of the RI/FS Work Plan and associated FSAP.

OBG analyzed the data collected during the hydraulic conductivity testing using the Hvorslev method. The results of the analyses are summarized on Table 5. More complete information on the hydraulic conductivity test analyses is presented in Appendix H.

4.3.7 Groundwater Sampling and Analysis

In May and June 2019 and in accordance with Section 2.4.7.4 of the RI/FS Work Plan, OBG sampled each newly installed overburden monitoring well, the campground well, the unused residential supply well at parcel 108.-1-6 (85 Coonbrook Road), and shallow bedrock wells EXB-1 and EXB-2 for PFAS, TOC, and major cations and anions. In addition, monitoring wells MW-7D, MW-11S, and MW-11D were sampled for analysis of TCL/TAL constituents, CN, and pH. The wells were purged and sampled using low-flow groundwater sampling methods. The groundwater sampling logs are provided in Appendix I and include the field measurements.

The groundwater samples were collected and managed in accordance with the FSAP and QAPP. The groundwater analytical results are presented on Table 6 and Figures 8 and 9.

4.3.8 Water Level Monitoring

In accordance with Section 2.4.8 of the RI/FS Work Plan, OBG collected manual water-level measurements on May 13, 2019 from 22 of the 24 newly-installed monitoring wells,[4] the two exploratory boreholes, the campground well, and the unused residential supply well at 85 Coonbrook Road. The depth-to-water measurements were converted to groundwater elevations using the surveyed measuring point elevations. The depth-to-water measurements and the groundwater elevations are shown on Table 7.

Figure 10 provides a water table map based on the groundwater elevations in the overburden wells screened in the upper aquifer. Figure 11 provides a piezometric map based on groundwater elevations in the overburden wells screened in the deeper aquifer.

Note that the water-level measurements collected on May 13, 2019 reflect the typical pumping conditions of the plants supply wells. Production well PW-3 seems to be screened within the overburden (total depth of 60 feet). Production wells PW-1 and PW-2 are in the bedrock (total depths of 362 and 400 feet, respectively). Those wells are periodically pumped to supply water to the plant operations which may influence the potentiometric surface in the overburden in the vicinity of those three wells.

4.4 SURFACE SOIL

In accordance with the RI/FS Work Plan (Section 2.5), 66 surface soil samples were collected from 31 locations in April and May 2018 by Sterling for PFAS and TOC analysis. In addition, four surface soil samples (designated SS-17C, SS-18C, SS-20C, and SS-22C) were analyzed for TCL/TAL constituents and CN.

In September 2018, seven surface soil locations (SS-4, SS-5, SS-6, SS-8, SS-16, SS-20, and SS-22) were resampled by OBG. Fourteen surface soil samples were collected during this event for PFAS analysis.

[4] A water-level measurement was not collected at MW-7D because a vehicle was parked over the monitoring well. A measurement was not obtained for MW-4S because the well was not yet installed.

Surface soil samples were collected and managed in accordance with the FSAP and QAPP. The surface soil analytical results are presented on Table 8 and Figures 12 and 13.

4.5 SUBSURFACE SOIL

During the direct-push activities in September and October 2018 and in accordance with the RI/FS Work Plan (Section 2.5), OBG collected 39 subsurface soil samples from 11 of the 16 discrete-interval groundwater sampling locations for PFAS and TOC analysis. In addition, 11 of the 39 subsurface soil samples were analyzed for TCL/TAL constituents, CN, and pH. Three subsurface soil samples were also collected at exploratory borehole EXB-1 for grain size analysis (see Appendix J).

As requested by the NYSDEC, two additional subsurface soil samples were collected by OBG during the installation of monitoring wells MW-5S and MW-6S in April 2019 for PFAS analysis. Four additional subsurface soil samples (at monitoring wells MW-5S, MW-6S, MW-10D, and MW-16D) were also collected by OBG for grain size analysis (see Appendix J).

Subsurface soil samples were collected and managed in accordance with the FSAP and QAPP. The subsurface soil analytical results are presented on Table 9, and Figures 6 and 14.

4.6 WASTEWATER AND SLUDGE

In accordance with the RI/FS Work Plan (Section 2.6), three wastewater samples and five sludge samples were collected by Sterling from two locations in April and May 2018 for PFAS and TOC analysis. In addition, Sterling (in April and May 2018) and OBG (in September 2018) collected wastewater and sludge samples for analysis of TCL/TAL constituents, CN, and pH. The wastewater and sludge samples were collected from an active underground storage tank in Building 6 (UST-6) and from an in-active sump associated with the former UST in Building 5 (UST-5).

The white pipe protruding from the bank north of Building 6 was inspected by Sterling in April 2018. The cap on the pipe was removed and it was determined there was no wastewater or sludge in the pipe for sampling. After the inspection, the cap was replaced on the pipe.

Wastewater and sludge samples were collected and managed in accordance with the FSAP and QAPP. The wastewater and sludge analytical results are presented on Tables 10 and 11 and Figure 15.