DES Waste Management Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

Manganese and Arsenic Background Evaluation Work Plan (Revised)
Tibbetts Road Site
23 Tibbetts Road
Barrington, NH 03825

NHDES Site #: 198406023
Project Type: Superfund
Project Number: 1713

Prepared For:
Ford Motor Company
290 Town Center Drive, Suite 800
Dearborn, MI 48126
Phone Number (313) 390-0875
RP Contact Name: Chuck Pinter
RP Contact Email: cpinter@ford.com

Prepared By:
Arcadis U.S., Inc.
10 Friends Lane, Suite 100
Newtown, PA 18940
Phone Number: 215-815-1030
Contact Name: James S. McLaughlin
Contact Email: james.s.mclaughlin@arcadis.com

Date of Report: April 24, 2024

Manganese and Arsenic Background Evaluation Work Plan (Revised)

Tibbetts Road Site
Barrington, New Hampshire

April 2024

Manganese and Arsenic Background Evaluation Work Plan (Revised)

Tibbetts Road Site
Barrington, New Hampshire

April 2024

Prepared By:
Arcadis U.S., Inc.
500 Edgewater Drive, Suite 511
Wakefield, MA 01880

Prepared For:
Ford Motor Company
Fairline Plaza North
290 Town Center Drive, Suite 800
Dearborn, MI 48126

Our Ref:
30156650

James McLaughlin
Project Manager

Ian Martz, P.G. (NH)
Senior Geologist

S-1-5-21-1177238915-2052111302-725345543-143366/e495b36b-2b46-44bc-b0f1-1817d121aff6/login.windows.net/7f90057d-3ea0-46fe-b07c-e0568627081b/Ian.Martz@arcadis-us.com

Digitally signed by: S-1-5-21-1177238915-2052111302-725345543-143366/e495b36b-2b46-44bc-b0f1-1817d121aff6/login.windows.net/7f90057d-3ea0-46fe-b07c-e0568627081b/Ian.Martz@arcadis-us.com
DN: CN = S-1-5-21-1177238915-2052111302-725345543-143366/e495b36b-2b46-44bc-b0f1-1817d121aff6/login.windows.net/7f90057d-3ea0-46fe-b07c-e0568627081b/Ian.Martz@arcadis-us.com
Date: 2024.04.25 09:34:50 -04'00'

Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

amsl	above mean sea level
Arcadis	Arcadis, U.S., Inc.
CC	confidence coefficient
CTV	central tendency value
DO	dissolved oxygen
DQO	Data Quality Objectives
EDD	electronic data deliverables
Ford	Ford Motor Company
ICL	Interim Cleanup Levels
IQR	interquartile range
LOD	limits of detection
MS/MSD	matrix spike/matrix spike duplicate
ORP	oxidation-reduction potential
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
QAPP	Quality Assurance Project Plan
RL	reporting limits
SLVWD	Swain's Lake Village Water District
TOC	total organic carbon
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
UTL	Upper Tolerance Limit
VOC	volatile organic compound

1 Introduction

On behalf of Ford Motor Company (Ford), Arcadis, U.S., Inc. (Arcadis) prepared this Work Plan to establish Site-specific manganese and arsenic concentrations in groundwater at the Tibbetts Road Site in Barrington, New Hampshire (the Site). This Work Plan has been developed based on previous discussions with the United States Environmental Protection Agency (USEPA). The location of the Site is presented on **Figure 1**, and a general Site layout (including the surrounding area and existing monitoring wells) is provided as **Figure 2**.

This Work Plan describes the proposed approach and statistical methods to be used to estimate Site-specific background concentrations for manganese and arsenic in groundwater. The objective of the evaluation is to determine representative background concentrations of manganese, arsenic, and other contaminants with Interim Cleanup Levels (ICLs) established in the 1992 Record-of-Decision (ROD) in groundwater at the Site, in the absence of Site-related influences resulting from the release of wastes at the Site.

1.1 Work Plan Structure

This Work Plan presents the proposed monitoring wells and historical dataset to be included in the evaluation, including the rationale for background representativeness; the sampling and analysis plan for wells that are still sampleable and/or for which relevant data are not yet available; and the statistical procedures proposed to meet the objectives of the background evaluation. The remainder of this document includes the following:

- Section 1.2: Summary of Data Quality Objectives (DQOs) guiding the work proposed in this Work Plan
- Section 2: High-level summary of the hydrogeological/geochemical CSM for the Site, referencing the most recent comprehensive CSM provided as **Appendix A**
- Section 3: Proposed background locations and rationale, including a description of the available historical data
- Section 4: Proposed monitoring well installation plan, and proposed additional data collection and analysis program for existing and sampleable active/inactive wells
- Section 5: Proposed statistical methods for processing and analyzing the data, and using the data to calculate groundwater background concentrations for manganese and arsenic
- Section 6: Summary of the investigation proposed to be conducted for this Work Plan resulting in a Final Report that proposes background concentrations of metal contaminants.

1.2 Data Quality Objectives

The DQOs are qualitative and quantitative statements that clarify study objectives, define the appropriate type of data, and specify the tolerable levels of potential decision errors used as the basis for establishing the quality and quantity of data needed to support parameter estimation and/or decision making. These project-specific statements describe the intended data use, the data need requirements, and the means to achieve acceptable data quality for the intended use. Guidelines followed in the preparation of DQOs are set out as steps in the DQOs Process for Hazardous Waste Site Investigations (USEPA 2000). This process was supplemented herein using Guidance on Systematic Planning Using the Data Quality Objectives Process (USEPA 2006a), which provides more specific guidance on parameter estimation problems. These seven steps are listed below:

- **Step 1. State the Problem**: Summarize the problem that will require environmental data, the resources required, and the preliminary CSM.
- **Step 2. Identify the Goals of the Study:** Identify the principal study questions, including what needs to be estimated, key assumptions, and potential alternative outcomes.
- **Step 3. Identify Information Inputs:** Identify the information and measurements needed to produce estimates, including decisions requiring resolution, and select appropriate sampling and analysis methods.
- **Step 4. Define the Boundaries of the Study:** Define the target population, spatial and temporal boundaries, and sampling units.
- **Step 5. Develop the Analytic Approach:** Specify appropriate population parameters and estimation procedures.
- **Step 6. Specify Performance or Acceptance Criteria:** Specify acceptable limits on estimation uncertainty.
- **Step 7. Develop/Optimize the Plan for Obtaining Data:** Design an effective data collection strategy based on the previous steps.

The seven-step system was used to develop the DQOs for this Work Plan, which are presented below.

1.2.1 Step 1: Problem Statement

Arsenic and manganese concentrations have been observed in overburden and bedrock groundwater at the Site above their respective Interim Cleanup Levels (ICLs) of 10 µg/L and 3,650 µg/L, and above their respective New Hampshire Department of Environmental Services (NHDES) Ambient Groundwater Quality Standards (AGQS) of 5 µg/L and 300 µg/L (the NHDES AGQS standards do not currently apply to the Site). Based on available site records, dissolved arsenic and manganese are not directly associated with releases at the Site, but rather may be present in groundwater because of geochemical processes that release them from solid-phase natural sources. Although areas where VOC releases occurred exhibit elevated dissolved manganese and arsenic resulting from microbial VOC oxidation coupled to the reductive dissolution of iron and manganese oxyhydroxides, manganese and arsenic are also both known to be naturally present in groundwater within the region. This Work Plan is required to establish Site-specific manganese and arsenic background concentrations to inform future remedial decisions at the Site.

1.2.2 Step 2: Identify the Study Goals

The purpose of the study is to estimate Site-specific manganese and arsenic background concentrations at the Site, with the specific goal of establishing revised, more appropriate ICLs to inform future remedial decisions. Determination of Site-specific background concentrations suitable as ICLs relies on the following key assumptions:

- Historical and/or current groundwater wells and water quality sample results can be identified which, with a very high degree of confidence, can be deemed representative of background conditions; i.e., not influenced by historical Site VOC releases.
- The background-representative wells and water quality samples identified are obtained from zones which are similar geologically and geochemically to the Site prior to the release of hazardous materials.

This Work Plan includes reference to the regional and Site-specific CSM (details included in Section 2 and in **Appendix A**). Based on the CSM, this Work Plan provides the rationale for the selection of background wells, outlines the proposed background monitoring well network and groundwater dataset and proposed sampling program, and describes the proposed statistical evaluations to be conducted to calculate groundwater manganese and arsenic background concentrations.

1.2.3 Step 3: Identify Information Inputs

The information inputs required to accomplish the project goals are:

- Geologic, hydrogeologic/hydraulic, and existing chemical data required to evaluate the hydrogeological and geochemical dynamics of manganese and arsenic in groundwater and aid in the selection of appropriate background locations and datasets;
- Geochemical data to evaluate groundwater conditions and calculate manganese and arsenic background concentrations.

The Site is unique in that the primary release area occurs at a topographic and potentiometric high point in the area; accordingly, the Site is lacking in “upgradient” zones which would serve as appropriate background locations for the study area. It is therefore necessary to evaluate the water quality dataset available to determine whether downgradient data exist that are not influenced by Site VOC releases; either because they are sufficiently far downgradient as to be beyond the extent of observed releases, and/or because they are outside of the predominant flow paths (cross-strike from the dominant northeast/southwest fracture flow in bedrock). To collect sufficient data to evaluate the Site-specific arsenic and manganese background concentrations, groundwater samples will also be collected from select locations to provide data to supplement the existing background groundwater dataset.

Water quality data and geochemical parameters to be collected and evaluated are summarized in Section 4. In addition to Site-specific COCs (VOCs and metals), water quality sampling will include collection of field parameters, redox indicator parameters (including DO, ORP, and TOC), and major ion water quality (cations, anions, and alkalinity). Collectively, these parameters will be used as lines of evidence to understand and verify differences in water quality between true background areas and areas affected by releases. Specifically, although elevated manganese and arsenic are demonstrated to be inversely correlated with DO and ORP in areas affected by VOC releases (discussed in Section 2), this correlation may or may not be as strong in background areas. Comparison of redox parameters with other major ion concentrations may help to identify other key differences between release-affected and unaffected zones.

1.2.4 Step 4: Define the Boundaries of the Study

The general area boundaries for this Work Plan include the Site and surrounding areas in which groundwater wells (including Site monitoring wells, former domestic wells, and current municipal water supply wells) have been installed. The vertical boundaries of the Work Plan include the overburden formation and portion of the bedrock formation represented by well borings. The locations of all historical and existing overburden and bedrock wells are shown on **Figures 3** and **4**, respectively.

1.2.5 Step 5: Develop the Analytic Approach

All new water quality samples will be collected and analyzed in accordance with the Quality Assurance Project Plan (QAPP) developed for the Site (Arcadis 2018) to ensure that background concentration estimations are made based on valid data. The 2018 QAPP will be updated to include all analytes and submitted for Agency approval at least 60 days before any sampling activities are scheduled to occur. Additional details on analytical data quality assurance/quality control procedures are provided in Section 4.6.

Geochemical analyses will be conducted to interpret the geochemical conditions and dynamics controlling Site COC concentrations. These evaluations will include graphical analyses (likely to include Stiff and Piper diagram generation), correlation/scatter plots (for example, to evaluate metals concentrations relative to redox parameters), and geochemical modeling to identify sorption and mineral solubility controls on manganese and arsenic in different areas across the Site. Specifically, whereas manganese is anticipated to be primarily mineral solubility controlled (dominated by Mn(III/IV) oxides under oxic conditions and $MnCO_3$ controlled under more reducing conditions), arsenic fate and transport will be governed more strongly by adsorption to iron and manganese oxyhydroxides; accordingly, the fate and transport of both manganese and arsenic are controlled by redox and solubility processes which can be quantified using a geochemical modeling software such as PHREEQC. These data analysis and modeling evaluations will be used to construct a geochemical conceptual site model that provides a solid basis and rationale for constituent concentrations attributable to effects of releases vs. natural background.

Following geochemical analyses, statistical evaluations will be conducted to identify outliers and calculate background concentrations. Although an initial data usability assessment will be conducted as described in the QAPP, additional usability assessments will be made using statistics (described further in Section 5). For example, the outlier evaluation will be used to identify data that may not represent the true background population; although outliers are not necessarily removed from a dataset based solely on the statistical test, it can be used to identify data that may require further investigation or justification for inclusion.

The statistical evaluations will also be used to determine which data subsets are used for background calculation. As described further in Sections 5, the statistical evaluation will determine sample populations and normality. Due to distinct ambient geochemical dynamics in each formation, it is anticipated that separate background concentrations will be estimated for the overburden and bedrock aquifers; however, evaluation of the lumped overburden and bedrock datasets will also be conducted.

1.2.6 Step 6: Specify Performance or Acceptance Criteria

Numerous steps will be taken as part of the sampling and analysis program to minimize contributions to total study error, including:

- Installation of new overburden monitoring wells
- Collection of data from the new overburden monitoring wells and multiple existing bedrock wells to adequately account for variability in the background dataset due to spatial heterogeneity in hydrogeology and geochemistry
- Collection of water quality from the same wells over multiple quarterly monitoring events to minimize uncertainties and errors resulting from random temporal variability
- Minimization of measurement errors associated with sample collection and laboratory analysis by following USEPA approved sample collection methodologies, USEPA approved analytical methods (including EPA Method 6020 for arsenic), and other quality assurance (QA) /quality control (QC) protocols as outlined in the QAPP (Arcadis 2018).

As noted in Step 5, the data collected will undergo data validation and usability assessments to verify the acceptability of the data for the intended use in background calculation. Data that are obtained by following the approved sample collection and analysis procedures and subsequently established as valid and usable will be deemed within acceptable limits of estimation uncertainty.

As described in Section 5, the estimated background value will be based on calculation of a 95-95 Upper Tolerance Limit (UTL), which accounts for variability and uncertainty in the concentration. The 95-95UTL is the upper limit of a statistical range designed to contain a pre-specified portion of the underlying population from which the statistical sample is drawn. It is a statistical estimation of the tolerance limit representing the true range, calculated using an adequate number of data points to make a reliable statistical estimate. Estimation of the limit of the range of background values as the 95-95UTL of a sample population therefore further helps to ensure that the uncertainty in any given value in the dataset (or central tendency value [CTV] for a given well) is within acceptable limits.

1.2.7 Step 7: Develop/Optimize the Plan for Obtaining the Data

To achieve the study objective discussed in Section 1.2.2, this Work Plan describes a comprehensive plan to evaluate historical data and collect additional groundwater samples to estimate background manganese and arsenic concentrations to be used to inform future remedial decisions at the Site. The proposed and existing wells identified as background-representative, including rationale and justification, are outlined in Section 3; the details of the sampling and analysis plan for collection of additional data are presented in Section 4, and the statistical methods that will be used to evaluate the groundwater data are detailed in Section 5.

2 Conceptual Site Model Summary

The original CSM was prepared for the Summary of Environmental Monitoring 2008 Report (Arcadis 2009) to address several of the "Recommendations and Follow-up Actions" proposed by the USEPA in the Tibbetts Road Superfund Site, Second 5-Year Review (USEPA 2008). An updated CSM was prepared for the Summary of Environmental Monitoring 2013 Annual Report (Arcadis 2014), with a focus on VOC releases at the Site. A supplemental CSM update was completed in 2022 to provide additional detail on the geologic, geochemical, and hydrogeologic conceptual model for manganese and arsenic (**Appendix A**). A high-level summary of the CSM findings is provided below.

2.1 Site Geology

A review of the available boring logs, geophysical logs, and sieve analyses suggests that several discernable hydrostratigraphic units are present. The subsurface units are designated as follows (in order from top to bottom):

- Upper Till: This upper layer of overburden consists of a glacial ablation till that was deposited during the last glacial retreat. Typically observed in the top 15 feet of soil, it mainly consists of poorly sorted fine to coarse sand and is typically yellowish to brown in color.
- Glacial Outwash: Glacial outwash and melt water deposits at the Site are described as stratified silts and sands with little fine soil and minor lenses of gravel. The color is typically brown to gray. Lenses of lacustrine-like sediments are found within this unit.
- Lower Till: This unit consists of a very dense glacial lodgment till typically described as silt and clay with a component of gravel and coarse sand. This unit often contains thin sand seams.
- Weathered Bedrock: Weathered bedrock residuum is located immediately above bedrock and is thicker on the western portion of the Site than on the east. The weathered rock consists of gravel- to boulder-sized fragments imbedded in a fine-grained matrix with identifiable minerals weathered from the bedrock.
- Bedrock: Historical and recent investigations indicate that the dominant rock type is a fine- to coarse-grained granofels, with varying degrees of felsic (quartz, feldspar) and mafic (biotite) content. Other minerals observed in little to trace amounts include garnet, muscovite, pyrite, and amphibole. Pegmatite layers have been noted on historical boring logs and are evident on the downhole geophysical gamma logs. Lenses of mica-rich schist and schist gneiss have also been identified within the bedrock north of the Site, and varying amounts of quartzite were observed in the bedrock south of the Site.

In general, the overburden material appears to become increasingly dense with depth, as higher clay content and lower K values have been observed. The upper till has a much higher percentage of sand and gravel; occasional cobbles to boulder-sized material have also been observed. There are transition zones between the glacial outwash and lower till sediments and above competent bedrock that appear sandier in nature. When saturated, the upper till and transitional zones will be of higher permeability and will be able to transmit water more readily than the surrounding stratum. Groundwater will preferentially flow laterally within these higher-permeability zones.

The bedrock high located off site to the northeast corresponds to a location where overburden is relatively thin and bedrock is highly fractured. It is theorized that this "knob" of bedrock was exposed at the surface before the last glaciation. As the continental glacier passed over the exposed knob, the bedrock was subjected to a high amount of directed stress. This stress created a relatively isolated pocket of heavily fractured bedrock, which extends to a depth of approximately 125 feet bgs.

Additional information is available in **Appendix A**, Section 2.5.

2.2 Site Hydrogeology

Historical shallow bedrock groundwater elevation contours approximate the topography at the Site with apparent radial groundwater flow. However, the historical extent of VOC releases in bedrock is aligned with the predominantly northeast/southwest trending fractures within the bedrock and exerts an important control on the transport of VOCs and other constituents. The radial flow and mounding beneath the topographic high are consistent with the regional groundwater flow characteristics.

Based on historical average groundwater elevations, there is a consistent downward vertical gradient present at the Site. The relatively high vertical gradient at the Site suggests limited communication between the overburden and the bedrock aquifer. Due to the low hydraulic conductivity of the lower till and weathered bedrock units, groundwater will tend to flow laterally within the more permeable upper till and outwash deposits to areas in which the lower till and weathered bedrock units are thin, fractured, or more permeable before flowing vertically into bedrock. The range of vertical gradients observed within bedrock is a result of the varying degree of bedrock fracture interconnection, as well as the Site's location within a bedrock aquifer recharge area.

The current distribution of COCs in bedrock suggests that groundwater has migrated laterally from the former drum storage areas northeast to the fracture zone. In this area, the overburden is relatively thin compared to other areas of the Site, and groundwater appears to flow vertically from the overburden aquifer into bedrock. As a result, most of the remaining VOC detections (primarily benzene) in bedrock have been identified in this area. COCs in bedrock tend to migrate from this area and elongate parallel to the dominant northeast-trending regional fractures.

Additional information is available in **Appendix A**, Section 2.7.

2.3 Site Geochemistry

Dissolved metals are present in groundwater at the Site. Manganese and arsenic are a concern at the Site due to exceedances above ICLs. Elevated levels of manganese and arsenic have been theorized to be related to the underlying geology of southeastern New Hampshire (Ayotte et al. 2003) and have been observed in far-downgradient wells such as MW-302 and 109R (i.e., not associated with VOC releases or related water chemistry) at the Site. Although no known metals releases have occurred at the Site, manganese and arsenic exhibit a correlation with historical VOC releases, indicating that the biodegradation of VOCs has resulted in the release of additional arsenic and manganese into groundwater, likely via the reductive dissolution of metal oxyhydroxides.

VOC releases and the presence of elevated arsenic and manganese are also consistent with the reducing (low DO and oxidation-reduction potential [ORP]) nature of the groundwater. This is particularly the case in overburden wells, where the extent of arsenic and manganese attenuation in VOC release areas shows a correlation with DO and ORP (**Appendix A**; Section 4).

Whereas VOC concentrations have decreased substantially since monitoring began (because of MNA and other active remedies), manganese and arsenic concentration reductions have not been observed to the same extent within historical VOC release areas. This is expected, as the natural attenuation of manganese (via reoxidation and precipitation) and arsenic (via coprecipitation with manganese and iron) is dependent on the inflow of oxic water to the aquifer following VOC biodegradation, which will take time.

In addition to the observation of arsenic and manganese in VOC biodegradation zones released from natural solid sources, and consistent with published regional observations, dissolved arsenic and manganese have been observed in bedrock and overburden groundwater outside of VOC release areas, which are believed to be due to natural conditions. As discussed in Section 3, arsenic has frequently been observed above its ICL of 10 µg/L. Although manganese has not been observed in proposed background locations above its current ICL of 3,650 µg/L, concentrations have been observed near or above the USEPA lifetime health advisory (and potential future ICL) of 300 µg/L.

3 Monitoring Well Identification and Justification

As described in the CSM (**Appendix A**) and shown on **Figures 3** and **4**, there have been over 170 existing and historical wells installed within the study area (including Site monitoring wells, former domestic wells, and current municipal water supply wells). The Site is located on a local topographic high, and at the top of a groundwater recharge zone; groundwater flows radially outward from this groundwater high. This complicates the evaluation of background, since it is not possible to install wells "upgradient" of historical release areas for the purpose of background evaluation. The approach instead used the following process:

- Analytical data were reviewed for existing and historical well locations, including manganese, arsenic, and VOCs with historical exceedances of their respective ICLs: benzene, cis-1,2-DCE, ethylbenzene, methyl tertiary butyl ether, PCE, toluene, vinyl chloride, and total xylenes.
- Each overburden and bedrock well location was classified into the following categories:
  - Locations with historical VOC exceedances of ICLs.
  - Locations with historical detections of VOCs above laboratory reporting limits (RLs).
  - Locations with no historical detections of VOCs above laboratory RLs.
  - Locations where no historical VOC data have been collected.
- Figures showing the approximate extent of VOC release areas (defined as wells with either historical VOC exceedances of the ICLs or locations with historical detections of VOCs above laboratory RLs) in overburden and bedrock groundwater were generated (included as **Figures 5** and **6**, respectively).
- Locations were retained for use in the background evaluation if the following criteria were met:
  - Location has been sampled previously for VOCs, and no historical detections of VOCs above laboratory RLs have been observed.
  - Water quality results do not indicate any geochemical anomalies which may call data quality into question (pending additional outlier detection conducted under the statistical evaluation).
  - Location downgradient or sidegradient of the approximate extent of historical VOC release areas, and the location is not immediately adjacent to the approximate extents (i.e., at least 100 feet away).

Several historical overburden monitoring wells have been abandoned or decommissioned which were in locations amenable for inclusion in the background evaluation. Since manganese and arsenic were not sampled at those locations prior to abandonment/decommissioning, a total of three new overburden wells will be installed to supplement the existing dataset. The locations of existing bedrock wells were determined to be sufficient, and no additional bedrock wells are proposed to be installed. The active and decommissioned wells identified as being representative of background are provided in **Table 1**, including specific rationale for the inclusion of each well, and are highlighted on **Figures 5** and **6**. Each of the decommissioned wells was determined to have sufficient historical data available for inclusion in the dataset. Therefore, the evaluation will include both existing and decommissioned wells.

4 Additional Data Collection and Analysis

As summarized on **Table 1**, groundwater samples will be collected from 11 existing bedrock wells. The bedrock wells include two active monitoring wells associated with the Site (MW-302 [60-70] and MW-302 [100-110]), the two public water supply wells currently being operated by the SLWVD (SWL-6 alt and SWL-7), and seven inactive residential wells that have been sampled previously. In addition, a total of three new overburden monitoring wells are proposed to be installed at locations shown on **Figure 5**.

A total of four quarterly monitoring events are proposed to be conducted from the 14 wells described above. Water level and water quality measurements will be collected following the USEPA-approved QAPP for the project (Arcadis 2018). A brief overview of the proposed activities is described below.

4.1 Monitoring Well Installation and Development

A total of three overburden monitoring wells (MW-401 to MW-403) will be installed; each well will be installed using hollow stem auger or drive-and-wash techniques. Continuous soil logging will be performed during drilling, and drilling will proceed until the top of bedrock is encountered (estimated at 30 to 55 feet below ground surface). Monitoring wells will be constructed of 2-inch-diameter schedule 40 polyvinyl chloride (PVC) with 10-foot-long screen (10-slot size [0.010-inch]). Screen depths will be selected based on the observed depth to groundwater and depth to bedrock, and screens will be submerged at least 15 feet below the observed water table to limit influence from more oxic groundwater near the water table.

Filter packs, seals, and surface completions will be completed consistent with New Hampshire guidance. The wells will be secured with a 2-foot by 2-foot concrete pad and either an 8-inch protective roadbox or 4-inch-diameter steel standpipe. Well construction details (including the materials used) will be recorded by an Arcadis field geologist. The measuring points and well labels will be marked with an indelible ink pen on both the inner and outer well casings or inside the roadbox lid. All drilling and well construction will be completed by a licensed New Hampshire driller under the oversight of an Arcadis geologist and will be conducted in accordance with all promulgated state and federal laws. All well locations will be surveyed by a licensed New Hampshire surveyor for northing, easting, and ground/top of casing elevations.

Each monitoring well will be developed using a submersible pump and surge block to remove fines and improve the hydraulic connection of the well with the native formation.

4.2 Groundwater Level Measurements

Groundwater levels will be measured in each new and existing monitoring well immediately before well sampling. The groundwater level measurements will be collected in accordance with the QAPP (Arcadis 2018). Water level measurements will be made to the nearest hundredth of a foot using an electronic water-level indicator. All levels will be recorded as depth below the top of the well casing (unless otherwise noted in the table) and converted to piezometric head in feet above mean sea level (amsl) using a surveyed well elevation. The water-level indicator probe will be cleaned with a detergent wash and deionized water rinse between wells to prevent cross-contamination.

4.3 Groundwater Sampling

The groundwater monitoring wells will be sampled by low-flow sampling methods using low-stress, low-flow procedures in accordance with USEPA approved procedures (USEPA 2017) and the approved QAPP (Arcadis 2018). Field parameters (including pH, temperature, dissolved oxygen [DO], ORP, turbidity, and specific conductivity) will be measured using a multi-sensor groundwater quality meter with a flow-through cell. Samples will be collected and sent to a New Hampshire-accredited laboratory for the following analyses:

- **VOCs (EPA Method 8260),** to confirm current groundwater quality and ensure that the sampled locations continue to be representative of background conditions.
- **Bis (2-ethylhexyl) phthalate and naphthalene (EPA Method 8270),** as requested by the USEPA in **Appendix B**, to confirm background concentrations of contaminants with ICLs established in the 1992 Record-of-Decision (ROD).
- **Total and dissolved iron, manganese, and arsenic (EPA Method 6020A)**. Total metals have been collected historically at the Site and data will be compared to historical data. The dissolved analysis will be collected to evaluate redox status and attenuation potential via iron coprecipitation upon reoxidation, and to assess the potential for suspended particulates.
- **Total and dissolved chromium, nickel, and vanadium (EPA Method 6020A)**, as requested by the USEPA in **Appendix B**, to confirm background concentrations of contaminants with ICLs established in the 1992 Record-of-Decision (ROD).
- **Total and dissolved lead (EPA Method 6020A).** No ICL was established for lead at the time of the 1992 ROD or as of 2024. As stated on Page 47 of the 1992 ROD, lead present in unfiltered historical samples may not be attributable to site contamination and could be a result of historical sample collection methods employed. Lead will be analyzed to confirm background and on-site concentrations by initial comparing dissolved lead to the 15 parts per billion (ppb) cleanup level for groundwater used for drinking water as recommended in the 1990 memo by the Office of Emergency and Remedial Response and the Office of Waste Program Enforcement.
- **Arsenic speciation (EPA Method 1632 or similar).** Arsenic speciation will include, at minimum, the quantification of inorganic As(III) (arsenite) and inorganic As(VI) (arsenate) on filtered and acid-preserved samples. Depending on laboratory capabilities, other species (such as methylated arsenic forms) may also be quantified. The proportion of arsenate to arsenite in each sample will provide additional insight on the groundwater redox state and redox dynamics, with potentially different arsenic dynamics observable in true background vs. VOC release/attenuation zones. Arsenic speciation will either be collected via Method 1632 (hydride generation-atomic absorption) or via the more modern method of ion chromatography coupled to inductively coupled plasma-mass spectrometry (IC-ICP-MS).
- **Total major cations: calcium, magnesium, sodium, and potassium (EPA Method 6010C/6020A).** Rationale discussed below.
- **Major anions: Sulfate, chloride, and nitrate (EPA Method 300)**. Rationale discussed below.
- **Total alkalinity (Standard Method [SM] 2320B)** (including calculation of carbonate, bicarbonate, and hydroxide components) Rationale discussed below.
- **Total organic carbon (TOC; EPA Method 9060A)**, to assess redox status and residual reducing potential. TOC will contribute to ongoing reducing potential by consuming dissolved oxygen (potentially limiting iron reoxidation).

Major cations and anions (including alkalinity) will be used to further develop the overall groundwater quality conceptual model, as a verification on data quality, and to provide specific insight on the dynamics of manganese and arsenic. Understanding spatial variation in major ion concentration may inform variation in manganese and arsenic if different geologic sources and/or water flow paths are important. Collecting the full suite of cations and anions is informative in verifying charge balance. In addition, these water quality constituents may directly affect transport and geochemical behavior of manganese and arsenic; for example, complexation of manganese with sulfate and carbonate may affect mobility.

Samples to be submitted for dissolved analyses will be field filtered using a 0.45-micron filter. Analytical methods and analytes used for the groundwater sampling events will be in accordance with the QAPP (Arcadis 2018). The 2018 QAPP will be updated to include all planned analytes and submitted for Agency approval at least 60 days before any sampling activities are scheduled to occur. Analytical data will be received from the laboratory as electronic data deliverables (EDDs) and uploaded to the project database, as described in the QAPP.

4.4 Waste Management

Investigation-derived waste (IDW) generated during the proposed activities will include purged groundwater and drill cuttings, as well as general site refuse. Groundwater generated (including drilling water and well development water) will be discharged to the ground surface at the site of generation. Drill cuttings will be thin-spread on the Site property, similar to previous drilling events. If petroleum contamination/sheens are observed in any of the drill cuttings or purge water, the IDW will be containerized and transported to a central staging area for subsequent characterization and off-site disposal.

4.5 Surveying

Newly installed monitoring wells (and any existing sampling locations that have not been surveyed) will be surveyed for the location, elevation of the ground surface, and measuring point elevation. Surveying will be measured to the nearest 0.1 foot horizontally and 0.01 foot vertically, and a reference point will be indicated by a notch or permanent marker. A New Hampshire-licensed surveyor will be contracted to perform surveying in accordance with the New Hampshire State Plane Coordinate System of the North American Datum of 1983 and vertically on the North American Vertical Datum of 1988. All measurement units will be in feet.

4.6 Quality Assurance/Quality Control

QA/QC samples will be collected for dissolved metals and geochemical parameters during groundwater sampling at the 14 proposed background locations in accordance with the QAPP. One blind duplicate sample and one matrix spike/matrix spike duplicate (MS/MSD) sample will be collected during each sampling event, and trip blanks will be included in any sample coolers containing VOC samples.

Following the collection of groundwater samples, the chains-of-custody, surrogate recoveries, holding times, and sample handling QC procedures will be reviewed, and a data validation/verification review will be completed on each laboratory analytical data package.

4.7 Implementation Sequence

The implementation order of activities proposed in this Work Plan is as follows:

Activity	Estimated Timing
Agencies' Approval of Work Plan	Quarter 2, 2024
Revised QAPP Submittal to Agencies	Quarter 3, 2024 (at least 60 days prior to sample collection)
Proposed Overburden Monitoring Well Installations	Quarter 4, 2024
Monitoring Well Sampling	Four quarters (Quarters 1 through 4, 2025)
Final Report Submittal	Early 2026

5 Background Statistical Approach and Preliminary Results

Estimated arsenic and manganese background concentrations will be calculated as 95-95UTL values based on the central-tendency-value manganese and arsenic concentrations determined from each background location well. This section provides the statistical methods that will be used to estimate the background concentrations of manganese and arsenic in groundwater. It is anticipated that separate background values will ultimately be proposed for overburden and bedrock groundwater; however, evaluation of the lumped overburden and bedrock datasets will also be conducted.

5.1 Statistical Methods

USEPA (2006b, 2009) guidance recommends the following steps for establishing background values for groundwater:

1. Calculate descriptive statistics (Section 5.1.2);
2. Create graphical representations (Section 5.1.3);
3. Determine normality (Section 5.1.4);
4. Identify outliers (Section 5.1.5);
5. Calculate decision thresholds (i.e., UTLs) (Section 5.1.6).

Each of these steps as it applies to the estimation manganese and arsenic background values for the Site is described in more detail below.

5.1.1 Data Conditioning

This section discusses the methods used to process and prepare data for statistical evaluation.

5.1.1.1 Field Duplicate Samples

Field duplicates will be collected as part of the data validation and usability assessment (Section 4.3); however, the field duplicates will not be included in the background groundwater statistics datasets, as they compromise statistical independence. The USEPA (2009) states the following regarding excluding duplicates from the background groundwater datasets:

> *"The variability in means of two correlated measurements is approximately 30% less than the variability associated with two single independent measurements. If a dataset consists of a mixture of single measurements and lab duplicates and/or field splits, the variability of the averaged values will be less than the variability of the single measurements. This would imply that the final dataset is not identically distributed. When data are not identically distributed, the actual false positive and false negative rates of statistical tests may be higher or lower than expected…Background variability will be underestimated, resulting in lowered prediction limit and a higher false positive rate (USEPA 2009, p. 6-27)."*

5.1.1.2 Data Validation and Qualified Data

The usability of the available analytical data for groundwater will be confirmed before statistical evaluation in accordance with the QAPP (Arcadis 2018). The data used will meet USEPA quality assurance requirements.

Estimated concentrations (those results denoted with the "J" qualifier) will be treated as quantified detected concentrations for the purposes of statistical analysis and will be included in the dataset. However, if all of the results in the dataset are less than the LOQs, then the J-qualified results less than the LOQ will not be processed as quantitative results. No data rejected through data validation will be included in the datasets.

5.1.1.3 Censored Data

Censored (non-detect) data will be handled in accordance with Section 15.6 of Unified Guidance (USEPA 2009). Based on this guidance, the "15% and 50% Non-Detect Rule" will be followed. This rule states that arbitrary values, such as one-half of the detection limit, can be substituted for the non-detects if a dataset has 15 percent or fewer non-detects. For parametric datasets with a non-detect rate greater than 15 percent, a method is needed to adjust the sample mean and standard deviation to account for the censorship. For this evaluation, the Kaplan-Meier method will be used to adjust the mean and standard deviation will be used for this purpose. If the proportion of non-detects is greater than 50 percent, then a non-parametric method will be used. Non-detected values with limits of detection (LODs) greater than the maximum detected concentration in a well-constituent dataset will not be in included in the data evaluation.

5.1.2 Descriptive Statistics

Descriptive statistics quantitatively describe the main features of a dataset. Descriptive statistics will be provided for each well-constituent pair. Commonly presented descriptive statistics include sample size, number of detects, frequency of detection, minimum and maximum concentrations, arithmetic mean, median, and standard deviation. The mean and median are measures of central tendency and characterize the center of a dataset. The mean represents the arithmetic average, and the median represents the middle of the ordered dataset. The minimum and maximum show the range of the data, and the standard deviation shows the spread of the data. A low standard deviation indicates that the observations are close to the mean, and a high standard deviation indicates that the observations are spread out over a larger range (USEPA 2006b).

5.1.3 Graphical Representations

Graphical representations visually communicate the features of a dataset. Time-series plots, box-and-whisker plots, and probability plots will be created on an as-needed basis to help establish goodness of fit outlier identification, or in other data interpretation. Time-series plots show constituent concentrations through time. They are useful for identifying inconsistent observations and will be used to qualitatively evaluate the datasets for potential seasonality and for anomalous data points as part of the outlier evaluation (described in Section 5.2.6).

Probability plots serve multiple purposes for establishing background concentrations. They allow for visual inspection of the data distribution, which complements formal statistical tests for distribution testing. Inflection points or changes in slope can indicate that the data represent a mixture of multiple populations, which may reflect multiple background sources or a combination of background and site-related sources. Finally, probability plots can be used to identify extreme values in the upper tail of the distribution, which may indicate potential outliers. Probability plots evaluate fits to the normal and lognormal distributions. A straight-line fit on a probability plot provides evidence that the data are from a single population with the specified distribution. Values that deviate substantially from this line may represent potential outliers or multiple populations and may require further statistical testing.

5.1.4 Determination of Normality

Many of the tests in this statistical analysis plan are predicated on the normality of the dataset; therefore, when necessary, datasets will be tested to demonstrate normality. The Shapiro-Wilk Test for Normality will be used for datasets with sample sizes up to 50 (USEPA 2009, Shapiro and Wilk 1965). The test will be run at the 5% critical level. For datasets with a sample size greater than 50, the Shapiro-Francia Test for Normality will be used (USEPA 2009, Shapiro and Francia 1972).

If a dataset does not pass a test of normality, data will be transformed following the ladder of powers. The ladder of powers is a sequence of transformations: square root, square, cube root, cube, logarithmic transformation, x^4, x^5, and x^6 (Helsel and Hirsch 2002, Box and Cox 1964). All points in the untransformed dataset will be changed by one of these operations, and the new dataset will be tested to determine if the transformed data meet the criterion of normality. If the test fails, the original data will be transformed using the next transformation in the ladder. Transformations will be attempted in the order of the ladder of powers until normality is achieved or until all of the options are exhausted. In the latter case, non-parametric tests will be necessary.

5.1.5 Outlier Evaluation

An outlier analysis can help identify potential outliers that may not represent the true background population. Dixon's test (USEPA 2009, Barnett and Lewis 1994) will be used when the sample size is fewer than 25, and Rosner's test (USEPA 2009, Rosner 1975) will be used when the sample size is equal to or greater than 25. Datasets that are not normally distributed or cannot be normalized will be tested using a screening method, Tukey's IQR test (Tukey 1977). Observations identified as statistical outliers at 5% significance will be documented but will not be removed from the background dataset solely on the basis of a statistical outlier test (USEPA 2009). Well-constituent pairs with a rate of detection less than 50% and a detection count fewer than or equal to four will not be analyzed for outliers.

5.1.6 Upper Tolerance Limits

Following the outlier analysis and determination of the data distribution, statistical methods will be used to calculate the upper bound limits of the background population. All historical data will be included when calculating a CTV for each well, which will be used to calculate the background value.

Following USEPA Unified Guidance (2009), the 95% UTL with 95% coverage (95-95UTL) will be used to represent background. The 95-95UTL represents the statistic, such that 95% of observations from the target population will be less than or equal to the 95-95UTL with a confidence coefficient of 0.95. A 95-95UTL represents a 95% upper confidence limit (UCL) of the 95th percentile of the data distribution (population). A 95-95UTL is designed to simultaneously provide coverage for 95% of the potential observations from the background population (or comparable to background) with a 95% level of confidence.

A 95-95UTL may be calculated on the lumped dataset or for individual statistical populations based on population and normality determinations. CTVs will be calculated for each background monitoring well for use in calculating the 95-95UTLs.

5.1.6.1 Parametric Upper Tolerance Limits

Statistical methods are available to calculate both parametric and non-parametric 95-95UTLs. Parametric 95-95UTLs will be calculated using one of the following equations depending on the data distribution:

- Normal Upper Tolerance Limit

$$\mathit{95\text{-}95UTL} = \bar{x} + \mathrm{K}(n, \gamma, 1-\alpha) \times s \qquad \text{Equation 1.0}$$

- Lognormal Upper Tolerance Limit

$$\mathit{95\text{-}95UTL} = \exp\left(\bar{y} + \mathrm{K}(n, \gamma, 1-\alpha) \times s_y\right) \qquad \text{Equation 2.0}$$

- Square Root Normal Upper Tolerance Limit

$$\mathit{95\text{-}95UTL} = \left(\bar{y} + \mathrm{K}(n, \gamma, 1-\alpha) \times s_y\right)^2 \qquad \text{Equation 3.0}$$

- Cube Root Normal Upper Tolerance Limit

$$\mathit{95\text{-}95UTL} = \left(\bar{y} + \mathrm{K}(n, \gamma, 1-\alpha) \times s_y\right)^3 \qquad \text{Equation 4.0}$$

where $\bar{x}$ is the sample mean, $\mathrm{K}(n, \gamma, 1-\alpha)$ is the one-sided normal tolerance factor associated with a sample size of n, coverage coefficient of γ, and confidence level of (1-α), and *s* is the background standard deviation. Finally, $\bar{y}$ and s_y are the sample mean and the standard deviation based on the transformed data.

It should be pointed out that tolerance intervals built using transformed data are not constructed around the arithmetic mean, but around the true central tendency, which is not the arithmetic mean for datasets that are not normally distributed. For square-root normal data, the central tendency is best expressed by the root mean squared. For lognormally distributed data, the central tendency is the geometric mean.

5.1.6.2 Nonparametric Upper Tolerance Limits

If the data do not follow a normal, lognormal, square root normal, or cube root normal distribution, then a non-parametric 95-95UTL can be calculated. As discussed in USEPA (2009) Unified Guidance:

"Unlike parametric tolerance intervals, the desired coverage (γ) of confidence level (1- α), cannot be pre-specified using a non-parametric limit. Instead, the achieved coverage and/or confidence level depends entirely on the background sample size (n) and the order statistic chosen as the upper tolerance limit (e.g., the maximum value). Guttman (1970) has shown the coverage of the limit follows a beta probability density with cumulative distribution:

$$I_t(n-m+1, m) = \int_{u=0}^{t} \frac{\Gamma(n+1)}{\Gamma(n-m+1)\Gamma(m)} u^{n-m}(1-u)^{m-1} du \qquad \text{Equation 5.0}$$

Where n = sample size and m = [(n+1)-(rank of upper tolerance limit value)]. If the background maximum is selected as the tolerance limit, its rank is equal to n and so m = 1. If the second largest value is chosen as the limit, its rank would be equal to (n-1) giving m = 1.

… Since the beta distribution is closely related to the more familiar binomial distribution, Guttman showed that in order to construct a non-parametric tolerance interval with at least γ coverage and (1- α) confidence probability, the number of (background samples) should be chosen such that:

$$\sum_{t=m}^{n} \binom{n}{t} (1-\gamma)^t \gamma^{n-t} \geq 1-\alpha \qquad \text{Equation 6.0}$$

If the background maximum is selected as the upper tolerance limit, so that m = 1, this inequality reduces to the simpler form:"

$$1-\gamma^n \geq 1-\alpha \qquad \text{Equation 7.0}$$

In this application, α = 0.05 and γ = 0.95. Inserting these values and rearranging shows that selecting the highest value as the UTL will lead to a confidence level less than 95 percent unless there are at least 59 members to the dataset. Thus, the highest value in a smaller dataset is a protective choice for representing the 95-95UTL.

5.2 Preliminary Results

As a preliminary demonstration of the statistical procedures, and to develop an approximation of the ultimate background concentration estimates, the current proposed background groundwater monitoring data for the Site were examined using the proposed statistical methods to estimate preliminary background concentrations of arsenic and manganese. These results are provided below.

5.2.1 Data Used in the Analysis

As described in Section 3, the groundwater data used for the statistical analysis was limited to monitoring wells and former private water supply wells known to be sufficiently distant from the Site so as to be unaffected by previous Site activity. The list of wells considered for the bedrock included monitoring wells (78R, 107R, 109R, MW-302 [60-70], and MW-302 [100-110]), former private water supply wells (CC-13 and 28R), and active water supply wells operated by the SLVWD (SWL-6 alt and SWL-7). The list of wells considered for the overburden were monitoring wells 58S, 74S, 77S, and 83S.

The samples used in the analysis were collected over a period of more than thirty years, from 1990 to 2021. The samples used in the statistical analysis are presented in **Table 1**, and the analytical results are presented in **Table 2**.

5.2.2 Statistical Methods

The methods used to obtain background concentrations, consistent with the procedures outlined in Section 5.1, involved determining a single value for each well for each of the two analytes; these values were then used to obtain a background concentration. These two steps are discussed in this section.

5.2.2.1 Assigning Concentration Values to Each Location

The inputs to the determination of the background values were single values for each constituent in each well, rather than simply using the data for the wells in **Tables 1** and **2** in a general way. This was necessary to fulfill the requirement that the concentrations used in the background calculation be statistically independent. The number of available samples from the wells varied; if the data had been evaluated in a general way, wells with a greater number of samples would have been overrepresented, and the background concentrations would have been biased toward these wells.

For this reason, the available data from each well had to be used to produce a single concentration to represent that monitoring well. The method was to determine the statistical distribution of the well and compute the central tendency of the concentration values. For example, the central tendency of a normally distributed data set is the arithmetic mean.

The statistical distribution was determined by testing the concentrations for each well-constituent pair for normality using the Shapiro-Wilk test at a 5% level of statistical significance (Shapiro and Wilk, 1965). If the data set failed the normality test, a series of transformations were used known as the ladder of powers (Helsel and Hirsch, 2002; Box and Cox 1964), until the data were normalized. If the data could not be normalized, and the statistical distribution could not be discerned, then the data were treated non-parametrically and the median was used as the central tendency of the data. It was assumed that the arithmetic mean could be used for data sets with fewer than four members. Data sets with four or more members were tested for statistical outliers using Dixon's test (Barnett and Lewis, 1994). Outliers detected using this test were to be identified, but not necessarily removed. However, no outliers were identified.

Non-detects were treated using the 15% and 50% Non-Detects Rule (USEPA, 2009, p.15-24). This rule states that if 15% of the data or less are non-detects, then the non-detects are replaced by half of the detection limit. A correction such as Cohen's adjustment (Cohen, 1956) or the Kaplan-Meier method (Kaplan and Meier, 1958) is used for data sets composed of more than 15% non-detects but not more than 50% non-detects. When more than 50% of the observations are non-detects, then non-parametric methods are used. For this analysis, the15% and 50% rule was applied, except to data sets with fewer than four members, in which case substitution was used. The Kaplan-Meier method was always used for data sets that required a correction for censorship.

Table 3 presents the central tendency values obtained to represent the arsenic and manganese concentrations. This table also shows the statistical distribution and identifies any outliers. All of the data sets that were of sufficient size to allow for normality testing were found to be normally distributed and without outliers. For each of the four overburden wells, the number of samples was too small to allow for the determination of the statistical distribution or for meaningful testing for outliers.

5.2.2.2 Obtaining a Background Concentration

The central tendencies obtained in the previous step were then used to construct a one-sided tolerance interval for each of the four data sets. The tolerance interval was designed to cover 95% of the data population with 95% confidence (i.e., the 95/95UTL). The UTL can be computed from the sample mean $\bar{x}$ and standard deviation *S* using a tolerance factor κ, as follows:

$$UTL = \bar{x} + \kappa S$$

The value of κ for the appropriate confidence, coverage, and sample size can be obtained from the statistical literature. For this analysis, a table was used provided by the USEPA (2009).

It is required that a data set be normally distributed to use the above equation. All of the data sets were tested using the Shapiro-Wilk test and found to be normally distributed. No statistical outliers were identified. All of the data sets had detection rates greater than 85%. Thus, the computation of the UTLs was a simple application of the above equation.

5.2.3 Results

The results of the statistical analysis of the bedrock and overburden wells are presented in **Table 4**. These tables included both UTLs and lines of evidence that the concentrations selected to represent the monitoring wells for both constituents are single populations. The following preliminary 95-95UTLs were calculated:

Location Type	UTL – Arsenic (µg/L)	UTL – Manganese (µg/L)
Bedrock Groundwater	42.3	455
Overburden Groundwater	74.0	8,819

The lines of evidence of a single population are a discernible statistical population, the number of outliers being small, that their probability plots are linear, and that their coefficients of variation are less than or equal to 1.0. Three of the data sets exhibited all four lines of evidence. One of the data sets had three of the four attributes.

All four data sets were normally distributed, satisfying the first line of evidence. None of the four data sets had statistical outliers. For all four data sets, the correlation coefficient with linearity in their probability plots satisfied (was greater than) the criterion at 95% confidence. Three of the four data sets have a coefficient of variation that was less than 1.0. The other data set, manganese in the overburden, had a coefficient of variation of 1.008, which narrowly exceeded 1.0.

The meaning of the 1.0 criterion is derived from the definition of the coefficient of variation, which is the standard deviation divided by the mean. It follows that if the coefficient of variation is less than 1.0, then the standard deviation is less than the mean, a situation in which the observations in the data set are less spread apart. This can be a line of evidence that the data are a single population.

That the data sets appear to be a single population support the use of the UTLs derived in this analysis as background concentrations for arsenic and manganese in groundwater in the bedrock and overburden at the Site.

6 Summary

The investigation conducted for this Work Plan will result in a Final Report that proposes background concentrations of metal contaminants based on statistical and geochemical evaluations, determines the concentrations of Site contaminants, and estimates potential cleanup times and potential remedies for those contaminants.

Additional groundwater data are proposed to be collected from existing bedrock wells and proposed new overburden wells, which will adequately account for variability in the background dataset due to spatial heterogeneity in hydrogeology and geochemistry. Background locations were retained for use in the background evaluation if (a) the location has been sampled previously for VOCs, and no historical detections of VOCs above laboratory RLs have been observed, and (b) water quality results do not indicate any geochemical anomalies which may call data quality into question. A total of four quarterly sampling events (including existing and new wells) are proposed to be conducted.

Preliminary 95-95UTLs (which provide a preliminary demonstration of the anticipated background values) have been derived for arsenic and manganese in bedrock and overburden groundwater at the Site. These UTLs/background values will be updated and submitted for USEPA/NHDES approval after the Work Plan tasks have been implemented and additional groundwater data have been collected from bedrock and overburden wells. Arcadis will also provide an estimate of cleanup times for all Site-related COCs (as well as a plan to address any COCs above background) in this subsequent submittal.

As described above, the results of the investigation will result in a Final Report that present the following:

- An overview of the investigation.
- Natural or enhanced conditions that affect metal contaminant mobility.
- Status of all contaminants at the Site that are described in the 1992 ROD and 1998 Amended ROD as well as the items mentioned above. A discussion of current and proposed ICLs for all contaminants that is based on the results of both geochemical and statistical evaluations.
- An estimate of cleanup times under the current remedy, MNA; and
- Develop and propose one or two possible in-situ remedies in the form of a Focused Feasibility Study (FFS).

7 References

Arcadis U.S., Inc. 2009. Summary of Environmental Monitoring 2008, Tibbetts Road Site, Barrington, New Hampshire.

Arcadis U.S., Inc. 2014. Summary of Environmental Monitoring 2013, Tibbetts Road Site, Barrington, New Hampshire.

Arcadis U.S., Inc. 2018. Quality Assurance Project Plan, Tibbetts Road Site, Barrington, New Hampshire. November.

Ayotte, J.D., Montgomery, D.L., Flanagan, S.M., and K.W. Robinson. 2003. Arsenic in Groundwater in Eastern New England: Occurrence, Controls, and Human Health Implications. Environmental Science & Technology, Vol. 37, No. 10, 2003. March.

Barnett, V. and T. Lewis. 1994. Outliers in Statistical Data. ISBN 978-0-471-93094-5. May.

Box, G.E.P. and D.R. Cox. 1964. An analysis of transformations (with discussion). Journal of Royal Statistical Society Series B, 26, 211-252.

Cohen, A.C. 1956. Simplified estimators for the normal distribution when samples are single censored or truncated. *Technometrics 1*, 217-237.

Helsel, D.R. and R.M Hirsh. 2002. Statistical Methods in Water Resources. Techniques of Water Resources Investigations of the United States Geological Survey – Book 4, Chapter A3. September.

Kaplan, E.L. and P. Meier. 1958. Non-parametric estimation from incomplete observations. *J. Amer. Stat. Assn., 53*, 457-481.

Rosner, B. 1975. On the Detection of Many Outliers. Technometrics, Vol 17, No. 2. May.

Shapiro, S.S. and R.S. Francia. 1972. An Approximate Analysis of Variance Test for Normality. Journal of the American Statistical Association, 67, 215-216.

Shapiro, S.S. and M.B. Wilk. 1965. An Analysis of Variance Test for Normality (Complete Samples). Biometrika, 52, 591-611.

Tukey, J.W. 1977. Exploratory Data Analysis. Pearson. ISBN 978-0201076165.

USEPA Region I. 2008. Second Five-Year Review Report for Tibbetts Road Site, Town of Barrington, Strafford County, New Hampshire. August.

USEPA. 2000. Data Quality Objectives Process for Hazardous Waste Site Investigations, EPA QA/G-4HW Final, EPA/600/R-00/007. January.

USEPA. 2006a. Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4 Final, EPA/240/B-06/001. February.

USEPA. 2006b. Data Quality Assessment: Statistical Methods for Practitioners, EPA QA/G-9S, EPA/240/B-06/003. February.

USEPA. 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. Office of Resource Conservation and Recovery, Program Implementation and Information Division, U.S. Environmental Protection Agency. EPA 530-R-09-007. March.

USEPA, 2017. Low-Stress (Low-Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells. Revision No. 4. September.

Tables

Table 1
Proposed Background Monitoring Wells and Rationale
Manganese and Arsenic Background Evaluation Work Plan
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Well Status	Bedrock Depth (ft bgs)	Casing Depth	Well Depth (ft bgs)	Well Screen Interval (ft bgs)	Number of Arsenic Samples	Number of Manganese Samples	Available Data Date Range	Proposed for Additional Sampling?	Rationale for Inclusion
Overburden Wells										
58S	Decommissioned	NE	N/A	47	7 - 47	3	3	1990 - 1995	N/A	Over 100 ft from observed historical VOC impacts
74S	Decommissioned	NE	N/A	18	13 - 18	1	1	1991	N/A	Over 100 ft from observed historical VOC impacts
77S	Decommissioned	12	N/A	15	5 - 15	1	1	1991	N/A	Over 100 ft from observed historical VOC impacts
83S	Decommissioned	NE	N/A	9.5	4 - 9	1	1	1991	N/A	Over 100 ft from observed historical VOC impacts
MW-401	Proposed	30*	N/A	30*	20 - 30*	N/A	N/A	N/A	Yes	Proposed well - located southwest of observed historical VOC impacts
MW-402	Proposed	55*	N/A	55*	45 - 55*	N/A	N/A	N/A	Yes	Proposed well - located southeast of observed historical VOC impacts
MW-403	Proposed	50*	N/A	50*	40 - 50*	N/A	N/A	N/A	Yes	Proposed well - located north of observed historical VOC impacts
Bedrock Wells										
015.1498 ("CC-13")	Inactive Residential	8	40	205	40 - 205	0	1	2011	Yes	South of historical VOC-impacted wells
015.1524 ("CC-08")	Inactive Residential	14	40	325	40 - 325	0	0	N/A	Yes	South of historical VOC-impacted wells
1-10821 ("CC-10")	Inactive Residential	24	42	180	42 - 180	0	0	N/A	Yes	South of historical VOC-impacted wells
15R	Inactive Residential	UNK	UNK	174	UNK	0	0	N/A	Yes	Southwest of historical VOC-impacted wells, cross-strike of known regional bedrock fractures
24R	Inactive Residential	UNK	UNK	UNK	UNK	0	0	N/A	Yes	West of historical VOC-impacted wells
28R	Inactive Residential	UNK	UNK	225	UNK	9	9	2015 - 2021	Yes	North of historical VOC-impacted wells, cross-strike of known regional bedrock fractures
29R	Inactive Residential	UNK	UNK	UNK	UNK	0	0	N/A	Yes	Southwest of historical VOC-impacted wells, cross-strike of known regional bedrock fractures
78R	Decommissioned	34	34	200	34 - 200	1	1	1991	N/A	Northwest of historical VOC-impacted wells, cross-strike of known regional bedrock fractures
107R	Decommissioned	23	24	60	24 - 60	1	1	1996	N/A	East of historical VOC-impacted wells, cross-strike of known regional bedrock fractures.
109R	Decommissioned	44	49	70	55 - 70	2	2	1995 + 1996	N/A	West of historical VOC-impacted wells, cross-strike of known regional bedrock fractures
MW-302 (60-70)	Active	55	60	70	60 - 70	15	15	2012 - 2021	Yes	North of historical VOC-impacted wells, cross-strike of known regional bedrock fractures
MW-302 (100-110)	Active	55	60	110	100 - 110	15	15	2012 - 2021	Yes	
SWL-6 alt	Active (Water Supply)	7	40	460	40 - 460	2	2	2011 + 2019	Yes	SLVWD public water supply well, north of historical VOC-impacted wells, cross-strike of known regional bedrock fractures
SWL-7	Active (Water Supply)	7	60	400	60 - 400	2	2	2011 + 2019	Yes	

Abbreviations:
ft bgs - feet below ground surface
N/A - not applicable
NE - not encountered
SLVWD - Swains Lake Village Water District
UNK - unknown
VOC - volatile organic compound

Table 2
Groundwater Data Used for Statistical Analysis
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
Overburden Monitoring Wells			
58S	6/15/1990	4.8 J	2,200
	10/9/1990	**20**	856 J
	6/9/1995	< 5.0	8.0
74S	5/29/1991	**10.2**	474
77S	5/1/1991	**19.3**	509
83S	5/29/1991	**32.7**	3,290
Bedrock Monitoring Wells			
28R	11/19/2015	**15.2**	52.5
	5/20/2016	< 10	11.3 J
	11/10/2016	**27.5**	64.9
	5/19/2017	**16.0**	67.1
	11/10/2017	< 50	78.5
	5/30/2018	9.9 J	31.6
	11/19/2018	**15.1**	26.3
	5/15/2019	< 10	12.8 J
	5/4/2021	**28.1**	89.6
78R	6/4/1991	**18.4**	106
107R	4/9/1996	**14.0**	360
109R	6/7/1995	**35.0**	48.0
	4/9/1996	**24.0**	18.0
MW-302 (60-70)	11/16/2012	**22.5**	155
	5/24/2013	**29.1**	217
	11/12/2013	**30.9**	202
	5/21/2014	**30.6**	109
	11/12/2014	**29.4**	122
	5/21/2015	**27.5**	265
	11/19/2015	**29.7**	550
	5/18/2016	**27.8**	53.0
	11/9/2016	**24.3**	8.7 J
	5/17/2017	**28.8**	307
	11/8/2017	**27.0**	222
	5/25/2018	**26.5**	437
	11/16/2018	**25.6**	477
	5/15/2019	**25.0**	282
	5/7/2021	**28.3**	51.9
MW-302 (100-110)	11/16/2012	**18.9**	124
	5/24/2013	**23.0**	119
	11/12/2013	**27.9**	228
	5/21/2014	**24.3**	235
	11/12/2014	**25.7**	147
	5/21/2015	**27.1**	203
	11/19/2015	**23.6**	113
	5/18/2016	**25.5**	35.5
	11/9/2016	**29.1**	9.7 J
	5/17/2017	**23.0**	261
	11/8/2017	**23.3**	218
	5/25/2018	**26.1**	358
	11/16/2018	**26.8**	297
	5/15/2019	**24.7**	388
	5/7/2021	**28.2**	1.92
Private Residential Supply Wells			
CC-13	12/14/2011	--	< 15
SWL-6 alt	4/26/2011	**16**	77
	4/29/2011	**18**	89
	4/29/2011	**21**	93
	4/27/2019	**12.8**	121
SWL-7	5/11/2011	**11**	78
	5/11/2011	**15**	79
	4/17/2019	5.3	49.8

Notes:
1. ICL: interim groundwater cleanup level
2. µg/L: micrograms per liter
3. J: result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value.
4. <: result less than indicated reporting limit (shown in parentheses)
5. **Bold** values indicate detections above ICLs

Table 3
Central Tendency of Arsenic and Manganese Concentrations
Tibbetts Road Site
Barrington, NH

Wells	Samples	Detections	Rate of Detection	Distribution	Outliers	Arithmetic Mean (mg/L)	Central Tendency (mg/L)
Bedrock Wells - Arsenic							
CC-13	0	0	Unknown	Unknown	Unknown	Unknown	Unknown
28R	9	6	66.7%	Normal - KM	None	16.31	16.5
78R	1	1	100.0%	Unknown	Unknown	18.40	18.4
107R	1	1	100.0%	Unknown	Unknown	14.00	14.0
109R	2	2	100.0%	Unknown	Unknown	29.50	29.5
MW-302(60-70)	15	15	100.0%	Normal	None	27.53	27.5
MW-302(100-110)	15	15	100.0%	Normal	None	25.15	25.1
SWL-6 alt	2	2	100.0%	Unknown	Unknown	15.57	15.6
SWL-7	2	2	100.0%	Unknown	Unknown	9.15	9.2
Bedrock Wells - Manganese							
CC-13	1	0	0.0%	Unknown	Unknown	7.50	<15
28R	9	9	100.0%	Normal	None	48.29	48.3
78R	1	1	100.0%	Unknown	Unknown	106.00	106.0
107R	1	1	100.0%	Unknown	Unknown	360.00	360.0
109R	2	2	100.0%	Unknown	Unknown	33.00	33.0
MW-302(60-70)	15	15	100.0%	Normal	None	197.57	197.6
MW-302(100-110)	15	15	100.0%	Normal	None	182.54	182.5
SWL-6 alt	2	2	100.0%	Unknown	Unknown	103.67	103.7
SWL-7	2	2	100.0%	Unknown	Unknown	64.15	64.2
Overburden Wells - Arsenic							
58S	3	2	66.7%	Unknown	Unknown	9.1	9.1
74S	1	1	100.0%	Unknown	Unknown	10.2	10.2
77S	1	1	100.0%	Unknown	Unknown	19.3	19.3
83S	1	1	100.0%	Unknown	Unknown	32.7	32.7
Overburden Wells - Manganese							
58S	3	3	100.0%	Unknown	Unknown	1021	1021
74S	1	1	100.0%	Unknown	Unknown	474	474
77S	1	1	100.0%	Unknown	Unknown	509	509
83S	1	1	100.0%	Unknown	Unknown	3290	3290

Notes:
mg/L: micrograms per liter.
KM: A Kaplan-Meier adjustment was applied in computing the central tendency.

Table 4
Statistical Data Analysis
Tibbetts Road Site
Barrington, NH

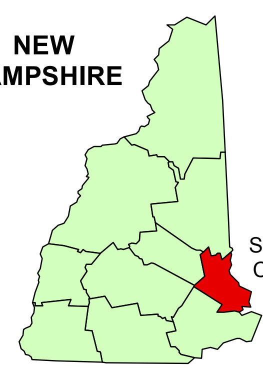
ARCADIS

Parameter	Arsenic mg/L	Manganese mg/L
Bedrock Wells		
Distribution	Normal	Normal
Outliers	0	0
Coefficient of Variation	0.367	0.896
Linearity	0.977	0.934
Criterion	0.905	0.912
Mean	19.5	122.5
Standard Deviation	7.2	109.8
Tolerance Factor	3.187	3.031
UTL	42.3	455.3
Overburden Wells		
Distribution	Normal	Normal
Outliers	0	0
Coefficient of Variation	0.613	1.008
Linearity	0.942	0.871
Criterion	0.868	0.868
Mean	17.8	1323.6
Standard Deviation	10.9	1334.6
Tolerance Factor	5.144	5.144
UTL	74.0	8188.8

Notes:
mg/L: Micrograms per liter.

Figures

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet



REFERENCE:
U.S.G.S. 7.5 Minute Series
Topographic Quadrangle:
Barrington, New Hampshire 1981,

CONTOUR INTERVAL: 10 feet.

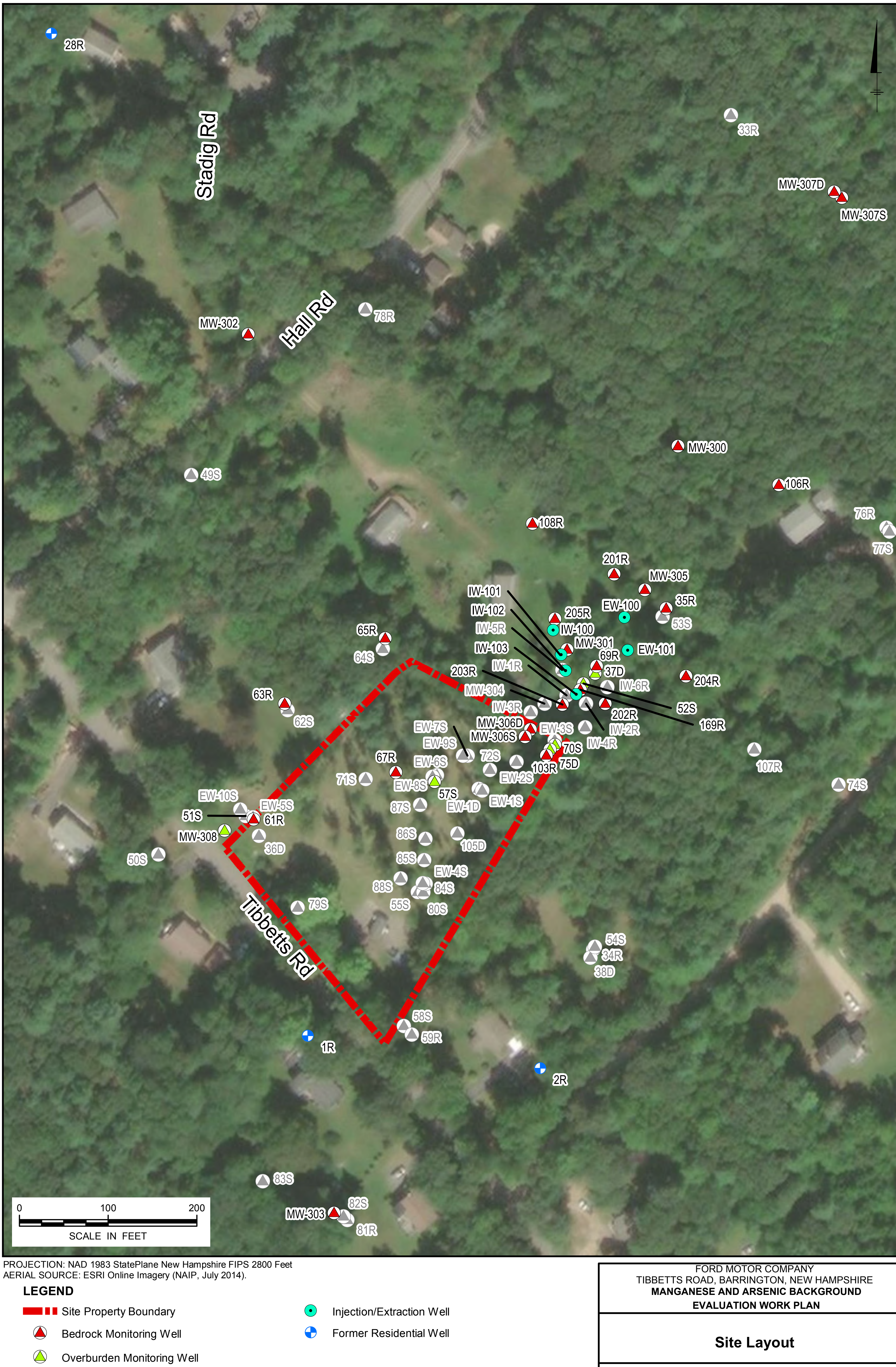
FORD MOTOR COMPANY,
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
MANGANESE AND ARSENIC BACKGROUND EVALUATION WORK PLAN

Site Location Map

ARCADIS

FIGURE
1

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: X:\FORD\FORD_TIBBETSRD\2016\NOVEMBER 2016\F1 TBT_15AN REG TOPO.MXD SAVED: 6/1/2017 BY: CMCKEOUGH



PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

LEGEND

- Site Property Boundary
- Bedrock Monitoring Well
- Overburden Monitoring Well
- Abandoned/Decommissioned Monitoring Well
- Injection/Extraction Well
- Former Residential Well

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
MANGANESE AND ARSENIC BACKGROUND EVALUATION WORK PLAN

Site Layout

ARCADIS

FIGURE
2

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: U:_ENV\NOVIBRIGHTON_MI\FORD\TIBBETSROAD\2020\F1 TBT_OVERBURDENWELLS.MXD SAVED: 11/16/2020 BY: AKENS

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

LEGEND

- Monitoring Well (Active)
- Abandoned/Decommissioned Monitoring Well
- Private Water Wells (Decommissioned)
- Site Property Boundary

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
MANGANESE AND ARSENIC BACKGROUND EVALUATION WORK PLAN

Historical and Existing Overburden Well Locations

ARCADIS

FIGURE
3

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

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: U:_ENV\NOVIBRIGHTON_MI\FORD\TIBBETSROAD\2020\F2 TBT_BEDROCKWELLS.MXD SAVED: 11/16/2020 BY: AKENS

LEGEND

- Monitoring Well (Active)
- Monitoring Well (Decommissioned)
- Former Private Water Well (Existing)
- Former Private Water Well (Decommissioned)
- SLVWD Water Supply Wells
- Site Property Boundary

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
MANGANESE AND ARSENIC BACKGROUND EVALUATION WORK PLAN

Historical and Existing Bedrock Well Locations

ARCADIS

FIGURE
4

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: U:_ENV\NOVIBRIGHTON_MI\FORD\TIBBETSROAD\2020\F1 TBT_OVERBURDENWELLS.MXD SAVED: 11/16/2020 BY: AKENS

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

Note: Historical site-related VOCs include: benzene, cis-1,2-dichloroethene, ethylbenzene, methyl tertiary butyl ether, tetrachloroethene, trichloroethene, vinyl chloride, and total xylenes

LEGEND

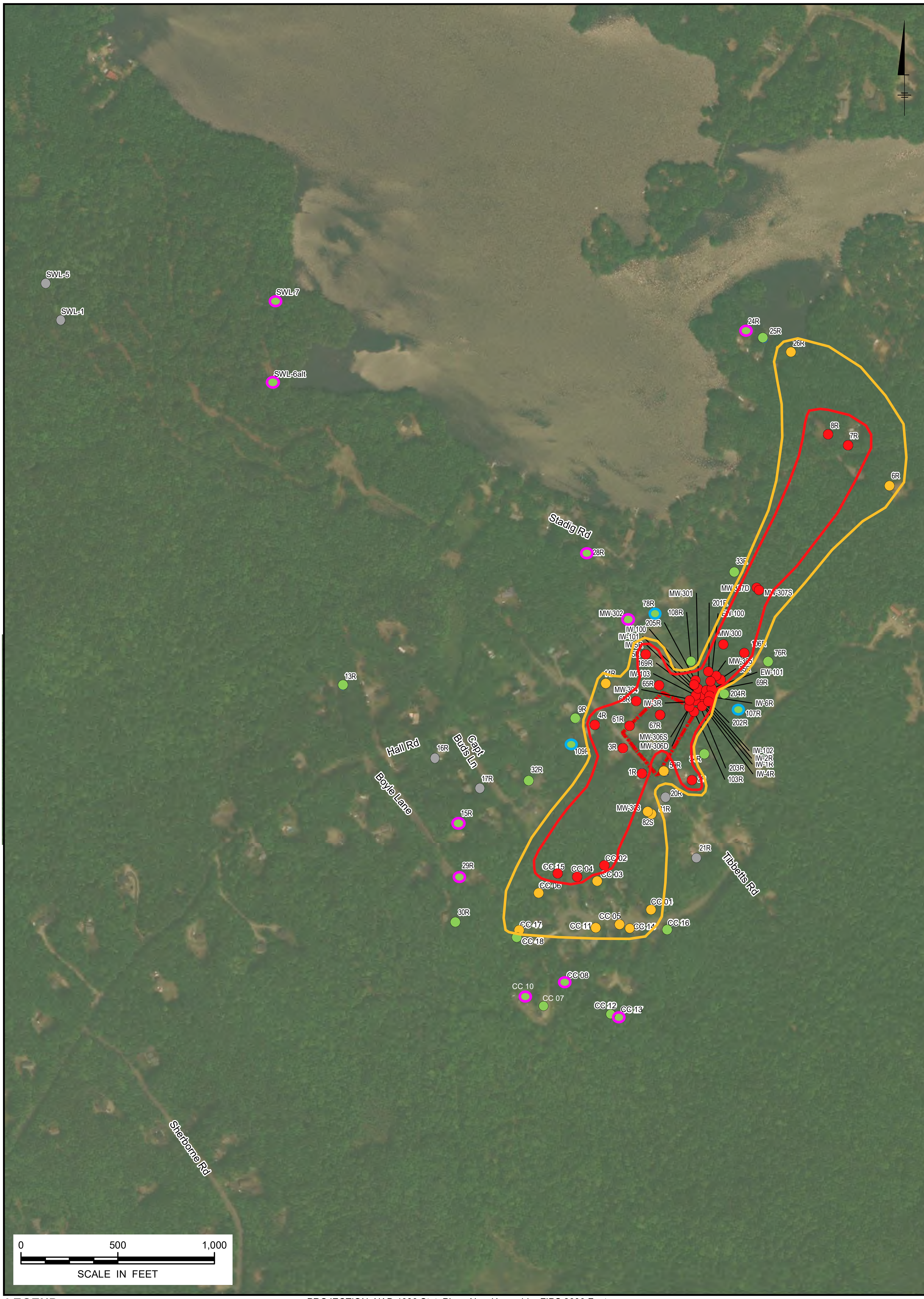
- Location with Historical Exceedance(s) of ICLs
- Historical Extent of ICL Exceedances
- Location with Historical Detection(s) above Laboratory Reporting Limits
- Historical Extent of Detections above Laboratory Reporting Limits
- Location with No Historical Detection(s) above Laboratory Reporting Limits
- No Historical Data Collected
- Proposed Overburden Monitoring Well Location (new)
- Proposed Additional Background Evaluation Location (decommissioned)

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
MANGANESE AND ARSENIC BACKGROUND EVALUATION WORK PLAN

Proposed Background Sampling Locations - Overburden

ARCADIS

FIGURE
5



LEGEND

- Location with Historical Exceedance(s) of ICLs
- Historical Extent of ICL Exceedances
- Location with Historical Detection(s) above Laboratory Reporting Limits
- Historical Extent of Detections above Laboratory Reporting Limits
- Location with No Historical Detection(s) above Laboratory Reporting Limits
- No Historical Data Collected
- Proposed Background Sampling Location
- Proposed Additional Background Evaluation Location (Decommissioned)

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

Note: Historical site-related VOCs include: benzene, cis-1,2-dichloroethene, ethylbenzene, methyl tertiary butyl ether, tetrachloroethene, trichloroethene, vinyl chloride, and total xylenes

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
MANGANESE AND ARSENIC BACKGROUND EVALUATION WORK PLAN

Proposed Background Sampling Locations - Bedrock

ARCADIS

FIGURE
6

Appendix A

Conceptual Site Model

Conceptual Site Model 2022

Tibbetts Road Site
Barrington, New Hampshire

July 2022

Conceptual Site Model 2022

Tibbetts Road Site
Barrington, New Hampshire

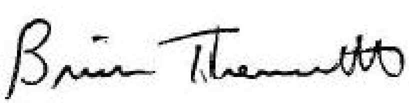
July 2022

Prepared By:
Arcadis U.S., Inc.
500 Edgewater Drive, Suite 511
Wakefield, MA 01880

Prepared For:
Ford Motor Company
Fairline Plaza North
290 Town Center Drive, Suite 800
Dearborn, MI 48126

Our Ref:
30125581

Ian Martz, P.G. (NH)
Senior Geologist



Brian Therriault
Principal Engineer

Michael Hay
Principal Scientist

James McLaughlin
Project Manager

Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

amsl	above means sea level
AROD	Amended Record of Decision
ATV	acoustic televiewer
BCI	BCI Geonetics, Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CDM	Camp, Dresser & McKee
cis-1,2-DCE	cis-1,2-dichloroethene
cm/s	centimeter per second
CSM	conceptual site model
DGR	directed groundwater recirculation
DO	dissolved oxygen
ft^2/day	square feet per day
g/day	gallons per day
GAC	granular activated carbon
GMZ	Groundwater Management Zone
gpm	gallon per minute
ICL	Interim Cleanup Level
ISCO	in-situ chemical oxidation
K	hydraulic conductivity
µg/L	microgram per liter
Ma	million years
mg/kg	milligram per kilogram
MIBK	methyl isobutyl ketone
MNA	monitored natural attenuation
mV	millivolt
NHDES	New Hampshire Department of Environmental Services
NHWSPCC	New Hampshire Water Supply and Pollution Control Commission
NPL	National Priorities List

ORP	oxidation-reduction potential
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
PRP	potentially responsible party
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SHA	Sanborn, Head & Associates
SLVWD	Swains Lake Village Water District
SVOC	semi-volatile organic compound
USEPA	United States Environmental Protection Agency
USGS	U.S. Geological Survey
VER	vacuum-enhanced groundwater recovery
VOC	volatile organic compound

1 Introduction and Site Overview

This document presents an updated conceptual site model (CSM) for the Tibbetts Road Site in Barrington, New Hampshire (the Site), revised from the version of the CSM included in the Summary of Environmental Monitoring 2013 Annual Report (Arcadis 2014). The original CSM was prepared for the Summary of Environmental Monitoring 2008 Report (Arcadis 2009) to address several of the “Recommendations and Follow-up Actions” proposed by the United States Environmental Protection Agency (USEPA) in the Tibbetts Road Superfund Site, Second 5-Year Review (USEPA 2008). This current iteration of the CSM has been updated to include activities completed at the Site from 2013 through 2021. A summary of these activities and changes is presented below, with additional details available in Sections 2 and 3 of this report:

- One bi-level bedrock well (MW-307S) and one single-zone bedrock well (MW-307D) were installed north of the Site in May 2014 to delineate off-site volatile organic compound (VOC) impacts and to serve as monitoring points for a proposed directed groundwater recirculation (DGR) pilot test.
- A DGR pilot test was performed from August through November 2014 using two injection wells (EW-100 and EW-101) and two extraction wells (IW-103 and IW-100) within a portion of the Site referred to as the Fracture Zone. Extracted groundwater was run through granular activated carbon (GAC) for treatment before being re-injected. A supplemental DGR pilot test was performed from June through November 2016 using the same injection and extraction wells identified above; oxygen was injected into the treated groundwater for a portion of this supplemental test.
- Due to the continued detection of VOCs in groundwater in the Cedar Creek subdivision, an expansion of the Swains Lake Village Water District (SLVWD) was proposed in 2014 (to provide potable water to these residences) and implemented in June through September 2015. All private bedrock wells in the subdivision were taken offline, and each residence was connected to an extension of the SLVWD water main.
- At the request of the New Hampshire Department of Environmental Services (NHDES), an automated pressure transducer was installed in former residential monitoring well 28R in November 2015 to assess the effects of the increased SLVWD pumping capacity (due to the additional connections in the Cedar Creek subdivision). The transducer was set to record continuous water levels every 4 hours. Arcadis received approval from the USEPA and NHDES in May 2018 to discontinue transducer monitoring.
- In November 2015, a supplemental excavation of overburden soil was completed in the area of former monitoring well EW-10S. The work was completed after the initial overburden excavation completed in 2013. Approximately 408 tons of VOC-impacted soils were removed and transported off site. One permanent monitoring well (MW-308) was installed directly downgradient of the proposed excavation boundaries.

In addition to summarizing the activities identified above, this CSM has been updated to include a discussion of arsenic and manganese in groundwater (Section 4).

1.1 Site Location

The Site is located at 23 Tibbetts Road (formerly 216 Tibbetts Road) in Barrington, New Hampshire. Barrington is in the southeast part of the state, approximately 2 miles northeast of the junction of Route 4 and Hall Road. The location of the Site is presented on **Figure 1-1**. The area is primarily rural and occupied by single family and seasonal residences. The Site consists of a 2-acre parcel located on a topographic high (approximately 330 feet above mean sea level [amsl]) with land surface sloping to the southwest towards the Oyster Creek watershed and to the north-northeast towards Swains Lake and the Bellamy River watershed. Swains Lake, a popular recreation destination, is located approximately 1,000 feet north of the Site.

The elevation of the region generally ranges from 100 to 400 feet amsl, with higher elevations located to the west-northwest of the Site and lower elevations located to the southeast. The regional topography and site location are included on **Figure 1-1**. The general site layout, including the surrounding area, existing monitoring wells, and DGR pilot test wells, is provided as **Figure 1-2**.

1.2 Site History

The following site history was included in the Fourth Five-Year Review Report (USEPA 2018), and has been summarized for inclusion in this document:

- The Site was historically the former residence of Mr. Alexander Johnson and his family. In the 1950s, Mr. Johnson reportedly transported partially filled drums of waste solvent and other hazardous materials from Ford, his place of employment in Somerville, Massachusetts, to his home for storage and use as a fuel and accelerant. This practice continued until the Ford manufacturing facility in Somerville closed in 1958.
- The partially filled drums were stored uncovered on his property. As the drums deteriorated, the contents gradually began discharging onto the ground surface and ultimately migrated to groundwater. Adjacent property owners began noticing the drums in the wooded area surrounding the Johnson residence and reported them to Town of Barrington and State of New Hampshire officials in 1982.
- A subsequent site inspection by State of New Hampshire officials in 1982 discovered more than 300 drums on the Johnson residence and evidence of releases to the environment. Subsequent inspections found that the contents of many of the drums had discharged to the ground surface. These discharges and uses resulted in the contamination of soil with VOCs, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and dioxin. Some of these compounds had migrated to groundwater, resulting in groundwater contamination with VOCs; acetone; and gasoline components including benzene, toluene, ethylbenzene, and xylene (collectively known as BTEX).
- In 1984, the USEPA removed 337 drums containing solvents, PCBs, and other hazardous materials from the property. The USEPA and the state subsequently excavated and removed approximately 405 cubic yards of soil contaminated by solvents and PCBs from the Site (Drum Storage Areas A and B), incinerated approximately 3.5 cubic yards of soil contaminated with dioxin, and identified contaminated groundwater in nearby residential drinking water wells.
- The Site was finalized for inclusion on the National Priorities List (NPL) on June 10, 1986.
- In 1987, the USEPA and the state built a drinking water treatment plant and water distribution network to serve approximately 45 homes whose wells were contaminated or threatened by groundwater contamination from the Site. A group of residents surrounding the Site formed the SLVWD to assume responsibility for the operation and maintenance of the water supply system and began operating the drinking water plant in 1988.
- The USEPA released the results of a Remedial Investigation and Feasibility Study (RI/FS) for public comment on June 24, 1992 and, following the comment period, signed a Record of Decision (ROD) on September 29, 1992 selecting a remedy for the Site. The RI/FS found that the only remaining contaminated media were overburden and bedrock groundwater (from VOCs and metals that included arsenic and manganese). The

Remedial Action Objective in the ROD was to restore the overburden and bedrock aquifer groundwater. The ROD remedy was to extract contaminated groundwater, treat the water to remove the contamination, and return the water to the aquifer.

- In 1995, the USEPA, the state, and the SLVWD negotiated a Consent Decree with Ford, the potentially responsible party (PRP), in which Ford agreed to improve and fund the drinking water supply system operated by the SLVWD and to conduct the remedial action at the Site.
- To perform the RI/FS remedy, Ford demolished the original Johnson residence and cleared, graded, and paved the site property (approximately 2 acres).
- Ford began operation of a vacuum-enhanced groundwater recovery (VER) system in 1996. The VER system removed both contaminated groundwater from the overburden aquifer and contaminant vapors, treated the water and vapors by carbon filtration, and discharged the treated water into the aquifer.
- In 1998, the USEPA determined that, although concentrations of VOCs in the overburden aquifer had not yet reached cleanup levels, the VER system had reached the limit of its effectiveness; Ford was permitted to shut down the VER system. The VER system had removed more than 800 pounds of contaminants from the overburden aquifer. Ford subsequently removed the asphalt cap but retained the VER system on site, using it to address hotspots uncovered by periodic Geoprobe® use and to pulse the system as contaminants slowly desorbed from the aquifer matrix.
- The USEPA issued an Amended ROD on September 28, 1998 (the 1998 AROD), changing the groundwater remedy to bioremediation and phytoremediation with "hotspot" remediation using the existing VER system. Approximately 1,600 hybrid poplar trees were planted at the Site in May of 1998 as part of the phytoremediation component of the 1998 AROD. The USEPA signed the Preliminary Close-Out Report on September 29, 1998, signifying the completion of the construction and active remediation at the Site.
- The selected remedy for contaminated bedrock groundwater documented in the 1998 AROD was monitored natural attenuation (MNA). Calculations performed for the 1998 AROD projected that concentrations of VOCs in overburden groundwater would achieve cleanup levels by 2012. Contaminant concentrations in the bedrock groundwater north of the Site remained elevated, and it was assumed that, once overburden concentrations reached cleanup levels, the bedrock concentrations would also decline.
- In 2003, Ford began a series of pilot studies to determine the efficacy of in situ remedies in the bedrock groundwater, examining the effects of permanganate injections among others, to potentially hasten the remediation. Permanganate injections were completed from 2003 through 2006.
- In December 2007, Arcadis submitted an Evaluation of Current Biogeochemical Conditions and Applicability of Monitored Natural Attenuation Report (Arcadis 2007). This report concluded that the overall size of the VOC-impacted area in bedrock is shrinking as a result of in-situ chemical oxidation (ISCO) injections and MNA and recommended the continuation of MNA as the selected remedy.

2 Geology, Hydrology, and Hydrogeology

The following sections summarize regional and site-specific features that influence historical contaminant migration.

2.1 Regional Bedrock Geology

The Site is located within a geologic region known as the Merrimack Trough. A portion of the Bedrock Geologic Map of New Hampshire prepared by the United States Geological Survey (Lyons et al. 1997) is presented on **Figure 2-1**. The Merrimack Trough is one of three distinct geologic terranes that were accreted to the continental margin during the mid-Paleozoic era approximately 440 to 350 million years (Ma) before present (Hon et al. 1986). The other two terranes accreted to the continent include the Nashoba and the easternmost Avalon. All three of the terranes are oriented southwest-northeast and comprise the bulk of the rocks visible at the surface in southeastern New England. Following the accretion of the Merrimack terrane to the continent, it was deformed and metamorphosed during the Middle Devonian (~370 to 350 Ma) “Acadian” orogeny. The Acadian orogeny was believed to have been caused by the collision of the Avalon terrane from the east. This collision created the large-scale, west-directed folding and thrusting and also spurred the extensive metamorphism throughout central New England (Spear 1992). This west-directed stress field is thought to be partially responsible for the northeast- and northwest-trending fractures that control groundwater flow at the Site; discussed further in Section 2.6 and 2.7.

The rocks within the Merrimack Trough consist of a series of Ordovician to Devonian age (440 to 430 Ma) metasedimentary rocks that have been intruded by Acadian aged and younger intrusive plutons (Spear 2002). Underlying the Site, bedrock consists of a series known as the Berwick Formation. The origin of the Berwick Formation is limey mud deposits from near coast marine environments (Walsh and Clark 1999). Following lithification, accretion, and subsequent deformation and metamorphism, the Berwick Formation today consists of heavily folded and fractured biotite-plagioclase-quartz granofels interbedded with schist and other calc-silicate rocks (Lyons et al. 1997).

2.2 Regional Faults and Fractures

The regional and local fault and fracture orientations of the Berwick Formation are oriented to the northeast-southwest and developed due to the west-directed stress field of the Acadian orogeny. Three mapped faults are visible on **Figure 2-1** and include the Cherry Hill Fault and Fire Hill Fault, trending northeast at N50E and N30E, respectively. The third fault consists of an unnamed fault located east of the Site and trends northeast at N05E.

In 1984, BCI Geonetics, Inc. (BCI) mapped fractures at the outcrop scale in the vicinity of the Site. The survey revealed two “master” joint sets in the area at general orientations of N50W and N28E. A lesser fracture set is also present trending N75E. Fractures oriented northwest were described as the most numerous and are characterized as steeply dipping, open, and continuous for tens of meters. Fractures oriented northeast were described as less numerous and are often infilled with quartz.

The USGS completed a bedrock geology map of the Windham quadrangle located approximately 30 miles southwest of the Site (Walsh and Clark 1999). The Windham quadrangle is located within the Merrimack Trough and is primarily underlain by the Berwick Formation. The mapping of 29 fracture sets within the quadrangle did not indicate a preferred fracture orientation. The most common brittle structures in the area are generally steeply dipping, northwest striking joints.

2.3 Regional Groundwater Hydrology

A regional hydrologic map showing groundwater elevation contours is presented as **Figure 2-2**. The groundwater elevation contours represent an interpolation based on topography and occurrences of surface water and groundwater discharge points identified on the Barrington, New Hampshire, USGS topographic map. Regional surface water occurrences generally include permanent lakes, streams, and wetlands. The intersection of a topographic contour line and a stream, river, or other water body is interpreted as a hydraulic head data point used to interpolate among surrounding data points to construct a regional groundwater map interpretation. In addition, groundwater elevation data from the Site, as well as from surrounding residential wells, were used as calibration points for the interpreted groundwater contours.

On a regional scale, groundwater (as well as surface water) moves from the northwest to the southeast with as much as 200 feet of hydraulic head difference between the uplands west-northwest of the Site and the lower elevations located to the southeast. Locally, the Site is situated on a topographic high with apparent groundwater flow to the north-northeast toward Swains Lake and to the west-southwest toward headwaters of the Oyster River. Groundwater mounding beneath topographic highs is likely due to the low bulk hydraulic conductivity of the bedrock aquifer as well as the overlying dense, clay-rich glacial sediments.

2.4 Surface Water Hydrology

Two major surface water bodies (Swains Lake and Mendum’s Pond) are located in the vicinity of the Site. Mendum’s Pond is located approximately 1.5 miles west-southwest of the Site and, as shown on **Figure 2-2**, two groundwater divides lie between the Pond and the Site. The closest major water body to the Site is Swains Lake, approximately 1,000 feet north. Swains Lake covers an area of approximately 400 acres. The lake is 3 miles long and 1 mile wide at its widest point. The water level within Swains Lake is maintained by a dam at an outlet located on the southeastern end of the lake. The original dam was built in the early 1860s and was enlarged in 1890 by the American Woolen Company. The dam has since passed through several ownerships and is currently operated by the Town of Barrington. The dam is an earth and stone structure, and the lake level is controlled by the removal or insertion of stop logs at the dam. Typically, the water level is lowered by approximately 22 to 26 inches in the fall, or when there is a danger of flooding due to heavy rains. Swains Lake drains into the Bellamy River, which feeds into the Bellamy Reservoir **(Figure 2-1)**; this reservoir is used as the primary drinking water source for Portsmouth, New Hampshire. The surface elevation of Swains Lake is approximately 279 feet amsl (USGS Topographic Quadrangle, Barrington, New Hampshire) and likely fluctuates several feet seasonally and with operation of the dam. Upon exiting Swains Lake, the Bellamy River drops steeply before entering a wetland located at an elevation of approximately 210 feet amsl.

2.5 Site Geology and Stratigraphy

Soil boring and monitoring wells have been installed at the Site during multiple phases of work since 1984 including the installation of ISCO injection wells in 2003 and 2006 and the additional bedrock wells from 2011 to 2014. A summary of well construction details for both existing and historical monitoring wells is provided in **Table**

2-1. Drilling methods and soil description procedures have varied widely during this period. In many historical drilling logs (especially the bedrock well logs), soil descriptions of the overburden were not included or are summarized using non-descriptive terminology such as “glacial till.” The overburden soil was often not continuously sampled or described. Given these limitations, a review of the available boring logs, geophysical logs, and sieve analyses suggests that several discernable hydrostratigraphic units are present in the overburden. Lithological details were added in an update to the CSM in 2013 to better understand groundwater flow and the movement of dissolved-phase constituents beneath the Site. The subsurface units are designated as follows (in order from top to bottom):

- Upper Till: This upper layer of overburden consists of a glacial ablation till that was deposited during the last glacial retreat. Typically observed in the top 15 feet of soil, it mainly consists of unsorted sand and is typically yellowish to brown in color. Grain size analysis completed on a soil sample collected from the till (well 62S, 5 to 7 feet below ground surface [bgs]) suggests that the till consists of poorly sorted fine to coarse sand with less than 20 percent silt and clay. Based on the grain size results, hydraulic conductivity (K) of the till is approximately 10^{-4} centimeters per second (cm/s).
- Glacial Outwash: Glacial outwash and melt water deposits at the Site are described as stratified silts and sands with little fine soil and minor lenses of gravel. The color is typically brown to grey. Lenses of lacustrine-like sediments are found within this unit. Grain size analysis completed on a soil sample within this unit (Well 58S, 15 to 16 feet bgs) suggests that the outwash deposits consist of poorly sorted fine to coarse sand with 40 to 50 percent silt and clay and a corresponding K of approximately 10^{-6} cm/s.
- Lower Till: This unit consists of a very dense glacial lodgment till typically described as silt and clay with a component of gravel and coarse sand. This unit often contains thin sand seams. Although no samples have been collected from this unit for physical analyses, typical K values for clayey tills range from 10^{-6} to 10^{-8} cm/s.
- Weathered Bedrock: Weathered bedrock residuum is located immediately above bedrock and is thicker on the western portion of the Site than on the east. The weathered rock consists of gravel- to boulder-sized fragments imbedded in a fine-grained matrix with identifiable minerals weathered from the bedrock. Grain size analysis completed on soil samples collected from this unit (well 60S, 45 to 46 feet bgs; well 58S, 39 to 39.5 feet bgs) suggests that the weathered bedrock consists of poorly sorted fine to coarse sand with 40 to 50 percent silt and clay and a corresponding K of approximately 10^{-8} to 10^{-9} cm/s.
- Bedrock: Historical and recent investigations indicate that the dominant rock type is a fine- to coarse-grained granofels, with varying degrees of felsic (quartz, feldspar) and mafic (biotite) content. Other minerals observed in little to trace amounts include garnet, muscovite, pyrite, and amphibole. Pegmatite layers have been noted on historical boring logs and are evident on the downhole geophysical gamma logs. Lenses of mica-rich schist and schist gneiss have also been identified within the bedrock north of the Site (wells 78R and MW-302). Varying amounts of quartzite were observed in the bedrock south of the Site (well MW-303). Packer testing completed at shallow and deep discrete intervals suggest that maximum bulk bedrock K is on the order of 10^{-3} to 10^{-4} cm/s, although most of tests yielded bulk bedrock K values on the order of 10^{-5} cm/s or less. Some bedrock zones (often 10 to 30 feet thick or more) have exhibited little or no significant fractures and a bulk K of 10^{-7} cm/s or less.

In general, the overburden material appears to become increasingly dense with depth, as higher clay content and lower K values have been observed. The upper 10 to 15 feet consists of unsorted glacial till with a much higher percentage of sand and gravel; occasional cobbles to boulder-sized material have also been observed. There are transition zones between the outwash and lower till sediments and above competent bedrock that appear sandier in nature. When saturated, the upper till and transitional zones will be of higher permeability and will be able to transmit water more readily than the surrounding stratum. Groundwater will preferentially flow laterally within these higher-permeability zones.

Based on these hydrostratigraphic units, three conceptual geologic cross-sections were prepared as a part of the 2013 CSM update. The orientations of the cross-sections are presented on **Figure 2-3**. Cross-Section A-A' is included as **Figure 2-4a** and transects the Site generally from southwest to northeast; Section B-B' is presented as **Figure 2-4b** and transects the Site from south to north; Section C-C' transects the Site from west to east and is included as **Figure 2-4c**. Each section transects former drum storage areas and depicts many of the existing and decommissioned overburden and bedrock monitoring wells. Where applicable, bedrock wells from 2011 to 2014 were included in these cross-sections. Also depicted on the cross-sections are locations of fractures noted within the bedrock wells. As shown on the cross-sections, bedrock is present at a higher elevation in the northeast portion of the Site.

The cross-sections also include the historical maximum and minimum observed water levels within the existing wells. Groundwater elevations have historically varied as much as 16 feet seasonally within select wells (wells 76R and 67R) and typically vary by 6 to 10 feet across the Site. As described in Section 2.7, groundwater elevations within overburden wells are typically higher than elevations within paired and adjacent bedrock wells, indicating a downward vertical gradient within the overburden.

Three additional cross-sections (D-D', E-E', and F-F'), generated to support the arsenic/manganese evaluation, are detailed in Section 4.

2.6 Fractures and Historical Pump Test Data

A topographic map depicting the bedrock surface elevations is included as **Figure 2-5**. The bedrock high located off site to the northeast corresponds to a location where overburden is relatively thin and bedrock is highly fractured. It is theorized that this "knob" of bedrock was exposed at the surface before the last glaciation. As the continental glacier passed over the exposed knob, the bedrock was subjected to a high amount of directed stress. This stress created a relatively isolated pocket of heavily fractured bedrock, which extends to a depth of approximately 125 feet bgs. This zone of fractured bedrock and the sandier overburden soil observed in this area allowed preferential migration of groundwater impacts into bedrock at this location, and has acted as a reservoir for groundwater impacts, transporting VOC-impacted groundwater into the regional fractures. The approximate location of this source area (henceforth referred to as the "Fracture Zone") is provided on **Figure 2-6**.

The following studies have been completed at the Site in an effort to characterize the nature of the fractured bedrock (CDM 1992):

- 1984-1985: The New Hampshire Water Supply and Pollution Control Commission (NHWSPCC) maps bedrock fractures in outcrop near the Site and completed a regional lineament analysis. Completed a series of surficial geophysical surveys, bedrock monitoring well installation, bedrock well pump tests, and downhole geophysical surveys.
- 1986: Additional hydrologic analysis of bedrock flow patterns completed, based on straddle packer pump tests and borehole logs.

- 1991: A series of surficial geophysical surveys completed by the USGS to characterize the bedrock fracture system.

As noted in Section 2.2, fractures mapped by BCI Geonetics, Inc. (BCI) at the outcrop scale suggest two “master” joint sets present at average orientations of N28E and N50W. A lesser fracture set is also present at N75E. Northwest-oriented fractures in these outcrops were most numerous, and were characterized as steeply dipping, open, and continuous for tens of meters. Northeast-oriented fractures were described as less numerous, continuous, and often filled with quartz. Analysis of seismic geophysical data and direct current resistivity data (USGS 1991) suggests that east, northeast, and north-northwest trending fracture sets are present beneath the Site.

Acoustic televiewer (ATV) logging was completed in 1984 at several bedrock monitoring and residential well locations (wells 1R, 2R, 4R, 5R, 6R, 8R, 21R, 32R, 33R, 34R, 59R, 61R, 63R, 65R, and 67R) to provide oriented fracture data. The fracture data available for the Site are illustrated on **Figure 2-7** in the form of rose diagrams that depict the relative frequency of fracture strike at each borehole location. Note that the rose diagrams are based on a limited dataset (approximately six to 16 fractures per borehole), and orientation data were not recorded for many of the fractures noted at each location. The rose diagrams suggest that, although fractures are encountered beneath the Site in virtually all orientations, two main fracture sets provide pathways for groundwater flow in bedrock: a north-northwest-trending set and a northeast-trending set. Northeast-trending fractures are noted at all ATV logged locations. The occurrence of the northeast-trending fracture set is generally more numerous at wells located in the central portion of the Site and to the north and west of the Site (wells 5R, 21R, 32R, 33R, 63R, 65R, and 67R). The north-northwest-trending fracture set appears to be more numerous in wells located around the southern boundary of the Site (wells 1R, 2R, 34R, 59R, and 61R).

Additional geophysical investigations were completed from 2011 to 2014 on new bedrock boreholes installed near the fracture zone (MW-305, MW-306S, MW-306D) and to the northeast (MW-307S and MW-307D); these bedrock boreholes were later finished as permanent monitoring wells with multiple screened intervals. Borehole geophysical logging techniques included fluid temperature, resistivity, caliper, acoustic televiewer, and heat pulse flowmeter logging. Based on the geophysical logs at these locations, the fractures within the fracture zone primarily strike north-south. The dominant joint set appears to dip to the west, with the secondary set dipping to the east. Borehole geophysics logs for the wells identified above are included in the historical Summary of Environmental Monitoring Reports (Arcadis 2012, 2013, 2014)**.**

Also illustrated on **Figure 2-7** is the apparent relative interconnectedness of a subset bedrock wells derived from historical pumping test data. The 1984 NHWSPCC pumping test completed at well 61R generated drawdown in surrounding wells located 125 feet to the north and south (wells 63R and 3R), 115 feet to the northeast (well 65R), and 70 feet to the east (well 67R). The northeast-trending fracture set has been observed within these wells and occurs between 105 and 133 feet bgs in wells 61R and 65R and between 115 and 165 feet bgs in well 63R. At well 67R, the fracture set is shallower at approximately 85 feet bgs. These apparently connected northeast-trending fractures strike between N15E and N40E, with dips ranging between 19 and 66 degrees to the west.

As a part of the DGR testing, additional hydraulic testing was completed in 2012 on injection wells (IW-100 to IW-103) and extraction wells (EW-100 and EW-101). The objectives of the hydraulic testing were to further characterize the bedrock hydraulics in the fracture zone, determine the approximate sustainable extraction and injection rates for the recirculation cell, and evaluate the connectivity between the injection and extraction wells. The hydraulic testing results indicate that the injection and extraction wells form two distinct hydraulic groups. Each group of wells responded to testing in unison, consistent with an efficient connection to north-south-trending fracture sets. Based on the pump test results, the effective bulk transmissivity for the fracture zone was estimated to be approximately 15 square feet per day (ft^2/day), with an estimated bulk storativity of 0.0005.

Before implementing the proposed DGR and ISCO pilot study, a short-term DGR tracer test was performed in October 2013 using one injection well (EW-101) and two extraction wells (IW-102 and IW-103). The objectives of the DGR tracer test were to evaluate the hydraulic connectivity between injection and extraction wells, determine an appropriate DGR cell configuration for the pilot-scale system, acquire operational parameters for the pilot-scale system, and assess the DGR cell capture efficiency. A tracer dye (eosine) and several in-situ pressure transducers were used during the recirculation test to confirm groundwater flow and distribution. In addition, passive charcoal samplers were installed in several perimeter wells so that very low concentrations of dye could be detected. Based on post-injection sampling, the DGR study demonstrated that there is a negligible risk of any injected reagent traveling outside of the fracture zone at concentrations that would be detectable in nearby residential wells. While the dye test found limited hydraulic connectivity between the injection and extraction wells, a more significant connectivity was observed to the north and east of the injection wells.

2.7 Site Hydrogeology

A bedrock groundwater potentiometric contour map depicting shallow bedrock groundwater elevations in May 2021 is presented on **Figure 2-8**. Monitoring wells used to create this bedrock groundwater contour map were selected based on the depth of installation (approximately 45 to 75 feet bgs) and the corresponding hydrostratigraphic unit (shallow bedrock). The groundwater elevations measured in May 2021 are summarized in **Table 2-2.** As shown on **Figure 2-8**, the groundwater elevation contours approximate the topography at the Site with apparent groundwater flow to the northeast and southwest. The radial flow and mounding beneath the topographic high are consistent with the regional groundwater flow characteristics, as discussed in Section 2.3.

Based on historical average groundwater elevations, there is a consistent downward vertical gradient present at the Site. **Table 2-3** summarizes the average vertical gradient at several overburden/bedrock and bedrock/bedrock well pairs. The historical overburden/bedrock downward vertical gradient at the Site varies between an average of 0.02 feet per foot (ft/ft) at historical monitoring wells 77S/76R (located northeast of the Site) to 0.15 ft/ft at monitoring wells 70S/103R (located near the northeast corner of the Site). The relatively high vertical gradient at the Site suggests limited communication between the overburden and the bedrock aquifer. Due to the low hydraulic conductivity of the lower till and weathered bedrock units, groundwater will tend to flow laterally within the more permeable upper till and outwash deposits to areas in which the lower till and weathered bedrock units are thin, fractured, or more permeable before flowing vertically into bedrock. The downward vertical gradient between shallow/intermediate and intermediate/deep bedrock varies between an average of 0.01 ft/ft in bi-level monitoring MW-306S (located south of the fracture zone) to 0.20 ft/ft in bi-level monitoring well MW-306D (located adjacent to MW-306S). A slight upward vertical gradient has been observed historically in well MW-307S (the monitoring well location furthest to the north/northeast); this represents the only known upward gradient within the local bedrock aquifer. The range of vertical gradients observed within bedrock is a result of the varying degree of bedrock fracture interconnection, as well as the Site's location within a bedrock aquifer recharge area.

The current distribution of COCs in bedrock (discussed in more detail in Section 3) suggests that groundwater has migrated laterally from the former drum storage areas northeast to the fracture zone. In this area, the overburden is relatively thin compared to other areas of the Site, and groundwater appears to flow vertically from the overburden aquifer into bedrock. As a result, most of the remaining VOC impacts (primarily benzene) in bedrock have been identified in this area. As discussed in Section 3, COCs in bedrock tend to migrate from this area and elongate parallel to the dominant northeast-trending regional fractures.

3 Historical VOC Impacts and Remediation

3.1 Overburden Soil and Groundwater

As shown on **Figure 3-1** and **Figure 3-2** and summarized on **Table 3-1,** historical VOC impacts in overburden soil and groundwater were concentrated around the three former drum storage areas located on the Site and extended to areas northeast and southwest of the Site. Several VOCs were historically detected at concentrations above the Interim Cleanup Level (ICLs) in overburden groundwater including benzene, cis-1,2-dichloroethene (cis-1,2-DCE), ethylbenzene, methyl isobutyl ketone (MIBK), tetrachloroethene (PCE), and toluene. **Figure 3-1** specifically displays the historical extent of benzene and TCE concentrations above their respective ICLs, which extend slightly beyond the site property boundary. This extent of ICL exceedance is shown for all VOCs more generally on **Figure 3-2**, which further illustrates that observed VOC impacts (above laboratory reporting limits) extend slightly further to the southwest and southeast (to wells 110S and 38D/54S, respectively). Eight monitoring wells were retained in the long-term monitoring program through 2015, and five of these wells are currently retained through 2021. The range of concentrations observed for benzene, cis-1,2-DCE, and TCE is shown for these eight wells on **Figure 3-3**. The concentration ranges over time have varied widely (nearly four orders of magnitude), primarily due to VOC attenuation and active removal. Additional information on historical remediation efforts and current VOC concentration trends is presented in the following sections.

3.1.1 Soil Excavation

As mentioned previously in Section 1.2, the USEPA conducted historical soil excavations in the 1980s in Drum Storage Areas B and C. No historical excavation work was conducted in Drum Storage Area A.

In 2011 and 2013, 31 soil borings (HP-01 to HP-31) were installed in the vicinity of Drum Storage Area A to further characterize the overburden and define the apparent source material in saturated soil that could be contributing to elevated VOC groundwater impacts observed in well EW-10S. Soil borings were advanced using direct-push methods to depths between 8 and 15 feet bgs. Several soil samples collected contained VOCs (primarily toluene, ethylbenzene, and xylenes) at concentrations higher than NHDES soil screening criteria. The sampling data and analytical laboratory reports are included in the Tibbetts Road Overburden Excavation Project Summary Report (Arcadis 2014).

Based on these soil data (as well as preliminary data collected in 2011), an area of localized overburden soil impacts was defined adjacent to the site boundary near former Drum Storage Area A (upgradient of well EW-10S). Approximately 193 tons of VOC-impacted soil were excavated in June 2013 and transported off site for disposal. In general, the excavation was advanced to a maximum depth of 14 to 15 feet bgs across the entire excavation. These depths corresponded to a decrease in photoionization detector (PID) readings, indicating that the vertical extent of the VOC-impacted soils had been reached.

Following excavation, Arcadis collected five confirmatory soil samples from the west, north, and east walls, and two samples from the bottom of the completed excavation to determine if the remedial objectives had been accomplished. All post-excavation analytical results were lower than the applicable NHDES soil criteria for all parameters, except for two compounds (1,2,2-trichloroethane and 1,2,3-trichloropropane), which were not previously detected during pre-excavation soil characterization at the Site. The average soil concentrations for these two compounds were below NHDES soil criteria. The post-excavation soil sampling analytical laboratory data and the laboratory reports are included in the Tibbetts Road Overburden Excavation Project Summary Report (Arcadis 2014).

Post-excavation groundwater sampling was completed in well EW-10S in November 2013, May 2014, November 2014, and May 2015. The initial soil excavation work did not result in any noticeable decreases in concentration trends, and it was apparent that residual impacted soil was still in place and contributing to groundwater impacts. Therefore, a supplemental soil excavation was proposed. In October 2015, six additional soil borings (HP-32 to HP-37) were installed to confirm the proposed excavation boundaries and to collect soil samples for waste characterization parameters. One soil boring (HP-35) was installed directly downgradient of the proposed excavation boundaries and completed as permanent overburden monitoring well MW-308. Based on the results of the waste characterization data, the site soils were deemed acceptable for in-state low-temperature thermal desorption treatment. In November 2015, approximately 408 tons of VOC-impacted soils were removed and transported off site. The excavation was advanced to depths between 18 and 22 feet bgs, and wells EW-10S and 51S were decommissioned as they were located within the excavation footprint.

A total of six confirmatory soil samples were collected from the sidewalls and bottom of the completed excavation. No VOCs were detected at concentrations above the most stringent applicable soil standards (NH S-1); The excavation was backfilled with clean native soil and certified clean fill material to grade. VOCs have never been detected at concentrations above their respective ICLs in groundwater samples collected from monitoring well MW-308. A Supplemental Overburden Excavation Project Summary Report is included as Appendix E of the Summary of Environmental Monitoring 2015 Report (Arcadis 2016).

3.1.2 Vacuum-Enhanced Recovery System

Following the submittal of the Remedial Investigation Report (CDM 1992), the USEPA signed a ROD for the Site on September 19, 1992 (USEPA 1992) and a Consent Decree on September 22, 1994 (USEPA 1994). The Consent Decree included a scope of work prepared by Geraghty & Miller to address groundwater impacts within the overburden at the Site. Following an investigation to better define the overburden groundwater impacts at the Site, three treatment cells were designed for the VER system (**Figure 3-4**). Following the completion of a pilot test in 1995, the system was upgraded in 1996 and operated seasonally until 2002. From August through November 2002, the system included groundwater extraction from bedrock well 169R via a submersible pump. The VER system was periodically adjusted and cycled during operation to maximize mass removal rates from the three treatment cells. During the approximate 6-year lifespan of the system, new extraction wells were added to the system, while active extraction wells were taken offline due to diminishing mass removal rates.

3.1.3 Phytoremediation

In May 1998, the temporary asphalt cap that had been installed as part of the VER system was removed. Approximately 1,600 hybrid poplar trees were planted on site in 24 rows (oriented northeast-to-southwest) and spaced at approximate 10-foot intervals. The intent of the poplar trees was to limit surface water infiltration at the Site, further enhance the natural biodegradation occurring at the Site, and improve the aesthetics of the Site (compared to the previous asphalt cap).

3.1.4 Monitored Natural Attenuation and Current VOC Trends

The concentration of VOCs within the overburden wells at the Site have decreased significantly over time, and concentrations are currently either below laboratory reporting limits or below ICLs. A summary of the analytical results at each well is provided as **Table 3-1**. The decreasing trends are due to the combination of source removal, groundwater remediation, installation of the phytoremediation cover, MNA, and the gradual migration of overburden impacts laterally and downward into the bedrock. More than 40 overburden monitoring wells have been decommissioned over time due to limited residual VOC impacts, and eight remaining wells are maintained on site for groundwater sampling and gauging.

Concentration trend charts in relation to site remediation for two overburden wells (37D and 57S) are included in **Appendix A** as Figures A-1 and A-2**.** These two wells were selected because they are existing overburden wells located within the fracture zone (37D) and source area (57S) that have been sampled regularly; however, the trends for the other six active monitoring wells are shown in **Table 3-1**, with ranges of select VOCs for these wells plotted on **Figure 3-3**. As shown on the trend charts, VOCs in both wells declined to at or below the ICL or reporting limits due to historical remediation.

3.2 Bedrock Groundwater

As mentioned previously in Section 2 and shown on **Figures 3-5** and **3-6,** the extent of VOC-impacted groundwater in the bedrock aquifer is greater than that observed in the overburden aquifer. Most historical VOC impacts in bedrock groundwater are in the fracture zone area northeast of the Site; impacted groundwater migrated from this area into the regional fracture system (oriented northeast-southwest). The spatial extents and depths of historical VOC impacts across the Site are further illustrated on cross-sections D-D’, E-E’, and F-F’ (Figures **3-7a**, **3-7b**, and **3-7c**, respectively; cross-section plan view shown on **Figure 2-3**). These cross-sections, along with the plan view map showing the extent of VOC-impacted groundwater (**Figure 3-6**), clearly demonstrate the influence of directional groundwater flow as governed by the local fracture network on the extent of VOC impacts. Whereas the extent of VOC impacts has historically extended to a length of up to approximately 4,000 feet in the northeast-southwest direction (**Figures 3-6** and **3-7c**), the width of the impacted area in the northwest-southeast direction does not appear to extend beyond approximately 650 feet (**Figures 3-6** and **3-7a**).

The historical concentration ranges of select VOCs (benzene, cis-1,2-DCE, and TCE) in bedrock monitoring wells are shown on **Figure 3-8**. Concentrations in the most impacted wells have varied dramatically over the historical monitoring period, with benzene concentrations observed above 6,000 micrograms per liter (µg/L), and cis-1,2-DCE and TCE near 5,000 µg/L. In all cases, concentrations have decreased substantially due to natural attenuation and other active remedies as described further below. These historical concentrations were observed to be highest in wells installed before 2012 (69R through 205R; **Figure 3-8**); in contrast, other wells installed during or after 2012, including pilot test system injection/extraction wells and monitoring wells MW-300 through MW-307 and 61R through 67R, tend to exhibit lower VOC concentrations due to their locations further away from the center of the VOC-impacted area and/or because they were installed after substantial natural attenuation had occurred. Additional information on historical remediation efforts and current VOC concentration trends is presented in the following sections.

3.2.1 Residential Water Supply

Before approximately 1987, the bedrock aquifer was used as the primary drinking water source for area residences. As indicated in **Table 3-2**, the highest concentrations of historical VOCs (primarily benzene and TCE) in the 1980s were detected at residential wells located southwest of Tibbetts Road (wells 1R, 3R, and 4R), on the south adjacent property (well 2R), and north of the Site (well 5R). TCE was also detected in wells 7R and 8R located on the north side of Hall Road approximately 1,500 feet to the northeast of the Site. The remainder of the residential wells often exhibited low or intermittent concentrations of VOCs that were qualified as “estimated” values or yielded single detections of VOCs that were not detected during follow-up sampling events. The locations of former residential wells are shown on **Figure 3-9.**

Following the 1982 discovery of VOCs in a residential well sample located near the Site and resulting Site investigations, the SLVWD community water system was constructed to distribute drinking water to residences in the vicinity of the Site in 1987. The locations of the water treatment plant and residences included in the water district are presented on **Figure 3-10**.

In 1990 and 1991, 11 of the previously closed residential wells were re-accessed to allow for additional investigations and sampling. VOCs were detected at two (1R and 5R) of the 11 residential wells sampled in 1990 and 1991. A residential well survey was conducted in 2013 to determine if any historical residential water wells still exist in the vicinity of the Site and to evaluate the current depth and distribution of VOCs in residential areas surrounding the Site. A total of eight former residential wells (1R, 2R, 6R, 7R, 15R, 25R, 28R, and 30R) and two active residential wells (24R and 26R) were sampled in 2013 and 2014. No VOCs were detected at concentrations above their respective ICLs in any of the wells sampled (**Table 3-2**).

Before 2012, the SLVWD water system consisted of a surface water intake at Swains Lake, a water treatment system, and distribution lines to residences in the Groundwater Management Zone (GMZ). In 2012, the SLVWD installed and connected two deep bedrock municipal production wells (SWL-6alt and SWL-7) to the existing water treatment system, and Swains Lake is no longer being used as a source of potable water. The SLVWD production well locations are shown on **Figure 3-10**. The production wells were installed to total depths of 460 and 400 feet bgs for bedrock wells SWL-6alt and SWL-7, respectively, and the estimated capacity of each well is approximately 75 gallons per minute (gpm). The primary source fracture at SWL-6alt is located 447 feet bgs, and the primary source fracture at SWL-7 is located between 295 and 303 feet bgs. At the request of the USEPA and NHDES, well 28R was added to the groundwater monitoring program in 2015 as a “sentry” location between the Site and the SVLWD production wells. No VOCs have been detected at concentrations above their respective ICLs at this monitoring location (**Table 3-2**).

An 18-lot residential subdivision known as Cedar Creek (formerly referred to as River’s Edge and Sera Lane) was developed in 2008 through 2011 on property located to the south of the Site; the location of the subdivision is shown on **Figure 3-11**. A total of 17 residences were constructed and are currently occupied. Private bedrock wells were installed to supply water to each of the residences. A total of 13 wells were sampled initially in November and December 2011. VOCs (including benzene, cis-1,2-DCE, and TCE) were detected in several sampled wells, which led to immediate action by Ford and the USEPA (including providing affected residents with bottled water). This led to the installation of in-home treatment systems in five homes (wells CC-02, CC-03, CC-04, CC-06, and CC-15) along the northern part of the subdivision, where TCE concentrations were detected at concentrations above 1 µg/L (**Figure 3-11**).

Each of the five Cedar Creek residential wells with installed treatment systems were sampled monthly for three months after system installation, and then quarterly for the duration of active system operation and well use. The remaining residences (with no treatment systems installed) were sampled annually in January of each year. The treatment systems were effective at removing VOCs from drinking water and were in operation until 2015. Analytical results from the sampling of the former residential wells of Cedar Creek (raw/influent water only) are included in **Table 3-2**. Additional details and historical sampling results from the groundwater treatment systems (including effluent/treated water) are available in annual environmental reports submitted previously by Arcadis (Arcadis 2012, 2013, 2014, 2015, 2016).

Site investigations were completed in 2013 to evaluate the potential hydraulic connectivity of the Site to the SLVWD production wells and Cedar Creek development. A data logger was installed on the SLVWD treatment system to record production well pumping data, and a series of pressure transducers was deployed in select site monitoring wells. The data logger and transducers were programmed to collect data for 1 month. Based on the data collected, there was no measurable connection between the Site and off-site pumping sources.

In June through September 2015, the SLVWD was expanded to include the entire Cedar Creek subdivision. All Cedar Creek wells in the subdivision were taken offline, and each residence was connected to an extension of the SLVWD water main. At the request of the NHDES, a pressure transducer was installed in former residential monitoring well 28R in November 2015 to assess the effects of the increased SLVWD pumping capacity. The transducer recorded water levels every 4 hours to determine the extent of hydraulic connectivity with the SLVWD production wells. As summarized in a previous quarterly status report for the Site (Arcadis 2018), there was no clear observed hydraulic connection between the sentry well and the SLVWD production well system. Arcadis received approval from the USEPA and NHDES in May 2018 to discontinue transducer monitoring and sampling for 1,4-dioxane at this location.

In October 2021, the SLVWD notified Arcadis that one additional residence was being constructed on the final remaining vacant lot and would be connected directly to the SLVWD (no additional private bedrock well installation).

3.2.2 In-Situ Chemical Oxidation Pilot 2003 and 2006

ISCO pilot tests were completed in November and December 2003 in the area of bedrock groundwater impacts located off the northeast corner of the Site, generally consistent with the location of the fracture zone, as shown on **Figure 3-12**. The second phase, consisting of two separate injection events, was completed in June and November 2006. Details regarding the first phase of the pilot test are provided in the Arcadis Interim Report submitted in May 2005 (Arcadis 2005). Details regarding the second phase and overall effectiveness of the pilot tests were provided in a letter report submitted to the USEPA in May 2008 (Arcadis 2008).

Permanganate was selected as the ISCO reagent for the two phases of pilot tests. After ISCO application, decreasing concentrations of COCs were observed within the fracture zone. A review of the contaminant trends indicates that some of the decreasing trends are attributable to biological degradation rather than direct oxidation. This can be most clearly observed by examining the trend charts for monitoring well 69R on Figure A-4 in **Appendix A**. Immediately after ISCO application, TCE concentrations demonstrated a steep decline to below ICLs, indicating reduction through direct oxidation, while benzene concentrations remained elevated. During the 7years following ISCO application, benzene concentrations declined by more than two orders of magnitude to a concentration approaching the ICL. Similar results were observed at monitoring well 201R after ISCO applications, as detailed on Figure A-9 in **Appendix A**.

The apparent biological degradation of benzene reflects a geochemical shift toward more oxidizing conditions brought on through ISCO treatments. The addition of terminal electron acceptors to the fracture zone in the form of manganese as a byproduct of permanganate oxidation may also have contributed to the accelerated biological degradation of benzene. Although the use of ISCO improved the biodegradation of non-target compounds (e.g., benzene, ethylbenzene, and xylenes), it was concluded that because permanganate does not directly oxidize benzene, its utility for further applications at the Site is limited and a different oxidant may be better suited if required to target any residual impacts.

3.2.3 Monitored Natural Attenuation

Arcadis completed an MNA study in December 2007, summarized in a report entitled Evaluation of Current Biogeochemical Conditions and Applicability of Monitored Natural Attenuation (Arcadis 2007). The conclusions of the report were as follow:

1) The overall sizes of the VOC-impacted areas appear to be shrinking over time as a result of historical remediation and natural attenuation processes.
2) COC concentrations demonstrate decreasing trends in monitoring wells within and outside the central portion of the impacted areas.
3) Based on the presence of degradation products (cis-1,2-DCE and vinyl chloride) and relatively low concentrations of TCE within the fracture zone source area, natural reductive de-chlorination appears to be occurring at the Site.

This predicted that additional VOC reduction towards ICLs will continue, which has been observed in data collected in the 14 years since the MNA study was submitted. As discussed above in Section 3.2.2, biodegradation of benzene and other VOCs is also occurring at the Site. A discussion of current VOC trends is presented in Section 3.2.5 below.

3.2.4 Directed Groundwater Recirculation Pilot, 2014 and 2016

As discussed in the Summary of Environmental Monitoring 2014 report (Arcadis 2015a) a DGR pilot test was performed from August through November 2014 using two injection wells (EW-100 and EW-101) and two extraction wells (IW-103 and IW-100) located within the fracture zone. Extracted groundwater was run through GAC for treatment before being re-injected. The DGR injection, extraction, and monitoring well network is shown on **Figure 3-13**. The objectives of the DGR pilot test were to evaluate the effectiveness of DGR at flushing and recovering VOCs from the fracture zone, and to evaluate design criteria for potential expansion and/or reconfiguration of the DGR cell. A DGR Pilot Study Technical Memorandum (Arcadis 2015b) was submitted to the USEPA and the NHDES in October 2015.

The DGR pilot system operated as intended with circulation of water through and around the fracture zone with apparent hydraulic capture across the fracture zone area. Mass removal of up to 0.5 gallon per day (g/day) of benzene (2.0 g/day total VOCs) was achieved at a system operating rate of 6.5 gpm. The recirculation cell was effective at recovering VOC mass from the fracture zone based on VOC concentrations in the extraction water and observed VOC concentration trends in the monitoring well network during and after system operation.

This is clearly demonstrated on the trend charts for monitoring wells 169R and 205R, in which an accelerated decrease in benzene concentration was observed (Figures A-8 and A-12 in **Appendix A**).

A supplemental DGR pilot test was performed from June through November 2016 using the same injection wells (EW-100 and EW-101) and extraction wells (IW-103 and IW-100) used in the 2014 test. Extracted groundwater was run through GAC for treatment before being re-injected. In addition, oxygen was injected into the treated groundwater for a portion of the pilot test. The purpose of the 2016 DGR pilot test was to evaluate and compare the effectiveness of specific operational modes of the DGR system (continuous, pulsed operation, and oxygen amendment) in the treatment and removal of benzene and other VOCs located within the fracture zone. During system operation, hydraulic conditions were also monitored to determine the sustainable operational parameters of the DGR system and to evaluate hydraulic containment. The results of the DGR pilot test are documented in a DGR Pilot Study Technical Memorandum submitted as Appendix E of the 2016 Summary of Environmental Monitoring report (Arcadis 2017).

The 2016 pilot study operated as intended, with circulation of water through and around the Fracture zone and distribution of dissolved oxygen (DO) throughout the cell, with apparent hydraulic capture across the fracture zone. DGR operating rates during pulsed operation were similar to those obtained during continuous operation. The DGR system was effective at recovering VOC mass from the fracture zone. Mass removal of up to 0.5 g/day of benzene (2 g/day total VOCs) was achievable at system operating rates of 6.5 gpm. Oxygen appears to have been effectively distributed throughout the targeted treatment interval. The injection of oxygen also has the potential benefit of re-oxidizing manganese liberated through VOC degradation, resulting in attenuation of manganese and arsenic (discussed further in Section 4). Decreases in metals concentrations were observed during and in some cases after DGR operation in some monitoring wells including 108R, 201R, and 202R (Figures A-7, A-9, and A-10, respectively, in **Appendix A**). All of these wells are located on the edge of the fracture zone and screened in shallow bedrock.

3.2.5 Current VOC Trends

Based on the fracture distribution and hydraulic data outlined in Section 2, the primary VOC source mass within bedrock is located within the fracture zone. The overburden above the fracture zone is relatively thin due to the higher bedrock elevation in this area, allowing for preferential migration of groundwater from the overburden into the bedrock. This area of the bedrock is described as heavily fractured (e.g., monitoring wells 35R, 69R, and MW-301) within the first 100 feet, creating a reservoir for groundwater impacts connected to the regional bedrock fracture network. The groundwater impacts appeared to migrate from the fracture zone into the regional bedrock fracture network. Once within the regional network, groundwater migrates to both the northeast and southwest of the Site, parallel to the hydraulically dominant northeast trending fractures.

The current distribution of benzene and TCE in the bedrock aquifer (from data collected in May 2021) is shown on **Figure 3-5**; the relationship of current data to historical impacts indicates that the extent of VOCs in bedrock has greatly diminished over time. The highest remaining concentrations of benzene are located within the fracture zone (monitoring wells 169R, 205R, and MW-301), with lower concentrations generally migrating to the northeast (monitoring well MW-300, MW-307S, and MW-307D) and southwest (monitoring wells 103R and 203R) away from the fracture zone. The highest concentrations of TCE are no longer located in the fracture zone but are mainly located in the shallow bedrock to the southwest (monitoring wells 67R) and west (monitoring wells 63R and 65R) of the fracture zone.

Concentration trend charts for shallow bedrock wells within and surrounding the fracture zone are included in **Appendix A.** As can be seen in these charts, the ISCO and DGR remedial activities were successful at treating much of the source mass in the shallow bedrock comprising the fracture zone, while in some locations (e.g., monitoring well 103R), natural attenuation was apparent before initiation of ISCO and DGR.

A summary of deeper bedrock monitoring well conditions and trends in bi-level and multi-level wells located throughout the Site is presented below. As VOCs have been remediated within the fracture zone, VOCs within the regional and deeper bedrock well network have also declined and are at or below ICLs except as noted below:

- Fracture Zone – north of property (monitoring MW-301):
  - A total of five multi-level well intervals (35-45, 115-125, 145-155, 240-250, and 290-300 feet bgs) were installed in 2012.
  - Benzene is present at concentrations above the ICL in all depth intervals as of May 2021, except in the 115-125 feet bgs interval. Benzene in the deeper intervals is found at concentrations exceeding the ICL of 5 µg/L **(Table 3-1).**
  - Chlorinated VOCs (cis-1,2-DCE and TCE) have been detected historically at low concentrations below ICLs since 2012.
  - These data indicate some communication between the shallow and deeper bedrock zones, with the highest remaining benzene concentration in the shallow 35-45 feet bgs interval at 11.2 µg/L.
- Fracture Zone – north of property (monitoring wells 169R and 205R):
  - Wells were installed in 2001 and 2005, respectively, to approximately 60 feet bgs to assess VOC impacts in the shallow bedrock.
  - Concentrations of VOCs in monitoring well 169R were elevated well above the ICLs for benzene and cis-1,2-DCE historically but have declined by two orders of magnitude since 2001. Residual concentrations of benzene still exceeded the ICL of 5 µg/L in samples collected in May 2021 (15.2 µg/L).
  - Concentrations of VOCs in monitoring well 205R were elevated well above the ICLs for benzene and cis-1,2-DCE historically but have declined by two to three orders of magnitude since 2005. Residual concentrations of benzene were slightly below the ICL of 5 µg/L in samples collected in May 2021 (4.80 µg/L) but have exceeded the ICL in eight of the last 10 sampling events.
- West of Fracture Zone – off property (monitoring well 63R):
  - Monitoring well 63R was one of the first bedrock wells installed at the Site in 1984 (open bedrock borehole from 80 to 203 feet bgs; no screen installed). TCE was historically detected at concentrations above the ICL, with benzene also being detected occasionally at concentrations above the ICL.
  - The open borehole was converted to a bi-level monitoring well in 2012, with screened intervals of 85-100 and 150-165 feet bgs.
  - Benzene and cis-1,2-DCE concentrations have been below the ICL in both intervals since installation.
  - TCE has been detected at concentrations above the ICL in the deep interval since installation and has shown a decreasing trend since 2017.
- West of Fracture Zone – off property (monitoring well 65R):
  - Monitoring well 65R was one of the first bedrock wells installed at the Site in 1984 (open bedrock borehole from 80 to 204 feet bgs; no screen installed). Benzene, cis-1,2-DCE, and TCE were historically

detected at concentrations above the ICLs, with benzene and cis-1,2-DCE concentrations declining to below the ICLs since 2009.

- The open borehole was converted to a bi-level monitoring well in 2012, with screened intervals of 100-115 and 180-195 feet bgs.
- The highest concentrations of cis-1,2-DCE remaining at the Site are currently detected in the 180-195 feet bgs interval at this monitoring well location (173 µg/L in May 2021 samples).
- Since 2016 and 2017, respectively, TCE and benzene concentrations have decreased in both intervals to below ICLs.

• Southwest of Fracture Zone – mid-property (monitoring well 67R):
  - Monitoring well 67R was one of the first bedrock wells installed at the Site in 1984 (open bedrock borehole from 80 to 164 feet bgs; no screen installed). TCE was historically detected at concentrations exceeding the ICL of 5 µg/L.
  - The open borehole was converted to a bi-level monitoring well in 2012, with screened intervals of 83-98 and 149-164 feet bgs.
  - The highest concentrations of TCE remaining at the Site are currently detected in the 83-98 feet bgs interval at this monitoring well location (71.8 µg/L in May 2021 samples) and cis-1,2-DCE concentrations also slightly exceed the ICL of 70 µg/L.
  - Benzene is detected in both intervals, but at concentrations below the ICL of 5 µg/L since 2014.
  - TCE has been detected at concentrations above the ICL historically in the deeper 149-164 feet bgs interval, but the concentrations are lower than those detected in the shallow interval and were below the ICL in May 2021.
• Northeast of Fracture Zone – further off property (monitoring well MW-300):
  - Four multi-level well intervals (20-30, 40-50, 80-90, and 120-130 feet bgs) were installed in 2012.
  - Benzene and TCE were detected at concentrations above the ICLs historically in multiple intervals.
  - Benzene concentrations continue to slightly exceed the ICL in the 80-90 feet bgs interval (5.37 µg/L in May 2021). All other intervals have exhibited benzene concentrations below the ICL since 2017.
  - TCE is detected in all intervals, but at concentrations below the ICL of 5 µg/L since 2014.
• Northeast of Fracture Zone – far off property (monitoring wells MW-307S and MW-307D):
  - A bi-level monitoring well MW-307S with intervals of 80-90 and172-187 feet bgs and a deeper monitoring well MW-307D with screened interval of 200-210 feet bgs were installed in 2014.
  - TCE was detected at concentrations at and above the ICL in the 80-90 feet interval from 2014 to 2018; concentrations are currently below the ICL.
  - Low concentrations of benzene at and near the ICL have been observed in the 80-90 feet interval.

4 Arsenic and Manganese in Groundwater

Arsenic and manganese concentrations have been observed in overburden and bedrock groundwater at the Site above their respective ICLs of 10 µg/L and 3,650 µg/L. However, dissolved arsenic and manganese are not directly associated with any known releases at the Site, but rather are present in groundwater as a result of geochemical processes that release them from solid-phase natural sources. These natural sources and the geochemical processes resulting in their release are described further below.

4.1 Sources and Geochemistry

4.1.1 Overburden Soils

Arsenic and manganese are naturally present in overburden soils. A study completed by Sanborn, Head & Associates (SHA 1998) provides data for arsenic in soils in Southeastern New Hampshire indicating an average arsenic concentration of 10.9 milligrams per kilogram (mg/kg). Arsenic concentrations in soil samples collected from various school institution properties in Barrington, Rochester, and Dover were reported to range from 6.1 to 18 mg/kg, which is similar to concentrations of arsenic detected in soil samples collected from the Site during overburden excavations conducted in 2013 and 2015 (0.1 to 14.2 mg/kg). The USEPA has previously noted that there is no risk to human health or the environment at the Site from soil (USEPA 2018). In addition, manganese is ubiquitous in soils across the United States and the world including New Hampshire where average soil concentrations on the order of the 500 to 700 mg/kg have been observed (Schacklette and Boerngen 1984).

As described in Section 1, the Site is located within a rural residential area in the Town of Barrington and is used for single-family residences around the Site and seasonal residences on Swains Lake to the north. Surrounding land not used for residential development is mostly forested, with vegetation supplying soils with nutrients and natural organic matter. The soils underlying the Site and to the north of the Site are characterized as prime agricultural land; these soils have an optimal combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops (SRPC 2009). As described in Section 3.1.3, historical phytoremediation at the Site was also conducted in previously asphalted areas and included planting of poplar trees and addition of nutrients. Accordingly, soil at the Site contains organic matter and nutrients which, under certain geochemical conditions as described further below, may support the release of solid-phase arsenic and manganese.

4.1.2 Bedrock

The predominant bedrock type at the Site is the Berwick Formation (**Figure 2-1**), which is described as a biotite-quartz-feldspar granofels or schist. Geologic models for this area of New Hampshire suggest that late-stage pegmatites, formed during granite crystallization, can be enriched with arsenic and provide a source of arsenic to groundwater for specific bedrock formations (Ayotte et al. 2003). This includes the Berwick Formation, as pegmatite layers have been noted on historical rock cores and are evident on the downhole geophysical data (Arcadis 2014). Manganese also occurs naturally in groundwater, especially in oxygen-depleted systems, with natural variability in groundwater being quite wide, sometimes spanning orders of magnitude in the same aquifer (IMnI 2013). Elevated manganese (above the USEPA health advisory level of 300 µg/L) has been observed in surveys of domestic and public supply bedrock wells in southeastern New Hampshire, with maximum concentrations of approximately 1,700 µg/L (Moore 2004; USGS/USEPA 2014).

4.1.3 Geochemical Processes

In groundwater systems, naturally occurring microbes can utilize organic carbon as an electron donor for respiration. The source of this organic carbon may include both natural organic matter and anthropogenic inputs including VOCs. In this process, the oxidation of a carbon source is coupled to reduction of electron acceptors such as oxygen. When carbon is abundant, oxygen may be depleted, and other electron acceptors may be used.

In general, electron acceptors are used by specific microbial populations in order from the greatest to least energy yield. Following oxygen consumption, electron acceptors in natural systems may include (in order of greatest energy yield) nitrate, manganese, iron, and sulfate, followed by carbon dioxide for methane production depending on availability of each constituent. As these reactions proceed, the aquifer becomes more “reducing” as electron acceptors are consumed.

As noted above, arsenic and manganese are naturally occurring in soils and bedrock in Southeastern New Hampshire. In weathered soil systems, manganese is most typically present as oxide and oxyhydroxide minerals, while arsenic tends to occur as a constituent co-precipitated within iron and manganese oxyhydroxide minerals. The use of iron and manganese by microbes as an electron acceptor results in the reductive dissolution of iron and manganese oxyhydroxides (i.e., the release of iron and manganese into solution). In their oxidized forms, iron (as iron oxide [Fe III]) and manganese (as manganese oxide [Mn III/IV]) oxyhydroxides exhibit low solubility at neutral pH, but following microbial reduction, and in the absence of oxygen, both iron (as Fe II) and manganese (as Mn II) are stable and highly soluble. In addition, this dissolution of oxyhydroxide phases in the formation results in the release of co-associated arsenic and potentially other metals into solution. Under this condition, in the absence of significant sulfate reduction that may attenuate arsenic and metals within sulfide phases (the primary control on transport of iron, manganese, and arsenic) includes adsorption to mineral surfaces.

At the Site, there is strong evidence that dissolved arsenic and manganese are naturally present in groundwater, but it is clear that biodegradation of VOCs has contributed to elevated arsenic and manganese concentrations within a localized extent of the VOC-impacted areas. As VOCs are remediated from the aquifer, the amount of carbon present and available for microbes to utilize declines, and the aquifer is anticipated to return to its natural geochemical state over time. However, attenuation of dissolved metals and arsenic does not just rely on the attenuation of VOCs, but on the reintroduction of oxygen to the aquifer. In the presence of oxygen, iron readily reoxidizes and precipitates as an oxyhydroxide at and near neutral pH. Manganese also oxidizes and reprecipitates, although generally at a slower rate than iron. The oxidative precipitation of iron and manganese attenuates dissolved arsenic via adsorption and coprecipitation. The attenuation of manganese and arsenic in the formation may be slow and is expected to be limited to natural background levels. Natural organic matter, if present, can continue to act as a carbon source for microbes to support background levels of dissolved metals and arsenic.

4.2 Historical VOC Influence

Overburden groundwater exhibits a naturally downward hydraulic gradient in the vicinity of the Site, recharging bedrock groundwater. Accordingly, overburden soils serve as a source of nutrients and natural organic matter to the bedrock aquifer. In addition to natural organic matter, VOCs released to the environment at the Site have historically served as a carbon source that promotes biological activity in both overburden and bedrock groundwater.

The historical ranges in concentrations of arsenic and manganese in VOC-impacted monitoring wells, including eight overburden wells and 52 bedrock wells sampled in the long-term monitoring program through at least 2015, are provided on **Figures 4-1** and **4-2**, respectively. The results are shown alongside the summed concentrations of benzene, cis-1,2-DCE, and TCE for the same wells (these plots can also be compared with the individual plots for benzene, cis-1,2-DCE, and TCE for overburden and bedrock wells on **Figure 3-3** and **Figure 3-8**, respectively). These results illustrate a very broad range in arsenic and manganese concentrations across the VOC-impacted well network including wide variation between wells and within a given well. Within the dataset, arsenic concentrations range over two orders of magnitude (from a few µg/L to a few hundred µg/L), while manganese concentrations generally span over four orders of magnitude (between 1 and 10,000 µg/L, not including permanganate-affected wells). The observed concentration ranges apply to both overburden and bedrock monitoring wells. Particularly high maximum concentrations of manganese were observed in bedrock monitoring wells 169R and 203R, which is due to dissolved manganese immediately following permanganate injections as part of the ISCO pilot program (Section 3.2.2).

These concentration plots qualitatively illustrate a correlation between the level of VOC impacts and the concentrations of arsenic and manganese. In the overburden, the highest concentrations of arsenic and manganese are observed at overburden monitoring wells 37D and 57S, which also exhibit among the highest maximum VOC concentrations. Similarly, bedrock wells exhibiting the highest arsenic and manganese concentrations also exhibit among the highest VOC concentrations including monitoring wells 69R, 169R, and 203R. To further investigate the extent of the correlation, the average arsenic, manganese, and summed VOC concentrations were compared as scatter plots on **Figure 4-3**. Note that the historical average of each analyte was chosen for comparison rather than individual time points, given the potential lag in arsenic and manganese attenuation following VOC attenuation, as described further in Section 4.4 below. Key observations from these comparisons include the following:

- A positive correlation with average VOC concentration is observed for both arsenic and manganese. Specifically, the highest average arsenic and manganese concentrations are observed in wells with total VOC concentrations averaging between 100 and 3,000 µg/L.
- Despite this correlation, several wells exhibit relatively low average arsenic and manganese concentrations in the presence of detectable VOCs. The results suggest that the correlation is relatively weak below an average total VOC concentration near or lower than approximately 100 µg/L. This is not surprising because VOC concentrations below 100 µg/L would result in oxidation of iron and manganese at similar orders of magnitude, which may not be observable against background metals concentrations.
- Some select wells exhibit relatively high average manganese and arsenic concentrations that fall outside the correlation range for the other wells. In many cases, this may be due to the timing of well installation relative to historical VOC impacts; for example, bedrock wells installed after 2012 (yellow points in **Figure 4-3**) may be exhibiting high residual arsenic and manganese with low average VOCs where substantial VOC natural attenuation occurred before well installation.

The VOC-impacted monitoring well results are further compared with results from monitoring wells residing outside of the VOC-impacted area (as determined based on a lack of VOC detections in the historical dataset for these wells) for overburden groundwater (**Figure 4-1**) and bedrock groundwater (**Figure 4-4**). In these comparisons, a distinction is made between "near-downgradient" and "far-downgradient" wells based on proximity to the VOC-impacted areas. For the near-downgradient well set, even though no VOCs were detected in the available timeframe, the wells are close enough to the VOC-impacted area that influence from VOCs cannot be ruled out, whereas wells in the far-downgradient category are less likely to be directly or indirectly influenced by VOC impacts. Note that in bedrock, some monitoring wells (including MW-302 and 109R) are listed as "far downgradient" even though they are relatively close to some historically impacted wells. These were categorized as such when adjacent to residential wells (including 4R and 5R) where expansion of the VOC footprint apparently occurred via pumping, which likely had a very localized and limited effect on the apparent VOC extent. Key observations include the following:

- In the overburden, both near-downgradient and far-downgradient monitoring wells exhibit markedly lower arsenic concentrations relative to VOC-impacted wells; however, these wells exhibit variable arsenic concentrations that have historically exceeded the 10 µg/L ICL. Near-downgradient concentrations are similar to or lower than those observed further downgradient, suggesting low mobility of arsenic beyond the extent of the delineated VOC-impacted area.
- Similarly, overburden manganese concentrations in downgradient wells tend to be lower than those observed in VOC-impacted wells. Near-downgradient wells exhibit manganese concentrations higher than far-downgradient wells, potentially due to migration of VOC-mobilized manganese slightly beyond the delineated VOC footprint.
- In bedrock, wells beyond the VOC footprint and off the predominant groundwater flow direction (**Figure 3-8** and **Figure 3-10**) also exhibit arsenic concentrations above the 10 µg/L ICL, with historical maximum concentrations above 30 µg/L.
- Manganese concentrations decrease with distance from the VOC-impacted area, with near-downgradient manganese concentrations below 1,000 µg/L and far-downgradient concentrations close to or below approximately 300 µg/L.

4.3 Comparison with Redox Parameters

Groundwater DO and oxidation-reduction potential (ORP) results were compared with VOC, manganese, and arsenic concentrations to evaluate the influence of VOC and metals concentrations on redox dynamics. **Figures 4-5** and **4-6** show the ranges in DO and ORP values for the same set of eight overburden and 52 bedrock monitoring wells described in Section 4.2. **Figures 4-5** and **4-7** also show the available results for VOC-unimpacted overburden and bedrock wells, respectively, although limited historical field parameter data exist for far-downgradient wells.

In overburden wells, the DO concentrations and ORP largely follow anticipated redox behavior based on depth of the well, along with extent of VOC impacts. Relatively deep overburden wells 37D and 75D exhibit DO below 3 to 4 mg/L, with ORP near 0 millivolt (mV); this is also consistent with the relatively high manganese and arsenic concentrations observed in these wells. Overburden wells 57S and MW-308 also exhibit low DO (below 4 mg/L) and relatively low ORP; although 57S is relatively shallow, the low redox condition is likely exacerbated by historically high VOCs. This may also be true for MW-308, noting that the well was installed in 2015 following soil excavations that occurred immediately upgradient; this well was also likely installed after substantial VOC attenuation had taken place.

Although DO and ORP in bedrock groundwater are also widely variable, with individual wells exhibiting results spanning an order of magnitude or more, the results indicate that nearly all wells exhibit DO concentrations historically below 2 mg/L and ORP near 0 mV on average for part or all of the monitoring history.

Groundwater arsenic and manganese concentrations were compared directly with DO and ORP concentrations via scatter plots provided on **Figures 4-8** and **4-9**. For these plots, rather than comparing well averages, individual data points were compared directly, assuming minimal time lag between the effects of redox conditions on manganese and arsenic concentrations. The results are similar for bedrock and overburden, illustrating as expected that both manganese and arsenic concentrations tend to be higher under relatively reducing conditions (DO below approximately 4 mg/L, with ORP close to 0 mV). The results for bedrock wells 169R and 203R are plotted separately to differentiate the potential effects of the permanganate. Although two data points do indicate high manganese values with ORP near or above +200 mV, most of the data points are consistent with the rest of the dataset, with high manganese values corresponding to low ORP between -200 and 0 mV.

4.4 Arsenic and Manganese Trends with Time

As noted in Section 3, VOC concentrations in overburden and bedrock monitoring wells have substantially decreased over time as a result of both natural attenuation and active VOC remediation. The concentrations of VOCs, arsenic, manganese, and redox parameters (DO and ORP) over time in select representative overburden and bedrock wells are provided in **Appendix A**. The results illustrate that, while the concentrations of manganese and arsenic have decreased in some wells, other wells have exhibited little to no decrease in manganese and arsenic following substantial VOC removal. This result is not surprising given the low redox condition (both natural and induced) in many of these wells. Whereas VOC attenuation may occur in aerobic and anaerobic conditions, the attenuation of arsenic and manganese is anticipated over longer timeframes after the attenuation of VOCs as oxygen is reintroduced into the aquifer. This process may be slow or inhibited where natural organic carbon deposits consume oxygen and maintain a reducing environment or where residual organic carbon (e.g., microbial biomass) is relatively high following microbial VOC degradation. Well-specific observations are noted below.

- Of the wells evaluated, shallow overburden monitoring well 57S has demonstrated among the greatest decrease in manganese and arsenic concentrations (approximately one order of magnitude from historical concentrations), likely due to its location in shallow overburden providing relatively high recharge of DO.
- In contrast, overburden monitoring well 37D has not exhibited decreases in manganese and arsenic concentrations. Although VOC concentrations have attenuated to below ICLs, a strongly reducing condition has been maintained at this well.
- Moderate decreases have been observed at bedrock wells 35R, 69R, and 203R. These improvements have generally lagged the VOC improvements, demonstrating the importance of subsequent redox recovery following VOC attenuation.

5 Conclusions

Based on the revised conceptual site model outlined above, Arcadis offers the following conclusions:

- The historical and current distributions of COCs in groundwater suggest that impacts have migrated laterally within the overburden from the former drum storage areas to areas in which the overburden is thin or more permeable, and then downward into bedrock.
- A relatively isolated Fracture Zone exists in bedrock northeast of the Site consistent with the location of a bedrock topographic high. Bedrock fracture and hydrogeologic data collected within and around the fracture zone suggest that this zone is limited in extent, extends to a depth of approximately 125 feet bgs, and is likely related to glaciation as opposed to a wide-ranging linear geologic structure. The overburden overlying this zone is relatively thin and more permeable, allowing for the preferential downward migration of COCs from overburden into bedrock. Once within the Fracture Zone, the COCs appear to spread into the regional fracture system, which is dominated by a northeast-southwest-trending fracture set.
- Historical hydrogeologic investigations and groundwater elevation contouring have demonstrated radial flow and mounding beneath the topographic high (in both the overburden and bedrock aquifers). This is consistent with the regional groundwater flow characteristics.
- Based on the historical average groundwater elevations, there is a consistent downward vertical gradient present at the Site (within the overburden, between overburden and bedrock, and within the bedrock).
- Historical VOC impacts in overburden soil and groundwater were concentrated around three former drum storage areas located on the Site. The concentration of VOCs within the overburden wells at the Site have decreased significantly over time, and concentrations are currently either below laboratory reporting limits or below ICLs. The decreasing trends are due to the combination of source removal, groundwater remediation, installation of the phytoremediation cover, MNA, and the gradual migration of overburden impacts laterally and downward into the bedrock.
- The lateral extent of VOC-impacted groundwater in the bedrock aquifer is greater than that observed in the overburden aquifer, historically extending up to approximately 4,000 feet in the northeast-southwest direction. Concentrations have decreased substantially due to MNA and other active remedies (ISCO and DGR pilot tests).
- The highest remaining concentrations of benzene in bedrock wells are located within the fracture zone (monitoring wells 169R, 205R, and MW-301), with lower concentrations generally migrating to the northeast (monitoring well MW-300, MW-307S, MW-307D) and southwest (monitoring wells 103R and 203R) away from the fracture zone.
- The highest concentrations of TCE and cis-1,2-DCE in bedrock wells are no longer located in the fracture zone but are mainly located in the shallow bedrock to the southwest (monitoring wells 67R) and west (monitoring wells 63R and 65R) of the fracture zone.
- Dissolved metals are present in groundwater at the Site, both as a natural condition and because of VOC impacts. Specifically, manganese and arsenic are a concern at the Site due to exceedances above ICLs. Manganese and arsenic are naturally occurring in groundwater in southeastern New Hampshire and have been observed in far-downgradient wells (i.e., not impacted with VOCs) at the Site. Although no known metals releases have occurred at the Site, manganese and arsenic exhibit a correlation with historical VOC impacts,

indicating that the biodegradation of VOCs has resulted in the release of additional arsenic and manganese into groundwater, likely via the reductive dissolution of metal oxyhydroxides.

- VOC impacts and the presence of elevated arsenic and manganese are also consistent with the reducing (low DO and ORP) nature of the groundwater. This is particularly the case in overburden wells, where the extent of arsenic and manganese attenuation in historically VOC-impacted areas shows a correlation with DO and ORP.
- Whereas VOC concentrations have decreased substantially since monitoring began (as a result of MNA and other active remedies), manganese and arsenic concentration reductions have not been observed to the same extent. This is expected, as the natural attenuation of manganese (via reoxidation and precipitation) and arsenic (via coprecipitation with manganese and iron) is dependent on the inflow of oxic water to the aquifer following VOC biodegradation.

6 References

Arcadis G&M, Inc. 2005. In-Situ Chemical Oxidation Pilot Test Interim Report and Supplemental Work Plan, Tibbetts Road Site, Barrington, New Hampshire.

Arcadis U.S., Inc. 2007. Evaluation of Current Biogeochemical Conditions and Applicability of Monitored Natural Attenuation, Tibbetts Road Site, Barrington, New Hampshire.

Arcadis U.S., Inc. 2008. In-Situ Chemical Oxidation Pilot Testing, Tibbetts Road Site, Barrington, New Hampshire.

Arcadis U.S., Inc. 2009. Summary of Environmental Monitoring 2008, Tibbetts Road Site, Barrington, New Hampshire.

Arcadis U.S., Inc. 2012. Summary of Environmental Monitoring 2011, Tibbetts Road Site, Barrington, New Hampshire.

Arcadis U.S., Inc. 2013. Summary of Environmental Monitoring 2012, Tibbetts Road Site, Barrington, New Hampshire.

Arcadis U.S., Inc. 2014. Tibbetts Road Overburden Excavation Project Summary Report, Tibbetts Road Site, Barrington, New Hampshire. February 10, 2014.

Arcadis U.S., Inc. 2015a. Summary of Environmental Monitoring 2014, Tibbetts Road Site, Barrington, New Hampshire. April.

Arcadis U.S., Inc. 2015b. Directed Groundwater Recirculation Pilot Study Technical Memorandum. Tibbetts Road Site, Barrington, New Hampshire. October

Arcadis U.S., Inc. 2016. Summary of Environmental Monitoring 2015, Tibbetts Road Site, Barrington, New Hampshire. May.

Arcadis U.S., Inc. 2017. Summary of Environmental Monitoring 2016, Tibbetts Road Site, Barrington, New Hampshire. September.

Arcadis U.S., Inc. 2018. 4th Quarter Status Report (October-December 2017). Tibbetts Road Site, Barrington, New Hampshire. March.

Ayotte, J.D., Montgomery, D.L., Flanagan, S.M., and K.W. Robinson. 2003. Arsenic in Groundwater in Eastern New England: Occurrence, Controls, and Human Health Implications. Environmental Science & Technology, Vol. 37, No. 10, 2003. March.

Camp, Dresser & McKee (CDM). 1992. Remedial Investigation Report, Tibbetts Road Superfund Site, Barrington, New Hampshire. Federal Programs Corporation, USEPA Region I. June 1992.

Hon, R., Hepburn, J.C., Bothner, W.A., Olezewski, W.J., Gaudette, H.E., Dennen, W.H., and Loftenius, C. 1986. Mid-Paleozoic calc-alkaline rocks of the Nashoba Block and Merrimack trough. In Guidebook for Field trips in Southwestern Mine. Edited by D.W. Newberg. New England Intercollegiate Geological Conference, 78th Annual Meeting, Bates College, Lewiston, ME, pp. 37-52.

International Manganese Institute (IMnI). 2013. Fact Sheet 6 – Manganese in Groundwater: Research and Potential Risks. November.

Lyons, J., Bothner, W., Moench, R., and J. Thompson. 1997. The Bedrock Geologic Map of New Hampshire. USGS.

Moore, R.B. 2004. Quality of Water in the Fractured-Bedrock Aquifer of New Hampshire. Scientific Investigations Report 2004-5093, U.S. Department of the Interior, U.S. Geological Survey.

New Hampshire Water Supply and Pollution Control Commission (NHWSPCC). 1985. Report #144 1985, Hydrogeologic Investigation Tibbetts Road Hazardous Waste Site, Barrington, NH May 15.

Posten, S., Karmazinski, P., and M. Nicholas. 1986. Geohydrological Investigations, Tibbetts Road Site, Barrington, N.H. USEPA Region I ERB/EERU.

Sanborn, Head & Associates (SHA). 1998. Background Metals Concentration Study – New Hampshire Soils. New Hampshire Department of Environmental Services, Concord, New Hampshire. November.Schacklette, H.T. and J.G. Boerngen. 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States. U.S. Geological Survey Professional Paper 1270.

Spear, F.S. 1992. Inverted metamorphism, P-T paths, and cooling history of west-central New Hampshire: implications for the tectonic evolution of central New England. In: P. Robinson and J. B. Brady, Eds., Guidebook for Field Trips in the Connecticut Valley 32 Region of Massachusetts and Adjacent States, Volume 2. Amherst, Massachusetts, Department of Geology and Geography, University of Massachusetts, p. 446-466.

Strafford Regional Planning Commission (SRPC). 2009. Town of Barrington – Natural Resources Inventory. March.

USEPA Region I. 1992. Record of Decision, Tibbetts Road Superfund Site, Barrington, New Hampshire. September 29, 1992.

USEPA Region I. 1994. Consent Decree, United States of America, and State of New Hampshire v. Ford Motor Company. Filed November 8, 1994.

USEPA Region I. 2008. Second Five-Year Review Report for Tibbetts Road Site, Town of Barrington, Strafford County, New Hampshire. August 2008.

USEPA Region I. 2018. Fourth Five-Year Review Report for Tibbetts Road Site, Town of Barrington, Strafford County, New Hampshire. August.

USGS/USEPA. 2014. Arsenic, Iron, Lead, Manganese, and Uranium Concentrations in Private Bedrock Wells in Southeastern New Hampshire, 2012-2013. Fact Sheet 2014-3042. May,

Walsh, G.J. and S.F. Clark, Jr. 1999. Bedrock geologic map of the Windham quadrangle, Rockingham and Hillsborough Counties, New Hampshire, U.S. Geological Survey Open File Report 99–8, scale 1:24,000, 18-p text, only available at http://pubs.usgs.gov/of/1999/of99-8/.

Tables

Well ID	Installation Date	Monitoring Zone	Ground Surface Elevation (ft amsl)	Measuring Point Elevation (ft amsl)	Well Diameter (in)	Bedrock Depth (ft bgs)	Bedrock Elevation (ft amsl)	Casing Depth (ft bgs)	Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)	Screen Length (ft)
Existing Monitoring Wells												
35R	9/23/1985	BR	317.99	320.88	6	25	292.99	29	82	--	--	--
37D	9/19/1985	OB	324.51	327.66	2	NE	--	--	26	16	26	10
52S	9/19/1985	OB	325.01	328.19	2	NE	--	--	12	7	12	5
57S	4/27/1984	OB	330.30	329.82	2	NE	--	--	19	9	19	10
61R*	7/10/1984	BR	325.72	--	6	58	267.72	70	204	--	--	--
	10/1/2012			325.37	2	58			90	75	90	15
				325.28	2	58			198	183	198	15
63R*	7/9/1984	BR	323.95	--	6	60	263.95	80	203	--	--	--
	10/2/2012			323.75	2	60			100	85	100	15
				323.73	2	60			165	150	165	15
65R*	7/9/1984	BR	326.99	--	6	70	256.99	80	204	--	--	--
	10/4/2012			327.53	2	70			115	100	115	15
				327.56	2	70			195	180	195	15
67R*	7/10/1984	BR	329.37	--	6	68	261.37	80	164	--	--	--
	10/4/2012			329.22	2	68			98	83	98	15
				329.33	2	68			164	149	164	15
69R	7/20/1984	BR	322.74	326.34	1.5	25	297.74	--	58	38	58	20
70S	4/1/1991	OB	326.76	326.40	2	NE	--	--	13	8	13	5
73S	4/2/1991	OB	328.70	--	2	NE	--	--	19	14	19	5
75D	4/4/1991	OB	326.97	326.56	2	26	300.97	--	26	21	26	5
103R	3/31/1995	BR	327.04	326.77	4	38	289.04	--	62	44	62	18
106R	4/19/1995	BR	311.54	312.89	4	9	302.54	24	60	--	--	--
108R	4/20/1995	BR	321.98	323.27	4	44	277.98	51	64	54	64	10
169R	10/2/2001	BR	324.80	326.17	4	33	291.80	33	60	--	--	--
201R	10/9/2003	BR	318.80	320.32	4	28	290.80	35	60	40	60	20
202R	10/10/2003	BR	325.37	326.82	4	30	295.37	35	60	40	60	20
203R	10/8/2003	BR	326.22	327.47	4	34	292.22	38	60	40	60	20
204R	10/8/2003	BR	322.31	324.37	4	27	295.31	33	60	40	60	20
205R	11/23/2005	BR	323.02	325.31	4	27	296.02	--	62	32	62	30
EW-3S	8/15/1995	OB	326.73	326.63	2	NE	--	--	19	9	19	10
EW-100	8/21/2012	BR	319.40	319.03	4	26	293.40	31	165	--	--	--
EW-101	9/17/2012	BR	321.92	321.75	4	31	290.92	35	165	--	--	--
IW-100	9/4/2012	BR	323.30	323.03	4	36.5	286.80	42	165	--	--	--
IW-101	9/21/2012	BR	323.39	323.49	4	34	289.39	39	165	--	--	--
IW-102	8/30/2012	BR	323.81	323.94	4	34	289.81	39	165	--	--	--
IW-103	9/22/2012	BR	324.13	323.88	4	33.5	290.63	39	165	--	--	--
MW-300	5/27/2011	BR	307.27	311.73	0.5	10.5	296.77	20	30	20	30	10
					0.5	10.5			50	40	50	10
					0.5	10.5			90	80	90	10
					0.5	10.5			130	120	130	10
MW-301	11/21/2011	BR	322.86	326.03	0.5	27	295.86	35	45	35	45	10
					0.5	27			125	115	125	10
					0.5	27			155	145	155	10
					0.5	27			250	240	250	10
					0.5	27			300	290	300	10
MW-302	4/20/2011	BR	315.49	315.87	1.5	55	260.49	60	70	60	70	10
				315.89	1.5	55			110	100	110	10
MW-303	5/11/2011	BR	311.47	311.63	1.5	50	261.47	55	65	55	65	10
				311.63	1.5	50			125	115	125	10
MW-305	8/29/2012	BR	318.04	322.29	0.5	22	296.04	27	45	35	45	10
					0.5	22			72	62	72	10
					0.5	22			155	145	155	10
					0.5	22			243	233	243	10
					0.5	22			275	265	275	10
					0.5	22			300	285	300	15
MW-306S	8/30/2013	BR	327.95	330.05	2	40	287.95	46	100	85	100	15
				329.93	2	40			140	130	140	10
MW-306D	8/28/2013	BR	327.53	329.49	2	41	286.53	46	195	185	195	10
				349.43	2	41			300	280	300	20
MW-307S	5/13/2014	BR	302.67	304.17	2	13	289.67	18	90	80	90	10
				304.15	2	13			187	172	187	15
MW-307D	5/27/2014	BR	302.75	306.23	2	13	289.75	18	210	200	210	10
MW-308	10/19/2015	OB	--	--	2	NE	--	--	19	9	19	10
Decommissioned Monitoring Wells												
32R	9/24/1985	BR	295.84	297.64	6	29	266.84	39	222	--	--	--
33R	10/2/1985	BR	307.75	310.14	6	11	296.75	21	221	--	--	--
34R	9/26/1985	BR	326.74	326.22	6	60	266.74	60	222	--	--	--
36D	9/13/1985	OB	327.10	329.57	2	NE	--	--	57	47	57	10
38D	10/1/1985	OB	327.90	330.06	2	NE	--	--	50	25	50	25
49S	9/28/1985	OB	319.94	322.16	2	NE	--	--	10	5	10	5
50S	9/23/1985	OB	323.40	325.80	2	NE	--	--	14	9	14	5
51S	9/13/1985	OB	325.91	328.20	2	NE	--	--	16	11	16	5
53S	9/17/1985	OB	319.87	322.08	2	NE	--	--	11	6	11	5
54S	9/16/1985	OB	327.07	326.81	2	NE	--	--	13	8	13	5
55S	4/26/1984	OB	--	--	2	NE	--	--	10	6	16	10
58S	7/10/1984	OB	328.78	328.10	2	NE	--	--	47	7	47	40
59R	7/5/1984	BR	329.18	327.99	6	50	279.18	60	203	--	--	--
60S	7/5/1984	OB	--	--	2	53	--	--	52	2	52	50
62S	7/12/1984	OB	325.35	324.64	4	65	260.35	--	60	4	64	60
64S	7/31/1984	OB	328.19	329.33	2	75	253.19	--	75	13	73	60
68S	7/30/1984	OB	--	--	2	31	--	--	31	0	30	30
71S	4/1/1991	OB	330.14	331.36	2	NE	--	--	17	12	17	5
72S	4/2/1991	OB	329.11	330.72	2	NE	--	--	13	7	12	5
74S	4/3/1991	OB	322.65	324.54	2	NE	--	--	18	13	18	5
76R	4/2/1991	BR	313.18	314.96	6	12	301.18	38	252	--	--	--
77S	4/10/1991	OB	313.48	315.11	2	12	301.48	--	15	10	15	5
78R	4/11/1991	BR	317.10	--	6	34	283.10	34	200	--	--	--
79S	4/12/1991	OB	328.11	329.85	2	NE	--	--	22	17	22	5
80S	4/12/1991	OB	329.73	330.68	2	15	314.73	--	16	11	15	4
81R	4/15/1991	BR	323.04	--	6	31	292.04	60	310	--	--	--
82S	4/16/1991	BR	323.12	322.68	2	17	306.12	--	43	33	43	10
83S	4/22/1991	OB	312.91	313.33	2	NE	--	--	9.5	4	9	5
84S	10/28/1992	OB	329.81	329.99	2	NE	--	--	20	4	20	16
85S	10/27/1992	OB	330.05	332.41	2	NE	--	--	18	3	18	15
86S	10/27/1992	OB	--	--	2	NE	--	--	36	3	18	15
87S	10/27/1992	OB	330.19	332.72	2	NE	--	--	18	3	18	15
88S	10/27/1992	OB	330.40	333.05	2	NE	--	--	18	3	18	15
105D	4/5/1995	OB	--	329.09	2	52	--	--	30	25	30	5
107R	4/19/1995	BR	321.14	322.49	4	23	298.14	24	60	--	--	--
109R	4/26/1995	BR	308.84	309.68	2	44	264.84	49	70	55	70	10
110S	4/27/1995	OB	309.13	310.60	2	44	265.13	--	15	9.5	14.5	5

Well ID	Installation Date	Monitoring Zone	Ground Surface Elevation (ft amsl)	Measuring Point Elevation (ft amsl)	Well Diameter (in)	Bedrock Depth (ft bgs)	Bedrock Elevation (ft amsl)	Casing Depth (ft bgs)	Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)	Screen Length (ft)
EW-1D	5/10/1995	OB	--	329.14	4	NE	--	--	34.5	24.5	34.5	10
EW-1S	5/10/1995	OB	--	329.01	4	NE	--	--	17	7	17	10
EW-2S	8/15/1995	OB	--	328.15	4	NE	--	--	18.5	8.5	18.5	10
EW-4S	8/17/1995	OB	--	330.00	4	NE	--	--	17	7	17	10
EW-5S	8/16/1995	OB	--	326.38	4	NE	--	--	17.5	7.5	17.5	10
EW-6S	7/22/1996	OB	--	329.90	4	NE	--	--	20	5	20	15
EW-7S	7/24/1996	OB	--	329.59	4	NE	--	--	19	5	19	14
EW-8S	9/3/1996	OB	--	329.54	4	NE	--	--	20	8	20	12
EW-9S	9/3/1996	OB	--	329.82	4	NE	--	--	19	9	19	10
EW-10S	3/11/1997	OB	--	327.40	4	NE	--	--	17.5	7.5	17.5	10
IW-1R	10/3/2003	BR	325.79	327.61	4	33	292.79	38	60	40	60	20
IW-2R	10/8/2003	BR	325.42	325.78	4	29	296.42	33	60	40	60	20
IW-3R	1/12/2006	OB/BR	327.51	328.93	4	34	293.51	--	59	29	59	20
IW-4R	1/10/2006	OB/BR	326.02	328.03	4	33	293.02	--	58	28	58	20
IW-5R	1/17/2006	OB/BR	325.12	326.46	4	28	297.12	--	55	25	55	30
IW-6R	1/5/2006	OB/BR	324.78	326.68	4	29	295.78	--	49	19	49	30
MW-304	8/27/2012	BR	326.08	327.30	4	37	289.08	42	289	--	--	--
Former Residential Wells (Existing)												
015.1423 ("CC-01")	5/9/2008	BR	--	--	6	32	--	60	405	--	--	--
015.1479 ("CC-02")	8/31/2009	BR	--	--	6	57	--	88	437	--	--	--
015.1429 ("CC-03")	11/5/2008	BR	--	--	6	42	--	75	300	--	--	--
015.1458 ("CC-04")	3/17/2009	BR	--	--	6	25	--	90	385	--	--	--
015.1489 ("CC-15")	10/12/2009	BR	--	--	6	10	--	44	305	--	--	--
015.1475 ("CC-06")	7/25/2009	BR	--	--	6	13	--	40	485	--	--	--
015.1496 ("CC-17")	4/15/2010	BR	--	--	6	24	--	40	205	--	--	--
015.1497 ("CC-18")	4/16/2010	BR	--	--	6	22	--	40	225	--	--	--
1-10821 ("CC-10")	4/22/2013	BR	--	--	6	24	--	42	180	--	--	--
1-10809 ("CC-07")	3/15/2013	BR	--	--	6	24	--	42	300	--	--	--
015.1524 ("CC-08")	4/20/2010	BR	--	--	6	14	--	40	325	--	--	--
015.1447 ("CC-11")	3/12/2009	BR	--	--	6	23	--	50	500	--	--	--
015.1488 ("CC-05")	10/8/2009	BR	--	--	6	29	--	50	325	--	--	--
015.1499 ("CC-12")	1/21/2010	BR	--	--	6	6	--	40	245	--	--	--
015.1498 ("CC-13")	1/17/2010	BR	--	--	6	8	--	40	205	--	--	--
015.1465 ("CC-14")	7/7/2009	BR	--	--	6	22	--	60	280	--	--	--
015.1437 ("CC-16")	10/10/2008	BR	--	--	6	51	--	70	305	--	--	--
1R	--	BR	326.31	--	6	--	--	--	143	--	--	--
2R	--	BR	327.05	--	6	--	--	--	186	--	--	--
6R	--	BR	323.63	--	6	--	--	--	253	--	--	--
7R	--	BR	308.42	--	6	--	--	--	82	--	--	--
13R	--	BR	--	--	6	--	--	--	145	--	--	--
15R	--	BR	279.77	--	6	--	--	--	174	--	--	--
16R	--	BR	283.60	--	6	--	--	--	--	--	--	--
24R	--	BR	280.57	--	6	--	--	--	--	--	--	--
25R	--	BR	284.27	--	6	--	--	--	100	--	--	--
26R	--	BR	283.40	--	6	--	--	--	--	--	--	--
28R	--	BR	306.52	--	6	--	--	--	225	--	--	--
29R	--	BR	286.16	--	6	--	--	--	--	--	--	--
30R	--	BR	265.81	--	6	--	--	--	45	--	--	--
Former Residential Wells (Decommissioned)												
3R	--	BR	--	--	--	--	--	--	--	--	--	--
4R	--	BR	320.73	--	--	--	--	--	135	--	--	--
5R	--	BR	--	--	--	--	--	--	238	--	--	--
8R	--	BR	--	--	--	--	--	--	166	--	--	--
9R	--	BR	316.97	--	--	--	--	--	--	--	--	--
14R	--	BR	322.17	--	--	--	--	--	98	--	--	--
17R	--	BR	293.60	--	6	--	--	--	11.1	--	--	--
20R	--	BR	326.14	--	--	--	--	--	55	--	--	--
21R	--	BR	--	--	--	--	--	--	295	--	--	--
39S	--	OB	308.44	--	6	--	--	--	--	--	--	--
41S	--	OB	291.48	292.25	--	--	--	--	--	--	--	--
44S	--	OB	285.34	286.51	--	--	--	--	--	--	--	--
47S	--	OB	--	--	--	--	--	--	12-13'	--	--	--
SLVWD Water Supply Wells							--					
SWL-1		BR	--	--	6	--	--	--	500	--	--	--
SWL-3		BR	--	--	6	--	--	--	660	--	--	--
SWL-6 alt		BR	--	--	6	7	--	40	460	--	--	--
SWL-7		BR	--	--	6	7	--	60	400	--	--	--

Abbreviations:
bgs - below ground surface
ft - feet
in - inches
amsl - mean sea level
NA - Well construction details area not available
NE - Bedrock not encountered
* - Well converted into bi-level monitoring well.

Table 2-2
Groundwater Elevation Measurements (May 2021)
Tibbetts Road Site
Barrington, NH

Well ID	Measuring Point Elevation (ft amsl)	Screen Top (ft bgs)	Screen Bottom (ft bgs)	Screen Length (ft)	5/3/2021 DTW (ft bmp)	5/3/2021 WTE (ft amsl)
Overburden Wells						
37D	327.66	15.5	25.5	10	5.75	321.91
52S	328.19	6.5	11.5	5	5.76	322.43
57S	329.82	9	19	10	4.15	325.67
70S	326.40	8	13	5	NM	NM
75D	326.56	21	26	5	3.07	323.49
EW-3S	326.63	9	19	10	NM	NM
MW-308	NS	9	19	10	6.22	NS
Bedrock Wells						
28R	306.52	NA	225	NA	14.23	292.29
35R	320.88	29	82	53[1]	NM	NM
61R (75-90)	325.37	75	90	15	NM	NM
61R (183-198)	325.28	183	198	15	32.50	292.78
63R (85-100)	323.75	85	100	15	NM	NM
63R (150-165)	323.73	150	165	15	14.51	309.22
65R (100-115)	327.53	100	115	15	17.92	309.61
65R (180-195)	327.56	180	195	15	20.24	307.32
67R (83-98)	329.22	83	98	15	16.78	312.44
67R (149-164)	329.33	149	164	15	20.90	308.43
69R	330.16	38	58	20	NM	NM
103R	326.77	44	62	18[1]	12.70	314.07
106R	312.89	24	60	36[1]	NM	NM
108R	323.27	53.5	63.5	10	12.00	311.27
169R	326.17	33	60	27[1]	14.44	311.73
201R	320.32	40	60	20	NM	NM
202R	326.82	40	60	20	13.30	313.52
203R	327.47	40	60	20	14.76	312.71
204R	324.37	40	60	20	10.68	313.69
205R	325.31	32	62	30	14.98	310.33
MW-302 (60-70)	315.87	60	70	10	9.48	306.39
MW-302 (100-110)	315.89	100	110	10	10.96	304.93
MW-303 (55-65)	311.63	55	65	10	19.53	292.10
MW-303 (115-125)	311.63	115	125	10	27.83	283.80
MW-306S (85-100)	330.05	85	100	15	21.41	308.64
MW-306S (130-140)	329.93	130	140	10	NM	NM
MW-306D (185-195)	329.49	185	195	10	22.55	306.94
MW-306D (280-300)	329.43	280	300	20	44.11	285.32
MW-307S (80-90)	304.17	80	90	10	17.90	286.27
MW-307S (172-187)	304.15	172	187	15	NM	NM
MW-307D	306.23	200	210	10	20.40	285.83

Notes:

1. Elevations for each well surveyed by Bay Colony Group, Inc. (1995-2006) and Ducharme & Dillis Civil Design Group, Inc. (2012-2014)
2. NM - not measured
3. NS - not surveyed
4. DTW - depth to water
5. WTE - water table elevation
6. TOC - top of casing
7. ft bmp - feet below measuring point
8. ft amsl - feet above mean sea level
9. ft bgs - feet below ground surface
10. [1] - open bedrock monitoring well (no well screen installed)

Table 2-3
Vertical Gradient Calculations
Tibbetts Road Site
Barrington, NH

Well ID	Bottom of Screen (ft bgs)	Top of Screen (ft bgs)	Middle of Screen (ft bgs)	Distance Between Screens (ft bgs)	Average Vertical Gradient	Apparent Vertical Component of Groundwater Flow
Shallow vs. Deep Overburden Wells (1995 to 2012)						
70S	13.0	8.0	10.5	-13.0	**-0.12**	Downward
75D	26.0	21.0	23.5			
52S	11.5	6.5	9.0	-9.0	**-0.06**	Downward
37D	20.4	15.4	17.9			
Overburden vs. Bedrock Wells (1995 to 2012)						
77S*	15.0	10.0	12.5	-132.5	**-0.02**	Downward
76R*	252.0	38.0	145.0			
53S*	10.8	5.8	8.3	-47.2	**-0.07**	Downward
35R	82.0	29.0	55.5			
52S	11.5	6.5	9.0	-39.6	**-0.12**	Downward
69R	58.5	38.5	48.5			
70S	13.0	8.0	10.5	-42.5	**-0.15**	Downward
103R	62.0	44.0	53.0			
71S*	17.0	12.0	14.5	-107.9	**-0.09**	Downward
67R[+]	163.8	81.0	122.4			
64S*	75.0	15.0	45.0	-97.3	**-0.08**	Downward
65R[+]	203.5	81.0	142.3			
62S*	16.3	11.3	13.8	-123.5	**-0.08**	Downward
63R[+]	202.3	71.0	137.3			
51S	16.3	11.3	13.8	-123.5	**-0.13**	Downward
61R[+]	203.5	71.0	137.3			
Shallow vs. Intermediate Bedrock Wells (2012 to present)						
61R (75-90)	90.0	75.0	82.5	-108.0	**-0.16**	Downward
61R (183-198)	198.0	183.0	190.5			
63R (85-100)	100.0	85.0	92.5	-65.0	**-0.03**	Downward
63R (150-165)	165.0	150.0	157.5			
65R (100-115)	115.0	110.0	112.5	-75.0	**-0.03**	Downward
65R (180-195)	195.0	180.0	187.5			
67R (83-98)	98.0	83.0	90.5	-66.0	**-0.09**	Downward
67R (149-164)	164.0	149.0	156.5			
MW-302 (60-70)	70.0	60.0	65.0	-40.0	**-0.03**	Downward
MW-302 (100-110)	110.0	100.0	105.0			
MW-303 (55-65)	65.0	55.0	60.0	-60.0	**-0.13**	Downward
MW-303 (115-125)	125.0	115.0	120.0			
Intermediate vs. Deep Bedrock Wells (2012 to present)						
MW-306S (85-100)	100.0	85.0	92.5	-42.5	**-0.01**	Downward
MW-306S (130-140)	140.0	130.0	135.0			
MW-306D (185-195)	195.0	185.0	190.0	-100.0	**-0.20**	Downward
MW-306D (280-300)	300.0	280.0	290.0			
MW-307S (80-90)	195.0	185.0	190.0	-100.0	**0.01**	Upward
MW-307S (172-187)	300.0	280.0	290.0			

Notes:
1. ft bgs - feet below ground surface
2. *Well abandoned during or before 2012.
3. [+]Well converted into bi-level monitoring well in 2012.

Well ID	Chemical Name: / ICL: / Unit: / Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
Overburden Wells												
36D	1/1/1985	ND	--	ND	ND	ND	ND	2.0 J	--	ND	--	--
	6/15/1990	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	10/11/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	4.0 J	< 10	< 5.0	**31**	43.9 J
	6/2/1995	< 10	< 10	< 10	< 10	< 10	12.0	1.0 J	< 10	3.0 J	**20.6**	< 5.0
	4/2/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.7	< 5.0
	7/24/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**14**	7.6
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	--	--
	5/18/2005	< 5.0	3.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	**19.8**	6.41
37D	1/1/1985	**620**	--	58.0	**87,000**	**6.0 J**	430	**200**	--	270	--	--
	6/19/1990	**1,000 J**	**140**	< 250	**2,300**	< 250	< 390	**150 J**	< 500	< 1,000	**52.5 J**	**9,610**
	10/10/1990	**3,100 J**	**270**	**1,500**	**3,800**	**210**	**2,600**	**630**	< 200	3,100	**44.2**	**6,010 J**
	5/31/1991	**2,300**	**950**	**1,100**	750	**38 J**	840	**160**	--	2,200	**26.8**	**5,590**
	5/24/1994	**290**	26.0	ND	790	< 10	ND	**25.0**	--	ND	**31**	--
	5/27/1995	**98.0**	< 20	190	28.0	**130**	41.0	**330**	< 20	6.0 J	**31.1**	**4,500**
	8/23/1995	**28.0**	**100**	68.0	< 40	**91.0**	< 20	**320**	< 20	< 20	--	--
	4/3/1996	< 10	**89.0**	33.0	< 20	**47.0**	< 10	< 10	< 10	< 10	**26**	**4,000**
	8/12/1996	< 20	52.0	< 20	< 40	**35.0**	< 20	**120**	< 20	< 20	--	--
	1/8/1997	2.0 J	39.0	10.0	7.0 J	**38.0**	< 5.0	**87.0**	< 5.0	< 5.0	--	--
	3/21/1997	< 25	43.0	14 J	< 50	**36.0**	< 25	**97.0**	--	< 25	--	--
	4/20/1998	< 5.0	7.80	< 5.0	< 10	**7.60**	< 5.0	**14.0**	< 5.0	< 5.0	**360**	3,100
	5/6/1999	1.6 J	3.4 J	< 5.0	< 10	2.2 J	< 5.0	**5.40**	< 10	< 15	**107**	
	12/21/1999	< 5.0	1.0 J	< 5.0	< 10	1.5 J	< 5.0	2.3 J	< 5.0	< 15	**33.4**	1,820
	7/13/2000	< 5.0	< 5.0	< 5.0	< 10	2.2 J	< 5.0	2.2 J	< 5.0	< 15	**91.7**	2,220
	12/6/2000	< 5.0	1.9 J	< 5.0	< 10	1.9 J	< 5.0	2.0 J	< 5.0	< 15	**19.2**	1,740
	7/26/2001	< 5.0	< 5.0	< 5.0	< 10	**7.00**	< 5.0	< 5.0	< 5.0	< 10	**38.0**	2,500
	12/19/2001	**35.0**	10.0	< 5.0	220	< 5.0	150	< 5.0	< 5.0	< 10	**24.0**	2,800
	7/10/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**41.0**	3,000
	12/19/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**42.0**	2,600
	6/5/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**44.0**	2,800
	12/19/2003	< 5.0	17.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**55.1**	3,410
	5/26/2004	< 5.0	16.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**52.3**	**3,920**
	11/5/2004	< 5.0	48.0	< 5.0	< 10	2.0 J	< 5.0	2.0 J	< 5.0	< 5.0	**53.6**	**3,870**
	5/20/2005	< 5.0	39.0	< 5.0	< 10	4.0 J	< 5.0	< 5.0	< 10	< 1.0	**51.1**	**4,530**
	11/14/2005	< 5.0	**170**	< 5.0	< 10	5.00	< 5.0	2.0 J	< 5.0	< 1.0	**52.0**	**4,850**
	6/29/2006	< 5.0	**220**	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 5.0	< 1.0	**71.5**	**6,640**
	8/30/2006	< 5.0	**260**	< 5.0	< 10	3.0 J	< 5.0	1.0 J	< 5.0	< 1.0	**57.4**	**5,300**
	11/20/2006	< 5.0	**120**	< 5.0	< 10	3.0 J	< 5.0	< 5.0	< 5.0	< 1.0	**67.7**	**5,760**
	2/26/2007	< 5.0	63.0	< 5.0	< 10	2.0 J	< 5.0	< 5.0	< 5.0	< 1.0	**63.0**	**5,770**
	5/31/2007	< 5.0	33.0	< 5.0	< 10	1.0 J	< 5.0	< 5.0	< 5.0	< 1.0	**51.6**	**6,610**
	11/26/2007	< 5.0	16.0	< 5.0	< 10	1.0 J	< 5.0	< 5.0	< 5.0	< 1.0	**50.4**	**5,470**
	5/20/2008	< 5.0	8.00	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	**61.4**	**6,240**
	11/20/2008	< 5.0	4.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	**80.6**	**6,140**
	6/24/2009	< 0.5	1.67	< 0.5	< 10	< 0.5	0.350 J	< 0.5	< 0.5	< 0.5	**58.7**	**6,240**
	11/20/2009	< 0.5	0.950	< 0.5	< 10	0.290 J	< 0.5	< 0.5	< 0.5	< 0.5	**67.0**	**7,370**
	12/2/2010	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**78.9**	**5,390**
	5/10/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**50.1**	**4,920**
	11/16/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**70.5**	**5,030**
	5/16/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**60.5**	**5,560**
	11/12/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**78.2**	**5,370**
	5/21/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**59.4**	**5,260**
	11/11/2013	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**80.4**	**5,720**
	5/19/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**93.4**	**4,420**
	11/10/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**247**	**5,880**
	5/20/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**67.6**	**5,460**
	11/16/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**73.4**	**5,450**
	5/17/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**55.2**	3,500
	5/16/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**71.9**	**4,760**
	5/23/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**71.0**	**4,390**
	11/14/2018	--	--	--	--	--	--	--	--	--	**275**	**4,070**
	5/15/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**77.2**	**5,090**
	5/3/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**204**	**6,450**
38D	1/1/1985	2.0 J	--	7.0 J	ND	ND	17.0	ND	--	58.0	--	--
	5/31/1990	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	10/11/1990	< 5.0	< 5.0	< 5.0	< 23	< 5.0	< 5.0	< 5.0	< 10	< 5.0	**25.6**	446 J
47S	10/26/1984	5.0 J	--	ND	ND	--	ND	5.0 J	--	ND	--	--
	11/21/1984	ND	--	ND	ND	--	ND	ND	--	ND	--	--
	6/6/1985	ND	--	ND	ND	--	ND	ND	--	ND	--	--
	11/26/1985	ND	--	ND	ND	--	ND	ND	--	ND	--	--
	5/8/1986	ND	--	ND	ND	--	ND	ND	--	ND	--	--
49S	1/1/1985	2.0 J	--	5.0 J	ND	ND	20.0	ND	--	52.0	--	--
	6/15/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
	10/9/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	**25.4**	1,090 J
50S	1/1/1985	**6.0 J**	--	ND	ND	ND	22.0	ND	--	52.0	--	--
	6/15/1990	**41 J**	2.0 J	360 J	< 10	< 5.0	330 J	< 5.0	< 10	760 J	--	--
	10/10/1990	**2,200**	--	--	940	**3,200**	--	--	--	--	**185**	**12,400 J**
	2/8/1994	**22.0**	ND	490	ND	< 10	62.0	< 10	--	1,400	**41**	--
	6/2/1995	**21 J**	< 40	370	< 40	< 40	7.0 J	< 40	< 40	720	**300**	**6,130**
	11/28/1995	**32.0**	< 25	670	< 50	< 25	240	< 25	< 25	1,700	--	--
	4/2/1996	< 200	< 200	**780**	< 400	< 200	< 200	< 200	< 200	2,200	**320**	**7,900**
	8/7/1996	< 50	< 50	300	< 100	< 50	< 50	< 50	< 50	680	--	--
	1/8/1997	**16.0**	< 10	230	4.0 J	< 10	3.0 J	< 10	< 10	360	--	--
	3/21/1997	**44 J**	< 100	620	< 200	< 100	34 J	< 100	--	1,200	--	--
	4/21/1998	< 25	< 25	310	< 50	< 25	< 25	< 25	< 25	590	**370**	**7,100**
	5/5/1999	**12.0**	< 5.0	200	< 10	< 5.0	12.0	< 5.0	< 10	210	**141**	187
	12/21/1999	**10.0**	< 5.0	210	< 10	< 5.0	< 5.0	< 5.0	< 5.0	300	**398**	**5,990**
	7/12/2000	**6.80**	< 5.0	320	< 10	< 5.0	4.3 J	< 5.0	< 5.0	440	**445**	**8,640**
	12/4/2000	4.0 J	< 5.0	110	< 10	< 5.0	< 5.0	< 5.0	< 5.0	190	**486**	**8,540**
	7/24/2001	**7.40**	< 5.0	160	< 10	< 5.0	< 5.0	< 5.0	< 5.0	190	--	--
	12/17/2001	**5.60**	< 5.0	85.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	160	**1,400**	**9,400**
	7/8/2002	**9.30**	< 5.0	85.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	190	**420**	**11,000**
	12/18/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**200**	**6,600**
	6/2/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**570**	**6,700**
	12/19/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**298**	**5,700**
	6/2/2004	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**412**	**4,480**
	11/3/2004	< 5.0	< 5.0	1.0 J	< 10	< 5.0	< 5.0	< 5.0	< 5.0	0.800 J	**457**	**5,110**
	5/24/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	1.0 J	**387**	**6,700**
	5/20/2008	< 5.0	< 5.0	3.0 J	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	**294**	**5,220**
	11/19/2008	< 5.0	< 5.0	4.0 J	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	**471**	**6,210**
	11/16/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
51S	1/1/1985	**120**	--	ND	210	ND	1,000	ND	--	4,800	--	--
	6/19/1990	< 5,000	< 5,000	< 5,000	**10,000**	< 5,000	< 24,000	< 5,000	< 10,000	< 21,000	**48.0 J**	**7,020**
	10/9/1990	**28 J**	< 100	450	< 200	< 100	**2,500**	< 100	< 200	2,200	**165**	**3,710 J**
	6/2/1995	< 1,000	< 1000	**3,400**	850 J	< 1,000	**18,000**	< 1000	< 1,000	**12,000**	**139**	**7,410**
	11/28/1995	< 25	< 25	270	< 50	< 25	580	< 25	< 25	2,000	--	--
	4/10/1996	< 250	< 250	**4,000**	< 500	< 250	**7,800**	< 250	< 250	**23,000**	**140**	**5,700**
	8/14/1996	< 500	< 500	**2,300**	< 1,000	< 500	**17,000**	< 500	< 500	**11,000**	--	--
	1/8/1997	< 500	< 500	**1,300**	< 1,000	< 500	**15,000**	< 500	< 500	**11,000**	--	--
	3/20/1997	< 2,500	< 2,500	**1,600 J**	< 5,000	< 2,500	**12,000**	< 2,500	--	10,000	**110**	**5,000**
	4/17/1998	< 100	< 100	370	< 200	< 100	440	< 100	< 100	2,100	**210**	**5,800**
	10/26/1998	< 100	< 100	**1,000**	< 200	< 100	690	< 100	< 100	4,400	**250**	**6,400**
	5/4/1999	1.5 J	< 5.0	73.0	< 10	< 5.0	130	< 5.0	< 5.0	400	**307**	**9,510**
	12/20/1999	< 5.0	< 5.0	**870**	< 10	< 5.0	140	< 5.0	< 16	4,300	**249**	**9,440**
	7/12/2000	**7.60**	< 5.0	620	< 10	< 5.0	**1,200**	< 5.0	< 5.0	5,500	**151**	**6,400**
	12/4/2000	**14.0**	< 6.4	**830**	< 16	< 6.4	190	< 5.0	< 6.4	3,300	**198**	**9,020**
	7/24/2001	< 50	< 50	**840**	< 100	< 50	670	< 50	< 50	5,900	**300**	**10,000**
	12/17/2001	< 5.0	< 5.0	230	< 10	< 5.0	7.70	< 5.0	< 5.0	58.0	**380**	**10,000**
	7/8/2002	< 5.0	< 5.0	5.70	< 10	< 5.0	< 5.0	< 5.0	< 5.0	100	**17.0**	**4,100**
	12/18/2002	< 5.0	< 5.0	33.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	70.0	**57.0**	**6,600**
	6/2/2003	< 5.0	< 5.0	36	< 20	< 5.0	< 5.0	< 5.0	< 5.0	500	**54.0**	**5,600**
	12/19/2003	< 5.0	< 5.0	34.0	< 10	< 5.0	< 5.0	< 5.0	< 10	340	**50.4**	**4,600**
	5/28/2004	< 5.0	< 5.0	31.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	278	**75.0**	**5,370**
	11/2/2004	1.0 J	< 5.0	7.00	< 10	< 5.0	1.0 J	< 5.0	< 5.0	53.0	**136**	**6,400**
	5/17/2005	< 5.0	< 5.0	21.0	< 10	< 5.0	1.0 J	< 5.0	< 10	114	**125**	**4,510**
	11/10/2005	3.0 J	< 5.0	39.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	68.0	**139**	**5,440**
	6/26/2006	< 5.0	< 5.0	39.0	< 10	< 5.0	2.0 J	< 5.0	< 5.0	51.0	**188**	--
	11/29/2006	2.0 J	< 5.0	93.0	< 10	< 5.0	4.0 J	< 5.0	< 5.0	133	**150**	**5,690**
	5/19/2008	< 5.0	< 5.0	30.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	57.0	**133**	**4,250**
	11/17/2008	< 5.0	< 5.0	28.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	31.0	**208**	**4,420**

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
51S (cont.)	6/22/2009	< 0.5	< 0.5	60.5	< 10	< 0.5	0.530	< 0.5	< 0.5	126	**134**	3,430
	11/18/2009	1.20	< 0.5	176	< 10	< 0.5	0.770	0.390 J	< 0.5	128	**172**	2,860
	11/30/2010	< 0.5	< 0.5	7.96	< 10	< 0.5	< 0.5	0.370 J	< 0.5	0.550	**21.9**	1,810
	5/9/2011	0.670 J	< 0.5	80.9	< 10	< 0.5	< 0.5	0.320 J	< 0.5	79.1	**105**	2,830
	11/14/2011	3.56	< 0.5	181 J	< 10	< 0.5	58.2	0.470 J	< 0.5	273 J	**165**	2,800
	5/15/2012	0.330 J	< 0.5	48.0	< 10	< 0.5	0.430 J	< 0.5	< 0.5	47.6	**177**	2,560
	11/13/2012	2.75	< 0.5	289	< 10	< 0.5	6.82	< 0.5	< 0.5	441	**100**	2,240
	5/23/2013	0.308 J	< 0.5	36.3	< 10	< 0.5	< 0.5	< 0.5	< 0.5	43.9	**142**	1,650
	11/12/2013	< 2.5	< 2.5	518	< 25	< 2.5	934	< 2.5	< 2.5	2,320	**305**	**12,500**
	5/20/2014	0.222 J	< 0.5	351	1.75 J	< 0.5	600	< 0.5	< 0.5	1,730	**258**	**10,400**
	11/11/2014	0.339 J	< 0.5	**834**	1.73 J	< 0.5	1.55	0.223 J	< 0.5	3,430	**210**	**8,290**
	5/19/2015	< 0.5	< 0.5	636	< 5.0	< 0.5	1.07	< 0.5	< 0.5	2,430	**216**	**6,680**
52S	1/1/1985	**1,700**	--	ND	**47,000**	**18 J**	**5,200**	**84 J**	--	750	--	--
	6/15/1990	**960 J**	--	ND	ND	ND	**12,000 J**	**310 J**	--	ND	**30.1 J**	**12,600**
	10/10/1990	**1,100**	**200 J**	**880**	< 500	**130 J**	**4,600**	**300**	< 500	2,000	**150**	**18,600 J**
	5/31/1991	**200**	**180**	110	ND	ND	880	**29 J**	--	290	**63.6**	**8,910**
	5/24/1994	3.80	1.60	4.30	ND	3.20	ND	4.20	--	3.90	--	--
	6/2/1995	2.0 J	8.0 J	2.0 J	< 10	**10.0**	< 10	**20.0**	< 10	< 10	< 5.0	1,430
	11/28/1995	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	4/3/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	150
	8/13/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	1/8/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	3/21/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	2.0 J	< 5.0	--	< 5.0	--	--
	4/21/1998	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	2.7	97.0
	5/6/1999	< 5.0	< 5.0	< 5.0	< 10	< 5.0	2.6 J	< 5.0	< 10	< 15	**120**	166
	12/21/1999	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	6.2	124
	7/13/2000	< 5.0	2.7 J	< 5.0	< 10	1.8 J	< 5.0	< 5.0	< 5.0	< 15	**14**	**7,120**
	12/6/2000	< 5.0	< 5.0	< 5.0	6.1 J	< 5.0	< 5.0	< 5.0	< 5.0	< 15	< 7.0	156
	7/26/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**51**	**3,400**
	12/19/2001	**110**	22.0	9.00	610	< 5.0	430	< 5.0	< 5.0	37.0	**410**	**9,600**
	6/13/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	--	< 10	--	--
	7/10/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	99
	12/18/2002	< 5.0	5.10	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	1,100
	6/4/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	50.0
	12/16/2003	< 5.0	1.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	807
	2/9/2004	< 5.0	2.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	1,960
	3/22/2004	< 5.0	1.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	1,270
	5/20/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	< 5.0	650
	11/27/2006	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	1,000
	11/11/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	923
	5/20/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	< 15
	11/16/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	773
	5/17/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	< 15
	5/16/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	7.9 J
	5/23/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	< 15
	5/15/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	< 15
	5/3/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	0.309 J	1.09
53S	1/1/1985	2.0 J	--	ND	19.0	ND	8.0 J	ND	--	36.0	--	--
	6/15/1990	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	10/11/1990	< 5.0	< 5.0	< 5.0	< 10	**8.00**	< 5.0	**10.0**	< 10	< 5.0	**17.2**	536 J
	5/31/1991	ND	--	ND	ND	ND	ND	ND	--	ND	3.6	48.0
	5/24/1994	ND	ND	ND	ND	3.30	ND	1.40	--	ND	--	--
	4/8/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	8/13/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	33.0
	1/8/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	3/21/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**7.00**	--	< 5.0	--	--
	4/21/1998	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 2.0	37.0
	5/6/1999	3.1 J	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 15	< 2.0	< 1.0
	12/21/1999	1.1 J	< 5.0	3.4 J	< 10	< 5.0	1.5 J	2.3 J	< 5.0	3.0 J	< 2.0	93.2
	7/13/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	< 7.0	164
	12/6/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	< 7.0	125
	7/26/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	130
	7/10/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	59.0
	5/26/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	< 5.0	44.4
54S	1/1/1985	ND	--	ND	ND	ND	1.0 J	ND	--	ND	--	--
	6/15/1990	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	10/11/1990	< 5.0	< 5.0	< 5.0	< 36	< 5.0	< 5.0	< 5.0	< 10	< 5.0	**18.2**	760 J
	11/28/1995	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	4/9/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	67
	8/8/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	7.00	< 5.0	< 5.0	7.00	--	--
	11/18/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
55S	7/11/1984	**980**	--	**1,827**	--	**125**	**18,732**	**214**	--	--	--	--
	11/26/1984	**1,468**	--	**1,945**	--	--	**31,703**	--	--	--	--	--
	6/19/1990	< 5.0	< 5.0	< 5.0	< 10	2.0 J	< 5.0	< 5.0	< 10	< 25	--	--
57S	7/11/1984	**244**	--	**1,319**	250	ND	**18,655**	**10,361**	--	**10,790**	--	--
	11/26/1984	ND	--	**1,989**	--	ND	**37,322**	**13,091**	--	**11,287**	--	--
	1/1/1985	**1,900**	--	**4,700**	**21,000**	**110 J**	**140,000**	**27,000**	--	**28,000**	--	--
	6/19/1990	**170 J**	< 500	< 500	< 1,100	< 500	**3,900 J**	< 1,700	< 1,000	< 1,300	**55.0 J**	**19,900**
	10/11/1990	**160**	**4,000**	**1,700**	< 1,000	< 500	**7,700**	**7,800**	< 1,000	5,400	**96.8**	**16,100 J**
	2/8/1994	< 500	**18,000**	**1,800**	ND	< 500	**28,000**	**3,200**	--	8,400	**120**	--
	5/31/1995	**100 J**	**15,000**	**760**	< 500	< 500	250 J	**7,200**	< 500	220 J	**113**	**14,000**
	11/29/1995	< 500	**9,400**	< 500	< 1,000	< 500	< 500	**3,800**	< 500	< 500	--	--
	4/8/1996	< 250	**6,600**	400	< 500	< 250	**1,100**	**2,600**	< 250	400	**260**	**16,000**
	8/7/1996	< 500	**1,900**	< 500	< 1,000	< 500	< 500	< 500	< 500	< 500	--	--
	1/8/1997	**21 J**	**1,300**	200	< 100	< 50	77.0	**2,000**	< 50	770	--	--
	3/20/1997	< 2,500	< 2,500	**2,200 J**	< 5,000	< 2,500	**37,000**	**8,700**	--	**12,000**	**160**	**18,000**
	4/20/1998	< 1,000	**1,400**	**2,400**	< 2,000	< 1,000	**28,000**	**6,500**	< 1,000	6,300	**170**	**19,000**
	5/4/1999	**200**	**1,500**	**1,300**	< 10	**160**	**7,000**	**3,700**	< 10	7,300	**310**	**18,200**
	12/20/1999	1.5 J	**380**	260	< 10	1.5 J	82	**22.0**	< 5.0	240	**122**	**27,800**
	7/13/2000	< 12	**670**	**1,700**	< 40	< 16	**2,200**	**85.0**	< 16	3,800	**126**	**44,500**
	12/5/2000	< 12	**450**	340	< 40	< 16	980	< 10	< 16	1,000	**80.1**	**25,000**
	7/25/2001	< 25	**440**	**760**	< 50	< 25	58.0	< 25	< 25	1,300	**66**	**23,000**
	12/17/2001	< 25	**6,100**	**3,800**	< 50	< 25	**13,000**	< 25	< 25	**14,000**	**300**	**23,000**
	6/13/2002	< 25	**1,000**	**810**	< 10	< 25	**2,800**	< 25	--	2,900	--	--
	7/8/2002	< 20	**230**	84.0	< 40	< 20	510	< 20	< 20	380	**14**	**11,000**
	12/17/2002	< 20	**570**	620	< 40	< 20	97.0	< 20	< 20	1,500	**110**	**12,000**
	6/6/2003	< 10	**140**	180	< 20	< 10	22.0	< 10	< 10	340	**33.0**	**6,900**
	12/19/2003	< 5.0	**180**	210	< 10	< 5.0	27.0	< 5.0	< 5.0	273	**57.5**	**8,850**
	5/27/2004	< 5.0	11.0	13.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	16.0	**13.5**	**5,430**
	11/4/2004	< 5.0	**450**	590	< 10	< 5.0	1,000	2.0 J	< 5.0	1,180	**104**	**10,700**
	5/24/2005	< 5.0	**110**	200	< 10	< 5.0	160	< 5.0	< 10	348	**36.0**	**5,440**
	11/8/2005	< 5.0	**100**	230	< 10	< 5.0	120	< 5.0	< 5.0	460	**51.6**	**6,050**
	6/27/2006	< 5.0	**84.0**	190	< 10	< 5.0	16.0	< 5.0	< 5.0	227	**53.8**	**4,550**
	11/27/2006	< 5.0	16.0	64.0	< 10	< 5.0	4.0 J	< 5.0	< 5.0	62.0	**53.6 J**	**4,800**
	6/1/2007	< 5.0	17.0	110	< 10	< 5.0	8.00	< 5.0	< 5.0	116	**33 J**	**5,390**
	11/30/2007	< 5.0	44.0	330	< 10	< 5.0	100	2.0 J	< 5.0	438	--	--
	5/23/2008	< 5.0	3.0 J	52.0	< 10	< 5.0	2.0 J	< 5.0	< 2.0	45.0	< 100	2,250
	11/19/2008	< 5.0	7.00	250	< 10	< 5.0	20.0	< 5.0	< 2.0	250	**78.6 J**	**6,380**
	6/23/2009	< 0.5	4.48	196	< 10	0.400 J	18.9	1.17	< 0.5	214	**45.5**	**5,950**
	11/19/2009	< 0.5	9.03	188	< 10	0.380 J	20.4	2.08	< 0.5	210	**55.0**	**6,430**
	12/2/2010	< 0.5	7.33	354	< 10	< 0.5	53.3	0.970	< 0.5	571	**52.4**	2,640
	5/11/2011	< 0.5	0.510	7.17	< 10	< 0.5	0.370 J	0.410 J	< 0.5	4.95	5.8 J	196
	11/16/2011	< 0.5	2.08	47.2	< 10	< 0.5	4.66	1.54	< 0.5	53.4	**19.7**	1,510
	5/17/2012	< 0.5	1.28	12.3	< 10	< 0.5	1.00	1.04	< 0.5	13.9	< 10	1,470
	11/14/2012	< 0.5	3.33	255	< 10	0.601	95.6	1.41	< 0.5	521	**44.4**	**3,770**
	5/24/2013	< 0.5	0.662	8.92	< 10	0.512	0.722	0.903	< 0.5	10.7	< 10	1,720
	11/15/2013	< 0.5	1.27	6.15	< 5.0	0.217 J	< 0.5	1.46	< 0.5	2.83	9.2 J	1,980
	5/20/2014	< 0.5	0.420 J	< 0.5	< 5.0	< 0.5	< 0.5	0.504	< 0.5	< 1.5	< 10	563
	11/12/2014	< 0.5	1.97	7.98	< 5.0	< 0.5	0.255 J	< 0.5	< 0.5	2.04	**63.9**	**3,810**
	5/19/2015	< 0.5	0.689	< 0.5	< 5.0	< 0.5	< 0.5	0.813	< 0.5	< 1.5	< 10	764
	11/19/2015	< 0.5	3.54	93.4	< 5.0	< 0.5	9.79	3.68	< 0.5	222	**87.2**	**5,030**
	5/18/2016	< 0.5	0.624	< 0.5	< 5.0	< 0.5	< 0.5	0.822	< 0.5	< 1.0	< 10	705
	11/7/2016	< 0.5	5.82	91.7	< 5.0	< 0.5	5.45	**5.03**	< 0.5	155	**35.1**	**6,840**
	5/17/2017	< 0.5	0.567	0.457 J	< 5.0	< 0.5	< 0.5	0.689	< 0.5	< 1.5	< 10	**6,970**
	11/7/2017	< 0.5	0.336 J	26.3	< 5.0	0.162 J	0.772	0.510	< 0.5	25.6	**71.3**	**5,350**
	5/25/2018	< 0.5	1.06	< 0.5	< 5.0	< 0.5	< 0.5	1.14	< 0.5	< 1.5	**12.5**	1,980
	11/14/2018	< 0.5	0.494 J	< 0.5	< 5.0	< 0.5	< 0.5	0.750	< 0.5	< 1.5	< 10	1,530
	5/14/2019	< 0.5	1.00	2.47	< 5.0	< 0.5	< 0.5	1.24	< 0.5	1.50	**29.8**	2,300
	5/4/2021	< 1.0	1.24	18.3	< 5.0	< 1.0	1.12	1.37	< 1.0	28.3	**11.5**	2,440

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
58S	9/18/1984	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	11/26/1984	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	1/1/1985	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	6/15/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	4.8 J	2,200
	10/9/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	**20**	856 J
	6/9/1995	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 5.0	8.0
60S	9/18/1984	**703**	--	**1,500**	**3,440**	ND	**6,500**	**26.4**	--	4,000	--	--
	11/26/1984	**741**	--	**3,346**	--	ND	**49,169**	**636**	--	**15,556**	--	--
62S	9/18/1984	ND	--	ND	5.40	ND	ND	**27.8**	--	ND	--	--
	11/26/1984	ND	--	ND	ND	ND	ND	**18.5**	--	ND	--	--
	1/1/1985	4.0 J	--	ND	ND	ND	ND	**22.0**	--	ND	--	--
	6/15/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**21 J**	< 10	< 5.0	4.8 J	**7,800**
	10/10/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 10	254 J
64S	9/18/1984	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	1/1/1985	ND	--	ND	ND	ND	ND	ND	--	ND	--	--
	6/15/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	5.8 J	1,890
	10/10/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	**12.6**	5.8 J
68S	9/18/1984	**575**	--	130	**19,000**	ND	**2,270**	**772**	--	1,046	--	--
	11/26/1984	**2,573**	--	ND	--	ND	**11,938**	ND	--	ND	--	--
70S	5/31/1991	--	--	7.00	--	1.0 J	87.0	4.0 J	--	23.0	**17.6 J**	**6,890**
	2/8/1994	**630**	**420**	660	ND	**180**	**3,700**	**430**	--	1,300	**14**	--
	5/31/1995	**260**	**460**	700	< 50	**310**	320	**500**	< 50	900	**79.4**	**14,200**
	8/23/1995	< 5.0	7.00	1.0 J	< 10	**10.0**	< 5.0	**15.0**	< 5.0	2.0 J	--	--
	11/29/1995	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	4/4/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	700
	8/7/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	1/8/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	3/21/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	--	< 5.0	--	--
	5/4/1999	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 15	**309**	607
	12/21/1999	< 5.0	< 5.0	< 5.0	< 10	< 5.0	1.6 J	< 5.0	< 5.0	1.3 J	< 2.0	1,060
	7/13/2000	2.30 J	< 5.0	< 5.0	16.0	< 5.0	4.0 J	< 5.0	< 5.0	< 15	**15**	1,010
	12/5/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	< 7.0	133
	7/26/2001	< 5.0	< 5.0	< 5.0	< 25	< 5.0	< 5.0	< 5.0	< 10	< 10	< 10	230
	12/18/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	6.30	< 5.0	< 5.0	< 10	**18.0**	830
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	3,500
	5/19/2005	< 5.0	13.0	< 5.0	< 10	**6.00**	< 5.0	< 5.0	< 10	< 1.0	5.24	1,820
	11/9/2005	< 5.0	34.0	10.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	1,850
	6/27/2006	< 5.0	**120**	100	< 10	1.0 J	1.0 J	< 5.0	< 5.0	4.00	**20.5**	**5,800**
	5/29/2007	< 5.0	20.0	2.0 J	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	1,950
	11/30/2007	< 5.0	17.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	2,690
	5/19/2008	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	343
	11/13/2014	< 0.5	0.544	0.439 J	< 5.0	0.305 J	< 0.5	0.265 J	< 0.5	1.85	< 10	**8,360**
	5/18/2015	< 0.5	< 0.5	0.233 J	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	186
	11/18/2015	< 0.5	0.870	< 0.5	< 5.0	< 0.5	0.234 J	< 0.5	< 0.5	0.603 J	**20.9**	**4,890**
71S	5/31/1991	ND	--	ND	ND	ND	2.0 J	**130**	--	ND	**17.5**	1,470
	2/14/1992	--	--	--	--	--	--	--	--	--	6.0	--
	11/29/1995	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	7/9/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	2,500
	5/26/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	4.0 J	12.3
	11/15/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
72S	5/31/1991	ND	--	**980**	ND	**150 J**	**5,100**	ND	--	2,800	**84.9**	**15,600**
	2/14/1992	--	--	--	--	--	--	--	--	--		--
	2/8/1994	< 25	**520**	**1,200**	ND	**310**	760	< 25	--	2,300	**64**	--
	5/31/1995	**80 J**	**1,600**	**3,200**	< 200	**52 J**	**2,300**	< 200	< 200	6,200	**92.2**	**29,600**
	11/29/1995	< 200	**820**	**1,500**	< 400	< 200	**6,300**	< 200	< 200	3,500	--	--
	4/1/1996	< 100	**590**	660	290	< 100	870	< 100	< 100	730	**250**	**26,000**
	8/7/1996	< 25	**130**	140	< 50	< 25	< 25	< 25	< 25	72.0	--	--
	1/8/1997	< 5.0	6.00	< 5.0	< 10	4.0 J	1.0 J	< 5.0	< 5.0	2.0 J	--	--
	3/21/1997	< 5.0	5.00	< 5.0	< 10	3.0 J	< 5.0	< 5.0	--	9.00	--	--
	4/20/1998	**530**	< 500	< 500	**23,000**	< 500	< 500	< 500	< 500	< 500	**34.0**	2,900
	5/4/1999	< 5.0	**170**	290	< 10	**55.0**	5.80	**10.0**	< 10	400	**452**	**16,600**
	12/20/1999	< 5.0	**260**	8.40	< 10	**14.0**	< 5.0	1.8 J	< 5.0	28.0	**139**	
	7/13/2000	< 5.0	**330**	90.0	< 10	**60.0**	2.8 J	**6.80**	< 5.0	100	**147**	
	12/5/2000	< 5.0	19.0	< 5.0	< 10	**13.0**	< 5.0	< 5.0	< 5.0	2.6 J	**137**	**15,300**
	7/25/2001	< 5.0	8.00	< 5.0	< 10	**12.0**	< 5.0	< 5.0	< 5.0	< 10	**140**	**13,000**
	12/18/2001	< 5.0	< 5.0	< 5.0	< 10	**5.80**	10.0	< 5.0	< 5.0	< 10	**200**	**16,000**
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	**10.0**	< 5.0	< 5.0	< 5.0	< 5.0	**13**	**11,000**
	12/19/2002	< 5.0	< 5.0	< 5.0	< 10	**8.40**	< 5.0	< 5.0	< 5.0	< 10	**210**	**15,000**
	6/6/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**57.0**	**11,000**
	12/18/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**143**	**14,400**
	5/26/2004	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**42.5**	2,920
	11/4/2004	< 5.0	1.0 J	< 5.0	< 10	2.0 J	< 5.0	1.0 J	< 5.0	< 5.0	**200**	**10,700**
	5/19/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	**23.1**	3,440
	11/14/2005	< 5.0	< 5.0	< 5.0	< 10	1.0 J	< 5.0	< 5.0	< 5.0	< 1.0	**102**	**6,820**
73S	5/30/1991	ND	--	1.0 J	ND	ND	7.00	**14.0**	--	7.00	5.0	1,320
	2/8/1994	ND	10.0	ND	ND	ND	ND	**90.0**	--	ND	**11.0**	--
	1/8/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	4/20/1998	< 5.0	57.0	< 5.0	< 10	< 5.0	< 5.0	**170**	< 5.0	< 5.0	< 2.0	81.0
	5/4/1999	< 5.0	**140**	< 5.0	< 10	< 5.0	< 5.0	**210**	< 10	< 15	**12.4**	1,480
	12/20/1999	< 5.0	**94.0**	< 5.0	< 10	< 5.0	< 5.0	**100**	< 5.0	< 15	< 2.7	88.2
	7/13/2000	< 5.0	**110**	< 5.0	< 10	< 5.0	< 5.0	**100**	< 5.0	< 15	< 7.0	96.6
	12/5/2000	< 5.0	**110**	< 5.0	< 10	< 5.0	< 5.0	**110**	< 5.0	< 15	< 7.0	373
	7/24/2001	< 5.0	63.0	< 5.0	< 10	< 5.0	< 5.0	**64.0**	< 5.0	< 10	**26**	1,200
	12/17/2001	< 5.0	16.0	< 5.0	< 10	< 5.0	< 5.0	**26.0**	< 5.0	< 10	10.0	310
	7/8/2002	< 5.0	20.0	< 5.0	< 10	< 5.0	< 5.0	**21.0**	< 5.0	< 10	< 10	42
	12/17/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**5.10**	< 5.0	< 10	< 10	34.0
	6/9/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**5.90**	< 5.0	< 10	< 10	20.0
	12/22/2003	< 5.0	6.00	< 5.0	< 10	< 5.0	< 5.0	**8.00**	< 5.0	< 5.0	< 5.0	25.4
	6/1/2004	< 5.0	4.0 J	< 5.0	< 10	< 5.0	< 5.0	**7.00**	< 5.0	< 5.0	< 5.0	13.5
	11/3/2004	< 5.0	6.00	< 5.0	< 10	< 5.0	< 5.0	**8.00**	< 5.0	< 5.0	< 5.0	13.4
	5/26/2005	< 5.0	4.0 J	< 5.0	< 10	< 5.0	< 5.0	**7.00**	< 10	< 1.0	< 5.0	19.8
	11/8/2005	< 5.0	3.0 J	< 5.0	< 10	< 5.0	< 5.0	5.00	< 5.0	< 1.0	< 5.0	86.8
	6/26/2006	< 5.0	1.0 J	< 5.0	< 10	< 5.0	< 5.0	2.0 J	< 5.0	< 1.0	2.87 J	--
	11/28/2006	< 5.0	2.0 J	< 5.0	< 10	< 5.0	< 5.0	2.0 J	< 5.0	< 1.0	< 100	12.4
	6/1/2007	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	54.6
	5/22/2008	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 2.0	< 1.0	< 100	18.2
	6/23/2009	< 0.5	0.790	< 0.5	< 10	< 0.5	< 0.5	1.61	< 0.5	< 0.5	< 10	59.1
	11/19/2009	< 0.5	1.01	0.290 J	< 10	< 0.5	< 0.5	1.96	< 0.5	< 0.5	< 10	16.5
	11/30/2010	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	0.330 J	< 0.5	< 0.5	< 10	100
	5/9/2011	< 0.5	0.310 J	< 0.5	< 10	< 0.5	< 0.5	0.570	< 0.5	< 0.5	< 10	33.8
	11/15/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	0.530	< 0.5	< 0.5	< 10	37.5
	5/17/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	0.350 J	< 0.5	< 0.5	< 10	7.7 J
	11/13/2012	< 0.5	< 0.5	0.841	< 10	< 0.5	4.22	0.577	< 0.5	6.02	6.6 J	484
	5/24/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	0.212 J	< 0.5	< 0.5	< 10	55.2
	11/12/2013	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	0.255 J	< 0.5	< 1.5	< 10	130
	5/20/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	0.210 J	< 0.5	< 1.5	< 10	65.1
	11/12/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	90.7
	5/19/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	132
	11/19/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	0.244 J	< 0.5	< 1.0	< 10	165
74S	5/29/1991	ND	--	ND	ND	ND	ND	ND	--	ND	**10.2**	474
75D	6/1/1991	**2,900**	--	--	**74,000**	ND	**3,300**	ND	--	2,100 J	--	--
	5/27/1995	5.0 J	< 10	3.0 J	< 10	**89.0**	4.0 J	**69.0**	< 10	< 10	--	--
	8/23/1995	4.0 J	61.0	3.0 J	< 10	**79.0**	2.0 J	**62.0**	< 5.0	2.0 J	--	--
	11/29/1995	**45.0**	**150**	< 5.0	< 10	**120**	< 5.0	**100**	< 5.0	7.00	--	--
	4/9/1996	< 5.0	34.0	< 5.0	< 10	**110**	< 5.0	**110**	< 5.0	< 5.0	**12.0**	1,500
	7/26/2001	< 5.0	32.0	< 5.0	< 25	**41.0**	< 5.0	< 5.0	< 10	< 10	--	--
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	**13.0**	< 5.0	< 5.0	< 5.0	< 10	< 10	810
	12/17/2002	< 5.0	< 5.0	< 5.0	< 10	**12.0**	< 5.0	< 5.0	< 5.0	< 10	< 10	980
	6/3/2003	< 5.0	5.90	< 5.0	< 10	**19.0**	< 5.0	< 5.0	< 5.0	< 10	**12.0**	1,600
	12/18/2003	< 5.0	15.0	< 5.0	< 10	**14.0**	< 5.0	< 5.0	< 5.0	< 5.0	7.46	1,330
	5/25/2004	< 5.0	30.0	< 5.0	< 10	**14.0**	< 5.0	< 5.0	< 5.0	< 5.0	**20.9**	1,380
	11/4/2004	< 5.0	67.0	< 5.0	< 10	**23.0**	< 5.0	3.0 J	< 5.0	< 5.0	**15.2**	1,420
	5/26/2005	< 5.0	**160**	< 5.0	< 10	**30.0**	< 5.0	**6.00**	< 10	< 1.0	**10.5**	1,610
	11/9/2005	< 5.0	**240**	< 5.0	< 10	**30.0**	< 5.0	**13.0**	< 5.0	< 1.0	**15.1**	1,420
	6/27/2006	< 5.0	**330**	< 5.0	< 10	**27.0**	< 5.0	**8.00**	< 5.0	< 1.0	**12.7**	2,130
	11/21/2006	< 5.0	**360**	< 5.0	< 10	**22.0**	< 5.0	**6.00**	< 5.0	< 1.0	< 100	1,940
	5/30/2007	< 5.0	**160**	< 5.0	< 10	**12.0**	< 5.0		< 5.0	< 1.0	< 100	1,790
	11/29/2007	< 5.0	**120**	< 5.0	< 10	**8.00**	< 5.0	2.0 J	< 5.0	1.0 J	< 100	1,830
	5/22/2008	< 5.0	**72.0**	< 5.0	< 10	4.0 J	< 5.0	< 5.0	< 2.0	< 1.0	< 100	1,460

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
75D (cont.)	11/17/2008	< 5.0	27.0	< 5.0	< 10	2.0 J	< 5.0	1.0 J	< 2.0	< 1.0	< 100	1,930
	6/22/2009	< 0.5	13.2	< 0.5	< 10	1.33	0.370 J	0.750	< 0.5	0.580	4.5 J	1,720
	11/19/2009	< 0.5	11.0	< 0.5	< 10	1.02	0.570	0.750	< 0.5	1.49	8.3 J	1,650
	12/1/2010	< 0.5	3.17	0.520	< 10	0.380 J	0.530	0.290 J	< 0.5	4.21	**11.3**	1,840
	5/9/2011	< 0.5	3.45	< 0.5	< 10	0.430 J	0.320 J	0.250 J	< 0.5	1.48	4.4 J	2,220
	11/17/2011	< 0.5	2.85	< 0.5	< 10	< 0.5	0.430 J	0.300 J	< 0.5	3.08	8.5 J	1,840
	5/16/2012	< 0.5	3.53	< 0.5	< 10	0.260 J	0.250 J	0.450 J	< 0.5	2.06	3.5 J	1,860
	11/12/2012	< 0.5	1.91	< 0.5	< 10	< 0.5	< 0.5	0.257 J	< 0.5	0.579	6.40	1,500
	5/24/2013	< 0.5	3.91	4.61	< 10	0.529	0.355 J	0.358 J	< 0.5	1.73	5.0 J	1,060
	11/11/2013	< 0.5	1.85	1.61	< 5.0	0.255 J	0.207 J	0.384 J	< 0.5	1.26 J	**11.2**	2,790
	5/19/2014	< 0.5	0.959	0.894	< 5.0	0.211 J	0.183 J	0.384 J	< 0.5	< 1.5	< 10	1,280
	11/13/2014	< 0.5	1.51	0.355 J	< 5.0	0.195 J	0.251 J	0.270 J	< 0.5	< 1.5	< 10	2,250
	5/18/2015	< 0.5	1.51	< 0.5	< 5.0	0.221 J	0.233 J	0.228 J	< 0.5	< 1.5	< 10	1,840
	11/18/2015	< 0.5	2.18	< 0.5	< 5.0	< 0.5	0.240 J	0.352 J	< 0.5	< 1.0	< 10	2,260
	5/4/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	1.40	2,100
77S	5/1/1991	ND	--	ND	ND	ND	ND	ND	--	ND	**19.3**	509
	5/29/1991	--	--	--	--	--	--	--	--	--	--	--
	5/24/1994	ND	ND	ND	ND	ND	ND	ND	--	ND	--	--
79S	5/30/1991	**15.0**	--	1.0 J	ND	**53.0**	3.0 J	**53.0**	--	140	5.8 J	**3,880**
	2/8/1994	ND	ND	ND	ND	ND	ND	ND	--	ND	5.0	--
	5/4/1999	< 5.0	< 5.0	7.10	< 10	1.2 J	73.0	**6.60**	< 10	27.0	2.0	220
	12/21/1999	< 5.0	< 5.0	1.6 J	< 10	< 5.0	< 5.0	< 5.0	< 5.0	1.1 J	< 2.0	2,250
	7/13/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	1.2 J	1.2 J	< 5.0	< 15	< 7.0	2,800
	12/5/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	2.4 J	< 7.0	2,860
	7/24/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	**3,800**
	12/17/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	**5,000**
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	**3,800**
	5/17/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	< 5.0	**5,110**
	5/19/2008	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	**4,910**
	11/16/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
80S	1/1/1984	**980**	--	**1,827**	1,135	**125**	**18,732**	**214**	--	8,218	--	--
	1/1/1985	**4,100**	--	**3,700**	**29,000**	**34 J**	**98,000**	**1,100**	--	**29,000**	--	--
	5/30/1991	**590**	--	**1,400**	ND	ND	**18,000**	**210 J**	--	6,700	**21.9**	**6,370**
	2/13/1992	--	--	--	--	--	--	--	--	--	**88**	--
	2/8/1994	**78.0**	**260**	350	ND	**34.0**	27.0	**25.0**	--	< 700	**114**	--
	8/7/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	5/18/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	**22.1**	624
	11/16/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
83S	5/29/1991	ND	--	ND	ND	ND	ND	ND	--	ND	**32.7**	3,290
84S	5/31/1995	**150 J**	**390 J**	**820 J**	760 J	< 1,000	**12,000**	< 1000	< 1,000	2,400	**446**	**17,400**
	8/23/1995	**130 J**	**500**	**1,200**	< 500	< 250	**7,400**	< 250	< 250	5,300	--	--
	11/29/1995	< 5.0	67.0	47.0	< 10	**6.00**	16.0	**6.00**	< 5.0	47.0	--	--
	4/2/1996	< 50	< 50	200	< 100	< 50	53.0	< 50	< 50	470	**160**	3,600
	8/7/1996	< 5.0	26.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	1/8/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	3/20/1997	< 5.0	< 5.0	3.0 J	< 10	< 5.0	1.0 J	< 5.0	--	3.0 J	**170**	1,800
	5/4/1999	1.6 J	5.50	5.00	< 10	< 5.0	2.2 J	< 5.0	< 10	7.8 J	**279**	**3,890**
	12/20/1999	1.7 J	12.0	8.70	< 10	< 5.0	4.6 J	< 5.0	< 5.0	10 J	**421**	**6,220**
	7/13/2000	**7.00**	18.0	7.50	< 10	< 5.0	44.0	< 5.0	< 5.0	44.0	**372**	**4,280**
	12/5/2000	2.9 J	9.10	6.80	< 10	< 5.0	< 5.0	< 5.0	< 5.0	9.4 J	**637**	**6,120**
	7/24/2001	**6.40**	16.0	7.40	< 10	< 5.0	7.40	< 5.0	< 5.0	35.0	**340**	**4,200**
	12/18/2001	< 5.0	9.70	7.20	< 10	< 5.0	< 5.0	< 5.0	< 5.0	15.0	**350**	3,000
	7/2/2002	< 5.0	8.90	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**170**	**4,100**
	5/18/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	8.00	**75.4**	1,150
	11/10/2005	1.0 J	< 5.0	6.00	< 10	< 5.0	< 5.0	< 5.0	< 5.0	10.0	**83.2**	2,030
85S	7/24/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	1,700
	7/9/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**14.0**	**4,300**
	5/18/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	**13.0**	225
87S	2/8/1994	ND	ND	ND	ND	ND	ND	ND	--	ND	10.0	--
	12/20/1999	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	7.0	198
	12/5/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	< 7.0	115
	7/25/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	420
	7/9/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	1,400
	5/24/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	< 5.0	18.3
88S	8/7/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	7/24/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	510
	7/9/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	1,200
	5/17/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	3.92 J	69.5
105D	5/31/1995	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 25	13.0
	4/5/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
	7/24/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**11.0**	< 10
	7/9/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	15.0
	5/18/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	< 5.0	17.9
110S	6/9/1995	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 5.0	79
	8/23/1995	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	4/10/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	13.0	< 5.0	< 5.0	28.0	< 5.0	20
	8/14/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
EW-1S	4/8/1996	< 120	**240**	140	< 250	< 120	**4,100**	< 120	< 120	700	**670**	**3,400**
	8/8/1996	< 250	**800**	< 250	< 500	< 250	**1,700**	< 250	< 250	1,700	--	--
	9/17/1996	< 200	**310**	56 J	< 400	< 200	**1,600**	< 200	< 200	940	--	--
	10/14/1996	**9.00**	**110**	< 5.0	18.0	**6.00**	10.0	< 5.0	< 5.0	110	--	--
	12/30/1996	< 50	**91.0**	90.0	< 100	**33 J**	460	**10 J**	< 50	520	--	--
	1/8/1997	< 10	**100**	61.0	9.0 J	**30.0**	11.0	**12.0**	< 10	430	--	--
	3/21/1997	< 250	**390**	540	< 500	< 250	**2,900**	< 250	--	1,600	--	--
	5/28/1997	< 100	< 100	230	< 200	**22 J**	**2,100**	< 100	< 100	1,300	--	--
	6/27/1997	**14 J**	**92.0**	160	40 J	**17 J**	**2,200**	**16 J**	< 50	1,900	--	--
	10/7/1997	< 5.0	11.0	7.00	< 10	< 5.0	6.00	< 5.0	< 5.0	88.0	--	--
	11/11/1997	< 5.0	11.0	16.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	76.0	--	--
	4/21/1998	< 5.0	22.0	42.0	< 10	**140**	< 5.0	**5.80**	< 5.0	150	**28,000**	**16,000**
	5/5/1999	< 5.0	38.0	2.3 J	< 10	**10.0**	31.0	3.0 J	< 10	8.7 J	**385**	3,130
	12/20/1999	< 5.0	< 5.0	1.5 J	< 10	2.5 J	2.3 J	< 5.0	< 5.0	< 15	**21.0**	1,370
	7/13/2000	< 5.0	< 5.0	< 5.0	< 10	1.9 J	< 5.0	< 5.0	< 5.0	< 15	**358**	2,160
	12/5/2000	< 5.0	1.1 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	**276**	1,080
	7/25/2001	< 5.0	10.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**2,000**	2,400
	12/18/2001	< 5.0	12.0	11.0	< 10	< 5.0	9.40	< 5.0	< 5.0	< 10	**870**	1,100
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**250**	850
	6/3/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	**149**	684
EW-1D	4/17/1998	< 100	**130**	620	390	< 100	**2,500**	< 100	< 100	3,300	< 2.0	< 5.0
	10/27/1998	**190**	**120**	540	**2,000**	< 100	**1,800**	< 100	< 100	2,600	5.1	< 5.0
	5/5/1999	**56.0**	27.0	44.0	640	< 5.0	140	2.0 J	< 10	150	9.3	19.0
	12/20/1999	< 5.0	< 5.0	1.4 J	< 10	< 5.0	1.2 J	< 5.0	< 5.0	1.1 J	7.7	5.6
	7/13/2000	**58.0**	30.0	100	540	< 5.0	200	< 5.0	< 5.0	360	< 7.0	13.2
	12/5/2000	< 5.0	< 5.0	1.6 J	< 10	< 5.0	< 5.0	< 5.0	< 5.0	3.1 J	< 7.0	< 3.0
	7/25/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	10.0
	12/18/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	12.0	< 5.0	< 5.0	< 10	< 10	< 10
	7/9/2002	**12.0**	15.0	12.0	51.0	< 5.0	13.0	< 5.0	< 5.0	35.0	< 10	< 10
	5/24/2005	< 5.0	2.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	4.00	< 5.0	8.51
EW-2S	4/8/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**42.0**	**17,000**
	9/17/1996	1.0 J	4.0 J	< 5.0	< 10	3.0 J	< 5.0	3.0 J	< 5.0	< 5.0	--	--
	10/14/1996	5.00	10.0	< 5.0	5.0 J	**21.0**	< 5.0	**7.00**	< 5.0	< 5.0	--	--
	1/8/1997	< 5.0	< 5.0	< 5.0	< 10	1.0 J	< 5.0	< 5.0	< 5.0	< 10	--	--
	3/21/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**7.00**	--	< 5.0	--	--
	4/20/1998	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**86.0**	2,800
	5/5/1999	< 5.0	< 5.0	1.5 J	< 10	< 5.0	6.70	< 5.0	< 10	1.7 J	**46.5**	248
	12/21/1999	< 5.0	< 5.0	1.1 J	< 10	< 5.0	< 10	< 5.0	< 5.0	< 10	**22.0**	63.7
	7/13/2000	< 5.0	**100**	83.0	< 10	**14.0**	380	3.9 J	< 5.0	180	**42.7**	3,410
	12/5/2000	< 5.0	**140**	42.0	< 10	1.5 J	49.0	< 5.0	< 5.0	97.0	**40.8**	2,450
	7/26/2001	< 5.0	23.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**17.0**	430
	12/18/2001	< 5.0	14.0	< 5.0	< 10	< 5.0	7.10	< 5.0	< 5.0	< 10	**18.0**	510
	7/8/2002	< 5.0	16.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 50	1,900
	5/19/2005	< 5.0	54.0	320	< 10	< 5.0	260	< 5.0	< 10	460	**15.3**	637
	6/28/2006	< 5.0	2.0 J	120	< 10	< 5.0	27.0	< 5.0	< 5.0	330	**50.2**	--
	11/21/2006	< 5.0	< 5.0	1.0 J	< 10	< 5.0	< 5.0	< 5.0	< 5.0	1.0 J	< 100	124
	6/1/2007	< 5.0	3.0 J	6.00	< 10	< 5.0	6.00	< 5.0	< 5.0	20.0	< 100	505
	11/30/2007	< 5.0	5.0 J	470	< 10	< 5.0	140	< 5.0	< 5.0	1,490	< 100	2,970
	5/22/2008	< 5.0	< 5.0	8.00	< 10	< 5.0	< 5.0	< 5.0	< 2.0	3.00	< 100	445
	11/18/2008	< 5.0	3.0 J	350	< 10	< 5.0	22.0	< 5.0	< 2.0	910	< 100	**4,880**
	6/24/2009	< 0.5	< 0.5	12.2	< 10	< 0.5	0.330 J	< 0.5	< 0.5	18.6	**15.0**	434
	11/20/2009	< 0.5	4.10	327	5.22 J	< 0.5	5.03	< 0.5	< 0.5	769	**47.8**	1,860

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
EW-2S (cont.)	12/1/2010	< 0.5	0.320 J	9.89	< 10	< 0.5	< 0.5	< 0.5	< 0.5	18.2	6.0 J	1,090
	5/9/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	336
	11/17/2011	< 0.5	0.310 J	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	7.3 J	405
	5/16/2012	< 0.5	0.790	8.53	< 10	0.320 J	< 0.5	0.290 J	< 0.5	19.2	**14.8**	2,700
EW-3S	4/4/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	1,700
	9/17/1996	**23.0**	44.0	11.0	< 10	**28.0**	4.0 J	**32.0**	< 5.0	7.00	--	--
	10/14/1996	4.0 J	7.00	2.0 J	< 10	**6.00**	< 5.0	4.0 J	< 5.0	< 5.0	--	--
	1/8/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	--	--
	3/21/1997	< 5.0	2.0 J	< 5.0	< 10	< 5.0	9.00	4.0 J	--	5.00	--	--
	4/20/1998	< 5.0	< 5.0	< 5.0	< 10	5.00	< 5.0	< 5.0	< 5.0	< 5.0	**27.0**	1,600
	5/5/1999	< 5.0	< 5.0	1.7 J	< 10	< 5.0	8.50	< 5.0	< 10	2.2 J	**509**	**6,260**
	12/21/1999	< 5.0	< 5.0	< 5.0	< 10	1.0 J	< 5.0	< 5.0	< 5.0	< 10	**15.2**	**3,550**
	7/13/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	1.80	< 5.0	< 5.0	< 15	9.7	2,140
	12/5/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	7.3	262
	7/26/2001	< 5.0	< 5.0	< 5.0	< 25	< 5.0	< 5.0	< 5.0	< 10	< 10	< 50	120
	12/18/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	5.60	< 5.0	< 5.0	< 10	**170**	7,000
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	< 10
	5/19/2005	< 5.0	**110**	< 5.0	< 10	**14.0**	< 5.0	< 5.0	< 10	< 1.0	< 5.0	1,230
	11/8/2005	< 5.0	53.0	< 5.0	< 10	4.0 J	< 5.0	1.0 J	< 5.0	< 1.0	< 5.0	287
	6/28/2006	< 5.0	**130**	1.0 J	< 10	5.00	< 5.0	< 5.0	< 5.0	< 1.0	6.85	--
	11/21/2006	< 5.0	10.0	< 5.0	< 10	1.0 J	< 5.0	< 5.0	< 5.0	< 1.0	< 100	312
	2/28/2007	< 5.0	**100**	< 5.0	< 10	4.0 J	< 5.0	1.0 J	< 5.0	< 1.0	< 100	743
	5/30/2007	< 5.0	14.0	< 5.0	< 10	2.0 J	< 5.0	< 5.0	< 5.0	< 1.0	< 100	10.9
	11/29/2007	< 5.0	**100**	< 5.0	< 10	1.0 J	< 5.0	< 5.0	< 5.0	< 1.0	**45 J**	**15,700**
	5/21/2008	< 5.0	19.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	196
	11/17/2008	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	50.2
	6/25/2009	< 0.5	1.23	< 0.5	< 10	0.280 J	< 0.5	< 0.5	< 0.5	< 0.5	< 10	1,430
	11/20/2009	< 0.5	< 0.5	< 0.5	< 10	< 0.5	0.470 J	< 0.5	< 0.5	< 0.5	< 10	104
	12/3/2010	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	9.7 J	683
	5/11/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**63.8**	**9,620**
	11/17/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	618
	5/16/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	0.310 J	< 0.5	< 0.5	< 0.5	< 10	72.4
	11/15/2012	< 0.5	0.772	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	**7,660**
	5/24/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5.1 J	307
	11/11/2013	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	186
	5/19/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	69.6
	11/10/2014	< 0.5	0.489 J	< 0.5	< 5.0	0.266 J	< 0.5	< 0.5	< 0.5	0.676 J	< 10	**3,750**
	5/18/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	57.5
	11/18/2015	< 0.5	0.740	< 0.5	< 5.0	0.259 J	< 0.5	< 0.5	< 0.5	< 1.0	< 10	2,270
EW-4S	4/2/1996	< 10	< 10	33.0	< 20	< 10	33.0	< 10	< 10	450	**54**	2,700
	9/17/1996	< 5.0	1.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	16.0	--	--
	10/14/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	9.00	--	--
	1/8/1997	< 5.0	< 5.0	< 5.0	5.0 J	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	8/14/1997	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	4/20/1998	< 5.0	12.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**520**	3,000
EW-5S	4/10/1996	< 5.0	< 5.0	7.00	< 10	< 5.0	< 5.0	< 5.0	< 5.0	42.0	130	1200
	9/17/1996	< 25	< 25	< 25	< 50	< 25	67.0	**9.0 J**	< 25	440	--	--
	10/14/1996	< 5.0	< 5.0	140	< 10	< 5.0	8.00	**6.00**	< 5.0	100	--	--
	12/30/1996	< 500	< 500	260 J	< 1,000	< 500	**3,400**	< 500	< 500	1,900	--	--
	1/8/1997	4.0 J	< 10	41.0	5.0 J	< 10	380	< 10	< 10	260	--	--
	3/21/1997	< 5.0	< 5.0	2.0 J	< 10	< 5.0	7.00	< 5.0	--	24.0	--	--
	10/7/1997	**8.00**	< 5.0	120	< 10	< 5.0	120	< 5.0	< 5.0	320	--	--
	11/11/1997	< 50	< 50	250	< 100	< 50	860	< 50	< 50	900	--	--
	4/21/1998	< 5.0	< 5.0	< 5.0	15.0	< 5.0	5.60	< 5.0	< 5.0	< 5.0	**13,000**	**7,200**
	5/5/1999	5.00	< 5.0	62.0	< 10	< 5.0	4.2 J	< 5.0	< 10	180	**4,080**	2,080
	12/20/1999	4.2 J	< 5.0	2.3 J	< 10	< 5.0	< 5.0	< 5.0	< 5.0	2.9 J	**3,220**	**3,860**
	7/13/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	1.4 J	< 5.0	< 5.0	1.1 J	**191**	**4,270**
	12/5/2000	**39.0**	< 5.0	170	< 10	< 5.0	57.0	< 5.0	< 5.0	360	**352**	**6,840**
	7/24/2001	< 25	< 25	41.0	< 50	< 25	780	< 25	< 25	1,200	**120**	**3,700**
	12/17/2001	**12.0**	< 5.0	5.20	< 10	< 5.0	< 5.0	< 5.0	< 5.0	17.0	**1,100**	**6,400**
	6/13/2002	< 5.0	< 5.0	64.0	< 10	< 5.0	37.0	< 5.0	--	160	--	--
	7/9/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	98.0	< 10	**3,900**
	12/18/2002	< 5.0	< 5.0	14.0	< 10	< 5.0	58.0	< 5.0	< 5.0	28.0	**31**	**6,400**
	6/5/2003	< 5.0	< 5.0	6.70	< 10	< 5.0	21.0	< 5.0	< 5.0	19.0	< 10	1,000
	12/22/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**19.8**	330
	11/3/2004	< 5.0	< 5.0	3.0 J	< 10	< 5.0	5.00	< 5.0	< 5.0	6.00	**46.6**	966
	5/18/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	< 5.0	48.4
EW-6S	8/15/1996	0.710	22.0	2.70	ND	ND	3.90	4.40	--	1.30	--	--
	9/17/1996	0.260	11.0	0.600	ND	ND	2.50	**5.40**	--	0.600	--	--
	10/14/1996	0.340	11.0	0.510	ND	ND	2.40	**6.70**	--	0.490	--	--
	7/24/2001	< 5.0	**130**	7.40	< 10	< 5.0	28.0	< 5.0	< 5.0	36.0	**11.0**	2,000
	7/8/2002	< 10	**230**	98.0	< 20	< 10	150	< 10	< 10	240	**39.0**	1,300
	5/27/2004	< 5.0	7.00	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.72	1,410
	5/25/2005	--	--	--	--	--	--	--	--	--	8.66	1,310
	6/10/2005	< 5.0	3.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	--	--
	11/11/2005	< 5.0	4.0 J	3.0 J	< 10	< 5.0	< 5.0	< 5.0	< 5.0	1.0 J	8.30	531
EW-7S	4/16/1998	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	4.90	1,800
	10/27/1998	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.10	2,900
	5/5/1999	< 5.0	< 5.0	< 5.0	< 10	< 5.0	5.20	< 5.0	< 10	1.3 J	< 2.0	**11,000**
	12/20/1999	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 7.0	2,840
	7/13/2000	< 5.0	1.1 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	< 7.0	**4,440**
	12/5/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	< 7.0	2,900
	7/25/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	--	--
	12/18/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	14.0	< 5.0	< 5.0	< 10	10	2,900
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	**6,200**
	12/19/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	710
	6/6/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	850
	12/18/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	1,720
	5/25/2005	--	--	--	--	--	--	--	--	--	4.72 J	623
	6/8/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	--	--
EW-8S	9/17/1996	**260 J**	**11,000**	600 J	< 2,000	< 1,000	**2,500**	**5,400**	< 1,000	600 J	--	--
	10/14/1996	**340 J**	**11,000**	510	< 1,000	< 500	**2,400**	**6,700**	< 500	490 J	--	--
	12/30/1996	< 2,500	**2,300 J**	< 2,500	< 5,000	< 2,500	**9,200**	**1,600 J**	< 2,500	2,300 J	--	--
	1/8/1997	**160**	**2,000**	190	27 J	**36 J**	**1,500**	**1,100**	< 50	1,100	--	--
	3/21/1997	< 120	**860**	690	< 250	< 120	**2,500**	**46 J**	--	9,500	--	--
	5/28/1997	**180**	< 100	210	< 200	**23 J**	**1,800**	**1,200**	< 100	500	--	--
	6/27/1997	**260**	**2,400**	340	< 250	**34 J**	**4,400**	**1,500**	< 120	1,200	--	--
	8/14/1997	**160**	**2,900**	240	< 250	< 120	260	**520**	< 120	1,300	--	--
	10/7/1997	< 100	**1,400**	< 100	< 200	< 100	< 100	**300**	< 100	< 100	--	--
	11/11/1997	< 25	**320**	< 25	< 50	< 25	< 25	**34.0**	< 25	< 25	--	--
	4/20/1998	< 5.0	13.0	< 5.0	< 10	< 5.0	6.20	**85.0**	< 5.0	< 5.0	**470**	830
	5/5/1999	< 5.0	18.0	< 5.0	< 5.0	< 5.0	4.1 J	**9.90**	< 10	6.5 J	**805**	2,920
	12/20/1999	**8.20**	**1,400**	8.20	< 10	3.2 J	28.0	**190**	< 5.0	340	**35.6**	**10,000**
	7/13/2000	**61.0**	**1,800**	**790**	< 40	< 16	**8,800**	**97.0**	< 16	2,700	**388**	**18,900**
	12/5/2000	< 5.0	18.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	1.0 J	**30.1**	2,380
	7/25/2001	< 5.0	9.00	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**150**	730
	12/17/2001	< 5.0	**950**	15.0	< 10	< 5.0	150	**5.40**	< 5.0	69.0	**220**	**5,800**
	7/8/2002	< 5.0	16.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	34
	5/25/2005	--	--	--	--	--	--	--	--	--	< 5.0	9.33
	6/10/2005	< 5.0	4.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	--	--
EW-9S	9/17/1996	**1,600 J**	**2,600 J**	**1,400 J**	< 10,000	< 5,000	**18,000**	< 5,000	< 5,000	5,100	--	--
	10/14/1996	**2,900**	**6,200**	**1,800**	1,500 J	< 1,200	**27,000**	< 1,200	< 1,200	8,400	--	--
	12/30/1996	**610**	**1,500**	**800**	650 J	< 500	**4,100**	**110 J**	< 500	1,700	--	--
	1/8/1997	**620**	**3,200**	56 J	760	**360**	590	**510**	< 120	1,500	--	--
	3/21/1997	< 5.0	13.0	< 5.0	< 10	**14.0**	< 5.0	3.0 J	--	< 5.0	--	--
	5/28/1997	**1,300**	< 200	**1,300**	1,800	< 200	**4,200**	**150 J**	< 200	2,900	--	--
	6/27/1997	**1,000**	**2,200**	**990**	**1,900**	**51 J**	**4,200**	**70 J**	< 120	2,100	--	--
	8/14/1997	**820**	**2,300**	**900**	1,300	< 120	**2,700**	< 120	< 120	1,900	--	--
	10/7/1997	**210**	**630**	220	< 200	< 100	**2,100**	< 100	< 100	640	--	--
	11/11/1997	< 20	**440**	200	62.0	< 20	150	< 20	< 20	290	--	--
	4/20/1998	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**19,000**	**17,000**
	5/5/1999	< 5.0	2.5 J	9.00	< 10	< 5.0	85.0	**6.70**	< 10	32.0	**242**	3,040
	12/20/1999	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**21.7**	1,640
	7/13/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	2.6 J	< 5.0	< 5.0	< 15	**15.2**	366
	12/5/2000	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	**13.3**	2,060
	7/24/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**24**	160
	12/18/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	7.50	< 5.0	< 5.0	< 10	**1,600**	**10,000**
	7/8/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	5.70	< 5.0	< 5.0	< 10	< 50	130
	5/25/2005	--	--	--	--	--	--	--	--	--	< 5.0	16.9

ARCADIS

Well ID	Chemical Name: / ICL: / Unit: / Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
	6/8/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	--	--
EW-10S	3/21/1997	< 500	< 500	570	< 1,000	< 500	**13,000**	< 500	--	7,100	--	--
	5/28/1997	< 200	< 200	**890**	< 400	< 200	**6,400**	< 200	< 200	4,500	--	--
	6/27/1997	< 120	< 120	400	< 250	< 120	**2,500**	< 120	< 120	2,400	--	--
	8/14/1997	< 50	< 50	170	< 100	< 50	850	< 50	< 50	800	--	--
	11/11/1997	< 120	< 120	170	< 250	< 120	**1,800**	< 120	< 120	1,600	--	--
	5/5/1999	3.7 J	< 5.0	230	< 10	< 5.0	510	1.1 J	< 10	540	**47,500**	**38,700**
	12/20/1999	**6.90**	< 5.0	380	< 10	< 5.0	**1,100**	3.3 J	< 5.0	2,200	**2,880**	**12,000**
	7/12/2000	3.7 J	< 5.0	330	< 10	< 5.0	710	1.1 J	< 5.0	1,300	**4,880**	**7,190**
	12/4/2000	< 6.0	< 8.0	480	< 20	< 8.0	**3,500**	< 5.0	< 8.0	1,800	**5,580**	**9,960**
	7/24/2001	< 100	< 100	680	< 200	< 100	**4,700**	< 100	< 100	3,600	**190**	**15,000**
	12/17/2001	< 5.0	< 5.0	**710**	< 10	< 5.0	5.30	< 5.0	< 5.0	240	**430**	**8,600**
	6/13/2002	< 25	< 25	110	< 50	< 25	700	< 25	--	740	--	--
	7/9/2002	< 50	< 50	440	< 100	< 50	**1,600**	< 50	< 50	1,800	**60.0**	**8,800**
	12/19/2002	< 5.0	< 5.0	46.0	< 20	< 5.0	88	< 5.0	< 5.0	580	**130**	**12,000**
	6/5/2003	< 10	< 10	88.0	< 20	< 10	180	< 10	< 10	340	**43.0**	**4,600**
	12/19/2003	< 5.0	< 5.0	110	< 10	< 5.0	820	< 5.0	< 5.0	720	**213**	3,600
	6/1/2004	< 5.0	< 5.0	310	< 10	< 5.0	**1,400**	< 5.0	< 5.0	1,570	**171**	**4,210**
	11/2/2004	2.0 J	4.0 J	**1,100**	< 10	< 5.0	**10,000**	< 5.0	< 5.0	5,600	**663**	**16,200**
	5/17/2005	< 5.0	< 5.0	230 J	< 10	< 5.0	**1,400**	< 5.0	< 10	1,180	**77.1**	**5,420**
	11/8/2005	< 5.0	< 5.0	450	< 10	< 5.0	**2,100**	< 5.0	< 5.0	2,500	**114**	2,790
	6/29/2006	< 5.0	< 5.0	19.0	< 10	< 5.0	62.0	< 5.0	< 5.0	51.0	**20.2**	1,530
	11/21/2006	< 5.0	< 5.0	26.0	< 10	< 5.0	120	< 5.0	< 5.0	126	< 100	566
	5/29/2007	< 5.0	< 5.0	100	< 10	< 5.0	**1,100**	< 5.0	< 5.0	360	**29.8 J**	2,750
	11/26/2007	2.0 J	3.0 J	**740**	< 10	< 5.0	**5,700**	0.9 J	< 5.0	3,600	**270**	**9,460**
	5/19/2008	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	**27.9 J**	1,040
	6/30/2008	2.0 J	1.0 J	**750**	< 10	< 5.0	**8,500**	5.00	< 2.0	3,500	**150**	**7,730**
	11/17/2008	2.0 J	< 5.0	**830**	< 10	< 5.0	**7,600**	4.0 J	< 2.0	3,900	**104**	**7,930**
	6/23/2009	2.29	< 0.5	**950**	< 10	< 0.5	**9,030**	**6.42**	< 0.5	4,420	**65.0**	**8,690**
	11/19/2009	2.59 J	8.78 J	**1,350**	< 10	< 0.5	**17,800**	2.74 J	< 0.5	6,160	**92.5**	**10,800**
	11/30/2010	0.370 J	1.00	496	< 10	< 0.5	**2,930**	1.25	< 0.5	4,450	**257**	**7,820**
	5/9/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	1.71	9.0 J	325
	11/14/2011	1.64	1.09	**706**	< 10	< 0.5	**12,400**	**5.89**	< 0.5	3,190	**213**	**12,300**
	5/17/2012	1.09	0.860	429	< 10	< 0.5	**6,000**	4.00	< 0.5	1,810	**60.8**	**6,740**
	11/13/2012	< 2.5	< 2.5	375	< 50	< 2.5	**22,600**	< 2.5	< 2.5	2,010	**81.2**	**7,570**
	5/24/2013	< 0.5	< 0.5	3.61	< 10	< 0.5	40.6	< 0.5	< 0.5	15.9	5.1 J	149 B
	11/12/2013	< 5.0	< 5.0	**1,910**	< 50	< 5.0	**18,700**	**6.30**	< 5.0	**10,400**	**93.1**	**17,300**
	5/20/2014	< 0.5	< 0.5	0.753	< 5.0	< 0.5	3.35	< 0.5	< 0.5	5.69	< 10	313
	11/11/2014	1.17	0.242 J	**2,340**	< 5.0	< 0.5	**31,400**	**12.9**	< 0.5	**12,900**	**127**	**14,000**
	5/19/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	0.745	< 0.5	< 0.5	1.36 J	< 10	35.7
MW-308	11/19/2015	< 0.5	< 0.5	174	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	284	**109**	**11,500**
	5/18/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**15.0**	**8,940**
	11/9/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	9.9 J	**9,770**
	5/18/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	578
	11/7/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	302
	5/30/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	**12,900**
	11/14/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	127
	5/16/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	0.253 J	< 0.5	< 0.5	< 1.5	< 10	**10,200**
	5/5/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	0.515 J	16.9
Bedrock Wells												
28R	3/6/2013	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	0.150 J	< 0.5	< 0.5	< 1.5	--	--
	11/19/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**15.2**	52.5
	5/20/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	113 J
	11/10/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**27.5**	64.9
	5/19/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**16.0**	67.1
	11/10/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 50	78.5
	5/30/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	9.9 J	31.6
	11/19/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	0.683	< 0.5	< 0.5	< 1.5	**15.1**	26.3
	5/15/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	12.8 J
	5/4/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**28.1**	89.6
32R	1/1/1985	ND	--	--	ND	ND	ND	ND	--	ND	--	--
	1/1/1985	ND	--	--	ND	ND	ND	2.0 J	--	ND	--	--
	1/1/1985	ND	ND	--	ND	ND	ND	ND	--	ND	--	--
	6/5/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
	6/5/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
	6/6/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
35R	1/1/1985	**12.0**	ND	--	ND	ND	ND	**110**	--	4.0 J	--	--
	6/6/1990	**19.0**	< 5.0	< 5.0	140	< 5.0	< 5.0	4.0 J	< 10	< 5.0	--	--
	6/1/1991	**52.0**	ND	--	320	ND	ND	**12 J**	--	ND	--	--
	5/24/1994	**290**	26.0	ND	790	< 10	ND	**25.0**	--	ND	--	--
	1/8/1997	**17.0**	4.0 J	< 5.0	120	< 5.0	< 5.0	1.0 J	< 5.0	< 5.0	--	--
	3/21/1997	< 5.0	3.0 J	5.00	23.0	< 5.0	3.0 J	5.00	--	6.00	--	--
	4/21/1998	**130**	< 25	< 25	1,000	< 25	< 25	< 25	< 25	< 25	**30.0**	870
	5/6/1999	**120**	9.60	1.6 J	180	1.2 J	< 5.0	**12.0**	< 10	< 15	--	--
	12/21/1999	**92.0**	10.0	1.8 J	< 10	1.8 J	< 5.0	**18.0**	< 5.0	< 15	--	--
	2/16/2000	**53.0**	8.70	< 5.0	< 10	2.1 J	< 5.0	**19.0**	< 5.0	< 15	--	--
	7/13/2000	**75.0**	8.20	< 5.0	24.0	1.7 J	< 5.0	**13.0**	< 5.0	< 15	--	--
	12/6/2000	**78.0**	8.30	< 5.0	< 10	2.3 J	< 5.0	**19.0**	< 5.0	< 15	--	--
	7/26/2001	**60.0**	12.0	< 5.0	< 25	< 5.0	< 5.0	**22.0**	< 10	< 10	--	--
	12/19/2001	**140**	28.0	5.40	33.0	< 5.0	58.0	**20.0**	< 5.0	13.0	--	--
	7/10/2002	**30.0**	8.20	< 5.0	< 10	< 5.0	< 5.0	**12.0**	< 5.0	< 10	--	--
	1/16/2003	**40.0**	11.0	< 5.0	< 10	< 5.0	< 5.0	**20.0**	< 5.0	< 10	**23.0**	960
	3/12/2003	**31.0**	12.0	< 5.0	< 10	< 5.0	< 5.0	**20.0**	< 5.0	< 10	**22.0**	960
	6/4/2003	**44.0**	10.0	< 5.0	< 10	< 5.0	< 5.0	**20.0**	< 5.0	< 10	**21.0**	950
	10/27/2003	**56.0**	20.0	< 5.0	< 10	< 5.0	< 5.0	**27.0**	< 5.0	< 5.0	**21.6**	1,170
	12/17/2003	**56.0**	19.0	< 5.0	< 10	< 5.0	< 5.0	**22.0**	< 5.0	< 5.0	**25.2**	1,110
	2/10/2004	**41.0**	13.0	< 5.0	< 10	< 5.0	< 5.0	**20.0**	< 5.0	< 5.0	**21.2**	1,100
	3/23/2004	**50.0**	12.0	< 5.0	< 10	< 5.0	< 5.0	**23.0**	< 5.0	< 5.0	**18.6**	1,200
	5/25/2004	**56.0**	16.0	< 5.0	< 10	5.00	< 5.0	**18.0**	< 5.0	< 5.0	**19.7**	1,100
	11/8/2004	**76.0**	24.0	5.00	< 10	4.0 J	1.0 J	**29.0**	< 5.0	1.0 J	**19.6**	1,380
	5/26/2005	**35.0**	12.0	< 5.0	< 10	**6.00**	< 5.0	**20.0**	< 10	< 1.0	**20.3**	1,160
	11/11/2005	**53.0**	22.0	3.0 J	< 10	3.0 J	< 5.0	**19.0**	< 5.0	< 1.0	**19.8**	1,260
	7/5/2006	**18.0**	5.0 J	< 5.0	< 10	< 5.0	< 5.0	3.0 J	< 5.0	< 1.0	**27.0**	925
	8/31/2006	**19.0**	7.00	< 5.0	< 10	1.0 J	< 5.0	**6.00**	< 5.0	< 1.0	**23.8**	1,060
	11/21/2006	5.00	2.0 J	< 5.0	< 10	0.9 J	< 5.0	2.0 J	< 5.0	< 1.0	< 100	993
	2/27/2007	5.00	5.0 J	< 5.0	< 10	2.0 J	< 5.0	4.0 J	< 5.0	< 1.0	< 100	834
	5/30/2007	**18.0**	5.0 J	< 5.0	< 10	< 5.0	< 5.0	2.0 J	< 5.0	< 1.0	< 100	823
	11/27/2007	**14.0**	10.0	< 5.0	< 10	3.0 J	< 5.0	**11.0**	< 5.0	< 1.0	**44 J**	1,120
	5/22/2008	**6.00**	11.0	< 5.0	< 10	1.0 J	< 5.0	4.0 J	< 2.0	< 1.0	< 100	926
	11/21/2008	4.0 J	7.00	< 5.0	< 10	2.0 J	< 5.0	5.00	< 2.0	< 1.0	< 100	1,170
	6/25/2009	**27.3**	14.0	2.68	< 10	1.77	0.870	**9.02**	< 0.5	0.790	**14.2**	1,250
	11/24/2009	**37.2**	22.0	3.01	< 10	2.85	< 0.5	**12.8**	< 0.5	< 0.5	**15.7**	1,450
	11/30/2010	**13.7**	22.7	1.24	< 10	2.44	0.340 J	**9.59**	< 0.5	1.25	**13.8**	1,820
	5/10/2011	**12.0**	13.8	0.930	< 10	2.45	< 0.5	**8.48**	< 0.5	0.410 J	**16.3**	1,430
	11/14/2011	3.63	18.1	< 0.5	< 10	2.36	< 0.5	**7.54**	< 0.5	< 0.5	**12.9**	1,700
	5/16/2012	1.07	5.16	< 0.5	< 10	1.47	< 0.5	4.79	< 0.5	< 0.5	**14.5**	1,310
	11/12/2012	0.277 J	1.94	< 0.5	< 10	1.10	< 0.5	1.84	< 0.5	< 0.5	< 10	304
	5/23/2013	0.794	5.00	< 0.5	< 10	1.23	< 0.5	3.56	< 0.5	< 0.5	< 10	1,390
	11/12/2013	0.287	1.54	< 0.5	< 5.0	0.620	< 0.5	1.70	< 0.5	< 1.5	6.8 J	1,840
	5/21/2014	**10.6**	4.72	2.44	< 5.0	0.740	< 0.5	1.32	< 0.5	0.889 J	**10.4**	1,370
	9/11/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	--	--
	10/15/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	--	--
	1/6/2015	< 0.5	0.575	< 0.5	< 5.0	0.244 J	< 0.5	0.672	< 0.5	< 1.5	--	--
	5/20/2015	**6.70**	3.18	1.80	< 5.0	0.700	< 0.5	1.01	< 0.5	0.611 J	9.3 J	1,400
	11/17/2015	4.67	3.23	1.51	< 5.0	0.655	< 0.5	1.20	< 0.5	< 1.0	< 10	1,590
	5/17/2016	0.378 J	0.775	< 0.5	< 5.0	0.467 J	< 0.5	1.18	< 0.5	< 1.0	< 10	1,750
	8/23/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	373
	11/7/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	366
	5/16/2017	3.25	3.12	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	332
	11/8/2017	0.248 J	0.375 J	< 0.5	< 5.0	0.783	< 0.5	1.09	< 0.5	< 1.5	< 10	85.8
	5/24/2018	1.30	1.99	< 0.5	< 5.0	0.466 J	< 0.5	1.33	< 0.5	< 1.5	< 10	371
	11/12/2018	0.295 J	3.26	< 0.5	< 5.0	0.205 J	2.70	0.981	< 0.5	< 1.5	< 10	392
	5/13/2019	< 0.5	1.19	< 0.5	< 5.0	< 0.5	0.487 J	0.242 J	< 0.5	< 1.5	< 10	650
59R	9/18/1984	ND	ND	--	ND	ND	ND	ND	--	ND	--	--
	11/26/1984	ND	ND	--	ND	ND	ND	ND	--	ND	--	--
	1/1/1985	ND	ND	--	ND	ND	ND	ND	--	ND	--	--
	6/1/1990	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 5.0	--	--
	5/21/2008	< 5.0	< 5.0	< 5.0	< 10	< 5.0	8.00	< 5.0	< 2.0	< 1.0	< 100	99.9
	11/20/2008	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	111

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
59R (cont.)	6/26/2009	< 0.5	< 0.5	< 0.5	< 10	< 0.5	4.93	< 0.5	< 0.5	< 0.5	7.0 J	29.7
	11/23/2009	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	6.4 J	36.6
	12/3/2010	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	6.7 J	29.2
	5/12/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	5.5 J	39.8
	11/17/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	0.970	< 0.5	< 0.5	< 0.5	5.6 J	34.4
	5/15/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	29.0
61R	9/18/1984	< 5.0	--	--	20.5	ND	5.30	< 5.0	--	ND	--	--
	11/26/1984	< 5.0	--	< 5.0	ND	ND	29.1	< 5.0	--	ND	--	--
	1/1/1985	ND	--	--	ND	ND	ND	**16.0**	--	ND	--	--
	6/1/1990	2.0 J	< 5.0	< 5.0	< 10	< 5.0	< 5.0	5.00	< 10	< 5.0	--	--
	6/2/1995	2.0 J	2.0 J	< 10	< 10	< 10	< 10	**28.0**	< 10	2.0 J	**26**	134
	4/1/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**17.0**	< 5.0	< 5.0	**26**	170
	10/26/1998	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**10.0**	< 5.0	< 5.0	8.9	180
	7/24/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**13.0**	< 5.0	< 10	**80**	490
	7/9/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	< 10
	11/5/2004	4.0 J	6.00	< 5.0	< 10	< 5.0	< 5.0	**14.0**	< 5.0	< 5.0	**35.6**	260
	5/31/2005	2.0 J	6.00	< 5.0	< 10	< 5.0	< 5.0	**12.0**	< 10	1.0 J	**51.7**	311
	5/22/2008	2.0 J	7.00	< 5.0	< 10	< 5.0	2.0 J	**9.00**	< 2.0	< 1.0	**45.8 J**	245
	6/26/2009	2.90	10.0	0.910	< 10	< 0.5	1.33	**12.8**	< 0.5	< 0.5	**28.6**	217
	12/2/2010	3.11	9.33	0.560	< 10	< 0.5	< 0.5	**7.77**	< 0.5	< 0.5	**31.0**	225
	5/9/2011	3.18	12.9	0.660	< 10	< 0.5	< 0.5	**8.55**	< 0.5	< 0.5	**27.5**	258
	11/14/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	0.390 J	< 0.5	< 0.5	< 0.5	< 10	61.8
	5/15/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	209
61R (75-90)	11/13/2012	0.385 J	< 0.5	0.384 J	< 10	< 0.5	< 0.5	< 0.5	< 0.5	0.273 J	< 10	10.4 J
	5/24/2013	1.36	3.10	< 0.5	< 10	< 0.5	< 0.5	0.237 J	< 0.5	< 0.5	**10.2**	14.7 J
	11/12/2013	< 0.5	1.85	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**13.0**	28.1
	5/19/2014	1.66	5.05	0.599	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**14.5**	78.3
	11/11/2014	0.640	3.77	0.217 J	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**12.7**	< 15
	5/19/2015	1.20	4.55	0.392 J	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**10.7**	102
	11/19/2015	1.14	6.23	0.438 J	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**12.7**	188
	5/18/2016	< 0.5	5.82	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	20.9
	11/10/2016	0.601	5.73	0.235 J	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**15.3**	24.5
	5/16/2017	0.294 J	4.37	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	20.1
	11/8/2017	< 0.5	3.61	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	527
	5/24/2018	< 0.5	3.42	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**14.9**	123
	11/15/2018	< 0.5	2.52	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**17.5**	446
	5/16/2019	< 0.5	3.15	< 0.5	< 5.0	< 0.5	0.568	< 0.5	< 0.5	< 1.5	< 10	32.9
61R (183-198)	11/13/2012	1.19	17.7	< 0.5	< 10	< 0.5	< 0.5	**38.7**	< 0.5	< 0.5	< 10	82.2
	5/21/2013	1.81	15.6	< 0.5	< 10	< 0.5	< 0.5	**25.7**	0.183 J	< 0.5	7.9 J	129
	11/12/2013	0.233 J	14.2	< 0.5	< 5.0	< 0.5	< 0.5	**20.6**	< 0.5	< 1.5	**12.5**	115
	5/19/2014	< 0.5	13.2	< 0.5	< 5.0	< 0.5	< 0.5	**24.4**	< 0.5	< 1.5	**12.0**	20.4
	11/11/2014	1.60	13.4	< 0.5	< 5.0	< 0.5	< 0.5	**15.6**	< 0.5	< 1.5	**14.4**	146
	5/19/2015	1.90	13.4	< 0.5	< 5.0	< 0.5	< 0.5	**13.1**	< 0.5	< 1.5	**11.8**	141
	11/19/2015	1.63	16.3	< 0.5	< 5.0	< 0.5	0.266 J	**15.1**	< 0.5	< 1.0	**10.2**	146
	5/18/2016	< 0.5	6.10	< 0.5	< 5.0	< 0.5	< 0.5	**7.96**	< 0.5	< 1.0	< 10	134
	11/9/2016	0.970	14.5	< 0.5	< 5.0	< 0.5	< 0.5	**10.5**	< 0.5	< 1.0	**14.0**	152
	5/18/2017	< 0.5	0.287 J	< 0.5	< 5.0	< 0.5	< 0.5	0.453 J	< 0.5	< 1.5	< 10	14.2 J
	11/8/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	0.582	< 0.5	< 1.5	< 10	29.2 J
	5/24/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	270
	11/16/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	89.6
	5/17/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	0.244 J	< 0.5	< 0.5	< 1.5	< 10	55.5
	5/6/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	1.90	344
63R	9/18/1984	**11.8**	ND	--	ND	ND	< 5.0	**23.1**	--	ND	--	--
	11/26/1984	**33.5**	ND	--	ND	ND	ND	**77.5**	--	ND	--	--
	1/1/1985	**14.0**	ND	--	2.0 J	ND	2.0 J	**310**	--	ND	--	--
	6/1/1990	**14.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**45.0**	< 10	< 5.0	--	--
	7/24/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**24.0**	< 5.0	< 10	**27.0**	340
	7/9/2002	**5.50**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**33.0**	< 5.0	< 10	**22.0**	310
	12/20/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**25.0**	< 5.0	< 10	**22.0**	310
	6/6/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**30.0**	< 5.0	< 10	**25.0**	350
	12/22/2003	< 5.0	2.0 J	< 5.0	< 10	< 5.0	< 5.0	**22.0**	< 5.0	< 5.0	**29.1**	336
	6/2/2004	5.00	2.0 J	< 5.0	< 10	< 5.0	< 5.0	**31.0**	< 5.0	< 5.0	**25.9**	297
	11/9/2004	3.0 J	2.0 J	< 5.0	< 10	< 5.0	< 5.0	**18.0**	< 5.0	< 5.0	**25.2**	324
	6/3/2005	**6.00**	4.0 J	< 5.0	< 10	< 5.0	< 5.0	**35.0**	< 10	< 1.0	**26.0**	328
	11/7/2005	4.0 J	6.00	< 5.0	< 10	< 5.0	< 5.0	**25.0**	< 5.0	< 1.0	**15.8**	204
	6/30/2006	5.00	15.0	< 5.0	< 10	< 5.0	< 5.0	**28.0**	< 5.0	< 1.0	**19.4**	--
	11/28/2006	1.0 J	7.00	< 5.0	< 10	< 5.0	< 5.0	**17.0**	< 5.0	< 1.0	< 100	117
	6/1/2007	4.0 J	8.00	< 5.0	< 10	< 5.0	< 5.0	**18.0**	< 5.0	< 1.0	< 100	324
	5/23/2008	3.0 J	9.00	< 5.0	< 10	< 5.0	< 5.0	**14.0**	< 2.0	< 1.0	**39 J**	329
	6/29/2009	1.14	3.70	< 0.5	< 10	< 0.5	< 0.5	**11.6**	< 0.5	< 0.5	**12.2**	139 B1
	12/3/2010	2.17	7.57	< 0.5	< 10	< 0.5	< 0.5	**10.7**	< 0.5	< 0.5	**21.8**	314
	5/12/2011	2.44	9.68	< 0.5	< 10	< 0.5	< 0.5	**13.2**	< 0.5	< 0.5	**26.6**	343
	11/18/2011	3.93	17.0	< 0.5	< 10	< 0.5	< 0.5	**12.5**	< 0.5	< 0.5	**23.0**	326
	5/18/2012	**5.77**	28.5	< 0.5	< 10	< 0.5	0.270 J	**12.8**	< 0.5	< 0.5	**30.1**	329
63R (85-100)	11/15/2012	1.38	7.93	0.411 J	< 10	< 0.5	2.40	3.23	< 0.5	1.57	< 10	< 15
	5/24/2013	0.642	3.56	< 0.5	< 10	< 0.5	1.74	1.06	< 0.5	0.498 J	< 10	8.5 J
	11/14/2013	0.870	4.66	0.282 J	< 5.0	0.252 J	2.92	2.23	< 0.5	1.49 J	< 50	< 75
	5/20/2014	< 0.5	0.834	< 0.5	< 5.0	< 0.5	0.488 J	0.229 J	< 0.5	< 1.5	< 10	< 15
	11/12/2014	0.225 J	1.35	< 0.5	< 5.0	< 0.5	0.849	0.521	< 0.5	< 1.5	< 10	23.0
	5/21/2015	0.428 J	2.08	< 0.5	< 5.0	< 0.5	1.12	1.04	< 0.5	< 1.5	9.3 J	28.8
	11/18/2015	0.503	2.51	< 0.5	< 5.0	< 0.5	1.06	1.15	< 0.5	< 1.0	< 10	13.2 J
	5/18/2016	0.393 J	2.11	< 0.5	< 5.0	< 0.5	0.731	1.21	< 0.5	< 1.0	9.8 J	< 15
	11/10/2016	0.291 J	1.99	< 0.5	< 5.0	< 0.5	0.407 J	1.01	< 0.5	< 1.0	< 10	< 15
	5/17/2017	< 0.5	1.48	< 0.5	< 5.0	< 0.5	0.246 J	0.940	< 0.5	< 1.5	< 10	7.40
	11/8/2017	< 0.5	1.32	< 0.5	< 5.0	< 0.5	0.173 J	0.700	< 0.5	< 1.5	< 10	< 15
	5/23/2018	< 0.5	1.51	< 0.5	< 5.0	< 0.5	0.222 J	0.891	< 0.5	< 1.5	< 10	< 15
	11/16/2018	< 0.5	1.21	< 0.5	< 5.0	< 0.5	< 0.5	0.752	< 0.5	< 1.5	< 10	< 20
	5/17/2019	0.220 J	1.81	< 0.5	< 5.0	< 0.5	2.23	1.11	< 0.5	< 1.5	< 10	< 15
63R (150-165)	11/15/2012	0.978	24.9	< 0.5	< 10	< 0.5	0.344 J	**18.8**	< 0.5	< 0.5	**10.8**	58.8
	5/21/2013	0.471 J	8.74	< 0.5	< 10	< 0.5	< 0.5	**9.12**	< 0.5	< 0.5	**28.8**	10.7 J
	11/14/2013	0.499 J	10.2	< 0.5	4.57 J	< 0.5	< 0.5	**11.5**	< 0.5	0.791 J	**25.8**	25.4
	5/20/2014	0.494 J	17.6	< 0.5	< 5.0	< 0.5	0.288 J	**14.1**	< 0.5	< 1.5	**34.5**	215
	11/12/2014	0.740	11.4	< 0.5	< 5.0	< 0.5	< 0.5	**12.3**	< 0.5	< 1.5	**24.4**	18.7
	5/21/2015	0.620	22.5	< 0.5	< 5.0	< 0.5	< 0.5	**24.2**	< 0.5	< 1.5	**21.8**	47.3
	11/18/2015	0.594	25.8	< 0.5	< 5.0	< 0.5	< 0.5	**23.2**	< 0.5	< 1.0	**17.9**	60.1
	5/18/2016	0.503	24.1	< 0.5	< 5.0	< 0.5	< 0.5	**21.2**	< 0.5	< 1.0	**21.1**	79.2
	11/10/2016	0.480 J	9.80	< 0.5	< 5.0	< 0.5	< 0.5	**11.3**	< 0.5	< 1.0	**20.0**	61.1
	5/17/2017	0.399 J	18.4	< 0.5	< 5.0	< 0.5	< 0.5	**21.1**	< 0.5	< 1.5	**15.1**	44.8
	11/8/2017	0.514	22.3	< 0.5	< 5.0	< 0.5	< 0.5	**20.8**	< 0.5	< 1.5	**18.7**	103
	5/23/2018	0.502	23.4	< 0.5	< 5.0	< 0.5	0.181 J	**16.3**	< 0.5	< 1.5	**16.1**	148
	11/16/2018	0.485 J	21.9	< 0.5	< 5.0	< 0.5	0.375 J	**15.6**	< 0.5	< 1.5	< 10	110
	5/17/2019	0.320 J	18.7	< 0.5	< 5.0	< 0.5	1.31	**12.4**	< 0.5	< 1.5	**17.1**	101
	5/10/2021	< 1.0	19.5	< 1.0	< 5.0	< 1.0	4.38	**9.01**	< 1.0	< 2.0	**14.5**	151
65R	9/18/1984	**123**	7.20	--	130	ND	24.8	**327**	--	ND	--	--
	11/26/1984	**226**	ND	--	--	ND	ND	**629**	--	ND	--	--
	1/1/1985	**200**	ND	--	210	2.0 J	2.0 J	**650**	--	ND	--	--
	6/6/1990	**39.0**	18.0	< 5.0	43.0	< 5.0	4.0 J	**110**	< 10	< 5.0	--	--
	8/13/1996	**140**	**95.0**	< 5.0	130	< 5.0	< 5.0	**72.0**	< 5.0	6.00	**17.0**	1,300
	7/26/2001	**6.10**	5.80	< 5.0	< 10	< 5.0	< 5.0	**9.40**	< 5.0	< 10	< 10	1,000
	7/10/2002	< 5.0	7.20	< 5.0	< 10	< 5.0	< 5.0	**9.40**	< 5.0	< 5.0	< 10	280
	12/20/2002	**64.0**	30.0	< 5.0	< 10	< 5.0	< 5.0	**12.0**	< 5.0	< 10	**15.0**	680
	6/5/2003	**22.0**	24.0	< 5.0	< 10	< 5.0	< 5.0	**13.0**	< 5.0	< 10	**13.0**	770
	12/22/2003	**12.0**	24.0	< 5.0	< 10	< 5.0	< 5.0	**13.0**	< 5.0	< 5.0	**15.5**	737
	6/2/2004	**8.00**	17.0	< 5.0	< 10	< 5.0	< 5.0	**17.0**	< 5.0	< 5.0	**13.4**	605
	11/9/2004	4.0 J	18.0	< 5.0	< 10	< 5.0	< 5.0	**12.0**	1.0 J	< 5.0	**13.2**	720
	6/3/2005	< 5.0	20.0	< 5.0	< 10	< 5.0	< 5.0	**12.0**	< 10	< 1.0	**34.6**	1,410
	11/7/2005	**78.0**	**200**	4.0 J	< 10	< 5.0	1.0 J	**29.0**	1.0 J	2.00	**17.1**	751
	7/5/2006	**110**	**300**	10.0	2.0 J	< 5.0	10.0	**46.0**	2.0 J	25.0	**12.8**	827
	11/28/2006	**17.0**	**100**	2.0 J	< 10	< 5.0	2.0 J	**14.0**	< 5.0	1.0 J	< 100	722
	6/1/2007	**48.0**	**150**	10.0	6.0 J	< 5.0	10.0	**14.0**	**3.0 J**	14.0	< 100	850
	5/23/2008	**24.0**	**120**	6.00	< 10	< 5.0	2.0 J	**11.0**	< 2.0	5.00	< 100	763
	11/19/2008	**8.00**	**75.0**	2.0 J	< 10	< 5.0	< 5.0	**7.00**	< 2.0	1.0 J	< 100	802
	6/24/2009	2.43	51.4	< 0.5	< 10	< 0.5	< 0.5	**7.11**	0.460 J	< 0.5	9.0 J	632
	11/19/2009	1.23	49.0	< 0.5	< 10	< 0.5	< 0.5	**5.58**	0.360 J	< 0.5	**11.1**	601
	12/3/2010	0.820	37.8	< 0.5	< 10	< 0.5	< 0.5	**6.95**	< 0.5	< 0.5	**10.6**	449
	5/11/2011	0.720	28.9	< 0.5	< 10	< 0.5	< 0.5	**6.05**	< 0.5	< 0.5	**12.4**	477
	11/18/2011	2.57	34.3	0.570	< 10	< 0.5	< 0.5	4.61	< 0.5	0.440 J	**10.3**	383
	5/17/2012	3.12	37.3	0.490 J	< 10	< 0.5	0.700	**5.23**	0.290 J	< 0.5	**18.2**	431
	11/12/2012	1.24	15.6	< 0.5	< 10	< 0.5	< 0.5	**7.18**	< 0.5	< 0.5	6.40	10.1 J

Well ID	Chemical Name: / ICL: / Unit: / Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
65R (100-115)	5/21/2013	1.40	8.89	< 0.5	< 10	< 0.5	0.560	**7.29**	< 0.5	0.637	9.3 J	3.2 J
	11/13/2013	1.26	12.5	< 0.5	< 5.0	< 0.5	0.290 J	**7.80**	< 0.5	< 1.5	**12.7**	< 15
65R (100-115) (cont.)	5/20/2014	1.12	16.4	< 0.5	< 5.0	< 0.5	0.281 J	**10.2**	< 0.5	< 1.5	**12.7**	9.0 J
	11/12/2014	0.631	8.83	< 0.5	< 5.0	< 0.5	0.176 J	**5.32**	< 0.5	< 1.5	**13.2**	< 15
	1/6/2015	0.720	12.8	< 0.5	< 5.0	< 0.5	0.171 J	**6.91**	< 0.5	< 1.5	--	--
	5/18/2015	0.550	10.9	< 0.5	< 5.0	< 0.5	< 0.5	**5.15**	< 0.5	< 1.5	**11.9**	< 15
	11/17/2015	0.676	21.0	< 0.5	< 5.0	< 0.5	< 0.5	**11.5**	< 0.5	< 1.0	**11.2**	6.4 J
	5/17/2016	< 0.5	6.57	< 0.5	< 5.0	< 0.5	< 0.5	3.94	< 0.5	< 1.0	**12.0**	< 15
	11/8/2016	< 0.5	5.45	< 0.5	< 5.0	< 0.5	< 0.5	2.72	< 0.5	< 1.0	**13.4**	< 15
	5/17/2017	< 0.5	4.22	< 0.5	< 5.0	< 0.5	< 0.5	2.47	< 0.5	< 1.5	**12.6**	< 15
	11/7/2017	< 0.5	3.42	< 0.5	< 5.0	< 0.5	< 0.5	2.30	< 0.5	< 1.5	**10.7**	< 15
	5/24/2018	< 0.5	3.11	< 0.5	< 5.0	< 0.5	0.260 J	1.58	< 0.5	< 1.5	< 10	< 15
	11/15/2018	< 0.5	11.3	< 0.5	< 5.0	< 0.5	< 0.5	4.85	< 0.5	< 1.5	**14.3**	67.8
	5/14/2019	< 0.5	2.29	< 0.5	< 5.0	< 0.5	0.759	1.37	< 0.5	< 1.5	**12.1**	7.30 J
	5/3/2021	< 1.0	1.77	< 1.0	< 5.0	< 1.0	< 1.0	1.06	< 1.0	< 2.0	**12.3**	1.77
65R (180-195)	11/12/2012	**39.8**	**432**	< 0.5	< 10	< 0.5	< 0.5	**24.2**	< 0.5	< 0.5	9.00	667
	5/21/2013	**7.27**	**83.2**	< 0.5	< 10	< 0.5	0.560	**8.11**	< 0.5	0.637	8.7 J	71.4
	11/13/2013	3.15	33.6	< 0.5	< 5.0	< 0.5	0.290 J	2.22	< 0.5	< 1.5	**10.9**	629
	5/20/2014	**25.6**	**223**	< 0.5	< 5.0	< 0.5	0.281 J	0.432 J	< 0.5	< 1.5	< 10	2,760
	11/12/2014	**18.8**	**184**	< 0.5	< 5.0	< 0.5	0.176 J	2.99	< 0.5	< 1.5	< 10	2,080
	1/6/2015	**16.2**	**198**	< 0.5	< 5.0	< 0.5	0.171 J	3.29	< 0.5	< 1.5	--	--
	5/18/2015	**14.3**	**196**	< 0.5	< 5.0	< 0.5	< 0.5	3.74	< 0.5	< 1.5	< 10	1,690
	11/18/2015	**17.7**	**226**	< 0.5	< 5.0	< 0.5	< 0.5	**6.24**	< 0.5	< 1.0	< 10	1,650
	5/17/2016	**9.11**	**264**	< 0.5	< 5.0	< 0.5	< 0.5	4.95	< 0.5	< 1.0	< 10	1,590
	11/8/2016	**5.76**	**190**	< 0.5	< 5.0	< 0.5	< 0.5	4.54	< 0.5	< 1.0	< 10	1,280
	5/17/2017	3.90	**153**	< 0.5	< 5.0	< 0.5	< 0.5	3.14	< 0.5	< 1.5	< 10	1,040
	11/7/2017	4.34	**168**	< 0.5	< 5.0	< 0.5	< 0.5	1.63	< 0.5	< 1.5	< 10	1,060
	5/24/2018	4.04	**165**	0.371 J	< 5.0	< 0.5	< 0.5	0.410 J	0.769	< 1.5	< 10	978
	11/15/2018	3.66	**167**	< 0.5	< 5.0	< 0.5	< 0.5	0.338 J	0.616	< 1.5	**11.2**	1,020
	5/14/2019	2.59	**178**	< 0.5	< 5.0	< 0.5	0.394 J	0.534	0.636	< 1.5	**14.5**	947
	5/3/2021	< 5.0	**173**	< 5.0	< 25	< 5.0	< 5.0	< 5.0	< 5.0	< 10	7.53	789
67R	9/18/1984	< 5.0	ND	--	ND	< 5.0	ND	**6.40**	--	ND	--	--
	11/26/1984	**6.00**	ND	--	ND	ND	ND	< 5.0	--	ND	--	--
	1/1/1985	2.0 J	ND	--	3.0 J	ND	ND	**26.0**	--	ND	--	--
	5/31/1990	3.0 J	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**9.00**	< 10	< 5.0	--	--
	5/31/1995	3.0 J	< 10	< 10	14.0	< 10	6.0 J	5.0 J	< 10	2.0 J	< 5.0	53
	4/5/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	26
	7/24/2001	< 5.0	5.30	< 5.0	< 10	< 5.0	< 5.0	**15.0**	< 5.0	< 10	< 10	370
	7/9/2002	< 5.0	6.00	< 5.0	< 10	< 5.0	< 5.0	**19.0**	< 5.0	< 10	< 10	350
	12/17/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**12.0**	< 5.0	< 10	< 10	320
	6/9/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	**15.0**	< 5.0	< 10	< 10	300
	12/26/2003	< 5.0	3.0 J	< 5.0	< 10	< 5.0	< 5.0	**17.0**	< 5.0	< 5.0	6.94	182
	5/27/2004	< 5.0	3.0 J	< 5.0	< 10	< 5.0	< 5.0	**14.0**	< 5.0	< 5.0	< 5.0	153
	11/5/2004	1.0 J	2.0 J	< 5.0	< 10	< 5.0	< 5.0	**12.0**	< 5.0	< 5.0	< 5.0	165
	6/2/2005	**6.00**	31.0	< 5.0	2.0 J	< 5.0	1.0 J	**29.0**	< 10	< 1.0	**14.3**	43.7
	11/9/2005	5.00	9.00	< 5.0	< 10	< 5.0	< 5.0	**16.0**	< 5.0	< 1.0	**10.5**	95.0
	6/28/2006	1.0 J	10.0	< 5.0	< 10	< 5.0	< 5.0	**14.0**	< 5.0	< 1.0	6.28	--
	11/27/2006	< 5.0	12.0	< 5.0	< 10	< 5.0	< 5.0	**14.0**	< 5.0	< 1.0	< 100	76.6
	5/31/2007	< 5.0	5.0 J	< 5.0	< 10	< 5.0	< 5.0	**10.0**	< 5.0	< 1.0	< 100	119
	5/23/2008	< 5.0	3.0 J	< 5.0	< 10	< 5.0	< 5.0	**8.00**	< 2.0	< 1.0	< 100	115
	6/29/2009	0.610	2.18	< 0.5	< 10	< 0.5	< 0.5	**9.20**	< 0.5	< 0.5	< 10	92.5
	12/2/2010	0.440 J	2.67	< 0.5	< 10	< 0.5	< 0.5	**9.39**	< 0.5	< 0.5	< 10	70.6
	5/11/2011	0.410 J	3.53	< 0.5	< 10	< 0.5	< 0.5	**14.0**	< 0.5	< 0.5	4.0 J	89.0
	11/15/2011	2.28	6.45	< 0.5	< 10	< 0.5	2.80	**19.3**	< 0.5	< 0.5	< 10	93.2
	5/18/2012	0.630	7.88	< 0.5	< 10	< 0.5	0.330 J	< 0.5	< 0.5	< 0.5	< 10	84.6
67R (83-98)	11/12/2012	3.87	16.9	0.437 J	< 10	< 0.5	2.94	**38.7**	< 0.5	1.77	< 10	5.2 J
	5/21/2013	3.38	37.4	0.430 J	< 10	< 0.5	3.55	**79.5**	0.194 J	1.77	5.5 J	3.0 J
	11/11/2013	4.56	23.5	< 0.5	< 5.0	< 0.5	1.14	**43.1**	< 0.5	0.923 J	< 10	< 15
	5/19/2014	**5.79**	40.7	< 0.5	< 5.0	< 0.5	1.39	**72.6**	0.262 J	< 1.5	8.6 J	< 15
	11/12/2014	3.38	37.8	< 0.5	< 5.0	< 0.5	0.756	**80.8**	0.271 J	< 1.5	8.1 J	< 15
	1/6/2015	1.07	18.0	< 0.5	< 5.0	< 0.5	0.267 J	**22.0**	< 0.5	< 1.5	--	--
	5/18/2015	3.33	29.0	< 0.5	< 5.0	< 0.5	0.508	**43.5**	0.266 J	< 1.5	< 10	39.8
	11/18/2015	4.34	60.0	< 0.5	< 5.0	< 0.5	0.802	**97.9**	0.266 J	< 1.0	< 10	19.2
	5/19/2016	2.34	59.0	< 0.5	< 5.0	< 0.5	0.404 J	**95.1**	0.336 J	< 1.0	< 10	28.6
	11/8/2016	1.70	**71.7**	< 0.5	< 5.0	< 0.5	< 0.5	**97.7**	< 0.5	< 1.0	**10.7**	11.0 J
	5/16/2017	1.57	57.7	< 0.5	< 5.0	< 0.5	< 0.5	**74.1**	< 0.5	< 1.5	9.3 J	6.4 J
	11/7/2017	1.94	56.0	< 0.5	< 5.0	< 0.5	0.187 J	**75.9**	0.243 J	< 1.5	**12.0**	5.1 J
	5/23/2018	0.306 J	54.5	< 0.5	< 5.0	< 0.5	< 0.5	**70.6**	0.312 J	< 1.5	9.0 J	< 15
	11/14/2018	1.23	49.9	< 0.5	< 5.0	< 0.5	< 0.5	**61.5**	0.338 J	< 1.5	< 10	43.1
	5/15/2019	1.31	63.1	< 0.5	< 5.0	< 0.5	1.23	**73.6**	0.366 J	< 1.5	< 10	15.6
	5/6/2021	< 2.0	**72.7**	< 2.0	< 10	< 2.0	< 2.0	**71.8**	< 2.0	< 4.0	**10.6**	15.8
67R (149-164)	11/12/2012	0.842	7.60	< 0.5	< 10	< 0.5	< 0.5	**14.1**	< 0.5	< 0.5	< 10	3,260
	5/21/2013	0.376 J	5.04	< 0.5	< 10	< 0.5	< 0.5	**11.0**	< 0.5	< 0.5	5.4 J	2,040
	11/11/2013	1.10	8.06	< 0.5	< 5.0	< 0.5	0.371 J	**12.4**	< 0.5	0.622 J	**11.2**	**4,320**
	5/19/2014	1.31	8.11	< 0.5	< 5.0	< 0.5	0.443 J	**11.3**	< 0.5	< 1.5	< 10	925
	11/12/2014	1.45	7.54	< 0.5	< 5.0	< 0.5	0.372 J	**12.1**	< 0.5	< 1.5	< 10	627
	1/6/2015	2.46	14.4	< 0.5	< 5.0	< 0.5	0.443 J	**22.3**	< 0.5	< 1.5	< 10	39.8
	5/18/2015	0.785	5.61	< 0.5	< 5.0	< 0.5	0.198 J	4.11	< 0.5	< 1.5	< 10	67.4
	11/19/2015	1.74	12.5	< 0.5	< 5.0	< 0.5	0.379 J	**15.1**	< 0.5	< 1.0	< 10	65.3
	5/19/2016	1.68	14.3	< 0.5	< 5.0	< 0.5	0.302 J	**17.7**	< 0.5	< 1.0	< 10	198
	11/8/2016	1.04	10.7	< 0.5	< 5.0	< 0.5	0.216 J	**7.67**	< 0.5	< 1.0	**15.4**	302
	5/17/2017	0.769	9.31	< 0.5	< 5.0	< 0.5	< 0.5	**9.37**	< 0.5	< 1.5	**17.1**	218
	11/7/2017	0.738	10.1	< 0.5	< 5.0	< 0.5	< 0.5	**10.7**	< 0.5	< 1.5	**19.3**	205
	5/23/2018	0.607	8.16	< 0.5	< 5.0	< 0.5	< 0.5	**7.35**	< 0.5	< 1.5	**17.1**	186
	11/14/2018	0.417 J	6.25	< 0.5	< 5.0	< 0.5	< 0.5	**5.03**	< 0.5	< 1.5	**13.0**	243
	5/15/2019	0.362 J	6.10	< 0.5	< 5.0	< 0.5	2.26	**9.26**	< 0.5	< 1.5	**12.9**	145
	5/6/2021	< 4.0	< 4.0	< 4.0	< 20	< 4.0	< 4.0	2.59 J	< 4.0	< 8.0	**23.6**	216
69R	9/18/1984	**500**	--	--	**10,000**	**10.6**	**3,300**	**3,000**	--	500	--	--
	11/26/1984	**473**	--	--	--	ND	893	**1,415**	--	ND	--	--
	6/19/1990	**490 J**	< 500	< 500	**5,500**	< 500	< 1,400	< 500	< 1,000	< 500	**31.6 J**	**3,880**
	10/10/1990	**2,800**	**1,100 J**	**1,100 J**	**41,000 J**	< 1,250	**5,400**	**650 J**	< 2,500	< 2,700	**80.0**	2,880 J
	6/1/1991	**4,000**	**1,700 J**	--	**53,000**	ND	**9,000**	ND	--	2,900	--	--
	5/24/1994	**3,500**	**1,100**	310	**10,000**	< 100	**4,600**	< 100	--	1,300	**114**	1,370
	6/2/1995	**2,700 J**	< 4,000	< 4,000	**51,000**	< 4,000	**7,300**	< 4,000	< 4,000	< 4,000	**135**	**5,330**
	4/5/1996	**2,100**	**1,100**	< 100	< 200	< 100	**1,900**	< 100	< 100	230	**960**	**6,600**
	8/14/1996	**4,100**	**1,300**	360	< 250	< 120	690	< 120	< 120	1,800	**160**	**7,500**
	1/8/1997	**5,200**	**1,200**	290	< 250	< 120	400	< 120	< 120	1,400	--	--
	3/21/1997	**6,300**	**1,800**	**790**	< 500	< 250	740	**170 J**	--	3,500	--	--
	6/9/1997	**4,700**	**1,400**	410 J	**76,000**	< 1,200	**16,000**	< 1,200	< 1,200	1,600	**22.0**	**4,900**
	6/27/1997	**5,100**	**1,200**	580 J	**70,000**	< 1,200	**19,000**	< 1,200	< 1,200	2,800	--	--
	7/10/1997	**5,300**	**1,100 J**	660 J	**54,000**	< 1,200	**20,000**	< 1,200	< 1,200	2,900	**110**	**4,600**
	7/24/1997	**4,100**	**920 J**	660 J	**61,000**	< 1,200	**17,000**	< 1,200	< 1,200	2,800	83	**5,100**
	8/25/1997	**3,800**	**880 J**	**1,200**	**44,000**	< 1,200	**12,000**	< 1,200	< 1,200	5,300	**160**	**5,000**
	4/21/1998	**3,600**	**720**	< 500	**26,000**	< 500	**12,000**	< 500	< 500	1,700	**120**	**4,600**
	7/1/1999	**3,500**	**960**	260	< 400	< 160	**19,000**	< 100	< 160	1,300	--	--
	2/16/2000	**3,300**	**990**	390	< 160	< 64	**7,500**	< 40	< 64	1,800	--	--
	7/13/2000	**4,000**	**720**	580	**32,000**	< 40	**14,000**	< 25	< 40	2,200	**245**	**6,470**
	12/6/2000	**4,800**	**1,200**	640	**9,700**	< 80	**13,000**	< 50	< 80	2,900	**234**	**4,760**
	7/26/2001	**2,200**	**780**	180	**2,700**	< 100	430	< 100	< 200	600	**230**	**8,000**
	12/19/2001	**2,900**	**730**	190	610	< 100	290	< 100	< 100	420	**130**	**9,000**
	7/10/2002	**4,400**	**1,600**	540	280	< 100	120	< 100	< 100	2,200	**140**	**4,400**
	12/18/2002	**4,000**	**1,100**	**740**	< 400	< 200	< 200	< 200	< 200	2,600	**140**	**5,400**
	1/16/2003	**4,000**	**1,000**	500	730	< 200	**2,200**	< 200	< 200	1,600	**140**	**4,800**
	2/17/2003	**3,200**	**880**	550	< 200	< 100	500	< 100	< 100	2,000	**140**	**5,800**
	3/12/2003	**3,000**	**860**	420	< 200	< 100	340	< 100	< 100	1,600	**150**	**4,900**
	6/4/2003	**3,700**	**870**	**750**	< 200	< 100	200	< 100	< 100	2,200	**130**	**4,900**
	10/27/2003	**2,200**	**770**	< 500	< 1,000	< 5.0	**2,100**	< 5.0	< 5.0	1,100	**65.8**	1,690
	12/18/2003	**3,400**	**1,000**	**870**	10.0	< 5.0	**1,300**	< 5.0	< 5.0	3,030	**98.4**	2,290
	2/10/2004	**2,500**	**480**	680	46.0	< 5.0	640	< 5.0	< 5.0	2,370	**101**	2,470
	3/23/2004	**2,800**	**730**	**820**	18.0	< 5.0	360	< 5.0	< 5.0	2,550	**109**	2,920
	5/26/2004	**1,700**	**550**	580	< 10	< 5.0	500	< 5.0	< 5.0	1,930	**48.8**	1,370
	11/3/2004	**1,400**	**460**	410	< 10	< 5.0	17.0	< 5.0	2.0 J	1,250	**84.1**	1,640
	5/20/2005	**1,100**	**410 J**	270 J	< 10	< 5.0	6.00	< 5.0	1.0 J	890	**89.0**	1,660
	11/9/2005	**1,700**	**490**	530	< 10	< 5.0	29.0	< 5.0	**4.0 J**	1,570	**95.7**	2,340
	6/29/2006	**1,200**	**360**	320	15.0	< 5.0	110	< 5.0	1.0 J	950	**137**	3,420
	8/30/2006	**1,200**	**370**	330	< 10	< 5.0	9.00	< 5.0	2.0 J	860	**117**	3,170
	11/20/2006	**810**	**340**	260	2.0 J	< 5.0	10.0	< 5.0	2.0 J	650	**129**	**3,760**
	2/26/2007	**880**	**320**	240	5.0 J	< 5.0	5.00	< 5.0	1.0 J	600	**107**	**3,760**
	5/31/2007	**650**	**260**	170	< 10	< 5.0	3.0 J	< 5.0	**3.0 J**	400	**91.6 J**	**4,050**
	11/28/2007	**530**	**300**	170	< 10	< 5.0	3.0 J	< 5.0	**3.0 J**	355	**75.6 J**	**3,750**

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: / ICL: / Unit: / Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
	5/20/2008	**460**	**210**	140	< 10	< 5.0	2.0 J	< 5.0	< 2.0	244	**92.8 J**	**5,120**
	11/20/2008	**610**	**200**	140	< 10	< 5.0	< 5.0	< 5.0	< 2.0	144	**93.9 J**	**4,190**
69R (cont.)	6/23/2009	**410**	**206**	139	< 10	< 0.5	5.18	0.420 J	0.680	188	**102**	**4,460**
	11/20/2009	**301**	**200**	104	< 10	< 0.5	1.72	< 0.5	< 0.5	96.6	**98.3**	**3,950**
	12/2/2010	**115**	**112**	70.1	< 10	< 0.5	0.990	< 0.5	0.340 J	74.8	**108**	3,410
	5/10/2011	**56.9**	**89.0**	35.3	< 10	< 0.5	0.620	0.380 J	< 0.5	23.4	**83.5**	3,320
	11/16/2011	**27.4**	**72.3**	24.1	< 10	< 0.5	0.460 J	0.450 J	0.270 J	16.5	**89.6**	2,770
	5/16/2012	**6.67**	20.5	8.00	< 10	< 0.5	0.330 J	0.520	< 0.5	6.72	**47.2**	1,570
	11/13/2012	**10.6**	31.3	9.90	< 10	< 0.5	0.346 J	< 0.5	< 0.5	7.09	**68.3**	1,990
	5/21/2013	4.86	22.5	4.09	< 10	< 0.5	0.190 J	0.641	< 0.5	2.83	**70.1**	2,080
	11/11/2013	**5.19**	13.9	2.75	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	1.99	**73.6**	3,060
	5/19/2014	3.10	8.10	1.68	< 5.0	< 0.5	21.0	0.344 J	< 0.5	1.56	**67.1**	1,880
	10/16/2014	2.17	8.00	0.967	< 5.0	< 0.5	< 0.5	0.429 J	< 0.5	0.819 J	--	--
	11/10/2014	0.449 J	1.10	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**53.6**	1,660
	1/7/2015	0.990	1.81	0.313 J	< 5.0	< 0.5	< 0.5	0.416 J	< 0.5	< 1.5	--	--
	5/20/2015	4.71	6.50	1.82	< 5.0	< 0.5	< 0.5	0.264 J	< 0.5	1.45 J	**63.1**	2,530
	11/16/2015	4.07	9.58	1.13	< 5.0	< 0.5	< 0.5	0.315 J	< 0.5	0.752 J	**73.0**	3,480
	5/17/2016	1.48	6.18	0.516	< 5.0	< 0.5	< 0.5	0.217 J	< 0.5	0.752 J	**57.3**	3,530
	8/23/2016	0.349 J	1.07	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**72.2**	2,720
	11/9/2016	0.343 J	1.07	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**46.2**	2,340
	5/16/2017	1.80	3.28	0.228 J	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**60.9**	3,290
	11/7/2017	1.19	3.27	0.370 J	< 5.0	< 0.5	< 0.5	0.242 J	< 0.5	< 1.5	**58.4**	3,200
	5/25/2018	0.346 J	0.983	< 0.5	< 5.0	< 0.5	< 0.5	0.297 J	< 0.5	< 1.5	**13.4**	720
	11/13/2018	1.24	2.67	< 0.5	< 5.0	< 0.5	< 0.5	0.267 J	< 0.5	< 1.5	**56.0**	3,050
	5/16/2019	2.29	2.69	0.517	< 5.0	< 0.5	< 0.5	0.304 J	< 0.5	< 1.5	**47.3**	2,350
76R	6/5/1991	ND	--	--	ND	ND	3.0 J	2.0 J	--	ND	3.8 J	97.9
	7/26/2001	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**56**	1,400
	7/10/2002	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	49
	5/26/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	< 5.0	22.0
78R	6/4/1991	ND	--	--	ND	ND	3.0 J	ND	--	ND	**18.4**	106
81R	6/5/1991	ND	--	--	ND	ND	22.0	ND	--	ND	**11.2**	148
82S	5/30/1991	1.0 J	--	ND	ND	ND	ND	ND	--	ND	**221**	297
103R	5/31/1995	**750 J**	< 2,000	< 2,000	**22,000**	< 2,000	900 J	< 2,000	< 2,000	< 2,000	**19.3**	1,450
	4/1/1996	< 5,000	< 5,000	< 5,000	**26,000**	< 5,000	< 5,000	< 5,000	< 5,000	< 5,000	**42.0**	2,600
	4/13/2000	**370**	48.0	9.10	410	< 5.0	3.2 J	2.1 J	< 5.0	20.0	--	--
	7/13/2000	**650**	**160**	49.0	**2,800**	< 5.0	880	**14.0**	< 5.0	170	**57.5**	2,670
	12/6/2000	**260**	**110**	15.0	1,100	< 5.0	120	1.3 J	< 5.0	24.0	**39.8**	1,970
	7/26/2001	**320**	**160**	38.0	880	< 10	140	< 10	< 20	78.0	**73.0**	**4,100**
	12/19/2001	**170**	62.0	11.0	230	< 10	20.0	< 10	< 10	< 20	**510**	**4,600**
	7/9/2002	**210**	**82.0**	11.0	220	< 10	< 10	< 10	< 10	< 20	**52.0**	2,000
	12/19/2002	**130**	51.0	7.90	35.0	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**36.0**	1,600
	1/16/2003	**170**	60.0	10.0	35.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**41.0**	1,700
	3/13/2003	**78.0**	40.0	5.00	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**32.0**	1,600
	6/3/2003	**100**	37.0	5.30	28.0	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**21.0**	1,600
	10/27/2003	**73.0**	35.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	1.0 J	**17.0**	1,940
	12/18/2003	**62.0**	37.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	1.0 J	**19.5**	1,900
	2/10/2004	**63.0**	31.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	1.0 J	**30.8**	1,610
	3/24/2004	**35.0**	12.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	1.0 J	**18.8**	1,520
	5/25/2004	**67.0**	34.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	2.0 J	**10.3**	1,360
	11/4/2004	**76.0**	38.0	4.0 J	< 10	< 5.0	< 5.0	1.0 J	< 5.0	2.0 J	**27.6**	1,760
	5/23/2005	**28.0**	18.0	2.0 J	< 10	4.0 J	< 5.0	< 5.0	< 10	< 1.0	**12.5**	413
	11/9/2005	**70.0**	37.0	4.0 J	< 10	< 5.0	< 5.0	1.0 J	< 5.0	2.00	**22.3**	1,470
	6/27/2006	**63.0**	44.0	3.0 J	4.0 J	< 5.0	< 5.0	1.0 J	< 5.0	2.00	**13.5**	711
	8/29/2006	**72.0**	46.0	3.0 J	2.0 J	< 5.0	< 5.0	1.0 J	< 5.0	< 1.0	**18.9**	1,230
	11/21/2006	**50.0**	38.0	2.0 J	< 10	< 5.0	< 5.0	1.0 J	< 5.0	1.0 J	< 100	1,420
	2/28/2007	**73.0**	8.00	< 5.0	7.0 J	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	3,330
	6/1/2007	**25.0**	17.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	604
	11/29/2007	**26.0**	17.0	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 5.0	< 1.0	**22.1 J**	1,060
	5/23/2008	5.00	13.0	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 2.0	< 1.0	< 100	627
	11/18/2008	**16.0**	13.0	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 2.0	< 1.0	< 100	916
	6/24/2009	**9.28**	10.7	0.330 J	< 10	< 0.5	< 0.5	1.29	< 0.5	< 0.5	8.1 J	681
	11/24/2009	**21.1**	12.1	0.900	< 10	< 0.5	< 0.5	1.24	< 0.5	< 0.5	**12.3**	803
	12/1/2010	**22.3**	12.0	0.580	< 10	< 0.5	< 0.5	0.700	< 0.5	< 0.5	**18.4**	1,010
	5/9/2011	**6.84**	14.5	0.250 J	< 10	< 0.5	< 0.5	0.670	< 0.5	< 0.5	**15.0**	708
	11/17/2011	**25.3**	16.2	2.15	< 10	< 0.5	< 0.5	0.970	< 0.5	1.07	**17.3**	1,170
	5/16/2012	**36.6**	21.8	3.03	< 10	< 0.5	< 0.5	0.800	< 0.5	1.11	**12.9**	1,320
	11/12/2012	**40.7**	24.0	2.65	< 10	< 0.5	< 0.5	0.862	< 0.5	0.730	9.7 J	1,470
	5/24/2013	**29.1**	18.6	2.58	1.18 J	< 0.5	< 0.5	0.999	< 0.5	0.935	**24.7**	1,750
	11/11/2013	**21.3**	16.0	1.45	< 5.0	< 0.5	< 0.5	0.662	< 0.5	< 1.5	**19.6**	1,590
	5/19/2014	**17.6**	18.4	1.59	< 5.0	< 0.5	< 0.5	0.403 J	< 0.5	< 1.5	**16.0**	1,080
	10/16/2014	**16.5**	18.3	1.17	< 5.0	< 0.5	< 0.5	0.524	< 0.5	< 1.5	--	--
	11/10/2014	**15.7**	13.5	1.24	< 5.0	< 0.5	< 0.5	0.784	< 0.5	< 1.5	**14.6**	1,430
	5/19/2015	**11.4**	21.5	0.918	< 5.0	< 0.5	< 0.5	0.403 J	< 0.5	< 1.5	**13.2**	1,360
	11/18/2015	**15.4**	34.3	0.776	< 5.0	< 0.5	< 0.5	0.332 J	< 0.5	< 1.0	**14.9**	1,840
	5/17/2016	**9.95**	27.3	0.533	< 5.0	< 0.5	< 0.5	0.255 J	< 0.5	< 1.0	**24.7**	1,640
	8/24/2016	**9.64**	10.9	0.694	< 5.0	< 0.5	< 0.5	0.527	< 0.5	< 1.0	**27.5**	1,640
	11/8/2016	**6.59**	11.2	0.501	< 5.0	< 0.5	< 0.5	0.366 J	< 0.5	< 1.0	**21.2**	1,500
	5/15/2017	2.71	17.1	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	1,280
	11/6/2017	**7.59**	29.0	0.990	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**26.0**	1,800
	5/30/2018	0.342 J	3.64	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	623
	11/14/2018	**7.50**	36.0	0.823	< 5.0	< 0.5	12.1	< 0.5	0.218 J	< 1.5	< 10	1,950
	5/14/2019	4.62	26.8	0.608	< 5.0	< 0.5	26.8	< 0.5	0.248 J	< 1.5	**29.5**	2,020
	5/4/2021	2.06	17.7	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**13.3**	2,000
106R	6/9/1995	**13.0**	< 10	< 10	< 10	< 10	< 10	1.0 J	< 10	< 10	8.1	13
	8/23/1995	**10.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	2.0 J	< 5.0	< 5.0	--	--
	11/28/1995	**13.0**	8.00	< 5.0	< 10	< 5.0	< 5.0	**7.00**	< 5.0	< 5.0	--	--
	4/2/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**14**	360
	5/6/1999	**11.0**	1.0 J	< 5.0	< 10	< 5.0	1.6 J	1.7 J	< 10	< 15	7.6	< 1.0
	2/16/2000	4.2 J	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 15	--	--
	7/26/2001	**15.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	82
	7/10/2002	**15.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	14.0
	12/20/2002	**16.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	110
	6/3/2003	**14.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	< 10	100
	12/17/2003	**19.0**	2.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	9.62	54.7
	6/3/2004	**8.00**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	6.94	91.8
	11/9/2004	**10.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	54.9
	5/27/2005	**11.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 10	< 1.0	< 5.0	82.0
	11/10/2005	**12.0**	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	--	56.7
	7/6/2006	**15.0**	2.0 J	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 5.0	< 1.0	5.52	73.0
	11/27/2006	**15.0**	2.0 J	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 5.0	< 1.0	< 100	75.5
	5/29/2007	**9.00**	2.0 J	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 5.0	< 1.0	< 100	65.9
	11/30/2007	**17.0**	2.0 J	< 5.0	< 10	< 5.0	< 5.0	2.0 J	< 5.0	< 1.0	< 100	43.3
	5/23/2008	**6.00**	1.0 J	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 2.0	< 1.0	< 100	62.6
	11/19/2008	**11.0**	1.0 J	< 5.0	< 10	< 5.0	< 5.0	1.0 J	< 2.0	< 1.0	< 100	43.2
	6/25/2009	**18.0**	2.93	< 0.5	< 10	< 0.5	< 0.5	1.95	< 0.5	< 0.5	4.5 J	28.3
	11/23/2009	**18.2**	3.15	< 0.5	< 10	< 0.5	< 0.5	1.96	< 0.5	< 0.5	3.9 J	17.6
	12/3/2010	**10.5**	1.70	< 0.5	< 10	< 0.5	< 0.5	1.35	< 0.5	< 0.5	6.0 J	36.1
	5/12/2011	3.06	1.21	< 0.5	< 10	< 0.5	< 0.5	1.24	< 0.5	< 0.5	6.3 J	113
	11/18/2011	**10.0**	1.58	< 0.5	< 10	< 0.5	< 0.5	1.22	< 0.5	< 0.5	7.6 J	18.2
	5/15/2012	3.62	0.810	< 0.5	< 10	< 0.5	< 0.5	0.720	< 0.5	< 0.5	5.8 J	140
	11/14/2012	**11.3**	2.06	< 0.5	< 10	< 0.5	< 0.5	1.43	< 0.5	< 0.5	4.1 J	43.6
	5/23/2013	0.958	0.411 J	< 0.5	< 10	< 0.5	< 0.5	0.510	< 0.5	< 0.5	< 10	79.9
	11/13/2013	**5.29**	1.33	< 0.5	< 5.0	0.244 J	< 0.5	1.20	< 0.5	< 1.5	< 10	33.0
	5/20/2014	1.45	0.553	< 0.5	< 5.0	0.209 J	< 0.5	0.605	< 0.5	< 1.5	9.3 J	77.6
	11/11/2014	4.80	0.963	< 0.5	< 5.0	0.252 J	< 0.5	0.824	< 0.5	< 1.5	< 10	26.8
	5/20/2015	1.43	0.347 J	< 0.5	< 5.0	< 0.5	< 0.5	0.403 J	< 0.5	< 1.5	< 10	89.0
	11/18/2015	2.28	0.512	< 0.5	< 5.0	< 0.5	< 0.5	0.469 J	< 0.5	< 1.0	**19.9**	91.5
	5/19/2016	0.764	0.309 J	< 0.5	< 5.0	< 0.5	< 0.5	0.329 J	< 0.5	< 1.0	**13.3**	110
	11/8/2016	3.59	0.886	< 0.5	< 5.0	< 0.5	< 0.5	0.674	< 0.5	< 1.0	**22.8**	108
	5/17/2017	0.303 J	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	0.245 J	< 0.5	< 1.5	< 10	119
	11/9/2017	0.702	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	0.306 J	< 0.5	< 1.5	< 10	148
	5/24/2018	0.345 J	0.236 J	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**15.6**	190
	11/15/2018	0.594	0.269 J	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	110
	5/13/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	129
107R	6/7/1995	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	--	--
	8/23/1995	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	--	--
	4/9/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**14.0**	360
108R	6/9/1995	< 10	< 10	< 10	< 10	2.0 J	< 10	< 10	< 10	< 10	**39.9**	22
	4/9/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**15.0**	120

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
108R	6/4/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 10	**25.0**	76.0
	10/28/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**28.0**	79.2
108R (cont.)	12/16/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**29.9**	103
	2/10/2004	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**30.7**	85.7
	3/24/2004	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**24.6**	80.5
	6/1/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	**27.0**	79.4
	11/28/2006	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	107
	5/31/2007	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	71.3
	11/29/2007	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**29.0 J**	102
	5/23/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**21.9**	295
	11/13/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**24.5**	254
	5/20/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**27.6**	316
	10/16/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	--	--
	11/13/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**28.8**	150
	1/6/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	--	--
	5/21/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**26.1**	187
	11/17/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**36.8**	< 15
	5/18/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**32.0**	46.2
	8/24/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**32.8**	453
	11/7/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**23.5**	196
	5/16/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**30.4**	216
	11/7/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**24.0**	198
	5/25/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**23.4**	158
	11/16/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**24.6**	461
	5/15/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**21.6**	133
	5/6/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**20.8**	30.0
109R	6/7/1995	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	**35.0**	48.0
	4/9/1996	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**24.0**	18.0
169R	10/8/2001	**5,600**	**1,500**	**1,200**	**31,000**	< 500	**28,000**	< 500	< 500	5,000	--	--
	12/19/2001	**3,800**	< 1,000	< 1,000	**62,000**	< 1,000	**18,000**	< 1,000	< 1,000	< 2,000	**55.0**	**5,200**
	7/10/2002	**4,300**	**1,400**	< 1,000	**39,000**	< 1,000	**18,000**	< 1,000	< 1,000	2,100	**66.0**	**5,600**
	12/19/2002	**2,100**	**620**	570	**12,000**	< 500	**9,100**	< 500	< 500	2,100	**60.0**	**4,200**
	1/16/2003	**2,200**	**580**	610	< 1,000	< 500	**10,000**	< 500	< 500	2,200	**63.0**	**4,500**
	2/17/2003	**2,400**	**680**	680	**15,000**	< 500	**9,600**	< 500	< 500	2,600	**77.0**	**5,100**
	3/12/2003	**2,100**	**710**	590	**15,000**	< 500	**9,100**	< 500	< 500	2,200	**72.0**	**4,700**
	6/4/2003	**3,300**	**800**	**880**	**26,000**	< 500	**15,000**	< 500	< 500	3,500	**80.0**	**5,300**
	10/27/2003	**2,300**	**630**	< 500	1,500	< 5.0	**6,900**	< 5.0	< 5.0	1,540	**90.0**	**3,980**
	12/16/2003	**2,700**	< 5.0	**740**	**5,500**	< 5.0	**10,000**	< 5.0	< 5.0	2,100	**28.8**	**13,600**
	2/9/2004	**1,800**	< 5.0	< 500	**3,200**	< 5.0	**5,400**	< 5.0	< 5.0	400	**11.3**	**9,820**
	3/22/2004	**2,200**	**290 J**	< 1,000	**2,600**	< 5.0	**7,800**	< 5.0	< 5.0	1,960	7.95	2,960
	5/24/2004	**1,800**	**630**	< 500	**2,600**	< 5.0	**5,200**	< 5.0	< 5.0	1,690	**25.9**	**5,090**
	11/3/2004	**1,400**	**460**	380	620	< 5.0	**3,100**	< 5.0	0.8 J	1,290	**33.7**	**4,370**
	5/20/2005	**1,900**	**650**	630	860 J	< 5.0	**5,200**	< 5.0	2.0 J	2,250	**53.0**	**4,620**
	11/7/2005	**1,700**	**560**	620	200	< 5.0	**3,800**	< 5.0	**3.0 J**	2,180	**56.9**	**4,450**
	6/28/2006	**1,200**	**520**	460	330	< 5.0	**1,900**	< 5.0	2.0 J	1,580	**10.4**	--
	8/29/2006	**1,200**	**410**	330	130	< 5.0	**1,300**	< 5.0	< 5.0	1,010	**27.9**	**6,090**
	11/20/2006	**770**	**350**	240	110	< 5.0	820	< 5.0	1.0 J	730	< 100	2,900
	2/26/2007	**900**	**360**	300	9.0 J	< 5.0	580	< 5.0	< 5.0	800	**26.5 J**	**5,250**
	5/29/2007	**990**	**400**	300	4.0 J	< 5.0	720	< 5.0	< 5.0	940	**20.8 J**	**4,320**
	11/27/2007	**410**	**280**	120	4.0 J	< 5.0	16.0	< 5.0	< 5.0	282	**42.9 J**	2,070
	5/20/2008	**510**	**310**	200	< 10	< 5.0	9.00	< 5.0	1.0 J	363	**31.8 J**	2,620
	11/18/2008	**440**	**290**	200	< 10	< 5.0	6.00	< 5.0	< 2.0	296	< 100	2,690
	6/22/2009	**508**	**302**	240	< 10	< 0.5	5.38	< 0.5	0.690	398	**51.7**	3,020
	11/18/2009	**471**	**337**	174	< 10	< 0.5	5.57	< 0.5	0.740	259	**51.8**	2,520
	11/30/2010	**234**	**134**	112	< 10	< 0.5	2.27	< 0.5	< 0.5	156	**61.0**	2,320
	5/9/2011	**119**	**90.7**	92.3	< 10	< 0.5	2.00	< 0.5	< 0.5	111	**54.3**	2,180
	11/17/2011	**113**	**123**	54.2	< 10	< 0.5	1.00	0.520	0.390 J	61.0	**41.3**	2,610
	5/15/2012	**107**	**83.9**	57.9	< 10	< 0.5	0.990	< 0.5	< 0.5	62.1	**58.4**	2,370
	11/13/2012	**92.6**	59.5	54.4	< 10	< 0.5	0.805	0.557	< 0.5	54.1	**50.1**	**14,900**
	5/24/2013	**74.0**	44.5	34.6	< 10	< 0.5	0.906	0.466	< 0.5	33.9	**87.0**	**42,000**
	11/11/2013	**48.5**	35.2	18.3	< 5.0	< 0.5	0.249 J	0.410 J	< 0.5	17.3	**46.7**	3,350
	5/19/2014	**88.7**	65.6	27.4	< 5.0	< 0.5	10.8	0.505	0.251 J	19.9	**47.7**	**3,910**
	10/15/2014	**39.6**	41.2	15.2	< 5.0	< 0.5	0.268 J	0.484 J	< 0.5	13.7	--	--
	11/10/2014	**20.4**	16.4	9.87	< 5.0	< 0.5	< 0.5	0.352 J	< 0.5	10.7	**53.4**	2,570
	1/7/2015	**20.1**	18.0	8.69	< 5.0	< 0.5	0.216 J	0.365 J	< 0.5	8.68	--	--
	5/20/2015	**42.5**	35.4	17.6	< 5.0	< 0.5	0.175 J	0.559	< 0.5	15.4	**79.9**	2,800
	11/16/2015	**9.44**	11.8	4.23	< 5.0	< 0.5	0.207 J	0.819	< 0.5	6.07	**49.6**	1,840
	5/16/2016	**11.8**	15.6	6.38	< 5.0	< 0.5	< 0.5	0.578	< 0.5	7.83	**34.9**	2,200
	7/6/2016	**11.4**	10.6	5.14	1.57 J	< 0.5	0.737	0.328 J	< 0.5	6.63	--	--
	8/23/2016	**14.0**	12.1	5.49	< 5.0	< 0.5	< 0.5	0.361 J	< 0.5	5.81	**402**	3,210
	10/13/2016	**12.0**	18.5	3.44	< 5.0	< 0.5	< 0.5	0.270 J	< 0.5	3.53	**821**	3,350
	11/8/2016	**13.6**	17.8	4.34	< 5.0	< 0.5	< 0.5	0.354 J	< 0.5	3.63	**66.4**	1,850
	5/15/2017	**11.2**	14.8	2.68	< 5.0	< 0.5	< 0.5	0.539	< 0.5	1.97	**39.6**	2,100
	11/7/2017	4.63	8.46	2.23	< 5.0	< 0.5	< 0.5	0.627	< 0.5	5.14	**67.0**	1,660
	5/25/2018	**30.0**	40.4	9.24	< 5.0	< 0.5	0.179 J	0.529	< 0.5	2.31	**48.3**	2,720
	11/14/2018	**23.7**	33.1	9.49	< 5.0	< 0.5	14.8	0.468 J	< 0.5	3.88	**43.7**	2,500
	5/15/2019	**20.6**	31.8	7.13	< 5.0	< 0.5	15.4	0.483 J	< 0.5	2.66	**37.1**	2,010
	5/3/2021	**15.2**	28.9	5.10	< 5.0	< 1.0	4.28	< 1.0	< 1.0	< 2.0	**80.5**	3,010
201R (40-42)	10/24/2003	**1,100**	**210**	13.0	25.0	< 5.0	31.0	**64.0**	< 5.0	20.0	--	--
201R (45-47)	10/24/2003	**1,100**	**210**	12.0	27.0	< 5.0	30.0	**62.0**	< 5.0	20.0	--	--
201R (50-52)	10/24/2003	**1,100**	**210**	13.0	30.0	< 5.0	30.0	**63.0**	< 5.0	20.0	--	--
201R (55-57)	10/24/2003	**1,100**	**210**	12.0	19.0	< 5.0	26.0	**59.0**	< 5.0	18.0	--	--
201R	10/30/2003	**940**	**220**	13.0	120	< 5.0	31.0	**58.0**	2.0 J	19.0	< 3.8	6.94
	12/16/2003	**530**	**170**	6.00	98.0	< 5.0	10.0	**34.0**	< 5.0	5.0 J	5.26	< 5.0
	2/9/2004	**120**	**99.0**	< 5.0	< 10	< 5.0	< 5.0	**27.0**	< 5.0	1.0 J	6.61	< 5.0
	3/22/2004	< 5.0	70.0	< 5.0	< 10	< 5.0	< 5.0	**28.0**	< 5.0	< 5.0	8.28	< 5.0
	5/25/2004	< 5.0	57.0	< 5.0	< 10	< 5.0	< 5.0	**22.0**	< 5.0	< 5.0	6.15	< 5.0
	11/8/2004	**110**	56.0	3.0 J	< 10	< 5.0	< 5.0	**20.0**	< 5.0	< 5.0	5.44	20.2
	6/1/2005	3.0 J	8.00	< 5.0	< 10	< 5.0	< 5.0	5.00	< 10	< 1.0	9.31	1.44 J
	11/10/2005	**94.0**	32.0	1.0 J	< 10	< 5.0	< 5.0	**7.00**	< 5.0	< 1.0	4.36 J	45.3
	7/5/2006	**100**	69.0	< 5.0	1.0 J	< 5.0	4.0 J	**8.00**	2.0 J	< 1.0	9.45	193
	8/31/2006	**300**	**140**	2.0 J	< 10	< 5.0	8.00	**10.0**	2.0 J	< 1.0	8.80	220
	11/21/2006	**300**	**130**	2.0 J	< 10	< 5.0	6.00	**9.00**	2.0 J	< 1.0	< 100	82.6
	2/27/2007	**160**	**95.0**	2.0 J	1.0 J	< 5.0	3.0 J	**6.00**	1.0 J	< 1.0	< 100	162
	5/30/2007	**200**	**91.0**	2.0 J	5.0 J	< 5.0	3.0 J	4.0 J	**3.0 J**	< 1.0	< 100	265
	11/27/2007	**230**	**120**	3.0 J	5.0 J	< 5.0	5.00	**6.00**	**3.0 J**	< 1.0	< 100	313
	5/22/2008	**180**	**91.0**	2.0 J	< 10	< 5.0	3.0 J	4.0 J	< 2.0	< 1.0	< 100	430
	11/21/2008	**230**	**98.0**	3.0 J	4.0 J	< 5.0	4.0 J	4.0 J	1.0 J	< 1.0	< 100	534
	6/23/2009	**35.0**	30.0	1.28	< 10	< 0.5	1.90	2.46	0.440 J	0.570	< 10	615
	11/19/2009	**135**	**88.6**	1.70	< 10	< 0.5	1.91	3.33	< 0.5	1.14	4.3 J	634
	11/30/2010	**107**	63.2	0.890	< 10	< 0.5	0.860	2.19	< 0.5	0.990	4.9 J	753
	5/10/2011	0.590	1.91	0.310 J	< 10	< 0.5	< 0.5	1.19	< 0.5	< 0.5	4.2 J	764
	11/14/2011	**93.5**	**127**	2.97	< 10	< 0.5	0.500	1.87	1.09	< 0.5	**11.3**	715
	5/16/2012	0.620	24.9	< 0.5	< 10	< 0.5	< 0.5	1.06	< 0.5	< 0.5	< 10	725
	11/14/2012	**22.7**	**76.4**	0.679	< 10	< 0.5	< 0.5	1.61	0.451 J	< 0.5	9.2 J	627
	5/23/2013	< 0.5	27.4	< 0.5	< 10	< 0.5	< 0.5	1.86	< 0.5	< 0.5	< 10	409
	11/13/2013	2.14	52.9	< 0.5	< 5.0	< 0.5	< 0.5	2.84	< 0.5	0.977 J	**16.7**	1,080
	5/20/2014	1.61	28.2	< 0.5	< 5.0	< 0.5	< 0.5	1.19	< 0.5	< 1.5	< 10	880
	9/11/2014	4.88	33.4	0.224 J	< 5.0	< 0.5	< 0.5	0.617	< 0.5	< 1.5	--	--
	10/16/2014	4.01	29.2	< 0.5	< 5.0	< 0.5	< 0.5	0.551	< 0.5	< 1.5	--	--
	11/11/2014	2.74	24.4	< 0.5	< 5.0	< 0.5	< 0.5	0.558	< 0.5	< 1.5	< 10	680
	1/7/2015	2.48	19.5	< 0.5	< 5.0	< 0.5	< 0.5	0.621	< 0.5	< 1.5	--	--
	5/21/2015	< 0.5	7.12	< 0.5	< 5.0	< 0.5	< 0.5	0.698	< 0.5	< 1.5	**12.9**	324
	11/17/2015	2.73	15.6	< 0.5	< 5.0	< 0.5	< 0.5	0.950	< 0.5	< 1.0	**16.2**	495
	5/17/2016	< 0.5	7.45	< 0.5	< 5.0	< 0.5	< 0.5	0.699	< 0.5	< 1.0	**11.3**	189
	8/23/2016	0.318 J	4.02	< 0.5	< 5.0	< 0.5	< 0.5	0.595	< 0.5	< 1.0	**13.0**	99.0
	11/7/2016	< 0.5	2.79	< 0.5	< 5.0	< 0.5	< 0.5	0.388 J	< 0.5	< 1.0	**12.4**	24.0
	5/16/2017	< 0.5	2.45	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**18.0**	107
	11/8/2017	< 0.5	2.83	< 0.5	< 5.0	< 0.5	< 0.5	0.482 J	< 0.5	< 1.5	**10.8**	29.9
	5/24/2018	< 0.5	4.36	< 0.5	< 5.0	< 0.5	< 0.5	0.409 J	< 0.5	< 1.5	**10.5**	218
	11/12/2018	1.38	8.72	< 0.5	< 5.0	< 0.5	8.11	0.636	< 0.5	< 1.5	**13.5**	328
	5/13/2019	< 0.5	4.51	< 0.5	< 5.0	< 0.5	0.258 J	< 0.5	< 0.5	< 1.5	< 10	37.0
202R (40-42)	10/24/2003	**630**	**110**	21.0	190	< 5.0	70.0	< 5.0	< 5.0	84.0	--	--
202R (45-47)	10/24/2003	**610**	**110**	22.0	180	< 5.0	72.0	< 5.0	< 5.0	86.0	--	--
202R (50-52)	10/24/2003	**620**	**110**	21.0	190	< 5.0	71.0	< 5.0	< 5.0	85.0	--	--
202R (55-57)	10/24/2003	**660**	**120**	24.0	180	< 5.0	82.0	< 5.0	< 5.0	97.0	--	--
202R	10/30/2003	**660**	**100**	16.0	860	< 5.0	51.0	2.0 J	< 5.0	65.0	3.82	13.5
	12/17/2003	**470**	**110**	14.0	1,500	< 5.0	62.0	< 5.0	< 5.0	50.0	7.74	14.9
	2/10/2004	**330**	67.0	21.0	**2,200**	< 5.0	57.0	< 5.0	< 5.0	66.0	**12.6**	96.4

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
	3/23/2004	**80.0**	44.0	17.0	820	< 5.0	11.0	< 5.0	< 5.0	45.0	**11.6**	86.4
	5/24/2004	**6.00**	19.0	8.00	1,100	< 5.0	< 5.0	< 5.0	< 5.0	5.0 J	**14.8**	119
202R (cont.)	11/5/2004	**26.0**	9.00	2.0 J	430	< 5.0	< 5.0	< 5.0	< 5.0	7.00	**16.7**	96.6
	5/23/2005	**40.0**	18.0	8.00	380	< 5.0	< 5.0	< 5.0	< 10	22.0	**29.9**	79.8
	11/8/2005	**180**	46.0	8.00	200	< 5.0	< 5.0	< 5.0	< 5.0	23.0	**25.9**	136
	6/29/2006	**30.0**	< 5.0	< 5.0	27.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**42.6**	2,860
	8/29/2006	**84.0**	< 5.0	3.0 J	22.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**24.8**	1,150
	11/20/2006	**83.0**	31.0	4.0 J	5.0 J	< 5.0	< 5.0	< 5.0	< 5.0	8.00	< 100	256
	2/27/2007	**27.0**	33.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**25.2 J**	461
	5/29/2007	**13.0**	32.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	694
	11/30/2007	5.00	23.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	146
	5/19/2008	< 5.0	7.0 J	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	**42 J**	190
	11/20/2008	2.0 J	35.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	1,840
	6/25/2009	0.970	17.9	< 0.5	< 10	0.400 J	0.280 J	< 0.5	< 0.5	< 0.5	**13.8**	144
	11/20/2009	2.95	39.1	< 0.5	< 10	0.410 J	< 0.5	0.510	< 0.5	< 0.5	**15.9**	853
	11/30/2010	0.530	30.2	< 0.5	< 10	< 0.5	< 0.5	0.570	< 0.5	< 0.5	**20.8**	863
	5/10/2011	< 0.5	15.5	< 0.5	< 10	< 0.5	< 0.5	0.490 J	< 0.5	< 0.5	**18.5**	517
	11/15/2011	0.870	33.1	< 0.5	< 10	< 0.5	< 0.5	0.860	< 0.5	< 0.5	**14.9**	1,230
	5/15/2012	< 0.5	12.2	< 0.5	< 10	< 0.5	< 0.5	0.540	< 0.5	< 0.5	7.6 J	166
	11/12/2012	< 0.5	13.2	< 0.5	< 10	< 0.5	< 0.5	0.542	< 0.5	< 0.5	8.40	454
	5/21/2013	< 0.5	6.24	< 0.5	< 10	< 0.5	< 0.5	0.658	< 0.5	< 0.5	**13.8**	235
	11/11/2013	< 0.5	2.71	< 0.5	< 5.0	< 0.5	< 0.5	0.463 J	< 0.5	< 1.5	**17.8**	1,410
	5/19/2014	< 0.5	2.57	< 0.5	< 5.0	< 0.5	< 0.5	0.366 J	< 0.5	< 1.5	**19.6**	2,090
	9/11/2014	0.264 J	2.92	< 0.5	< 5.0	< 0.5	< 0.5	0.316 J	< 0.5	< 1.5	--	--
	10/15/2014	0.301 J	2.75	< 0.5	< 5.0	< 0.5	< 0.5	0.292 J	< 0.5	< 1.5	--	--
	11/10/2014	0.313 J	2.80	< 0.5	< 5.0	< 0.5	< 0.5	0.314 J	< 0.5	< 1.5	9.6 J	1,980
	1/5/2015	< 0.5	2.01	< 0.5	< 5.0	< 0.5	< 0.5	0.295 J	< 0.5	< 1.5	--	--
	5/20/2015	< 0.5	0.611	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**13.0**	231
	11/16/2015	< 0.5	1.40	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**15.0**	867
	5/17/2016	< 0.5	0.810	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**12.8**	1,060
	8/23/2016	< 0.5	0.631	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	9.3 J	52.3
	11/7/2016	< 0.5	0.334 J	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**13.3**	135
	5/15/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	8.9 J	176
	11/6/2017	< 0.5	0.904	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**11.2**	225
	5/24/2018	< 0.5	0.695	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	89.1
	11/13/2018	< 0.5	1.37	< 0.5	< 5.0	< 0.5	< 0.5	0.227 J	< 0.5	< 1.5	< 10	527
	5/13/2019	< 0.5	0.532	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	15.9
	5/3/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**11.4**	62.1
203R (40)	10/28/2003	**2,400**	**1,000**	460 J	1,300	< 5.0	**7,900**	< 5.0	**3.0 J**	2,200	--	--
203R (45)	10/28/2003	**2,600**	**1,000**	< 1,000	< 2,000	< 5.0	**8,300**	< 5.0	< 5.0	1,950	**69.2**	**4,940**
203R (50)	10/28/2003	**3,200**	**1,200**	< 1,000	< 2,000	< 5.0	**11,000**	< 5.0	< 5.0	2,780	**84.4**	**6,260**
203R (55)	10/28/2003	**2,100**	640	< 500	< 1,000	< 5.0	**5,600**	< 5.0	< 5.0	1,570	**45.0**	2,070
203R	5/24/2005	**1,200**	< 5.0	< 5.0	200	< 5.0	< 5.0	< 5.0	< 10	< 1.0	< 5.0	**139,000**
	11/7/2005	**1,100**	< 5.0	< 5.0	200	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	**126,000**
	6/28/2006	**700**	< 5.0	< 5.0	130	< 5.0	150	< 5.0	< 5.0	< 1.0	3.98 J	--
	8/30/2006	**110**	< 5.0	< 5.0	120	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	2.54 J	**119,000**
	11/21/2006	**460**	< 5.0	< 5.0	39.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	**47,500**
	2/27/2007	< 5.0	< 5.0	< 5.0	18.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**72.2 J**	**490,000**
	5/30/2007	< 5.0	< 5.0	< 5.0	12 J	< 5.0	< 5.0	< 5.0	**3.0 J**	< 1.0	**49.4 J**	**382,000**
	11/28/2007	< 5.0	< 5.0	< 5.0	5.0 J	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**50.8 J**	**356,000**
	5/19/2008	< 25	< 25	< 25	< 50	< 25	< 25	< 25	< 10	< 5.0	< 200	**293,000**
	11/21/2008	< 5.0	< 5.0	< 5.0	2.0 J	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	**101,000**
	6/25/2009	1.96	< 0.5	< 0.5	25.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	**37,200**
	11/24/2009	**13.6**	< 0.5	< 0.5	12.4	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	**24,900**
	12/3/2010	**192**	41.8	0.740	< 10	< 0.5	3.84	0.280 J	< 0.5	7.07	< 10	2,160
	5/11/2011	**528**	**277**	20.0	< 10	< 0.5	2.76	0.420 J	1.01	31.7	< 10	**4,300**
	11/15/2011	**310**	**236**	34.9	< 10	< 0.5	1.62	1.03	0.990	30.8	7.6 J	**6,660**
	5/15/2012	**19.5**	59.4	0.440 J	< 10	< 0.5	0.260 J	0.750	< 0.5	2.14	< 10	**8,230**
	11/12/2012	**140**	**120**	9.72	< 10	< 0.5	2.65	1.15	0.523	13.0	**14.7**	**9,310**
	5/24/2013	**82.3**	61.8	4.08	< 10	< 0.5	0.504	0.677	0.367 J	5.29	9.8 J	**10,900**
	11/12/2013	**365**	**238**	57.9	< 5.0	< 0.5	0.813	0.404 J	0.879	42.5	**33.8**	**7,820**
	5/20/2014	**218**	**145**	21.7	< 5.0	< 0.5	0.482 J	0.379 J	0.558	16.0	**22.5**	**6,350**
	9/11/2014	**56.0**	67.1	18.1	< 5.0	< 0.5	0.177 J	0.494 J	0.413 J	15.8	--	--
	10/15/2014	**129**	**99.0**	48.3	< 5.0	< 0.5	0.799	0.504	< 0.5	39.7	--	--
	11/10/2014	**227**	**166**	39.3	< 5.0	< 0.5	2.20	0.461 J	0.867	35.7	**40.7**	**7,210**
	1/7/2015	**64.2**	**77.5**	12.7	< 5.0	< 0.5	0.381 J	0.676	0.348 J	12.4	--	--
	5/18/2015	**12.3**	30.5	0.452 J	< 5.0	< 0.5	0.381 J	0.492 J	< 0.5	0.390 J	**11.8**	2,140
	11/16/2015	**20.9**	55.2	1.62	< 5.0	< 0.5	0.381 J	0.920	< 0.5	1.14	**11.6**	**4,170**
	5/16/2016	2.41	21.6	1.38	< 5.0	< 0.5	< 0.5	0.753	< 0.5	1.20	**11.2**	3,470
	7/6/2016	1.79	18.5	0.214 J	< 5.0	< 0.5	0.599	0.943	< 0.5	2.00	--	--
	8/23/2016	**11.6**	53.3	< 0.5	< 5.0	< 0.5	< 0.5	0.738	0.295 J	8.55	**39.3**	**4,620**
	10/13/2016	**129**	**136**	30.0	< 5.0	< 0.5	< 0.5	0.846	0.433 J	25.2	**40.1**	**5,850**
	11/8/2016	**152**	**142**	47.7	< 5.0	< 0.5	0.339 J	0.783	< 0.5	31.9	**51.2**	**5,760**
	5/15/2017	4.33	29.8	0.607	< 5.0	< 0.5	< 0.5	0.327 J	< 0.5	< 1.5	**15.4**	3,130
	11/6/2017	**26.2**	46.9	2.30	< 5.0	< 0.5	0.172 J	0.925	0.214 J	< 1.5	**17.6**	**3,710**
	5/25/2018	1.16	12.6	< 0.5	< 5.0	< 0.5	< 0.5	0.767	< 0.5	< 1.5	< 10	631
	11/13/2018	**83.3**	**104**	22.6	< 5.0	< 0.5	0.422 J	0.822	0.403 J	1.18 J	**29.9**	3,260
	5/13/2019	< 0.5	16.0	< 0.5	< 5.0	< 0.5	< 0.5	0.462 J	< 0.5	< 1.5	< 10	96.6
	5/4/2021	2.50	19.5	< 1.0	< 5.0	< 1.0	< 1.0	0.638	< 1.0	< 2.0	**17.0**	1,400
204R (40-42)	10/24/2003	**8.00**	2.0 J	5.00	< 10	< 5.0	45.0	< 5.0	< 5.0	21.0	--	--
204R (45-47)	10/24/2003	**10.0**	3.0 J	7.00	< 10	< 5.0	56.0	< 5.0	< 5.0	26.0	--	--
204R (50-52)	10/24/2003	**10.0**	3.0 J	6.00	< 10	< 5.0	56.0	< 5.0	< 5.0	25.0	--	--
204R (55-57)	10/24/2003	**10.0**	3.0 J	7.00	< 10	< 5.0	58.0	< 5.0	< 5.0	26.0	--	--
204R	12/17/2003	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	8.13	< 5.0
	2/9/2004	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	6.74	5.35
	3/22/2004	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	8.97	19.0
	5/25/2004	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**10.3**	9.73
	11/5/2004	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**13.7**	2.84 J
	5/23/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 10	< 1.0	**19.3**	21.5
	11/10/2005	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**13.1**	6.76
	6/29/2006	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**14.1**	5.83
	11/20/2006	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	4.68 J
	5/29/2007	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 100	4.33 J
	5/19/2008	< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	13.6
	6/25/2009	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	6.5 J	4.6 J
	12/2/2010	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**11.7**	4.4 J
	5/10/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	8.9 J	12.5 J
	11/14/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	0.460 J	< 0.5	< 0.5	< 0.5	**10.4**	< 15
	5/17/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**10.9**	10.3 J
	11/12/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**10.3**	7.0 J
	5/21/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**13.0**	9.1 J
	11/11/2013	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**13.7**	40.3
	5/19/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	0.313 J	< 0.5	< 0.5	< 0.5	**10.8**	64.7
	9/11/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
	10/15/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
	11/12/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	0.209 J	< 0.5	< 0.5	< 0.5	8.4 J	111
	1/6/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
	5/22/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	--	--
	11/16/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	45.6
	5/17/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	8.8 J	68.8
	8/23/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	8.50
	11/7/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	1.38	< 0.5	< 0.5	< 1.0	< 10	15.9
	5/15/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**21.3**	< 15
	5/24/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**20.8**	< 15
	11/13/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**28.9**	< 20
	5/14/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**25.6**	< 15
	5/4/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**14.7**	< 1.0
205R	12/5/2005	**1,100**	**460**	200 J	**4,300**	< 5.0	16.0	**30.0**	2.0 J	315	--	--
	4/14/2006	**960**	**470**	190	**3,600**	< 5.0	210 J	**11.0**	2.0 J	450	**28.4**	761
	7/5/2006	**870**	**330**	170	**4,100**	< 5.0	300	**8.00**	2.0 J	450	**29.8**	893
	8/31/2006	**910**	**390**	140 J	**4,100**	< 5.0	330	**8.00**	2.0 J	290	**30.4**	941
	11/20/2006	**650**	**280**	180	**5,400**	< 5.0	210 J	5.00	1.0 J	460	< 100	937
	2/27/2007	**800**	**380**	130	**2,400**	< 5.0	270	5.00	2.0 J	345	**30.2 J**	925
	5/31/2007	**880**	**310**	160	**2,900**	< 5.0	290	4.0 J	**3.0 J**	440	< 100	920
	11/29/2007	**730**	**240 J**	150	**6,600**	< 5.0	220 J	3.0 J	0.9 J	390	**66.3 J**	928
	5/21/2008	**740**	**300**	150	**2,500**	< 5.0	180	4.0 J	1.0 J	430	**36.5 J**	892
	11/19/2008	**430**	**200**	94.0	**4,000**	< 5.0	57.0	3.0 J	0.8 J	205	< 100	916
	6/24/2009	**608**	**171**	108	**4,630**	< 0.5	89.4	4.60	0.700	273	**23.4**	941
	11/20/2009	**256**	**112**	33.5	**1,960**	< 0.5	14.0	4.33	< 0.5	54.9	**27.9**	872
	12/1/2010	**459**	**146**	90.4	**3,170**	< 0.5	60.4	2.01	0.520	202	**13.2**	3,520

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
	5/11/2011	**453**	**170**	107	**2,650**	< 0.5	54.5	3.77	0.520	208	**25.2**	2,560
	11/16/2011	**385**	**124**	80.9	1,730	< 0.5	29.5	3.40	0.520	183	**31.5**	1,050
	5/15/2012	**378**	**124**	71.6	**1,960**	< 0.5	11.5	2.37	< 0.5	145	**27.3**	1,100
205R (cont.)	11/14/2012	**294**	**107**	67.7	1,120	< 0.5	2.82	2.78	0.485 J	127	**25.5**	933
	5/24/2013	**107**	47.6	28.0	318	< 0.5	< 0.5	3.06	0.261 J	24.4	**32.9**	923
	11/12/2013	**70.0**	32.5	14.2	170	< 0.5	< 0.5	2.11	< 0.5	9.48	**33.0**	870
	5/22/2014	**96.8**	44.6	20.3	166	< 0.5	< 0.5	1.77	0.211 J	15.2	**32.1**	871
	10/15/2014	**70.1**	29.9	17.9	40.2	< 0.5	< 0.5	1.61	< 0.5	12.2	--	--
	11/11/2014	**44.8**	20.5	11.5	16.2	< 0.5	< 0.5	1.90	< 0.5	7.87	**33.9**	664
	1/6/2015	< 0.5	2.51	< 0.5	< 5.0	< 0.5	< 0.5	1.56	< 0.5	< 1.5	--	--
	5/19/2015	**20.5**	11.7	5.11	4.90 J	< 0.5	< 0.5	0.904	< 0.5	< 1.5	**32.7**	984
	11/17/2015	3.70	2.71	0.728	< 5.0	< 0.5	< 0.5	0.776	< 0.5	< 1.0	**27.5**	365
	5/18/2016	**13.4**	8.47	1.81	< 5.0	< 0.5	< 0.5	0.803	< 0.5	< 1.0	**39.9**	1,160
	7/6/2016	**9.60**	5.72	2.52	< 5.0	< 0.5	< 0.5	0.817	< 0.5	1.52	--	--
	8/24/2016	**8.75**	10.8	0.523	24.9	< 0.5	< 0.5	1.31	< 0.5	1.13	**15.2**	564
	10/13/2016	**8.41**	6.80	1.58	< 5.0	< 0.5	< 0.5	0.709	< 0.5	< 1.0	**31.5**	579
	11/8/2016	**18.8**	11.1	4.57	0.891 J	< 0.5	< 0.5	0.937	< 0.5	2.67	**32.4**	704
	5/16/2017	3.50	3.34	0.782	< 5.0	< 0.5	< 0.5	0.211 J	< 0.5	< 1.5	**19.0**	883
	11/8/2017	**13.8**	7.87	4.07	< 5.0	< 0.5	< 0.5	0.674	< 0.5	1.77	**35.1**	865
	5/25/2018	**9.75**	6.33	2.24	< 5.0	< 0.5	< 0.5	0.757	< 0.5	1.02 J	**33.2**	861
	11/14/2018	**20.0**	10.2	5.00	< 5.0	< 0.5	< 0.5	0.729	< 0.5	2.76	**36.0**	847
	5/16/2019	**11.5**	7.42	2.28	< 5.0	< 0.5	< 0.5	0.719	< 0.5	1.16 J	**21.6**	588
	5/5/2021	4.80	3.75	1.51	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	1.02 J	**27.3**	842
EW-100	9/26/2012	**572**	**207**	212	229	< 0.5	15.1	1.43	0.582	504	--	--
	12/13/2013	**24.0**	11.6	12.5	1.53 J	< 0.5	0.314 J	0.690	< 0.5	12.7	--	--
	1/5/2015	**7.14**	3.22	3.70	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	3.34	--	--
	5/16/2016	**19.2**	8.89	11.6	< 5.0	< 0.5	< 0.5	0.318 J	< 0.5	8.74	**15.0**	787
EW-100 (31-60)	5/21/2014	**112**	46.3	55.3	5.46	< 0.5	1.33	1.10	< 0.5	47.7	--	--
	5/20/2015	**70.1**	31.7	39.2	11.1	< 0.5	0.465 J	0.868	< 0.5	33.7	**27.2**	1,090
	11/17/2015	**26.8**	15.4	13.8	< 5.0	< 0.5	< 0.5	0.305 J	< 0.5	9.88	**16.0**	771
	5/15/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	80.6
	11/8/2017	**27.4**	21.5	8.18	< 5.0	< 0.5	< 0.5	0.615	< 0.5	< 1.5	< 10	625
	5/23/2018	< 0.5	1.61	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	65.2
	11/12/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	20.4
	5/13/2019	**14.6**	14.3	4.25	< 5.0	< 0.5	< 0.5	0.224 J	< 0.5	< 1.5	< 10	429
EW-101	9/19/2012	**77.8**	42.2	19.4	26.1	0.642	2.09	2.56	< 0.5	< 1.5	--	--
	12/13/2013	**12.0**	6.48	4.42	< 5.0	0.783	< 0.5	1.19	< 0.5	3.77	--	--
	1/7/2015	< 0.5	< 0.5	< 0.5	< 5.0	0.702	< 0.5	0.360 J	< 0.5	< 1.5	--	--
	5/16/2016	4.81	2.44	< 0.5	< 5.0	0.505	< 0.5	0.558	< 0.5	< 1.0	**11.4**	1,300
EW-101 (35-60)	5/21/2014	< 0.5	< 0.5	< 0.5	< 5.0	0.390 J	9.11	0.267 J	< 0.5	< 1.5	--	--
	5/20/2015	< 0.5	< 0.5	< 0.5	< 5.0	0.288 J	< 0.5	< 0.5	< 0.5	< 1.5	**11.4**	607
	11/17/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	0.243 J	< 0.5	< 1.0	**12.6**	142
	5/15/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	33.2
	11/8/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	305
	5/23/2018	0.279 J	0.262 J	< 0.5	< 5.0	0.211 J	< 0.5	0.221 J	< 0.5	< 1.5	< 10	107
	11/12/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	11.3	< 0.5	< 0.5	< 1.5	< 10	18.8 J
	5/13/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	81.6
IW-100	9/26/2012	**391**	**244**	62.0	**2,320**	< 0.5	157	4.90	0.808	286	--	--
	12/13/2013	**17.2**	22.7	1.82	1.97 J	0.166 J	< 0.5	2.35	< 0.5	1.14 J	--	--
	8/11/2014	**17.1**	20.7	2.06	2.36 J	0.163 J	< 0.5	2.02	< 0.5	1.46 J	--	--
	8/13/2014	**16.6**	22.0	2.50	4.01 J	0.192 J	< 0.5	2.57	< 0.5	1.91	--	--
	8/15/2014	**21.3**	22.6	3.83	15.3	0.180 J	< 0.5	2.42	< 0.5	6.81	--	--
	8/21/2014	**18.8**	17.4	3.78	15.0	< 0.5	0.711	2.32	< 0.5	5.46	--	--
	8/28/2014	**24.8**	20.9	5.25	24.3	< 0.5	1.08	2.78	< 0.5	7.98	--	--
	9/5/2014	**18.4**	16.1	4.42	13.7	< 0.5	0.994	2.11	< 0.5	6.74	--	--
	9/11/2014	**15.1**	18.5	3.77	11.0	< 0.5	0.635	2.29	< 0.5	5.77	--	--
	9/25/2014	**11.4**	14.3	2.87	6.05	< 0.5	0.194 J	2.00	< 0.5	2.94	--	--
	10/9/2014	**9.17**	14.4	1.77	6.36	< 0.5	< 0.5	1.59	< 0.5	1.76	--	--
	10/15/2014	**37.2**	**77.8**	12.6	16.6	< 0.5	0.822	3.08	0.325 J	12.5	--	--
	11/12/2014	**16.6**	39.4	4.73	4.12 J	< 0.5	0.332	2.87	< 0.5	4.16	--	--
	1/5/2015	**15.3**	14.4	2.15	< 5.0	< 0.5	< 0.5	1.64	< 0.5	1.62	--	--
	5/16/2016	**13.5**	15.8	2.76	< 5.0	< 0.5	< 0.5	1.97	< 0.5	2.42	8.6 J	1,510
	6/2/2016	**30.8**	58.5	10.8	10.1	< 0.5	0.370 J	2.93	0.252 J	11.5	--	1,460
	6/3/2016	**28.5**	56.3	10.1	10.6	< 0.5	0.378 J	2.92	0.267 J	11.9	--	1,540
	6/7/2016	**27.2**	63.2	10.3	9.69	< 0.5	0.639	3.29	0.279 J	11.8	--	1,520
	7/6/2016	**19.5**	49.1	6.59	6.31	< 0.5	1.15	3.62	0.226 J	7.33	**17.3**	1,400
	8/17/2016	**10.2**	15.5	1.87	< 5.0	< 0.5	< 0.5	1.42	< 0.5	1.25	**13.2**	1,410
	8/24/2016	**19.6**	57.7	6.54	< 5.0	< 0.5	0.530	3.63	0.257 J	5.96	**13.1**	1,370
	9/23/2016	**15.1**	67.8	5.25	< 5.0	< 0.5	< 0.5	3.51	< 0.5	4.02	**12.2**	874
	10/13/2016	**16.8**	**73.5**	5.62	< 5.0	< 0.5	< 0.5	2.96	< 0.5	3.79	**12.3**	723
	11/10/2016	**16.1**	**71.1**	5.28	< 5.0	< 0.5	< 0.5	3.33	< 0.5	3.62	**10.1**	689
IW-100 (41-60)	5/22/2014	**474**	**198**	84.0	857	< 0.5	54.3	0.570	0.889	254	--	--
	5/19/2015	**154**	**87.3**	32.6	145	< 0.5	2.41	< 0.5	0.471 J	67.2	**18.1**	1,210
	11/17/2015	**490**	**181**	86.3	457	< 0.5	19.1	0.363 J	1.13	296	**43.7**	1,810
	5/17/2017	3.60	7.40	< 0.5	< 5.0	< 0.5	< 0.5	1.32	< 0.5	< 1.5	< 10	834
	11/6/2017	**81.8**	43.7	11.7	44.7	< 0.5	1.07	< 0.5	0.242 J	32.0	**16.8**	446
	11/13/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	61.0
	5/13/2019	**11.5**	16.5	0.673	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	1.65	< 10	261
IW-100 (120-165)	5/23/2018	0.793	5.64	< 0.5	< 5.0	< 0.5	< 0.5	2.26	< 0.5	< 1.5	< 10	528
IW-101	9/19/2012	**129**	**198**	32.4	138	< 0.5	23.5	**5.22**	0.821	79.5	--	--
	12/13/2013	**91.9**	59.7	28.5	75.9	< 0.5	3.06	1.41	0.240 J	35.1	--	--
	1/5/2015	**162**	**73.6**	65.5	237	< 0.5	5.06	0.793	0.236 J	87.4	--	--
	5/16/2016	**50.1**	23.5	11.0	73.4	< 0.5	1.40	0.257 J	< 0.5	44.8	**46.9**	1,290
	8/23/2016	**23.6**	31.9	4.75	37.1	< 0.5	1.02	1.27	< 0.5	18.9	**27.6**	1,190
	10/13/2016	**46.9**	45.0	10.1	< 5.0	< 0.5	1.23	1.85	< 0.5	23.6	**46.7**	1,230
	11/7/2016	**46.2**	47.0	11.4	22.9	< 0.5	0.756	2.02	< 0.5	22.5	**33.7**	1,030
IW-101 (39-45)	5/22/2014	**17.5**	7.04	5.46	18.9	< 0.5	7.96	0.208 J	< 0.5	9.45	--	--
	5/19/2015	**12.4**	4.67	4.65	2.15 J	< 0.5	< 0.5	< 0.5	< 0.5	5.08	**35.6**	1,250
	11/17/2015	1.53	4.60	0.343 J	< 0.5	< 0.5	< 0.5	1.60	< 0.5	< 1.0	< 10	437
	5/17/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	27.9
	11/6/2017	< 0.5	0.437 J	0.454 J	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	0.633 J	**17.0**	70.8
	11/15/2018	**7.49**	3.68	3.55	< 5.0	< 0.5	22.7	< 0.5	< 0.5	4.74	**29.6**	544
	5/13/2019	**6.38**	3.64	3.32	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	4.83	**21.3**	764
IW-101 (105-165)	5/23/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	146
IW-102	9/26/2012	**220**	**206**	10.8	20.8 J	< 0.5	6.92	0.776	0.400 J	155	--	--
	12/12/2013	**76.9**	51.3	20.1	44.3	< 0.5	0.834	1.10	0.206 J	21.2	--	--
	1/5/2015	**72.2**	43.1	19.2	26.3	< 0.5	0.276 J	0.630	< 0.5	18.9	--	--
	5/16/2016	**34.0**	27.7	10.1	8.91	< 0.5	0.433 J	0.751	< 0.5	19.7	**15.0**	2,330
	8/23/2016	**27.3**	33.9	8.78	2.33 J	< 0.5	1.13	0.617	< 0.5	17.6	**23.1**	2,090
	10/13/2016	**40.2**	68.2	8.64	30.2	< 0.5	< 0.5	3.66	< 0.5	16.8	**22.2**	1,280
	11/7/2016	**30.2**	**77.2**	7.77	2.17 J	< 0.5	< 0.5	4.87	0.219 J	9.82	**20.5**	1,010
IW-102 (39-60)	5/22/2014	**12.4**	21.7	4.23	< 5.0	< 0.5	4.49	0.244 J	< 0.5	4.72	--	--
	5/19/2015	**19.8**	19.2	6.96	< 5.0	< 0.5	< 0.5	0.281 J	< 0.5	8.11	**19.1**	1,230
	11/16/2015	**7.73**	7.72	1.17	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	1.16	< 10	69.8
	5/16/2017	< 0.5	1.48	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	80.7
	11/6/2017	**26.7**	21.5	1.90	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	1.59	< 10	38.1
	5/23/2018	**5.96**	23.7	1.12	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	1.29 J	9.2 J	609
	11/15/2018	< 0.5	2.64	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	271
	5/15/2019	< 0.5	0.427 J	< 0.5	< 5.0	< 0.5	2.49	< 0.5	< 0.5	< 1.5	< 10	5.90 J
IW-103	9/26/2012	**99.0**	**109**	19.8	5.64	< 0.5	3.79	1.28	0.315 J	33.6	--	--
	12/12/2013	**59.9**	53.5	13.5	< 5.0	0.143 J	< 0.5	0.754	0.217 J	9.24	--	--
	8/11/2014	**55.2**	47.5	16.5	< 5.0	0.163 J	< 0.5	2.02	< 0.5	12.8	--	--
	8/13/2014	**33.0**	29.4	11.4	< 5.0	0.192 J	< 0.5	2.57	< 0.5	9.80	--	--
	8/15/2014	**35.3**	31.8	13.5	< 5.0	0.180 J	< 0.5	2.42	< 0.5	11.7	--	--
	8/21/2014	**26.7**	21.5	9.08	< 5.0	< 0.5	0.711	2.32	< 0.5	7.28	--	--
	8/28/2014	**34.6**	30.1	11.3	< 5.0	< 0.5	1.08	2.78	< 0.5	9.36	--	--
	9/5/2014	**31.8**	29.2	11.5	< 5.0	< 0.5	0.994	2.11	< 0.5	9.81	--	--
	9/11/2014	**24.8**	27.5	8.55	< 5.0	< 0.5	< 0.5	0.564	< 0.5	7.82	--	--
	9/25/2014	**21.1**	21.1	7.85	< 5.0	< 0.5	< 0.5	0.402 J	< 0.5	6.67	--	--
	10/9/2014	**22.7**	26.8	7.73	< 5.0	< 0.5	< 0.5	0.470 J	< 0.5	7.01	--	--
	10/15/2014	**20.3**	25.5	6.00	6.75	0.530	0.295 J	0.530	< 0.5	6.39	--	--
	11/12/2014	**11.9**	19.8	3.02	1.81 J	< 0.5	< 0.5	0.758	< 0.5	3.06	--	--
	1/5/2015	**84.2**	67.5	31.7	< 5.0	< 0.5	0.252 J	0.755	0.294 J	22.9	--	--
	5/16/2016	**35.1**	35.8	20.0	< 5.0	< 0.5	< 0.5	0.686	< 0.5	14.3	**30.1**	2,780
	6/2/2016	**18.4**	21.6	5.73	4.99 J	< 0.5	0.172 J	0.710	< 0.5	6.26	--	1,410
	6/3/2016	**16.2**	19.8	5.26	4.74 J	< 0.5	0.184 J	0.685	< 0.5	6.20	--	1,390
	6/7/2016	**14.7**	22.9	5.03	2.85 J	< 0.5	0.212 J	0.811	< 0.5	6.21	--	1,130
	7/6/2016	**14.5**	21.8	4.02	5.78	< 0.5	0.331 J	1.04	< 0.5	4.58	**12.8**	970
	8/17/2016	**26.0**	37.0	6.06	< 5.0	< 0.5	< 0.5	0.483 J	< 0.5	3.00	**11.9**	1,650

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
	8/24/2016	**7.98**	21.0	2.34	< 5.0	< 0.5	< 0.5	1.17	< 0.5	2.06	< 10	950
	9/23/2016	**6.25**	23.3	1.79	< 5.0	< 0.5	< 0.5	0.882	< 0.5	1.14	< 10	579
	10/13/2016	4.09	19.7	0.890	< 5.0	< 0.5	< 0.5	0.571	< 0.5	< 1.0	< 10	439
IW-103 (cont.)	11/10/2016	2.63	17.4	0.504	< 5.0	< 0.5	< 0.5	0.581	< 0.5	< 1.0	< 10	1,500
IW-103 (39-60)	5/22/2014	**47.7**	45.3	17.3	< 5.0	< 0.5	0.386 J	0.780	< 0.5	13.8	--	--
	5/19/2015	**43.3**	29.3	23.3	< 5.0	< 0.5	0.355 J	0.287 J	< 0.5	20.1	**40.5**	2,510
	11/19/2015	0.730	1.52	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**10.2**	95.3
	5/15/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	5.00	225
	11/6/2017	**6.51**	5.71	1.80	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	0.724 J	< 10	527
	5/23/2018	**13.9**	15.6	1.35	< 5.0	< 0.5	< 0.5	0.237 J	< 0.5	0.792 J	**29.5**	2,860
	11/15/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	16.7	< 0.5	< 0.5	< 1.5	< 10	105
	5/15/2019	**20.5**	36.3	2.34	< 5.0	< 0.5	12.1	0.481 J	0.186 J	< 1.5	**22.5**	2,860
IW-1R	10/29/2003	**3,300**	**1,500**	**820 J**	**12,000**	< 5.0	**18,000**	**22.0**	**3.0 J**	3,370	**19.1**	1,720
	11/8/2004	**2,000**	**570 J**	630 J	**4,900**	< 5.0	**8,300**	< 5.0	2.0 J	2,230	5.02	**8,620**
	5/23/2005	**2,900**	**1,200**	**1,100**	**5,500**	< 5.0	**15,000**	< 5.0	**6.0 J**	3,900	**43.3**	**4,380**
	11/7/2005	**2,800**	**1,100**	**1,000**	**2,800**	< 5.0	**11,000**	< 5.0	**6.0**	3,520	**38.1**	**4,060**
	6/30/2006	< 25	< 25	< 25	280	< 25	< 25	< 25	< 25	< 5.0	< 5.0	--
	8/29/2006	**1,900**	**79.0**	690	1,100	< 5.0	**4,200**	< 5.0	< 5.0	2,190	8.36	**6,240**
	11/21/2006	**1,400**	5.0 J	430	320	< 5.0	920	< 5.0	< 5.0	720	< 100	**6,510**
	2/26/2007	**980**	7.00	260	100	< 5.0	470	< 5.0	< 5.0	148	< 100	**18,400**
	5/30/2007	**980**	**510**	280	180	< 5.0	110	< 5.0	**3.0 J**	412	< 100	**73,800**
	11/27/2007	**450**	**460**	200	< 10	< 5.0	10.0	< 5.0	**3.0 J**	157	< 100	**5,350**
	5/20/2008	**450**	**350**	140	< 10	< 5.0	5.00	< 5.0	1.0 J	131	< 100	**6,330**
	11/18/2008	**470**	**320**	250	< 10	< 5.0	6.00	< 5.0	< 2.0	247	< 100	**5,990**
IW-2R	10/28/2003	**1,500**	**410**	260	740	< 5.0	**3,600**	< 5.0	< 5.0	1,020	**16.0**	26.9
	5/23/2005	**590**	< 5.0	< 5.0	7.0 J	< 5.0	1.0 J	< 5.0	< 10	< 1.0	3.63 J	**284,000**
	11/8/2005	**770**	< 5.0	< 5.0	10.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	**127,000**
	6/30/2006	< 25	< 25	< 25	44 J	< 25	< 25	< 25	< 25	< 5.0	< 5.0	--
	8/30/2006	< 5.0	< 5.0	< 5.0	25.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	2.82 J	**206,000**
	11/21/2006	2.0 J	< 5.0	< 5.0	7.0 J	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**64.7 J**	**253,000**
	2/26/2007	< 50	< 50	< 50	< 100	< 50	< 50	< 50	< 50	< 10	**86.1 J**	**707,000 J**
	6/1/2007	2.0 J	< 5.0	< 5.0	11 J	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**28.6 J**	**172,000**
	11/28/2007	2.0 J	< 5.0	< 5.0	12 J	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**28.2 J**	**154,000**
	5/20/2008	**12 J**	< 25	< 25	19 J	< 25	< 25	< 25	< 10	< 5.0	< 200	**139,000**
	11/20/2008	**330**	< 5.0	< 5.0	5.0 J	< 5.0	< 5.0	< 5.0	< 2.0	< 1.0	< 100	**7,010**
IW-3R	2/9/2006	**1,600**	**990**	**990**	340 J	< 5.0	**5,000**	< 5.0	2.0 J	2,910	--	--
	8/30/2006	**1,300**	**820**	**740**	390 J	< 5.0	**3,500**	< 5.0	1.0 J	1,970	**14.4**	**3,880**
	11/20/2006	**1,000**	**800**	640	830	< 5.0	**1,800**	< 5.0	2.0 J	1,540	< 100	**4,900**
	2/28/2007	**1,000**	**570**	500	220	< 5.0	990	< 5.0	2.0 J	860	< 100	924
	5/30/2007	**940**	**540**	270	840	< 5.0	930	< 5.0	**3.0 J**	430	< 100	1,810
	11/26/2007	**630**	**460**	160	730	< 5.0	560	< 5.0	1.0 J	240	< 100	**3,670**
	5/21/2008	**360**	**450**	100	200	< 5.0	320	< 5.0	2.0	125	< 100	**6,890**
	11/18/2008	**160**	**290**	61.0	74.0	< 5.0	100	< 5.0	1.0 J	65.0	< 100	**9,370**
IW-4R	2/9/2006	**510**	**120**	47.0	1,200	< 5.0	13.0	1.0 J	< 5.0	182	--	--
	8/29/2006	**420**	**130**	73.0	610	< 5.0	< 5.0	1.0 J	< 5.0	116	**96.0**	708
	11/20/2006	**260**	**120**	67.0	710	< 5.0	1.0 J	1.0 J	< 5.0	60.0	< 100	504
	2/27/2007	**270**	**140**	47.0	64.0	< 5.0	< 5.0	1.0 J	< 5.0	20.0	**59.4 J**	3,240
	5/29/2007	**220**	**120**	44.0	52.0	< 5.0	< 5.0	1.0 J	< 5.0	9.00	**64.7 J**	770
	11/28/2007	**85.0**	**150**	30.0	42.0	< 5.0	< 5.0	2.0 J	< 5.0	2.00	**26.8 J**	578
	5/21/2008	**48.0**	**180**	20.0	25.0	< 5.0	< 5.0	2.0 J	< 2.0	< 1.0	< 100	746
	11/20/2008	**27.0**	**170**	13.0	62.0	< 5.0	< 5.0	2.0 J	< 2.0	< 1.0	< 100	582
IW-5R	2/9/2006	**570**	**340**	310	130	< 5.0	440	< 5.0	< 5.0	1,030	--	--
	8/30/2006	**400**	**150**	150	90.0	< 5.0	81.0	< 5.0	< 5.0	480	**21.4**	**5,460**
	11/20/2006	**320**	**220**	140	92.0	< 5.0	19.0	< 5.0	< 5.0	350	< 100	1,370
	2/27/2007	**140**	< 5.0	< 5.0	14.0	< 5.0	< 5.0	< 5.0	< 5.0	< 1.0	**18.3 J**	**57,100**
	5/29/2007	**260**	**180**	< 5.0	< 10	< 5.0	< 5.0	< 5.0	< 5.0	8.00	< 100	**6,540**
	11/29/2007	**200**	**150**	5.00	2.0 J	< 5.0	< 5.0	< 5.0	< 5.0	2.00	< 100	**5,960**
	5/20/2008	**77.0**	**130**	6.00	< 10	< 5.0	< 5.0	< 5.0	< 2.0	3.00	< 100	**9,410**
	11/21/2008	**40.0**	**92.0**	8.00	< 10	< 5.0	< 5.0	< 5.0	< 2.0	5.00	< 100	**10,600**
IW-6R	2/9/2006	3.0 J	27.0	< 5.0	< 10	2.0 J	11.0	3.0 J	< 5.0	< 1.0	--	--
	8/30/2006	4.0 J	**150**	< 5.0	< 10	3.0 J	< 5.0	3.0 J	< 5.0	< 1.0	< 5.0	**4,540**
	11/20/2006	3.0 J	**170**	< 5.0	< 10	4.0 J	< 5.0	2.0 J	< 5.0	< 1.0	< 100	**7,570**
	2/26/2007	3.0 J	**110**	< 5.0	< 10	3.0 J	< 5.0	2.0 J	< 5.0	< 1.0	< 100	**7,470**
	5/31/2007	3.0 J	**92.0**	< 5.0	< 10	3.0 J	< 5.0	2.0 J	< 5.0	< 1.0	< 100	**6,880**
	11/27/2007	< 5.0	**85.0**	< 5.0	< 10	2.0 J	< 5.0	2.0 J	< 5.0	< 1.0	< 100	**6,980**
	5/20/2008	< 5.0	54.0	< 5.0	< 10	2.0 J	< 5.0	2.0 J	< 2.0	< 1.0	< 100	**5,970**
	11/20/2008	< 5.0	36.0	< 5.0	< 10	0.9 J	< 5.0	1.0 J	< 2.0	< 1.0	< 100	**5,770**
MW-300 (20-30)	11/15/2012	2.86	29.0	< 0.5	< 10	< 0.5	< 0.5	**8.13**	0.263 J	< 0.5	**94.7**	504
	5/24/2013	2.74	35.6	< 0.5	< 10	< 0.5	0.534	**6.78**	0.275 J	< 0.5	**65.3**	449
	11/13/2013	1.35	10.0	< 0.5	< 5.0	0.253 J	< 0.5	3.99	< 0.5	< 1.5	**63.3**	475
	5/21/2014	**5.44**	10.1	< 0.5	< 5.0	0.407 J	0.329 J	3.27	< 0.5	< 1.5	**28.5**	451
	11/13/2014	0.369 J	1.93	< 0.5	< 5.0	0.176 J	< 0.5	0.790	< 0.5	< 1.5	**22.4**	356
	1/5/2015	**11.8**	6.88	0.715	< 5.0	< 0.5	< 0.5	1.69	< 0.5	< 1.5	--	--
	5/21/2015	**11.2**	9.23	< 0.5	< 5.0	< 0.5	< 0.5	3.18	< 0.5	< 1.5	**30.7**	483
	11/18/2015	1.90	13.8	< 0.5	< 5.0	< 0.5	< 0.5	3.88	< 0.5	< 1.0	**53.4**	655
	5/18/2016	4.18	8.57	< 0.5	< 5.0	< 0.5	< 0.5	2.55	< 0.5	< 1.0	**28.3**	584
	11/8/2016	< 0.5	0.480 J	< 0.5	< 5.0	< 0.5	< 0.5	0.220 J	< 0.5	< 1.0	9.9 J	80.5
	5/18/2017	**8.11**	9.05	< 0.5	< 5.0	< 0.5	< 0.5	1.66	< 0.5	< 1.5	< 10	181
	11/7/2017	2.07	11.2	< 0.5	< 5.0	< 0.5	< 0.5	2.96	< 0.5	< 1.5	< 10	139
	5/24/2018	0.859	10.7	< 0.5	< 5.0	< 0.5	< 0.5	1.99	< 0.5	< 1.5	< 10	241
	11/15/2018	0.746	8.85	< 0.5	< 5.0	< 0.5	< 0.5	1.85	< 0.5	< 1.5	< 10	259
	5/13/2019	< 0.5	9.11	< 0.5	< 5.0	< 0.5	< 0.5	1.41	< 0.5	< 1.5	< 10	358
	5/6/2021	< 1.0	5.79	< 1.0	< 5.0	< 1.0	< 1.0	1.18	< 1.0	< 2.0	5.32	412
MW-300 (40-50)	11/15/2012	**5.78**	51.2	< 0.5	< 10	0.578	0.731	**10.0**	0.485 J	< 0.5	**15.4**	117
	5/23/2013	**12.7**	47.4	< 0.5	< 10	1.02	0.523	**12.8**	0.439 J	< 0.5	**11.0**	112
	11/13/2013	2.40	23.3	< 0.5	< 5.0	0.786	1.16	**7.73**	< 0.5	< 1.5	**10.8**	176
	5/21/2014	2.08	31.0	< 0.5	< 5.0	0.692	0.735	**7.76**	< 0.5	< 1.5	7.9 J	163
	11/13/2014	2.26	13.0	< 0.5	< 5.0	0.728	0.365 J	**5.12**	< 0.5	< 1.5	9.2 J	95.1
	1/5/2015	2.82	8.46	< 0.5	< 5.0	0.322 J	< 0.5	3.13	< 0.5	< 1.5	--	--
	5/21/2015	0.857	9.93	< 0.5	< 5.0	0.251 J	< 0.5	3.08	< 0.5	< 1.5	9.4 J	97.8
	11/18/2015	0.724	15.4	< 0.5	< 5.0	< 0.5	< 0.5	4.08	< 0.5	< 1.0	9.5 J	91.0
	5/18/2016	1.28	13.3	< 0.5	< 5.0	< 0.5	< 0.5	3.66	< 0.5	< 1.0	**44.5 J**	76.6
	11/8/2016	1.69	4.10	< 0.5	< 5.0	0.179 J	< 0.5	1.78	< 0.5	< 1.0	**12.8**	80.9
	5/18/2017	0.322 J	3.56	< 0.5	< 5.0	< 0.5	< 0.5	1.26	< 0.5	< 1.5	< 10	51.8
	11/7/2017	2.96	8.12	< 0.5	< 5.0	0.158 J	< 0.5	2.36	< 0.5	< 1.5	**13.3**	77.3
	5/24/2018	2.40	6.41	< 0.5	< 5.0	< 0.5	< 0.5	1.95	< 0.5	< 1.5	**10.3**	65.9
	11/15/2018	3.04	9.76	< 0.5	< 5.0	< 0.5	< 0.5	2.65	< 0.5	< 1.5	< 10	67.3
	5/13/2019	2.51	10.3	< 0.5	< 5.0	< 0.5	< 0.5	2.27	< 0.5	< 1.5	< 10	71.8
MW-300 (80-90)	11/16/2012	**12.9**	13.0	< 0.5	< 10	< 0.5	0.890	1.96	< 0.5	< 0.5	**19.5**	353
	5/23/2013	1.25	2.72	< 0.5	< 10	< 0.5	0.946	< 0.5	< 0.5	< 0.5	< 10	161
	11/13/2013	**18.9**	7.87	< 0.5	< 5.0	< 0.5	4.75	3.56	< 0.5	< 1.5	< 10	368
	5/21/2014	**27.1**	8.54	< 0.5	< 5.0	< 0.5	2.39	4.05	< 0.5	< 1.5	< 10	728
	11/13/2014	**9.06**	6.44	< 0.5	< 5.0	< 0.5	1.19	1.76	< 0.5	< 1.5	< 10	817
	1/5/2015	**5.42**	6.03	< 0.5	< 5.0	< 0.5	1.31	1.08	< 0.5	< 1.5	--	--
	5/21/2015	**18.7**	7.38	< 0.5	< 5.0	< 0.5	1.81	4.12	< 0.5	< 1.5	< 10	1,040
	11/18/2015	**18.2**	8.43	< 0.5	< 5.0	< 0.5	2.95	4.42	< 0.5	< 1.0	< 10	833
	5/19/2016	3.64	7.44	< 0.5	< 5.0	< 0.5	0.744	2.08	< 0.5	< 1.0	< 10	679
	11/8/2016	3.39	4.67	< 0.5	< 5.0	< 0.5	0.397 J	1.61	< 0.5	< 1.0	8.6 J	625
	5/18/2017	**10.7**	6.50	< 0.5	< 5.0	< 0.5	0.380 J	3.38	< 0.5	< 1.5	< 10	565
	11/7/2017	**7.85**	6.81	< 0.5	< 5.0	< 0.5	0.538	2.64	< 0.5	< 1.5	< 10	543
	5/24/2018	**10.7**	9.59	< 0.5	< 5.0	< 0.5	0.386 J	1.24	< 0.5	< 1.5	8.6 J	450
	11/15/2018	**10.4**	11.8	< 0.5	< 5.0	< 0.5	< 0.5	0.455 J	< 0.5	< 1.5	< 10	574
	5/13/2019	**11.2**	11.8	< 0.5	< 5.0	< 0.5	< 0.5	0.311 J	< 0.5	< 1.5	< 10	474
	5/6/2021	**5.37**	9.35	< 1.0	< 5.0	< 1.0	< 1.0	0.520 J	< 1.0	< 2.0	3.04	399
MW-300 (120-130)	12/4/2012	0.593	2.41	< 0.5	< 10	< 0.5	0.803	< 0.5	< 0.5	< 0.5	4.8 J	110
	5/24/2013	0.345 J	1.66	< 0.5	< 10	< 0.5	0.311 J	< 0.5	< 0.5	< 0.5	5.7 J	258
	11/14/2013	**5.09**	7.41	< 0.5	< 5.0	< 0.5	3.49	0.588	< 0.5	< 1.5	< 10	58.9
	5/21/2014	4.97	6.12	< 0.5	< 5.0	< 0.5	4.05	0.761	< 0.5	< 1.5	< 10	121
	11/13/2014	4.01	5.51	< 0.5	< 5.0	< 0.5	1.98	0.819	< 0.5	< 1.5	< 10	160
	5/21/2015	2.61	4.59	< 0.5	< 5.0	< 0.5	1.61	0.370 J	< 0.5	< 1.5	< 10	211
	11/20/2015	4.54	5.68	< 0.5	< 5.0	< 0.5	1.69	1.12	< 0.5	< 1.0	< 10	185
	5/20/2016	2.09	6.23	< 0.5	< 5.0	< 0.5	1.39	0.608	< 0.5	< 1.0	< 10	214
	11/10/2016	1.83	3.54	< 0.5	< 5.0	< 0.5	0.764	0.972	< 0.5	< 1.0	< 10	475
	11/10/2017	1.81	3.97	< 0.5	< 5.0	< 0.5	1.16	1.00	< 0.5	< 1.5	< 10	655
	5/29/2018	2.66	6.13	< 0.5	< 5.0	< 0.5	1.04	0.511	< 0.5	< 1.5	< 10	554
	11/19/2018	1.89	6.81	< 0.5	< 5.0	< 0.5	0.878	0.842	< 0.5	< 1.5	< 10	608
	5/14/2019	2.50	7.02	< 0.5	< 5.0	< 0.5	1.05	0.637	< 0.5	< 1.5	**10.9**	419
	11/14/2012	**415**	**192**	157	7.77 J	< 0.5	12.0	0.348 J	0.806	249	**86.9**	2,680
	5/24/2013	0.785	0.751	0.261 J	3.99 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**96.3**	3,070

ARCADIS

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
MW-301 (35-45)	11/15/2013	**150**	65.2	49.6	< 5.0	< 0.5	2.14	< 0.5	< 0.5	49.3	**71.4**	2,960
	5/22/2014	**30.9**	23.4	5.87	< 5.0	< 0.5	0.599	< 0.5	< 0.5	5.08	**118**	1,870
	9/12/2014	**28.1**	12.6	12.2	< 5.0	< 0.5	0.514	< 0.5	< 0.5	10.6	--	--
MW-301 (35-45) (cont.)	10/16/2014	**20.6**	9.45	12.4	< 5.0	< 0.5	0.323 J	< 0.5	< 0.5	10.8	--	--
	11/13/2014	**64.8**	29.5	25.2	< 5.0	< 0.5	0.853	< 0.5	< 0.5	21.9	**58.8**	1,350
	5/22/2015	**36.6**	18.6	9.28	< 5.0	< 0.5	0.490 J	< 0.5	< 0.5	7.09	**87.1**	1,810
	11/20/2015	**16.7**	8.95	12.6	< 5.0	< 0.5	0.278 J	< 0.5	< 0.5	10.7	**108**	1,900
	5/19/2016	**28.6**	14.6	18.4	< 5.0	< 0.5	0.443 J	0.245 J	< 0.5	14.4	**109**	1,760
	7/11/2016	**12.3**	6.35	6.37	< 5.0	< 0.5	0.397 J	< 0.5	< 0.5	4.82	--	--
	11/10/2016	**21.6**	11.9	11.0	< 5.0	< 0.5	0.438 J	< 0.5	< 0.5	9.00	**69.1**	1,680
	5/18/2017	**47.2**	28.7	12.3	< 5.0	< 0.5	0.444 J	< 0.5	< 0.5	9.48	**68.3**	1,810
	11/9/2017	**29.4**	12.9	17.5	< 5.0	< 0.5	0.717	0.281 J	< 0.5	15.0	**34.1**	1,340
	5/30/2018	**48.5**	25.7	10.3	< 5.0	< 0.5	0.394 J	< 0.5	< 0.5	8.06	**69.3**	1,320
	11/19/2018	**22.3**	14.7	6.08	< 5.0	< 0.5	0.452 J	< 0.5	< 0.5	4.49	**60.6**	1,260
	5/16/2019	**10.4**	6.44	1.74	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	1.33 J	9.7 J	500
	5/5/2021	**11.2**	6.13	5.97	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	3.36	**56.9**	1,260
MW-301 (115-125)	11/15/2012	**5.84**	17.1	< 0.5	< 10	< 0.5	0.524	1.84	< 0.5	< 0.5	6.1 J	673
	5/24/2013	1.17	5.93	< 0.5	0.970 J	< 0.5	0.383 J	0.919	< 0.5	0.240 J	8.7 J	688
	11/14/2013	1.91	13.3	< 0.5	< 5.0	< 0.5	0.234 J	1.94	< 0.5	< 1.5	6.3 J	632
	5/22/2014	3.92	10.1	< 0.5	< 5.0	< 0.5	0.659	0.727	< 0.5	< 1.5	< 10	588
	10/16/2014	1.92	9.76	< 0.5	< 5.0	< 0.5	0.952	0.737	< 0.5	< 1.5	< 10	1,530
	11/13/2014	1.58	7.40	< 0.5	< 5.0	< 0.5	0.254 J	1.70	< 0.5	< 1.5	< 10	444
	1/9/2015	1.74	8.55	< 0.5	< 5.0	< 0.5	0.480 J	0.739	< 0.5	< 1.5	--	--
	5/22/2015	2.16	6.77	< 0.5	< 5.0	< 0.5	0.366 J	0.663	< 0.5	< 1.5	< 10	581
	11/20/2015	2.19	8.80	< 0.5	< 5.0	< 0.5	0.417 J	1.82	< 0.5	< 1.0	< 10	490
	5/20/2016	2.41	9.95	< 0.5	< 5.0	< 0.5	0.387 J	0.989	< 0.5	< 1.0	< 10	453
	8/24/2016	2.37	6.72	< 0.5	< 5.0	< 0.5	0.450 J	0.810	< 0.5	< 1.0	< 10	293
	11/10/2016	1.03	4.88	< 0.5	< 5.0	< 0.5	0.255 J	1.03	< 0.5	< 1.0	< 10	66.1
	5/18/2017	1.26	4.76	< 0.5	< 5.0	< 0.5	0.388 J	0.892	< 0.5	< 1.5	< 10	244
	11/9/2017	1.30	4.85	< 0.5	< 5.0	< 0.5	0.285 J	1.10	< 0.5	< 1.5	9.2 J	386
	5/29/2018	2.40	7.81	< 0.5	< 5.0	< 0.5	0.543	1.16	< 0.5	< 1.5	**11.5**	385
	11/19/2018	3.59	11.8	< 0.5	< 5.0	< 0.5	0.626	0.680	< 0.5	< 1.5	< 10	410
	5/16/2019	3.09	9.57	< 0.5	< 5.0	< 0.5	0.564	0.471 J	< 0.5	< 1.5	< 10	590
MW-301 (145-155)	12/4/2012	2.63	12.0	< 0.5	6.58 J	< 0.5	1.25	< 0.5	< 0.5	0.670	4.7 J	1,260
	5/24/2013	0.308 J	0.651	< 0.5	2.49 J	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	8.7 J	1,610
	11/15/2013	**24.5**	57.7	< 0.5	< 5.0	< 0.5	0.706	1.29	0.234 J	< 1.5	< 10	1,680
	5/22/2014	**12.1**	32.4	< 0.5	< 5.0	< 0.5	1.10	0.652	< 0.5	< 1.5	< 10	1,530
	10/16/2014	**9.48**	26.1	< 0.5	< 5.0	< 0.5	1.20	0.344 J	< 0.5	< 1.5	--	--
	11/13/2014	**11.9**	33.2	< 0.5	< 5.0	< 0.5	1.20	0.344 J	< 0.5	< 1.5	--	--
	1/9/2015	**9.26**	26.0	< 0.5	< 5.0	< 0.5	1.06	0.374 J	< 0.5	< 1.5	--	--
	5/22/2015	**8.29**	21.0	< 0.5	< 5.0	< 0.5	1.24	0.371 J	< 0.5	< 1.5	< 10	1,780
	11/20/2015	**9.44**	26.4	< 0.5	< 5.0	< 0.5	1.36	1.10	< 0.5	< 1.0	< 10	1,820
	5/20/2016	**7.27**	24.6	< 0.5	< 5.0	< 0.5	0.870	1.23	< 0.5	< 1.0	< 10	1,460
	8/24/2016	< 0.5	0.494 J	< 0.5	< 5.0	< 0.5	1.35	< 0.5	< 0.5	< 1.0	< 10	1,410
	11/10/2016	**11.0**	31.3	< 0.5	< 5.0	< 0.5	2.12	2.06	< 0.5	< 1.0	< 10	1,620
	5/18/2017	**6.26**	24.6	< 0.5	< 5.0	< 0.5	0.779	2.17	< 0.5	< 1.5	< 10	1,490
	11/9/2017	**5.86**	20.7	< 0.5	< 5.0	< 0.5	0.749	3.21	< 0.5	< 1.5	< 10	1,630
	5/29/2018	**5.32**	19.1	0.190 J	< 5.0	< 0.5	0.779	3.47	< 0.5	< 1.5	< 10	1,440
	11/19/2018	**7.13**	17.7	< 0.5	< 5.0	< 0.5	1.01	0.678	< 0.5	< 1.5	< 10	1,400
	5/16/2019	**5.99**	17.5	< 0.5	< 5.0	< 0.5	1.02	0.894	< 0.5	< 1.5	< 10	1,310
	5/5/2021	**5.58**	13.1	< 1.0	< 5.0	< 1.0	1.03	< 1.0	< 1.0	< 2.0	1.54	1,430
MW-301 (240-250)	12/4/2012	0.394 J	2.21	< 0.5	61.5	< 0.5	0.627	< 0.5	< 0.5	0.211 J	**14.2**	1,870
	5/1/2013	4.18	3.91	< 0.5	1.38 J	< 0.5	0.494 J	< 0.5	< 0.5	< 0.5	5.2 J	1,020
	11/15/2013	**12.5**	24.2	< 0.5	< 5.0	< 0.5	2.19	0.309 J	< 0.5	< 1.5	< 10	1,120
	5/22/2014	**14.9**	28.9	< 0.5	< 5.0	< 0.5	1.84	0.902	< 0.5	< 1.5	< 10	1,170
	11/13/2014	**8.19**	22.2	< 0.5	< 5.0	< 0.5	1.02	0.444 J	< 0.5	< 1.5	< 10	933
	1/9/2015	**5.29**	15.6	< 0.5	< 5.0	< 0.5	0.811	0.214 J	< 0.5	< 1.5	--	--
	5/22/2015	**6.32**	15.6	< 0.5	< 5.0	< 0.5	0.707	< 0.5	< 0.5	< 1.5	< 10	1,070
	11/20/2015	**7.73**	21.9	< 0.5	< 5.0	< 0.5	1.12	0.332 J	< 0.5	< 1.0	< 10	1,190
	5/20/2016	**7.14**	23.4	< 0.5	< 5.0	< 0.5	1.34	0.626	< 0.5	< 1.0	< 10	1,230
	11/10/2016	**7.60**	23.6	< 0.5	< 5.0	< 0.5	1.09	0.407 J	< 0.5	< 1.0	< 10	1,160
	5/18/2017	**6.49**	19.0	< 0.5	< 5.0	< 0.5	0.970	0.307 J	< 0.5	< 1.5	< 10	1,190
	11/9/2017	**8.31**	22.6	< 0.5	< 5.0	< 0.5	1.35	0.461 J	< 0.5	< 1.5	< 10	931
	5/29/2018	**5.90**	28.5	0.283 J	< 5.0	< 0.5	1.61	2.06	< 0.5	< 1.5	< 10	860
	11/19/2018	**6.43**	19.9	< 0.5	< 5.0	< 0.5	1.28	0.371 J	< 0.5	< 1.5	< 10	808
	5/16/2019	4.70	22.5	< 0.5	< 5.0	< 0.5	0.943	0.784	< 0.5	< 1.5	< 10	667
	5/10/2021	**6.98**	19.3	< 1.0	< 5.0	< 1.0	1.38	0.579 J	< 1.0	< 2.0	2.85	721
MW-301 (290-300)	12/4/2012	0.618 J	3.03	< 0.5	195	< 0.5	1.02	< 0.5	< 0.5	0.379 J	8.2 J	1,750
	5/1/2013	1.48	5.54	< 0.5	3.01 J	< 0.5	0.565	< 0.5	< 0.5	0.193 J	7.2 J	798
	11/15/2013	**7.02**	37.0	< 0.5	2.03 J	< 0.5	0.806	< 0.5	< 0.5	< 1.5	10.0	1,560
	5/22/2014	**6.05**	41.9	< 0.5	< 5.0	< 0.5	0.664	1.19	0.188 J	< 1.5	**11.9**	1,160
	11/13/2014	3.55	24.8	< 0.5	< 5.0	< 0.5	0.629	0.278 J	< 0.5	< 1.5	< 10	926
	1/9/2015	3.62	22.9	< 0.5	< 5.0	< 0.5	0.655	0.228 J	< 0.5	< 1.5	--	--
	5/22/2015	4.97	23.5	< 0.5	< 5.0	< 0.5	0.606	< 0.5	< 0.5	< 1.5	< 10	1,040
	11/20/2015	**6.66**	29.3	< 0.5	< 5.0	< 0.5	1.37	0.517	< 0.5	< 1.0	< 10	1,040
	5/20/2016	**6.14**	26.0	< 0.5	< 5.0	< 0.5	1.22	0.440 J	< 0.5	< 1.0	< 10	937
	11/10/2016	**6.41**	2.0 J	< 0.5	< 5.0	< 0.5	1.70	0.606	< 0.5	< 1.0	8.7 J	823
	5/18/2017	**5.56**	24.7	< 0.5	< 5.0	< 0.5	1.17	0.512	< 0.5	< 1.5	< 10	947
	11/9/2017	**7.06**	26.7	< 0.5	< 5.0	< 0.5	2.30	0.731	< 0.5	< 1.5	9.2 J	785
	5/29/2018	**7.40**	27.6	< 0.5	< 5.0	< 0.5	2.47	0.807	< 0.5	< 1.5	< 10	813
	11/19/2018	**6.52**	24.0	< 0.5	< 5.0	< 0.5	1.30	0.369 J	< 0.5	< 1.5	**12.4**	769
	5/16/2019	**6.28**	24.3	< 0.5	< 5.0	< 0.5	1.68	0.578	< 0.5	< 1.5	< 10	557
	5/5/2021	**6.18**	18.6	< 1.0	< 5.0	< 1.0	2.29	0.594 J	< 1.0	< 2.0	3.53	791
MW-302 (60-70)	11/16/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**22.5**	155
	5/24/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**29.1**	217
	11/12/2013	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**30.9**	202
	5/21/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**30.6**	109
	11/12/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**29.4**	122
	5/21/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**27.5**	265
	11/19/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**29.7**	550
	5/18/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**27.8**	53.0
	11/9/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**24.3**	8.7 J
	5/17/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**28.8**	307
	11/8/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**27.0**	222
	5/25/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**26.5**	437
	11/16/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**25.6**	477
	5/15/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**25.0**	282
	5/7/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**28.3**	51.9
MW-302 (100-110)	11/16/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	2.38	< 0.5	< 0.5	< 0.5	**18.9**	124
	5/24/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	0.665	< 0.5	< 0.5	0.235 J	**23.0**	119
	11/12/2013	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**27.9**	228
	5/21/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**24.3**	235
	11/12/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**25.7**	147
	5/21/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**27.1**	203
	11/19/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**23.6**	113
	5/18/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**25.5**	35.5
	11/9/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**29.1**	9.7 J
	5/17/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**23.0**	261
	11/8/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**23.3**	218
	5/25/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**26.1**	358
	11/16/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**26.8**	297
	5/15/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**24.7**	388
	5/7/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**28.2**	1.92
MW-303 (55-65)	11/16/2012	4.70	0.496 J	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**17.6**	28.9
	5/23/2013	4.02	0.341 J	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**16.2**	31.8
	11/14/2013	1.70	< 0.5	< 0.5	< 5.0	< 0.5	0.186 J	< 0.5	< 0.5	1.03 J	**15.6**	39.3
	5/21/2014	3.53	< 0.5	< 0.5	< 5.0	< 0.5	0.235 J	< 0.5	< 0.5	< 1.5	**22.1**	79.7
	11/11/2014	2.05	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**24.4**	41.3
	5/21/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**23.3**	192
	11/20/2015	1.94	< 0.5	< 0.5	< 5.0	< 0.5	0.261 J	< 0.5	< 0.5	< 1.0	**23.3**	156
	5/19/2016	1.11	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**10.3**	510
	11/9/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**17.4**	83.2
	5/18/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**22.7**	144
	11/9/2017	1.11	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**21.7**	128
	5/30/2018	0.954	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**16.0**	125
	11/19/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**27.3**	161
	5/16/2019	0.243 J	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**24.0**	124
	5/7/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	**23.4**	124
	11/16/2012	**5.80**	0.552	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**18.1**	24.3

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
MW-303 (115-125)	5/23/2013	**5.04**	0.438 J	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	**21.3**	86.9
	11/14/2013	3.13	0.389 J	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	0.818 J	**17.2**	101
	5/21/2014	4.53	0.432 J	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**22.1**	126
MW-303 (115-125) (cont.)	11/11/2014	0.522	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**16.2**	63.9
	5/21/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**32.3**	39.3
	11/20/2015	2.59	0.417 J	< 0.5	< 5.0	< 0.5	0.242 J	< 0.5	< 0.5	< 1.0	**19.7**	127
	5/19/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**26.4**	10.9 J
	11/9/2016	0.621	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	**21.9**	122
	5/18/2017	0.483 J	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**19.5**	246
	11/9/2017	0.963	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**28.0**	246
	5/30/2018	1.05	0.280 J	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**13.7**	90.3
	11/12/2018	4.61	1.17	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**15.3**	143
	5/16/2019	1.31	0.674	< 0.5	< 5.0	< 0.5	0.356 J	< 0.5	< 0.5	< 1.5	**25.3**	99.1
	5/7/2021	3.06	1.36	< 1.0	< 5.0	< 1.0	< 1.0	0.641 J	< 1.0	< 2.0	**16.7**	124
MW-304	5/1/2013	**59.1**	**144**	9.83	12.6	< 0.5	1.43	0.312 J	0.591	12.7	--	--
MW-305	5/1/2013	< 0.5	7.48	< 0.5	< 10	0.516	< 0.5	1.26	< 0.5	< 0.5	--	--
MW-305 (35-45)	9/13/2013	< 0.5	1.60	< 0.5	1.91 J	< 0.5	0.405 J	< 0.5	< 0.5	< 1.5	--	--
	11/14/2013	3.14	9.17	< 0.5	< 5.0	0.173 J	2.97	1.07	< 0.5	< 1.5	**17.3**	2,180
	5/22/2014	2.27	4.59	< 0.5	< 5.0	< 0.5	1.82	0.208 J	< 0.5	< 1.5	**16.0**	3,050
	10/16/2014	1.36	2.97	< 0.5	< 5.0	< 0.5	1.52	< 0.5	< 0.5	< 1.5	--	--
	11/13/2014	0.592	1.33	< 0.5	< 5.0	< 0.5	1.17	< 0.5	< 0.5	< 1.5	**11.1**	1,100
	1/9/2015	0.975	1.39	< 0.5	< 5.0	< 0.5	1.51	< 0.5	< 0.5	< 1.5	--	--
	5/21/2015	4.18	2.72	< 0.5	< 5.0	< 0.5	1.43	0.236 J	< 0.5	< 1.5	**11.6**	2,180
	11/20/2015	4.87	3.50	0.252 J	< 5.0	< 0.5	0.919	< 0.5	< 0.5	< 1.0	**12.0**	3,080
	5/19/2016	**5.23**	4.37	0.426 J	< 5.0	< 0.5	1.67	< 0.5	< 0.5	< 1.0	< 10	3,320
	8/23/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	1,670
	11/10/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	0.359 J	< 0.5	< 0.5	< 1.0	< 10	92.9
	5/19/2017	0.340 J	0.484 J	< 0.5	< 5.0	< 0.5	0.882	< 0.5	< 0.5	< 1.5	< 10	67.0
	11/9/2017	0.465 J	1.18	< 0.5	< 5.0	< 0.5	0.975	< 0.5	< 0.5	< 1.5	**10.6**	3,140
	5/30/2018	1.04	3.21	< 0.5	< 5.0	< 0.5	1.07	< 0.5	< 0.5	< 1.5	< 10	2,300
	11/13/2018	0.713	3.98	< 0.5	< 5.0	< 0.5	0.229 J	< 0.5	< 0.5	< 1.5	9.6 J	3,240
	5/14/2019	0.876	7.13	< 0.5	< 5.0	< 0.5	0.310 J	0.276 J	< 0.5	< 1.5	8.6 J	2,430
	5/5/2021	< 1.0	2.15	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	6.33	3,420
MW-305 (62-72)	9/13/2013	0.470 J	2.35	< 0.5	< 5.0	0.632	< 0.5	1.99	< 0.5	< 1.5	--	--
	11/14/2013	2.79	1.94	0.537	< 5.0	< 0.5	0.184 J	0.309 J	< 0.5	< 1.5	**15.0**	1,270
	5/22/2014	4.01	2.81	0.298 J	< 5.0	< 0.5	0.736	0.421 J	< 0.5	< 1.5	**14.8**	1,310
	9/12/2014	3.06	1.77	0.354 J	< 5.0	< 0.5	0.842	< 0.5	< 0.5	< 1.5	--	--
	10/16/2014	2.44	1.23	0.306 J	< 5.0	< 0.5	0.818	< 0.5	< 0.5	< 1.5	--	--
	11/13/2014	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	9.6 J	796
	5/21/2015	1.21	0.390 J	< 0.5	< 5.0	< 0.5	0.393 J	< 0.5	< 0.5	< 1.5	< 10	775
	11/20/2015	4.61	3.03	< 0.5	< 5.0	< 0.5	0.265 J	0.676	< 0.5	< 1.0	**12.2**	1,200
	5/19/2016	0.518	0.347 J	< 0.5	< 5.0	< 0.5	0.215 J	< 0.5	< 0.5	< 1.0	**17.9**	193
	8/23/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	1,170
	11/10/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	< 15
	5/19/2017	1.40	1.76	< 0.5	< 5.0	< 0.5	0.329 J	< 0.5	< 0.5	< 1.5	< 10	60.6
	11/9/2017	1.57	5.16	< 0.5	< 5.0	< 0.5	< 0.5	0.458 J	< 0.5	< 1.5	< 10	233
	5/30/2018	2.74	4.09	< 0.5	< 5.0	< 0.5	0.399 J	0.423 J	< 0.5	< 1.5	< 10	161
	11/13/2018	0.341 J	1.66	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	485
	5/14/2019	0.406 J	1.14	< 0.5	< 5.0	< 0.5	< 0.5	0.444 J	< 0.5	< 1.5	< 10	548
MW-305 (145-155)	9/13/2013	0.363 J	2.09	< 0.5	< 5.0	0.373 J	< 0.5	1.12	< 0.5	< 1.5	--	--
	11/14/2013	0.288 J	0.769	< 0.5	< 5.0	< 0.5	0.468 J	< 0.5	< 0.5	< 1.5	< 10	404
	5/22/2014	0.273 J	0.890	< 0.5	< 5.0	< 0.5	1.44	< 0.5	< 0.5	< 1.5	8.9 J	897
	9/12/2014	0.260 J	0.763	< 0.5	< 5.0	< 0.5	0.886	< 0.5	< 0.5	< 1.5	--	--
	10/16/2014	0.200 J	0.691	< 0.5	< 5.0	< 0.5	1.04	< 0.5	< 0.5	< 1.5	--	--
	11/13/2014	0.297 J	0.694	< 0.5	< 5.0	< 0.5	1.42	< 0.5	< 0.5	< 1.5	7.6 J	711
	5/21/2015	0.257 J	0.631	< 0.5	< 5.0	< 0.5	1.64	< 0.5	< 0.5	< 1.5	7.9 J	1,110
	11/20/2015	1.10	1.17	< 0.5	< 5.0	< 0.5	1.33	< 0.5	< 0.5	< 1.0	< 10	1,210
	5/20/2016	1.16	1.40	< 0.5	< 5.0	< 0.5	1.27	< 0.5	< 0.5	< 1.0	< 10	928
	8/23/2016	**8.67**	18.5	< 0.5	< 5.0	< 0.5	0.979	0.745	< 0.5	< 1.0	**13.0**	1,130
	11/10/2016	0.304 J	0.603	< 0.5	< 5.0	< 0.5	0.823	< 0.5	< 0.5	< 1.0	**11.8**	890
	5/19/2017	< 0.5	0.740	< 0.5	< 5.0	< 0.5	1.01	< 0.5	< 0.5	< 1.5	< 10	352
	11/9/2017	0.241 J	0.970	< 0.5	< 5.0	< 0.5	1.47	< 0.5	< 0.5	< 1.5	< 10	700
	5/29/2018	0.317 J	1.28	< 0.5	< 5.0	< 0.5	1.01	< 0.5	< 0.5	< 1.5	< 10	767
	11/13/2018	0.232 J	1.09	< 0.5	< 5.0	< 0.5	1.00	< 0.5	< 0.5	< 1.5	< 10	598
	11/13/2018	0.232 J	1.09	< 0.5	< 5.0	< 0.5	1.16	< 0.5	< 0.5	< 1.5	< 10	598
	5/14/2019	0.237 J	1.09	< 0.5	< 5.0	< 0.5	0.803	< 0.5	< 0.5	< 1.5	**12.1**	354
	5/10/2021	< 1.0	2.11	< 1.0	< 5.0	< 1.0	1.51	< 1.0	< 1.0	< 2.0	2.67	614
MW-305 (233-243)	9/13/2013	0.679	1.72	< 0.5	< 5.0	< 0.5	3.86	0.454 J	< 0.5	< 1.5	--	--
	11/14/2013	0.693	4.03	< 0.5	< 5.0	< 0.5	0.817	0.547	< 0.5	< 1.5	**13.3**	908
	5/22/2014	0.989	4.70	< 0.5	< 5.0	< 0.5	3.44	0.255 J	< 0.5	< 1.5	**13.0**	1,060
	11/13/2014	0.789	6.41	< 0.5	< 5.0	< 0.5	1.64	0.338 J	< 0.5	< 1.5	< 10	998
	5/21/2015	0.475 J	2.30	< 0.5	< 5.0	< 0.5	1.30	< 0.5	< 0.5	< 1.5	**10.9**	1,310
	11/20/2015	0.934	6.44	< 0.5	< 5.0	< 0.5	1.18	0.580	< 0.5	< 1.0	< 10	1,090
	5/20/2016	0.493 J	2.68	< 0.5	< 5.0	< 0.5	1.45	< 0.5	< 0.5	< 1.0	< 10	971
	11/10/2016	0.467 J	4.07	< 0.5	< 5.0	< 0.5	1.25	< 0.5	< 0.5	< 1.0	< 10	820
	5/19/2017	0.384 J	3.00	< 0.5	< 5.0	< 0.5	1.35	< 0.5	< 0.5	< 1.5	< 10	938
	11/10/2017	0.407 J	4.10	< 0.5	< 5.0	< 0.5	1.66	< 0.5	< 0.5	< 1.5	< 10	796
	5/29/2018	1.21	22.0	< 0.5	< 5.0	< 0.5	1.03	1.55	< 0.5	< 1.5	< 10	801
	11/13/2018	1.03	17.6	< 0.5	< 5.0	< 0.5	1.08	0.798	< 0.5	< 1.5	< 10	715
	5/14/2019	0.839	14.0	< 0.5	< 5.0	< 0.5	1.26	0.601	< 0.5	< 1.5	**14.3**	503
MW-305 (265-275)	9/13/2013	0.772	3.86	< 0.5	< 5.0	< 0.5	1.85	0.641	< 0.5	< 1.5	--	--
	11/14/2013	1.63	10.0	< 0.5	< 5.0	0.178 J	0.189 J	1.20	< 0.5	< 1.5	< 10	798
	5/22/2014	1.10	9.39	< 0.5	< 5.0	< 0.5	1.66	0.408 J	< 0.5	< 1.5	< 10	628
	11/13/2014	0.962	11.8	< 0.5	< 5.0	< 0.5	0.589	0.869	< 0.5	< 1.5	< 10	482
	1/9/2015	0.507	5.03	< 0.5	< 5.0	< 0.5	0.835	< 0.5	< 0.5	< 1.5	--	--
	5/22/2015	0.889	7.74	< 0.5	< 5.0	< 0.5	0.699	0.401 J	< 0.5	< 1.5	< 10	548
	11/20/2015	0.560	4.16	< 0.5	< 5.0	< 0.5	1.01	0.202 J	< 0.5	< 1.0	< 10	559
	5/20/2016	0.539	4.40	< 0.5	< 5.0	< 0.5	1.03	< 0.5	< 0.5	< 1.0	< 10	500
	11/10/2016	0.520	4.91	< 0.5	< 5.0	< 0.5	1.15	< 0.5	< 0.5	< 1.0	< 10	482
	11/10/2017	0.480 J	4.27	< 0.5	< 5.0	< 0.5	1.44	0.242 J	< 0.5	< 1.5	< 10	481
	5/29/2018	0.585	5.58	< 0.5	< 5.0	< 0.5	1.97	0.347 J	< 0.5	< 1.5	< 10	467
	11/13/2018	1.20	18.0	< 0.5	< 5.0	< 0.5	1.94	0.889	< 0.5	< 1.5	< 10	440
	5/14/2019	0.623	6.47	< 0.5	< 5.0	< 0.5	1.57	0.386 J	< 0.5	< 1.5	**13.0**	355
MW-305 (285-300)	9/13/2013	0.470 J	2.44	< 0.5	< 5.0	< 0.5	2.07	0.269 J	< 0.5	< 1.5	--	--
	11/15/2013	0.212 J	1.39	< 0.5	< 5.0	< 0.5	1.60	< 0.5	< 0.5	< 1.5	5.5 J	1,090
	5/22/2014	0.809	4.63	< 0.5	< 5.0	< 0.5	1.97	< 0.5	< 0.5	< 1.5	9.0 J	**3,880**
	11/13/2014	0.402 J	2.62	< 0.5	< 5.0	< 0.5	1.27	< 0.5	< 0.5	< 1.5	8.1 J	2,420
	5/22/2015	0.542	2.11	< 0.5	< 5.0	< 0.5	1.14	< 0.5	< 0.5	< 1.5	**11.0**	**3,880**
	11/20/2015	0.575	3.72	< 0.5	< 5.0	< 0.5	1.46	< 0.5	< 0.5	< 1.0	< 10	**4,110**
	5/20/2016	0.607	3.80	< 0.5	< 5.0	< 0.5	1.51	< 0.5	< 0.5	< 1.0	< 10	**3,690**
	11/10/2016	0.829	6.47	< 0.5	< 5.0	< 0.5	1.64	< 0.5	< 0.5	< 1.0	< 10	3,370
	5/19/2017	0.756	5.25	< 0.5	< 5.0	< 0.5	1.48	< 0.5	< 0.5	< 1.5	< 10	3,050
	11/10/2017	0.821	5.34	< 0.5	< 5.0	< 0.5	1.76	< 0.5	< 0.5	< 1.5	8.6 J	3,130
	5/29/2018	1.03	5.40	< 0.5	< 5.0	< 0.5	2.01	< 0.5	< 0.5	< 1.5	< 10	3,130
	11/13/2018	1.23	7.93	< 0.5	< 5.0	< 0.5	0.681	< 0.5	< 0.5	< 1.5	< 10	3,120
	5/14/2019	1.13	7.09	< 0.5	< 5.0	< 0.5	1.83	< 0.5	< 0.5	< 1.5	< 10	2,540
	5/10/2021	0.617 J	3.62	< 1.0	< 5.0	< 1.0	1.81	< 1.0	< 1.0	< 2.0	2.84	3,230
MW-306S (85-100)	9/13/2013	**5.32**	67.3	0.961	1.27 J	< 0.5	1.54	**5.24**	0.280 J	2.70	--	--
	11/11/2013	1.41	20.7	< 0.5	< 5.0	< 0.5	< 0.5	0.225 J	< 0.5	0.597 J	8.0 J	8.4 J
	5/22/2014	0.737	23.9	< 0.5	< 5.0	< 0.5	< 0.5	0.391 J	< 0.5	< 1.5	< 10	16.6
	11/10/2014	1.02	30.8	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	170
	1/7/2015	2.09	59.1	< 0.5	< 5.0	< 0.5	< 0.5	0.306 J	0.251 J	< 1.5	--	--
	5/18/2015	1.76	**122**	< 0.5	< 5.0	< 0.5	< 0.5	0.507	0.559	< 1.5	< 10	389
	11/16/2015	1.39	**124**	< 0.5	< 5.0	< 0.5	< 0.5	0.583	< 0.5	< 1.0	< 10	312
	5/16/2016	1.14	**88.4**	< 0.5	< 5.0	< 0.5	< 0.5	0.410 J	0.421 J	< 1.0	< 10	208
	11/7/2016	0.553	19.0	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	313
	5/15/2017	< 0.5	31.6	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	111
	11/6/2017	< 0.5	9.35	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	96.4
	5/25/2018	< 0.5	16.9	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	80.6
	11/15/2018	< 0.5	10.7	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	350
	5/14/2019	< 0.5	10.6	< 0.5	< 5.0	< 0.5	19.9	< 0.5	< 0.5	< 1.5	**10.1**	97.0
	5/5/2021	< 1.0	2.60	< 1.0	< 5.0	< 1.0	0.962 J	< 1.0	< 1.0	< 2.0	6.10	765
MW-306S (130-140)	9/13/2013	0.410 J	2.99	< 0.5	< 5.0	< 0.5	< 0.5	0.401 J	< 0.5	< 1.5	--	--
	11/11/2013	< 0.5	0.668	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	0.910 J	**14.3**	7.3 J
	5/22/2014	< 0.5	5.30	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**12.2**	20.4
	11/10/2014	< 0.5	0.451 J	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	19.4
	1/7/2015	< 0.5	0.729	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	--	--
	5/18/2015	< 0.5	1.36	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	**11.3**	23.6
	11/17/2015	< 0.5	0.949	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	10.2 J

Table 3-1
Historical Groundwater Monitoring Results
Tibbetts Road Site
Barrington, NH

Well ID	Chemical Name: ICL: Unit: Sample Date	Benzene 5 µg/L	cis-1,2-DCE 70 µg/L	Ethylbenzene 700 µg/L	MIBK 1,825 µg/L	PCE 5 µg/L	Toluene 1,000 µg/L	TCE 5 µg/L	VC 2 µg/L	Xylenes 10,000 µg/L	Arsenic (Total) 10 µg/L	Manganese (Total) 3,650 µg/L
MW-306S (130-140) (cont.)	5/16/2016	< 0.5	1.03	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	9.1 J	< 15
	11/7/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.0	< 10	5.0 J
	5/15/2017	< 0.5	3.24	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	5.6 J
	11/6/2017	< 0.5	3.86	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	< 15
	5/25/2018	1.05	6.56	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	16.7
	11/13/2018	0.840	8.79	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	9.4 J
	5/14/2019	< 0.5	4.69	< 0.5	< 5.0	< 0.5	15.0	< 0.5	< 0.5	< 1.5	**15.3**	< 15
MW-306D (185-195)	9/13/2013	**48.8**	**107**	17.2	6.31	< 0.5	22.4	3.99	0.440 J	21.5	--	--
	11/13/2013	**15.5**	51.0	4.92	1.90 J	< 0.5	4.26	1.05	< 0.5	2.83	6.4 J	< 15
	5/22/2014	**41.2**	**242**	1.62	< 5.0	< 0.5	0.358 J	**5.66**	0.879	< 1.5	9.6 J	26.2
	11/10/2014	4.37	47.4	0.944	< 5.0	< 0.5	0.223 J	1.24	< 0.5	< 1.5	9.7 J	35.0
	1/7/2015	**7.82**	66.5	0.621	< 5.0	< 0.5	< 0.5	2.72	0.263 J	< 1.5	--	--
	5/18/2015	4.77	**86.2**	< 0.5	< 5.0	< 0.5	0.181 J	2.10	0.414 J	< 1.5	< 10	81.0
	11/17/2015	**9.59**	**198**	0.301 J	< 5.0	< 0.5	0.181 J	**7.76**	< 0.5	< 1.0	< 10	53.6
	5/17/2016	**6.96**	**194**	< 0.5	< 5.0	< 0.5	< 0.5	**8.20**	0.744	< 1.0	< 10	246
	11/7/2016	0.342 J	16.6	< 0.5	< 5.0	< 0.5	< 0.5	0.715	< 0.5	< 1.0	< 10	159
	5/15/2017	< 0.5	5.48	< 0.5	< 5.0	< 0.5	0.961	< 0.5	< 0.5	0.605 J	< 10	287
	11/6/2017	< 0.5	7.15	< 0.5	< 5.0	< 0.5	< 0.5	0.232 J	< 0.5	< 1.5	< 10	79.3
	5/25/2018	< 0.5	2.10	< 0.5	< 5.0	< 0.5	< 0.5	< 0.5	< 0.5	< 1.5	< 10	204
	11/13/2018	0.202 J	4.13	< 0.5	< 5.0	< 0.5	0.500	< 0.5	< 0.5	< 1.5	< 10	581
	5/14/2019	< 0.5	1.24	< 0.5	< 5.0	< 0.5	24.1	< 0.5	< 0.5	< 1.5	9.7 J	26.8
	5/5/2021	0.435 J	5.87	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	7.71	959
MW-306D (280-300)	9/13/2013	**9.70**	**104**	3.93	0.938 J	< 0.5	2.97	**8.44**	0.337 J	4.65	--	--
	11/13/2013	**8.56**	43.2	< 0.5	< 5.0	< 0.5	1.42	0.672	< 0.5	1.82	< 10	5.1 J
	5/22/2014	1.89	19.6	< 0.5	< 5.0	< 0.5	< 0.5	1.03	< 0.5	< 1.5	< 10	51.6
	11/10/2014	2.00	19.1	0.201 J	< 5.0	< 0.5	< 0.5	0.842	< 0.5	< 1.5	< 10	29.4
	1/7/2015	3.15	16.2	< 0.5	< 5.0	< 0.5	< 0.5	0.646	< 0.5	< 1.5	--	--
	5/18/2015	1.22	11.7	< 0.5	< 5.0	< 0.5	< 0.5	0.484 J	< 0.5	< 1.5	< 10	307
	11/17/2015	0.804	14.3	< 0.5	< 5.0	< 0.5	< 0.5	0.691	< 0.5	< 1.0	< 10	29.3
	5/17/2016	0.550	11.9	< 0.5	< 5.0	< 0.5	< 0.5	0.454 J	< 0.5	< 1.0	< 10	102
	11/7/2016	0.315 J	8.95	< 0.5	< 5.0	< 0.5	< 0.5	0.435 J	< 0.5	< 1.0	< 10	69.0
	5/15/2017	< 0.5	8.88	< 0.5	< 5.0	< 0.5	0.933	< 0.5	< 0.5	< 1.5	< 10	381
	11/6/2017	< 0.5	8.78	< 0.5	< 5.0	< 0.5	< 0.5	0.380 J	< 0.5	< 1.5	< 10	88.1
	5/25/2018	0.384 J	11.4	< 0.5	< 5.0	< 0.5	0.344 J	0.538	< 0.5	< 1.5	< 10	92.2
	11/13/2018	0.399 J	10.5	< 0.5	< 5.0	< 0.5	< 0.5	0.318 J	< 0.5	< 1.5	< 10	355
	5/17/2019	0.258 J	7.81	< 0.5	< 5.0	< 0.5	0.404 J	< 0.5	< 0.5	< 1.5	< 10	87.8
	5/5/2021	< 1.0	7.03	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0	< 1.0	< 2.0	2.24	11.3
MW-307S (80-90)	7/8/2014	0.226 J	17.4	< 0.5	< 5.0	< 0.5	< 0.5	**6.87**	< 0.5	< 1.5	--	--
	11/11/2014	1.51	9.69	< 0.5	< 5.0	0.222 J	0.197 J	**7.47**	< 0.5	< 1.5	8.0 J	1,300
	5/20/2015	0.272 J	10.3	< 0.5	< 5.0	< 0.5	< 0.5	3.71	< 0.5	< 1.5	< 10	194
	11/16/2015	2.38	9.64	< 0.5	< 5.0	< 0.5	< 0.5	**8.27**	< 0.5	< 1.0	**10.8**	362
	5/16/2016	< 0.5	2.49	< 0.5	< 5.0	< 0.5	< 0.5	1.56	< 0.5	< 1.0	< 10	8.7 J
	11/9/2016	4.64	10.9	< 0.5	< 5.0	< 0.5	0.294 J	**6.48**	< 0.5	< 1.0	**33.0**	218
	5/16/2017	4.18	10.6	< 0.5	< 5.0	< 0.5	0.294 J	**7.88**	< 0.5	< 1.5	**13.9**	231
	11/9/2017	3.80	9.56	< 0.5	< 5.0	< 0.5	< 0.5	**6.62**	< 0.5	< 1.5	**23.3**	206
	5/29/2018	**7.23**	15.4	< 0.5	< 5.0	< 0.5	< 0.5	**10.8**	< 0.5	< 1.5	**30.8**	195
	11/19/2018	3.58	10.3	< 0.5	< 5.0	< 0.5	22.8	**6.36**	0.214 J	< 1.5	9.0 J	164
	5/16/2019	2.35	8.10	< 0.5	< 5.0	< 0.5	67.7	4.97	0.243 J	< 1.5	9.5 J	113
	5/7/2021	2.07 J	4.73	< 4.0	< 20	< 4.0	< 4.0	2.97 J	< 4.0	< 8.0	**11.1**	121
MW-307S (172-187)	7/8/2014	< 0.5	23.6	< 0.5	< 5.0	< 0.5	< 0.5	**7.83**	< 0.5	< 1.5	--	--
	11/11/2014	< 0.5	4.52	< 0.5	< 5.0	< 0.5	< 0.5	1.28	< 0.5	< 1.5	7.9 J	227
	5/20/2015	< 0.5	5.24	< 0.5	< 5.0	< 0.5	< 0.5	2.32	< 0.5	< 1.5	< 10	136
	11/16/2015	< 0.5	5.46	< 0.5	< 5.0	< 0.5	< 0.5	2.71	< 0.5	< 1.0	< 10	33.3
	5/16/2016	< 0.5	2.64	< 0.5	< 5.0	< 0.5	< 0.5	1.60	< 0.5	< 1.0	< 10	29.4
	11/9/2016	< 0.5	1.11	< 0.5	< 5.0	< 0.5	< 0.5	1.36	< 0.5	< 1.0	< 10	73.1
	5/16/2017	< 0.5	0.994	< 0.5	< 5.0	< 0.5	0.410 J	0.931	< 0.5	< 1.5	< 10	233
	11/9/2017	< 0.5	2.05	< 0.5	< 5.0	< 0.5	< 0.5	1.33	< 0.5	< 1.5	9.7 J	407
	5/29/2018	< 0.5	3.07	< 0.5	< 5.0	< 0.5	< 0.5	1.60	< 0.5	< 1.5	< 10	341
	11/19/2018	0.596	4.61	< 0.5	< 5.0	< 0.5	12.6	2.52	< 0.5	< 1.5	< 10	583
	5/16/2019	< 0.5	4.22	< 0.5	< 5.0	< 0.5	22.3	2.14	< 0.5	< 1.5	< 10	585
MW-307D	7/8/2014	1.37	38.4	< 0.5	< 5.0	< 0.5	9.48	4.95	0.218 J	< 1.5	--	--
	11/11/2014	0.400 J	25.9	< 0.5	< 5.0	< 0.5	0.981	**5.41**	< 0.5	< 1.5	< 10	47.3
	5/20/2015	< 0.5	20.5	< 0.5	< 5.0	< 0.5	0.259 J	4.08	< 0.5	< 1.5	< 10	81.4
	11/16/2015	0.422 J	29.4	< 0.5	< 5.0	< 0.5	0.338 J	**5.17**	< 0.5	< 1.0	< 10	128
	5/16/2016	< 0.5	18.5	< 0.5	< 5.0	< 0.5	0.257 J	3.28	< 0.5	< 1.0	< 10	144
	11/9/2016	< 0.5	18.9	< 0.5	< 5.0	< 0.5	< 0.5	2.45	< 0.5	< 1.0	< 10	163
	5/16/2017	< 0.5	19.1	< 0.5	< 5.0	< 0.5	0.176 J	1.63	< 0.5	< 1.5	< 10	272
	11/9/2017	0.396 J	20.6	< 0.5	< 5.0	< 0.5	< 0.5	1.98	< 0.5	< 1.5	< 10	292
	5/29/2018	0.513	21.9	< 0.5	< 5.0	< 0.5	0.238 J	1.77	< 0.5	< 1.5	< 10	305
	11/19/2018	0.418 J	20.4	< 0.5	< 5.0	< 0.5	7.08	1.41	< 0.5	< 1.5	< 10	329
	5/16/2019	0.374 J	27.4	< 0.5	< 5.0	< 0.5	13.1	1.39	< 0.5	< 1.5	< 10	332
	5/7/2021	< 1.0	19.2	< 1.0	< 5.0	< 1.0	4.53	1.19	< 1.0	< 2.0	4.94	453

Notes:
1. ICL: interim groundwater cleanup level — 2021 Sampling Location
2. µg/L: micrograms per liter
3. J: result is less than the reporting limit but greater than or equal to the method detection limit, and the concentration is an approximate value.
4. <: result less than indicated reporting limit (shown in parentheses)
5. **Bold** values indicate detections above ICLs
6. ND: not detected
7. --:not analyzed
8. cis-1,2-DCE: cis-1,2-dichloroethene
9. MIBK: methyl isobutyl ketone
10. PCE: tetrachloroethene
11. TCE: trichloroethene
12. VC: vinyl chloride

Table 3-2
Historical Residential Well Sampling Results
Tibbetts Road Site
Barrington, NH

	Analyte:	Benzene	cis-1,2-DCE	Ethylbenzene	MIBK	Toluene	TCE	Xylenes	Manganese	Arsenic	Manganese
	Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	ICL:	5	70	700	1,825	1,000	5	10,000	3,650	10	3,650
Well ID	Sample Date										
1R	6/4/1982	**45**	--	--	--	--	--	183	--	--	--
	7/20/1982	**37**	--	--	--	4.0	--	147	--	--	--
	8/10/1983	**40**	--	--	58	--	--	119	--	--	--
	1/13/1984	**11**	--	--	10 J	--	--	31	--	--	--
	1/24/1984	**31**	--	--	24	--	--	29	--	--	--
	3/5/1984	**37**	--	--	11	14	**4.0**	73	--	--	--
	4/3/1984	**19**	--	--	25	--	**9.0**	100	--	--	--
	9/18/1984	**48**	--	6.3	62	5.0 J	**7.9**	140	--	--	--
	3/15/1985	**43**	--	5.9	--	--	**7.7**	138	--	--	--
	7/11/1985	**77**	--	7.9	--	--	**12**	143	--	--	--
	10/11/1985	**40**	--	5.9	68	--	**6.4**	126	--	--	--
	3/6/1986	**42**	5.0 J	6.3	46	--	**7.2**	134	--	--	--
	1/23/1987	**17**	5.0 J	--	--	--	**6.0**	--	--	--	--
	2/10/1987	**47**	5.0 J	5.0 J	45	--	**7.9**	122	--	--	--
	2/19/1987	**40**	5.0 J	5.0 J	45	--	**7.1**	112	--	--	--
	6/27/1990	**18**	--	--	20 J	--	--	35	--	--	--
	3/5/2013	< 0.5	1.3	< 0.5	< 2.5	< 0.5	0.120 J	< 1.0	--	--	--
2R	6/4/1982	--	--	--	--	--	--	--	--	--	--
	4/6/1984	--	--	--	--	--	--	--	--	--	--
	10/18/1984	--	--	--	--	--	--	--	--	--	--
	3/15/1985	--	--	--	--	--	5.0 J	--	--	--	--
	4/1/1985	--	--	--	--	--	**2.9**	--	--	--	--
	5/31/1985	1.9	--	--	--	--	**5.5**	--	--	--	--
	9/12/1985	1.0	--	--	--	--	**1.2**	--	--	--	--
	12/27/1985	4.2	--	--	--	--	**10**	--	--	--	--
	3/6/1986	5.0	--	--	--	--	**13**	--	--	--	--
	1/23/1987	5.0 J	--	--	--	--	**15**	--	--	--	--
	6/28/1990	--	--	--	--	--	--	--	--	--	--
	3/4/2013	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
3R	6/4/1982	--	--	--	--	--	--	--	--	--	--
	1/14/1984	--	--	--	--	--	--	--	--	--	--
	3/5/1984	3.0	--	--	--	--	--	--	--	--	--
	4/3/1984	--	--	--	--	--	--	--	--	--	--
	4/18/1984	--	--	--	--	--	--	--	--	--	--
	10/18/1984	**8.9**	--	--	--	5.0 J	**15**	--	--	--	--
	11/5/1984	**18**	--	--	--	5.0 J	**35**	5.0 J	--	--	--
	5/20/1985	**13**	--	--	--	--	**28**	--	--	--	--
	8/28/1985	**15**	--	--	--	--	**30**	--	--	--	--
	11/26/1985	**14**	--	--	--	--	**26**	--	--	--	--
	3/6/1986	**18**	--	--	--	--	**31**	--	--	--	--
	1/23/1987	**11**	5.0 J	--	--	--	**14**	--	--	--	--
4R	6/4/1982	--	--	--	--	--	--	--	--	--	--
	1/13/1984	--	--	--	--	--	--	--	--	--	--
	4/5/1984	--	--	--	--	--	--	--	--	--	--
	10/17/1984	5.0 J	--	--	--	--	5.0 J	--	--	--	--
	11/5/1984	5.0 J	--	--	--	--	**7.5**	--	--	--	--
	5/20/1985	5.0 J	--	--	--	--	**12**	--	--	--	--
	8/28/1985	5.0 J	--	--	--	--	**8.7**	--	--	--	--
	11/26/1985	**5.9**	--	--	--	--	**16**	--	--	--	--
	3/6/1986	**7.2**	--	--	--	--	**19**	--	--	--	--
	1/23/1987	**5.5**	--	--	--	--	**28**	--	--	--	--
	6/21/1990	--	--				--		--	--	--
5R	6/4/1982	--	--	--	--	--	--	--	--	--	--
	1/13/1984	3.2	--	--	--	--	< 10	--	--	--	--
	1/24/1984	4.3	--	--	--	--	**11**	--	--	--	--
	3/5/1984	**10**	--	--	--	--	**22**	--	--	--	--
	4/3/1984	5.0	--	--	--	--	**22**	--	--	--	--
	9/18/1984	**9.4**	--	--	--	--	**35**	--	--	--	--
	3/15/1985	**15**	--	--	--	--	**49**	--	--	--	--
	7/11/1985	**44**	--	--	--	--	**116**	--	--	--	--
	10/11/1985	**15**	--	--	--	--	**50**	--	--	--	--
	2/12/1986	**30**	5.0 J	--	--	--	**101**	--	--	--	--
	1/23/1987	**25**	5.0 J	--	--	--	**64**	--	--	--	--
	6/27/1990	**20**	--	--	--	--	**57**	--	--	--	--
	6/5/1991	**27**	3.0 J	--	--	2.0 J	**75**	--	--	--	--
6R	9/24/1985	--	--	--	--	--	5.0 J	--	--	--	--
	2/12/1986	--	--	--	--	--	**5.5**	--	--	--	--
	6/20/1990	--	--	--	--	--	--	--	--	--	--
	3/6/2013	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	0.110 J	< 1.0	--	--	--
7R	7/11/1985	--	--	--	--	--	**14**	--	--	--	--
	7/17/1985	--	--	--	--	--	**11**	--	--	--	--
	10/11/1985	--	--	--	--	--	5.0 J	--	--	--	--
	5/8/1986	--	--	--	--	--	**18**	--	--	--	--
	6/20/1990	--	--	--	--	--	**19**	--	--	--	--
	3/4/2013	< 0.5	0.76	< 0.5	< 2.5	< 0.5	**1.0**	< 1.0	--	--	--
8R	6/10/1985	--	--	--	--	--	**6.0**	--	--	--	--
	6/21/1985	--	--	--	--	--	**9.3**	--	--	--	--
	7/2/1985	--	--	--	--	--	**14**	--	--	--	--
	10/11/1985	--	--	--	--	--	**11**	--	--	--	--
	1/15/1986	--	--	--	--	--	**8.6**	--	--	--	--
	8/6/1986	--	--	--	--	--	**9.3**	--	--	--	--
	6/20/1990	--	--	--	--	--	--	--	--	--	--
	6/4/1991	--	--	--	--	--	--	--	--	--	--
9R	6/21/1990	--	--	--	--	--	--	--	--	--	--
13R	9/12/1985	2.8	--	--	--	--	--	--	--	--	--
	12/27/1985	--	--	--	--	--	--	--	--	--	--
	6/20/1990	--	--	--	--	--	--	--	--	--	--
14R	6/4/1982	--	--	--	--	--	--	--	--	--	--
	4/3/1984	--	--	--	--	--	--	--	--	--	--
	10/17/1984	--	--	--	25	--	--	--	--	--	--
	11/5/1984	--	--	--	--	--	--	--	--	--	--
	11/21/1984	--	--	--	--	--	--	--	--	--	--
	3/7/1985	--	--	--	--	--	--	--	--	--	--
	4/26/1985	--	--	--	--	--	--	--	--	--	--
	5/20/1985	--	--	--	--	--	--	--	--	--	--
	6/10/1985	--	--	--	--	--	--	--	--	--	--
	7/11/1985	--	--	--	--	--	--	--	--	--	--
	8/28/1985	--	--	--	--	--	--	--	--	--	--
	10/11/1985	--	--	--	--	--	--	--	--	--	--
	11/26/1985	--	--	--	--	--	--	--	--	--	--
	3/6/1986	--	--	--	--	--	--	--	--	--	--
	1/23/1987	--	--	--	--	--	5.0 J	--	--	--	--
	6/28/1990	--	--	--	--	--	--	--	--	--	--
15R	9/12/1985	1.5	--	--	--	--	--	--	--	--	--
	12/27/1985	--	--	--	--	--	--	--	--	--	--

Table 3-2
Historical Residential Well Sampling Results
Tibbetts Road Site
Barrington, NH

	Analyte:	Benzene	cis-1,2-DCE	Ethylbenzene	MIBK	Toluene	TCE	Xylenes	Manganese	Arsenic	Manganese
	Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	ICL:	5	70	700	1,825	1,000	5	10,000	3,650	10	3,650
Well ID	Sample Date										
15R (cont.)	5/8/1986	--	--	--	--	--	--	--	--	--	--
	6/20/1990	--	--	--	--	--	--	--	--	--	--
	3/1/2013	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
24R	3/1/2013	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
25R	3/4/2013	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
26R	9/25/2014	0.472 J	1.8	< 0.5	< 2.5	< 0.5	0.312 J	< 1.0	--	--	--
28R	3/6/2013	< 0.5	< 0.5	< 0.5	< 2.5	0.150 J	< 0.5	< 1.0	--	--	--
	11/19/2015	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 1.0		--	53
	5/20/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 1.0		--	113 J
	11/10/2016	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 1.0		--	65
	5/19/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 1.5		--	67
	11/10/2017	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 1.5		--	79
	5/30/2018	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 1.5		--	32
	11/19/2018	< 0.5	< 0.5	< 0.5	< 5.0	0.68	< 0.5	< 1.5		--	26
	5/15/2019	< 0.5	< 0.5	< 0.5	< 5.0	< 0.5	< 0.5	< 1.5		--	13 J
	5/4/2021	< 1.0	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0	< 2.0		--	90
29R	1/15/2014	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
30R	3/1/2013	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
47S	10/26/1984	5.0 J	--	--	--	--	5.0 J	--	--	--	--
	11/21/1984	--	--	--	--	--	--	--	--	--	--
	6/6/1985	--	--	--	--	--	--	--	--	--	--
	11/26/1985	--	--	--	--	--	--	--	--	--	--
	5/8/1986	--	--	--	--	--	--	--	--	--	--
CC-01	11/16/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	--	--	--
	12/7/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	0.0166	--	17
	1/16/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	--	--	--	--
	1/15/2014	< 0.5	3.3	< 0.5	< 2.5	< 0.5	0.328 J	< 1.0	--	--	--
	1/26/2015	< 0.5	0.81	< 0.5	< 2.5	< 0.5	0.142 J	< 1.0	--	--	--
CC-02	11/20/2011	0.79	43	< 0.5	< 10	< 0.5	4.2	< 0.5	--	--	--
	12/7/2011	0.80	42	< 0.5	< 10	< 0.5	4.0	< 0.5	0.099	--	99
	1/25/2013	1.0	**100**	< 0.5	< 10	< 0.5	**6.9**	--	--	--	--
	3/5/2013	**11**	**110**	< 0.5	< 10	< 0.5	**7.1**	0.45 J	0.13	--	130
	4/17/2013	**20**	**95**	< 0.5	< 10	0.108 J	**7.6**	< 1.0	0.141	--	141
	7/16/2013	3.35 J	**96**	< 4.0	< 20	< 4.0	**5.7**	< 8.0	0.136	--	136
	10/16/2013	1.20 J	**93**	< 4.0	< 20	< 4.0	**5.8**	< 8.0	0.138	--	138
	1/16/2014	< 4.0	70	< 4.0	< 20	< 4.0	4.7	< 8.0	0.128	--	128
	4/17/2014	< 2.0	54	< 2.0	< 1.0	< 2.0	4.0	< 4.0	0.114	--	114
	8/11/2014	< 2.0	52	< 2.0	< 1.0	< 2.0	4.5	< 4.0	0.00594	--	5.9
	10/21/2014	0.278 J	45	< 0.5	< 10	< 0.5	4.5	< 1.0	0.116	--	116
	5/12/2015	0.454 J	41	< 0.5	< 10	< 0.5	4.8	< 1.0	0.0998	--	100
	7/29/2015	0.362 J	34	< 0.5	< 10	< 0.5	3.5	< 1.0	0.104	--	104
CC-03	11/16/2011	0.490 J	9.4	< 0.5	< 10	< 0.5	0.97	< 0.5	--	--	--
	12/7/2011	0.50	11	< 0.5	< 10	< 0.5	1.2	< 0.5	0.04	--	40
	12/7/2011	0.480 J	11	< 0.5	< 10	< 0.5	1.2	< 0.5	0.0411	--	41
	7/12/2012	< 0.5	9.8	< 0.5	< 2.5	< 0.5	1.1	< 1.0	--	--	--
	8/29/2012	0.59	27	< 0.5	< 2.5	< 0.5	2.6	< 1.0	0.053	--	53
	9/26/2012	0.400 J	22	< 1.0	< 5.0	< 1.0	1.8	< 2.0	0.045	--	45
	11/14/2012	0.340 J	15	< 1.0	< 5.0	< 1.0	1.4	< 2.0	0.045	--	45
	1/16/2013	0.52	23	< 0.5	< 10	< 0.5	2.0	--	0.043	--	43
	4/17/2013	**7.7**	59	< 0.5	< 10	< 0.5	4.3	< 1.0	0.056	--	56
	7/16/2013	2.41 J	57	< 2.5	< 12.5	< 2.5	3.4	< 5.0	0.0552	--	55
	10/16/2013	1.17 J	44	< 2.5	< 12.5	< 2.5	2.9	< 5.0	0.0522	--	52
	1/15/2014	0.628 J	22	< 1.0	< 5.0	< 1.0	1.6	< 2.0	0.0488	--	49
	4/17/2014	0.451 J	21	< 1.0	< 5.0	< 1.0	1.5	< 2.0	0.0435	--	44
	7/18/2014	0.478 J	32	< 0.5	< 2.5	< 0.5	2.7	< 1.0	0.0484	--	48
	10/21/2014	0.408 J	26	< 0.5	< 2.5	< 0.5	2.1	< 1.0	0.0464	--	46
	1/26/2015	0.330 J	23	< 1.0	< 5.0	< 1.0	2.1	< 2.0	0.0496	--	50
	4/20/2015	0.263 J	15	< 0.5	< 2.5	< 0.5	1.5	< 1.0	0.0532	--	53
	4/20/2015	0.342 J	23	< 0.5	< 2.5	< 0.5	2.3	< 1.0	0.0575	--	58
CC-04	11/20/2011	< 0.5	63	< 0.5	< 10	< 0.5	**6.2**	< 0.5	--	--	--
	12/7/2011	< 0.5	58	< 0.5	< 10	< 0.5	**5.5**	< 0.5	0.0401	--	40
	12/7/2011	< 0.5	58	< 0.5	< 10	< 0.5	**5.8**	< 0.5	0.153	--	153
	7/12/2012	< 0.5	56	< 0.5	< 2.5	< 0.5	**5.4**	< 1.0	--	--	--
	8/29/2012	< 2.5	54	< 2.5	< 13	< 2.5	4.5	< 5.0	< 0.003	--	< 3.0
	9/26/2012	< 2.5	65	< 2.5	< 13	< 2.5	4.8	< 5.0	0.12	--	120
	1/16/2013	< 0.5	66	< 0.5	< 10	< 0.5	**5.4**	--	0.15	--	150
	4/17/2013	0.94	58	< 0.5	< 10	0.150 J	**5.7**	< 1.0	0.147	--	147
	7/16/2013	< 2.5	56	< 2.5	< 12.5	< 2.5	4.4	< 5.0	0.1	--	142
	10/16/2013	< 2.5	**71**	< 2.5	< 12.5	< 2.5	**6.4**	< 5.0	0.1	--	140
	1/16/2014	< 2.5	57	< 2.5	< 12.5	< 2.5	**5.4**	< 5.0	0.139	--	139
	4/17/2014	< 2.5	55	< 2.5	< 12.5	< 2.5	**5.1**	< 5.0	0.13	--	130
	7/16/2014	< 0.5	42	< 0.5	< 2.5	0.180 J	4.7	< 1.0	0.132	--	132
	10/21/2014	< 0.5	43	< 0.5	< 2.5	0.074 J	4.6	< 1.0	0.127	--	127
	1/26/2015	< 0.5	49	< 0.5	< 2.5	< 0.5	4.3	< 1.0	0.124	--	124
	4/20/2015	< 0.5	48	< 0.5	< 2.5	< 0.5	4.5	< 1.0	0.126	--	126
	7/29/2015	< 0.5	45	< 0.5	< 2.5	< 0.5	4.5	< 1.0	0.0955	--	96
CC-05	12/16/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5		--	--
	1/16/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	--		--	--
	1/15/2014	< 0.5	1.1	< 0.5	< 2.5	< 0.5	0.147 J	< 1.0		--	--
	1/26/2015	< 0.5	0.73	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0		--	--
CC-06	12/7/2011	0.81	38	< 0.5	< 10	< 0.5	4.2	< 0.5	0.0583	--	58
	7/12/2012	< 1.0	19	< 1.0	< 5.0	< 1.0	2.4	< 2.0	--	--	--
	8/29/2012	< 1.0	37	< 1.0	< 5.0	< 1.0	3.7	< 2.0	0.067	--	67
	9/26/2012	0.610 J	40	< 1.0	< 5.0	< 1.0	3.5	< 2.0	0.055	--	55
	11/14/2012	--	--	--	--	--	--	--	0.1	--	50
	1/16/2013	0.80	46	< 0.5	< 10	< 0.5	4.9	--	0.1	--	60
	4/17/2013	2.8	37	< 0.5	< 10	< 0.5	3.9	< 1.0	0.0701	--	70
	7/16/2013	1.14 J	35	< 2.5	< 12.5	< 2.5	2.7	< 5.0	0.0501	--	50
	5/2/2014	0.568 J	60	< 2.0	< 10	< 2.0	4.5	< 4.0	0.0689	--	69
	7/18/2014	0.295 J	48	< 0.5	< 2.5	< 0.5	4.2	< 1.0	0.0526	--	53
	10/20/2014	0.349 J	49	< 0.5	< 2.5	< 0.5	3.8	< 1.0	0.0642	--	64
	1/26/2015	0.286 J	46	< 0.5	< 2.5	< 0.5	4.2	< 1.0	0.067	--	67
	4/20/2015	0.351 J	42	< 0.5	< 2.5	< 0.5	3.8	< 1.0	0.0694	--	69
	7/29/2015	< 2.5	34	< 2.5	< 12.5	< 2.5	3.1	< 5.0	0.1	--	65
CC-07	1/15/2014	< 0.5	< 0.5	< 0.5	< 2.5	0.472 J	0.072 J	< 1.0		--	--
	1/26/2015	< 0.5	< 0.5	< 0.5	< 2.5	0.200 J	< 0.5	< 1.0		--	--
CC-08	12/16/2011	< 0.5	< 0.5	< 0.5	< 10	0.380 J	0.410 J	< 0.5		--	--
	1/16/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	--		--	--
	1/14/2014	< 0.5	0.140 J	< 0.5	< 2.5	< 0.5	0.121 J	< 1.0		--	--
	1/26/2015	< 0.5	0.302 J	< 0.5	< 2.5	< 0.5	0.104 J	< 1.0		--	--
CC-10	1/16/2014	< 0.5	0.418 J	< 0.5	< 2.5	< 0.5	0.66	< 1.0		--	--
	1/26/2015	< 0.5	0.387 J	< 0.5	< 2.5	< 0.5	0.419 J	< 1.0		--	--
CC-11	12/16/2011	0.290 J	1.3	< 0.5	< 10	< 0.5	< 0.5	< 0.5		--	--
	1/16/2013	< 0.5	1.5	< 0.5	< 10	< 0.5	< 0.5	--		--	--

	Analyte:	Benzene	cis-1,2-DCE	Ethylbenzene	MIBK	Toluene	TCE	Xylenes	Manganese	Arsenic	Manganese
	Unit	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
	ICL:	5	70	700	1,825	1,000	5	10,000	3,650	10	3,650
Well ID	Sample Date										
CC-11 (cont.)	1/15/2014	1.5	22	< 0.5	< 2.5	< 0.5	1.4	< 1.0		--	--
	1/15/2014	0.391 J	21	< 1.0	< 5.0	< 1.0	0.310 J	< 2.0		--	--
CC-12	12/14/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	0.340 J	< 0.5	< 0.015	--	< 15
	1/25/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	--	--	--	--
	1/15/2014	< 0.5	0.141 J	< 0.5	< 2.5	< 0.5	0.098 J	< 1.0	--	--	--
	1/26/2015	< 0.5	0.351 J	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
CC-13	12/14/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	< 0.015	--	< 15
	1/16/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	--	--	--	--
	1/15/2014	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
	1/26/2015	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
CC-14	12/14/2011	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	0.0116	--	12
	1/16/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	--	--	--	--
	1/15/2014	< 0.5	0.73	< 0.5	< 2.5	< 0.5	0.134 J	< 1.0	--	--	--
	1/26/2015	< 0.5	0.71	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
CC-15	1/5/2012	1.2	46	< 0.5	< 10	< 0.5	5.0	< 0.5	0.0841	--	84
	1/5/2012	1.2	46	< 0.5	< 10	< 0.5	5.0	< 0.5	0.0875	--	88
	7/12/2012	0.85	42	< 0.5	< 2.5	< 0.5	4.9	< 1.0	--	--	--
	8/29/2012	< 2.0	42	< 2.0	< 10	< 2.0	4.6	< 4.0	0.084	--	84
	9/27/2012	0.86 J	44	< 2.0	< 10	< 2.0	5.0	< 4.0	0.085	--	85
	11/14/2012	0.89 J	43	< 2.0	< 10	< 2.0	4.5	< 4.0	0.085	--	85
	1/16/2013	0.66	44	< 0.5	< 10	< 0.5	4.3	--	0.083	--	83
	4/17/2013	**7.0**	**71**	< 0.5	< 10	< 0.5	**6.3**	< 1.0	0.0956	--	96
	7/24/2013	1.87 J	**89**	< 2.5	< 12.5	< 2.5	**5.3**	< 5.0	0.101	--	101
	10/16/2013	0.743 J	68	< 2.5	< 12.5	< 2.5	**5.4**	< 5.0	0.107	--	107
	1/15/2014	< 2.5	60	< 2.5	< 12.5	< 2.5	**5.1**	< 5.0	0.102	--	102
	4/17/2014	< 2.5	47	< 2.5	< 12.5	< 2.5	4.3	< 5.0	1.0	--	981
	7/16/2014	0.359 J	46	< 0.5	< 2.5	< 0.5	4.7	< 1.0	0.1	--	100
	10/20/2014	0.334 J	48	< 0.5	< 2.5	< 0.5	4.4	< 1.0	0.1	--	96
	2/6/2015	0.426 J	46	< 0.5	< 2.5	< 0.5	**5.1**	< 1.0	0.1	--	103
	5/12/2015	< 2.5	38	< 2.5	< 12.5	< 2.5	4.4	< 5.0	0.1	--	87
	7/29/2015	0.246 J	24	< 0.5	< 2.5	0.175 J	4.1	< 1.0	0.0782 J	--	78 J
CC-16	1/5/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5	0.1	--	56
	1/16/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	--	--	--	--
	1/15/2014	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
	1/26/2015	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0	--	--	--
CC-17	1/20/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5		--	--
	1/16/2013	< 0.5	< 0.5	< 0.5	< 10	0.75	< 0.5	--		--	--
	1/16/2014	0.142 J	< 0.5	< 0.5	< 2.5	0.52	< 0.5	0.376 J		--	--
	1/26/2015	< 0.5	< 0.5	< 0.5	< 2.5	0.192 J	< 0.5	< 1.0		--	--
CC-18	1/20/2012	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	< 0.5		--	--
	1/16/2013	< 0.5	< 0.5	< 0.5	< 10	< 0.5	< 0.5	--		--	--
	1/16/2014	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0		--	--
	1/30/2015	< 0.5	< 0.5	< 0.5	< 2.5	< 0.5	< 0.5	< 1.0		--	--
SWL-6 alt	4/29/2011	--	--	--	--	--	--	--		**21**	93
	4/17/2019	--	--	--	--	--	--	--		**12.8**	121
SWL-7	5/11/2011	--	--	--	--	--	--	--		**15**	79
	4/17/2019	--	--	--	--	--	--	--		5.3	49.8

Notes:
1. µg/L - micrograms per liter
2. CC - Cedar Creek subdivision well location (raw/untreated water samples).
3. ICL - interim groundwater cleanup level
4. J - Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
5. < - result less than indicated reporting limit
6. -- - not measured
7. **Bold shaded** values indicate detections above ICLs.
8. cis-1,2-DCE - cis-1,2-dichloroethene
9. MIBK - methyl isobutyl ketone
10. TCE - trichloroethene

Figures

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet

REFERENCE:
U.S.G.S. 7.5 Minute Series
Topographic Quadrangle:
Barrington, New Hampshire 1981,

CONTOUR INTERVAL: 10 feet.

FORD MOTOR COMPANY,
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE

2022 CONCEPTUAL SITE MODEL

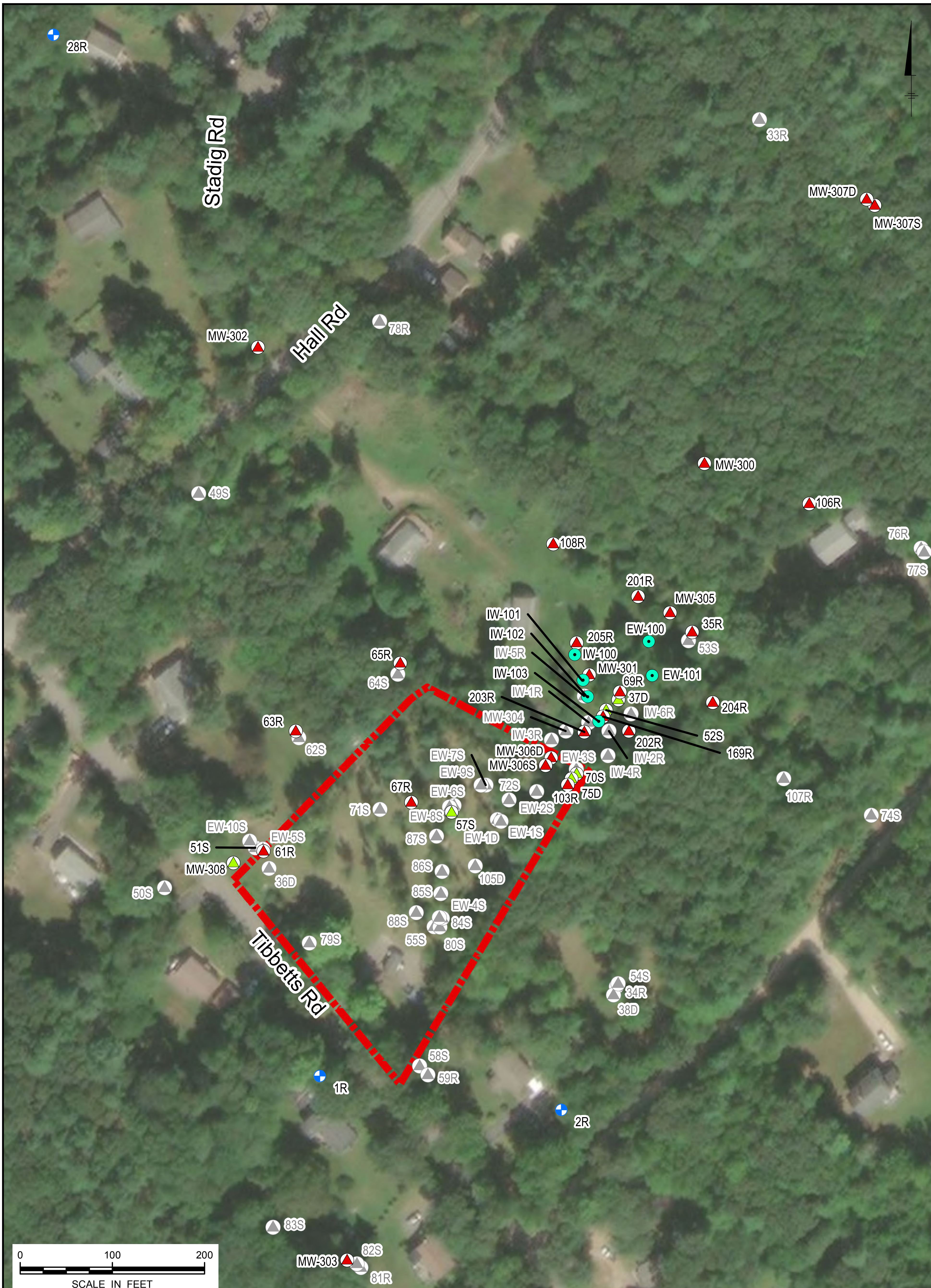
Site Location Map

ARCADIS

FIGURE
1-1

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: X:\FORD\FORD_TIBBETSRD\2016\NOVEMBER 2016\F1 TBT_15AN REG TOPO.MXD SAVED: 6/1/2017 BY: CMCKEOUGH

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: Z:\GISPROJECTS_ENV\FORD\FORD_TIBBETSRD\2019\F2 TBT_15AN SITE LAYOUT.MXD SAVED: 3/19/2020 BY: AKENS



PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

LEGEND

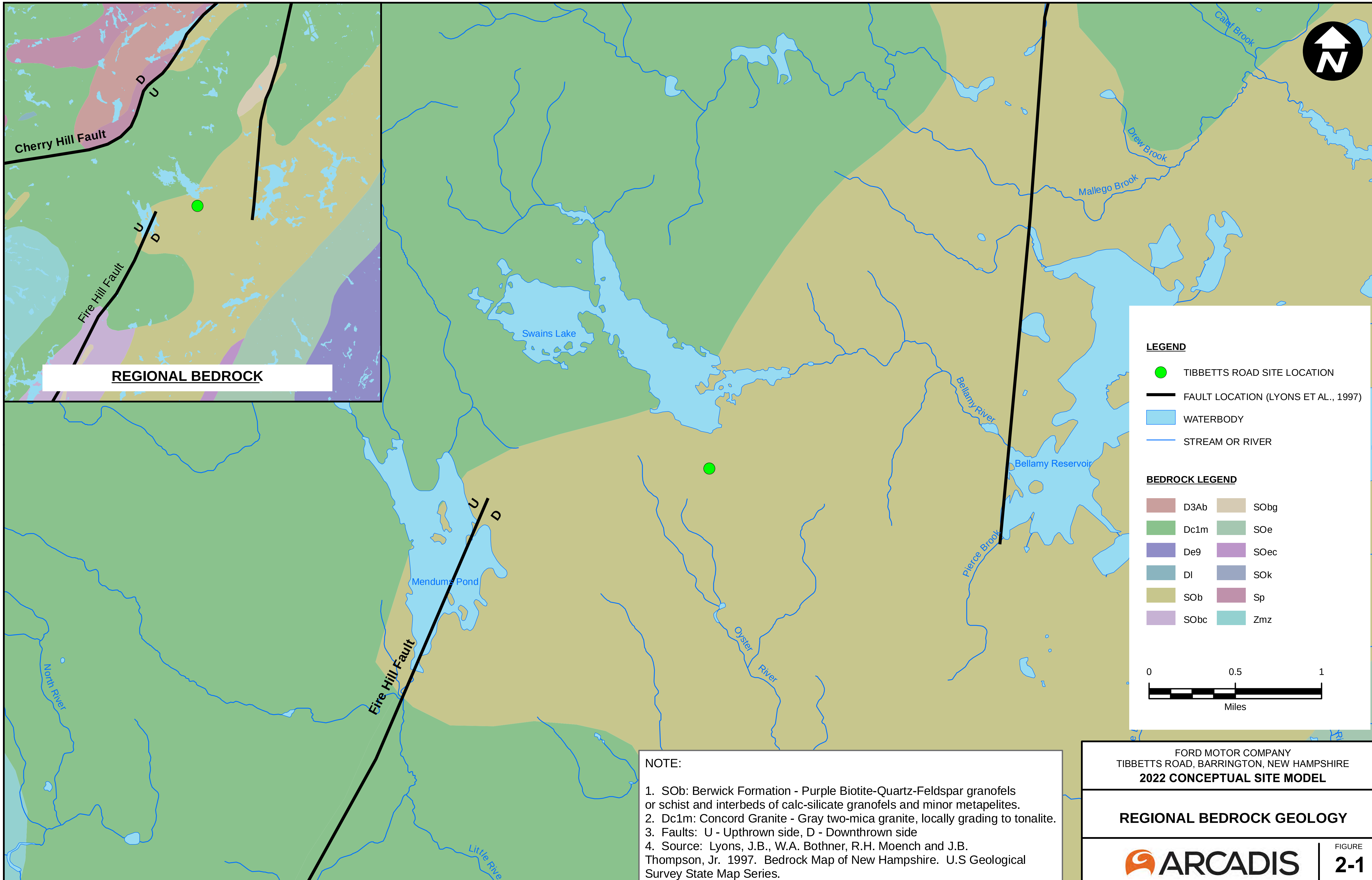
- Site Property Boundary
- Bedrock Monitoring Well
- Overburden Monitoring Well
- Abandoned/Decommissioned Monitoring Well
- Injection/Extraction Well
- Former Residential Well

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

Site Layout

ARCADIS

FIGURE
1-2



NOTE:

1. SOb: Berwick Formation - Purple Biotite-Quartz-Feldspar granofels or schist and interbeds of calc-silicate granofels and minor metapelites.
2. Dc1m: Concord Granite - Gray two-mica granite, locally grading to tonalite.
3. Faults: U - Upthrown side, D - Downthrown side
4. Source: Lyons, J.B., W.A. Bothner, R.H. Moench and J.B. Thompson, Jr. 1997. Bedrock Map of New Hampshire. U.S Geological Survey State Map Series.

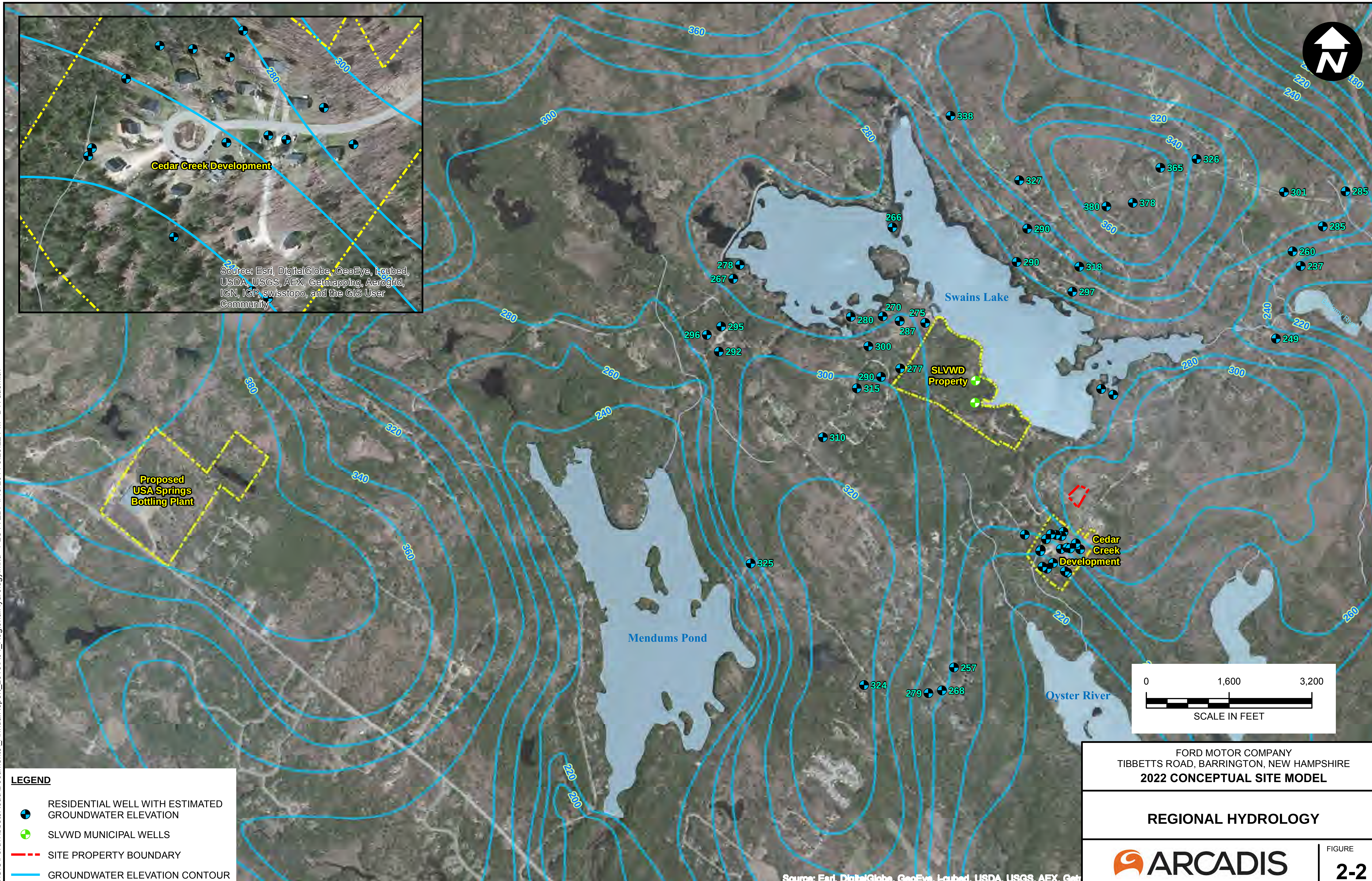
FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

REGIONAL BEDROCK GEOLOGY

ARCADIS

FIGURE
2-1

CITY: NOVI DIV/GROUP: ENV DB: KW PIC: EC PM: DS TM: PJC
Project (Project #) MA000725



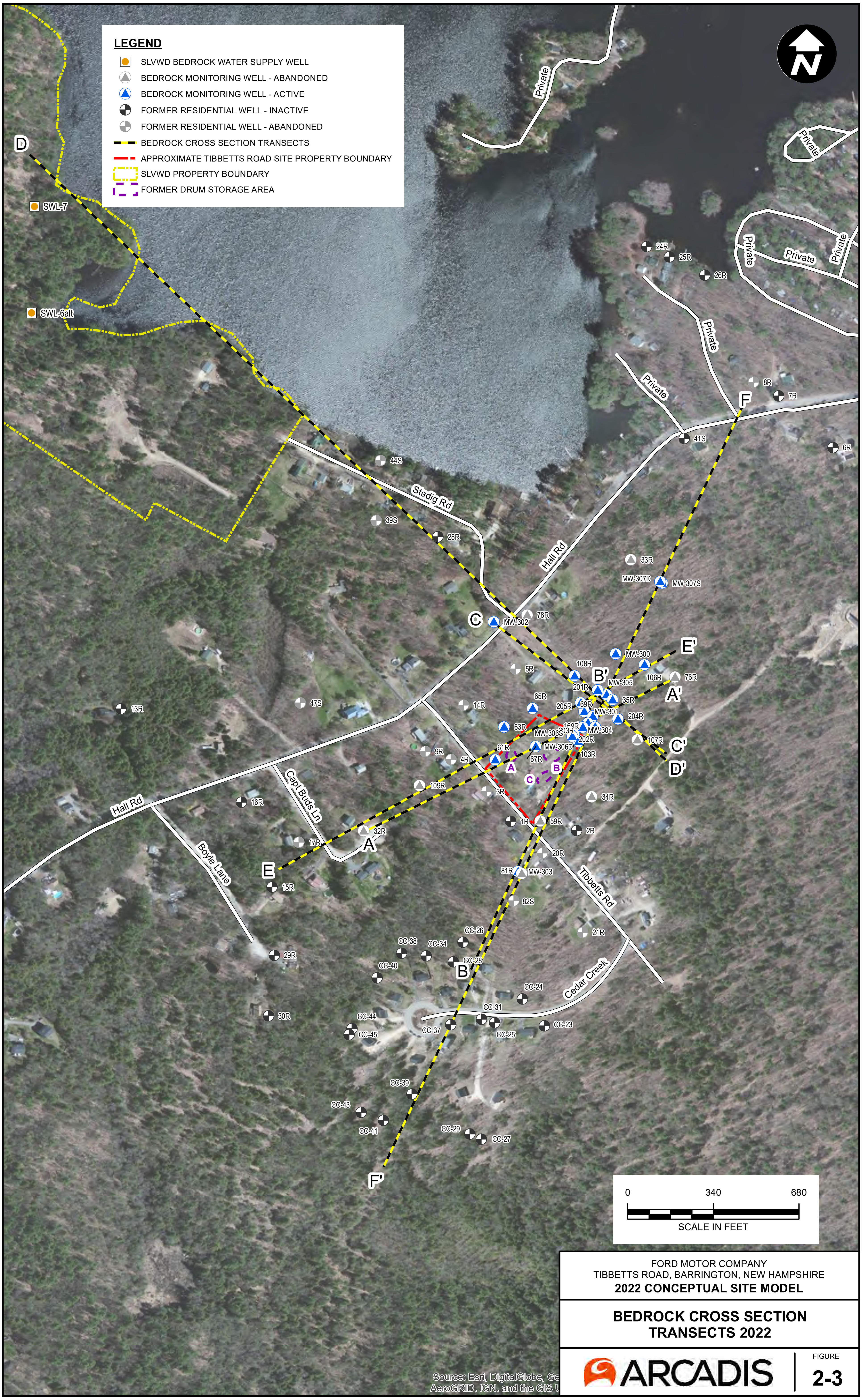
FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

REGIONAL HYDROLOGY

ARCADIS

FIGURE
2-2

CITY: KNOXVILLE DIV: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
G:\GIS\Ford\TibbettsRoad\Documents_AnnualReport_2013\A04_RegionalHydrology.mxd PLOTTED: 4/10/2014 5:23:22 PM BY: aasmith



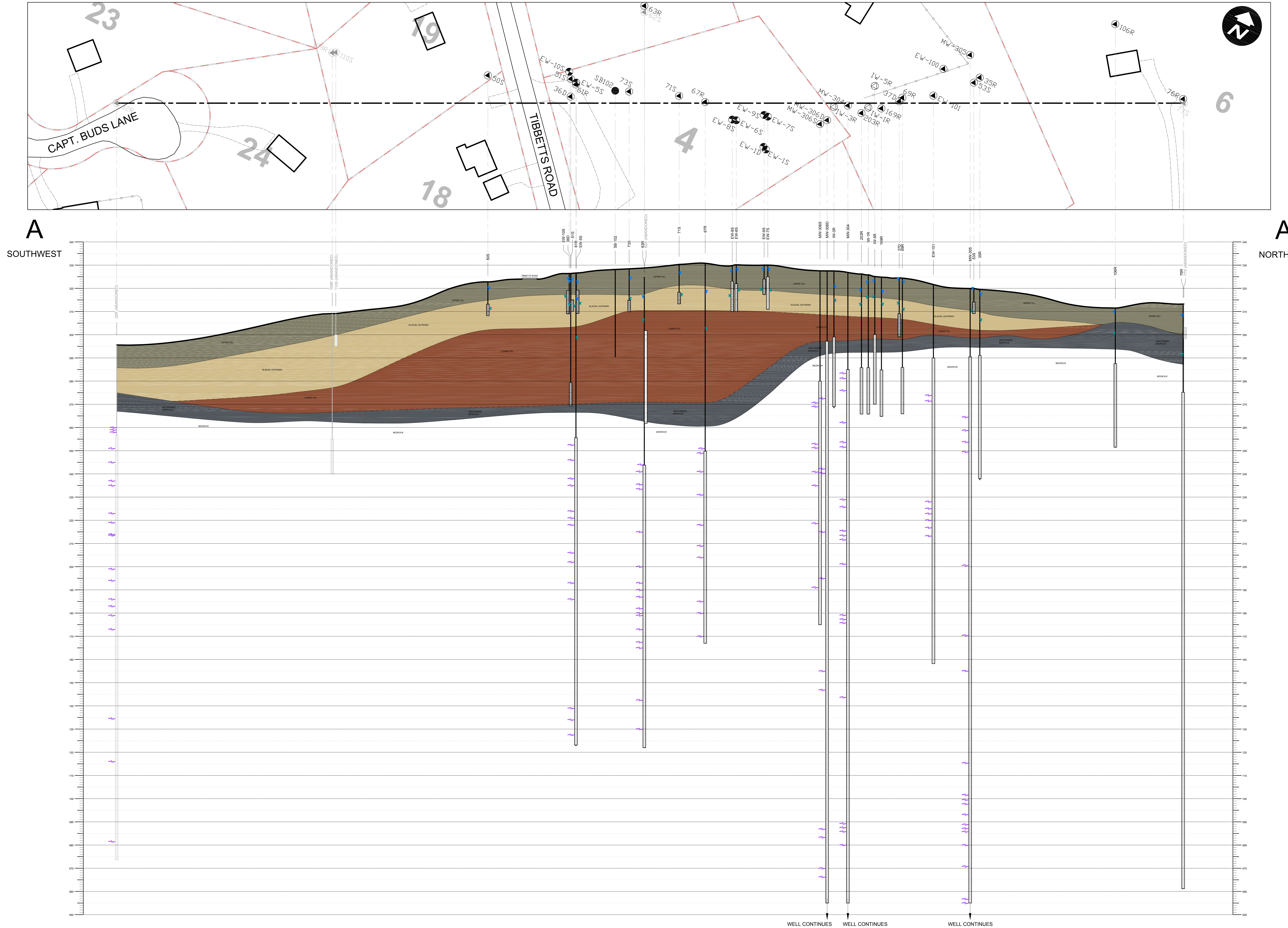
FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

BEDROCK CROSS SECTION TRANSECTS 2022

ARCADIS

FIGURE
2-3

CITY: KNOXVILLE DIV: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
T:_ENV\Novi\Brighton_MI\Ford\TibbettsRoad\2022\2021 Conceptual Site Model\Update\Bedrock Cross Section Transects 2021.mxd PLOTTED: 3/14/2022 2:03:59 PM BY: MSMiller



LEGEND

- SOIL BORING
- MONITORING WELL
- INJECTION WELL
- EXTRACTION WELL
- FENCE LINE
- PARCEL BOUNDARY
- UPPER TILL
- LOWER TILL
- GLACIAL OUTWASH
- WEATHERED BEDROCK
- COMPETENT BEDROCK
- MAXIMUM GROUNDWATER ELEVATION
- SOIL BORING
- FRACTURE
- WELL SCREEN
- MINIMUM GROUNDWATER ELEVATION

HYDROSTRATIGRAPHIC UNITS

UPPER TILL: Glacial ablation till typically consisting of unsorted sand.

GLACIAL OUTWASH: These glacial outwash and melt water deposits described as stratified sands with little fines with minor lenses of gravel. Lenses of lacustrine-like sediments are found within this unit.

LOWER TILL: This unit consists of a very dense glacial "till" or other fine grained deposit typically described as silt and clay with a component of gravel and coarse sand. Often contains thin sand seams.

WEATHERED BEDROCK: The weathered rock consists of gravel to boulder size fragments within a dense, fine-grained matrix with identifiable minerals weathered from the bedrock. Redoximorphic features such as mottles and iron staining are identified within this unit.

BEDROCK: Berwick Formation - biotite-quartz-feldspar granofels or schist. Described as salt and pepper in appearance with identifiable minerals such as quartz, mica (muscovite and biotite), white feldspars, garnet, and amphibole. Pegmatite layers that are observed in both the boring logs and the downhole geophysical gamma logs

0 60 120

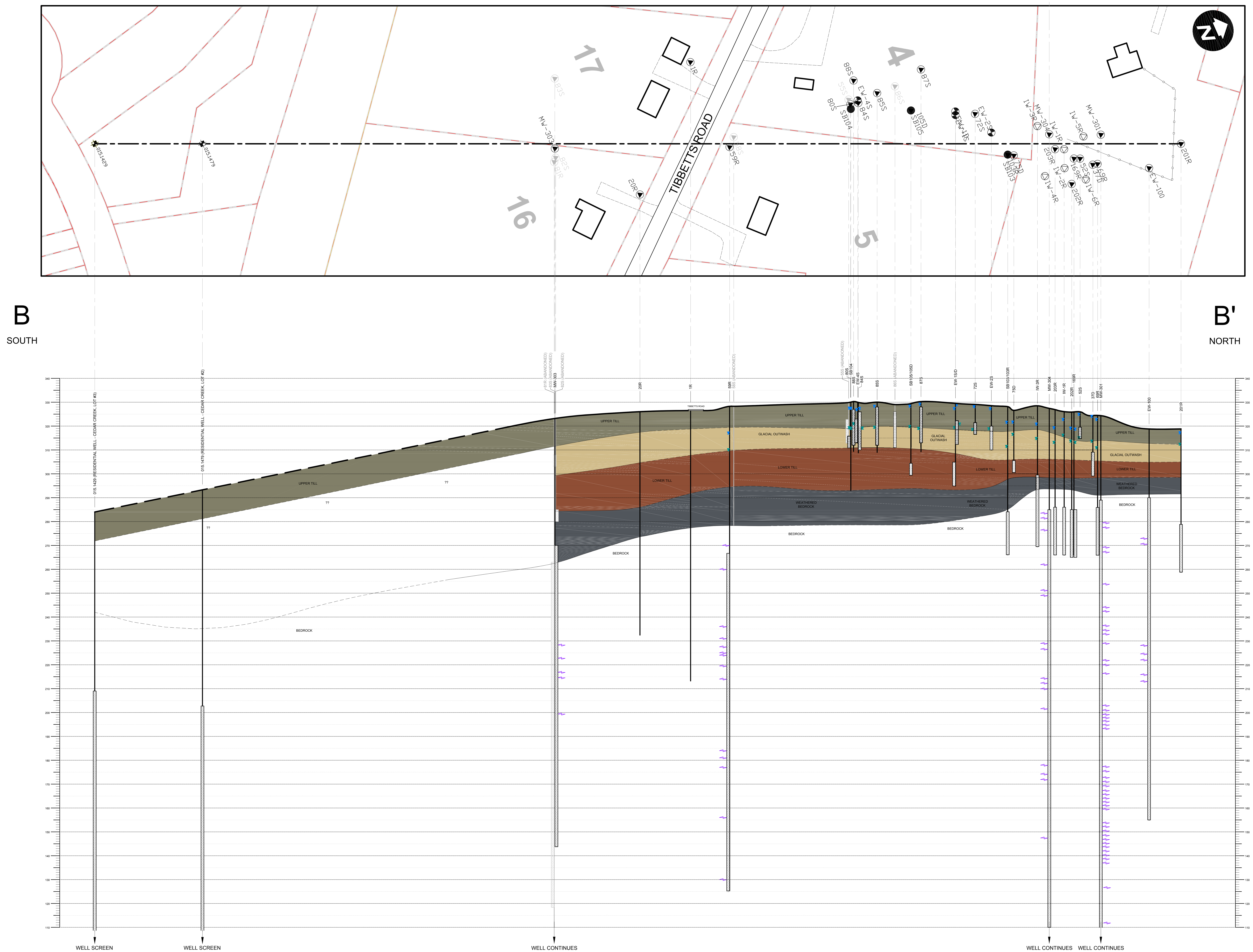
SCALE IN FEET
VERTICAL EXAGGERATION = 3X

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

CROSS-SECTION A-A'

ARCADIS

FIGURE
2-4a



LEGEND

- SOIL BORING
- MONITORING WELL
- INJECTION WELL
- EXTRACTION WELL
- FENCE LINE
- PARCEL BOUNDARY
- UPPER TILL
- LOWER TILL
- GLACIAL OUTWASH
- WEATHERED BEDROCK
- COMPETENT BEDROCK

MAXIMUM GROUNDWATER ELEVATION
SOIL BORING
FRACTURE
WELL SCREEN
MINIMUM GROUNDWATER ELEVATION

HYDROSTRATIGRAPHIC UNITS

UPPER TILL: Glacial ablation till typically consisting of unsorted sand.

GLACIAL OUTWASH: These glacial outwash and melt water deposits described as stratified sands with little fines with minor lenses of gravel. Lenses of lacustrine-like sediments are found within this unit.

LOWER TILL: This unit consists of a very dense glacial “till” or other fine grained deposit typically described as silt and clay with a component of gravel and coarse sand. Often contains thin sand seams.

WEATHERED BEDROCK: The weathered rock consists of gravel to boulder size fragments within a dense, fine-grained matrix with identifiable minerals weathered from the bedrock. Redoximorphic features such as mottles and iron staining are identified within this unit.

BEDROCK: Berwick Formation - biotite-quartz-feldspar granofels or schist. Described as salt and pepper in appearance with identifiable minerals such as quartz, mica (muscovite and biotite), white feldspars, garnet, and amphibole. Pegmatite layers that are observed in both the boring logs and the downhole geophysical gamma logs

0 60 120

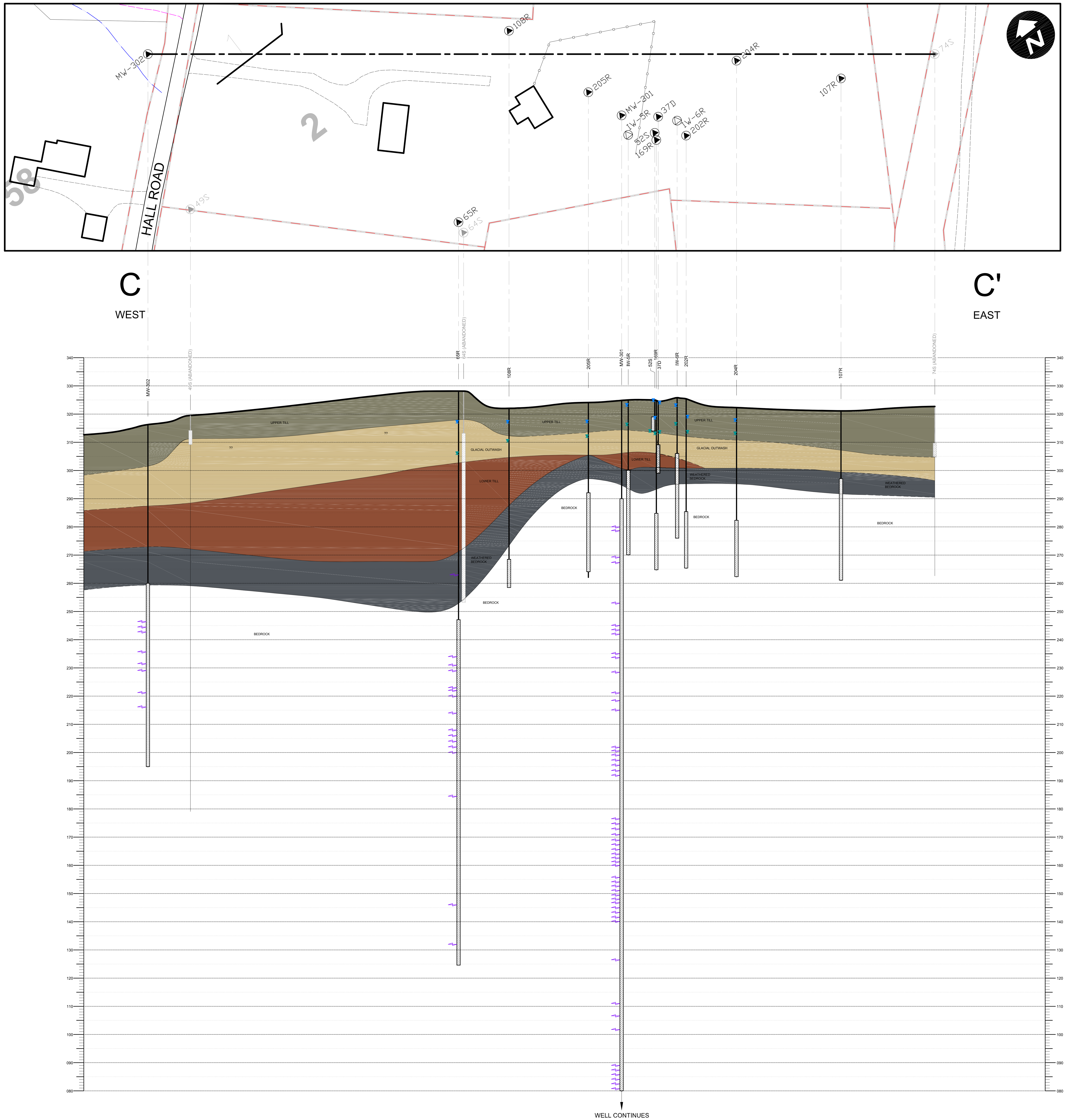
SCALE IN FEET
VERTICAL EXAGGERATION = 3X

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

CROSS-SECTION B-B'

ARCADIS

FIGURE
2-4b



LEGEND

SOIL BORING
MONITORING WELL
INJECTION WELL
EXTRACTION WELL
FENCE LINE
PARCEL BOUNDARY
UPPER TILL
LOWER TILL
GLACIAL OUTWASH
WEATHERED BEDROCK
COMPETENT BEDROCK

MAXIMUM GROUNDWATER ELEVATION
SOIL BORING
FRACTURE
WELL SCREEN
MINIMUM GROUNDWATER ELEVATION

HYDROSTRATIGRAPHIC UNITS

UPPER TILL: Glacial ablation till typically consisting of unsorted sand.

GLACIAL OUTWASH: These glacial outwash and melt water deposits described as stratified sands with little fines with minor lenses of gravel. Lenses of lacustrine-like sediments are found within this unit.

LOWER TILL: This unit consists of a very dense glacial "till" or other fine grained deposit typically described as silt and clay with a component of gravel and coarse sand. Often contains thin sand seams.

WEATHERED BEDROCK: The weathered rock consists of gravel to boulder size fragments within a dense, fine-grained matrix with identifiable minerals weathered from the bedrock. Redoximorphic features such as mottles and iron staining are identified within this unit.

BEDROCK: Berwick Formation - biotite-quartz-feldspar granofels or schist. Described as salt and pepper in appearance with identifiable minerals such as quartz, mica (muscovite and biotite), white feldspars, garnet, and amphibole. Pegmatite layers that are observed in both the boring logs and the downhole geophysical gamma logs

0 60 120

SCALE IN FEET
VERTICAL EXAGGERATION = 3X

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

CROSS-SECTION C-C'

ARCADIS

FIGURE
2-4c

LEGEND

- BEDROCK MONITORING WELL (ACTIVE)
- BEDROCK MONITORING WELL (ABANDONED)
- BEDROCK CONTOUR
- APPROXIMATE TIBBETTS ROAD SITE PROPERTY BOUNDARY

0 100 200
SCALE IN FEET

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE

2022 CONCEPTUAL SITE MODEL

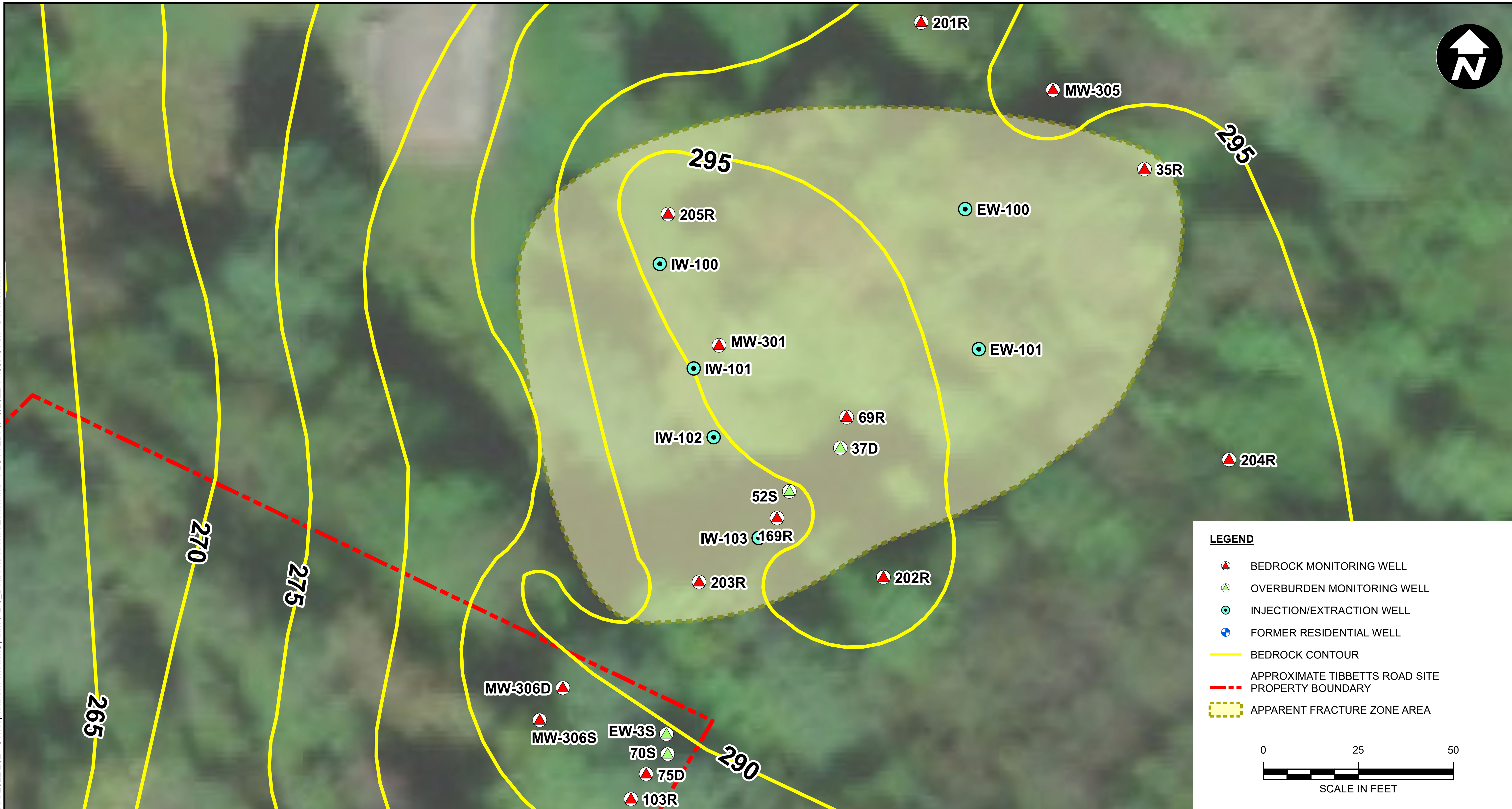
BEDROCK TOPOGRAPHY

ARCADIS

FIGURE
2-5

CITY: KNOXVILLE DIV: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
T:_ENV\NoviBrighton_MI\Ford\TibbettsRoad\2022\2021 Conceptual Site Model\Update\F2-5_BedrockTopo.mxd PLOTTED: 3/18/2022 11:47:23 AM BY: MSMiller

CITY: KNOXVILLE DIV: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
T:_ENV\NoviBrighton_MI\Ford\TibbetsRoad\2022\2021 Conceptual Site Model\Update\F2-6_BedrockFractureZone.mxd PLOTTED: 3/18/2022 11:53:45 AM BY: MSMiller



FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE

2022 CONCEPTUAL SITE MODEL

BEDROCK FRACTURE ZONE

ARCADIS

FIGURE

2-6

LEGEND

- BEDROCK WELL
- NO APPARENT HYDRAULIC CONNECTION
- WEAK OR MODERATE HYDRAULIC CONNECTION
- RELATIVELY STRONG HYDRAULIC CONNECTION

Relative Frequency of Fracture Strike Direction

NOTE: PUMP TESTS COMPLETED AT 61R (OPEN HOLE AND PACKER), 65R (PACKER ONLY) AND 169R (OPEN HOLE).

0 180 360

SCALE IN FEET

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

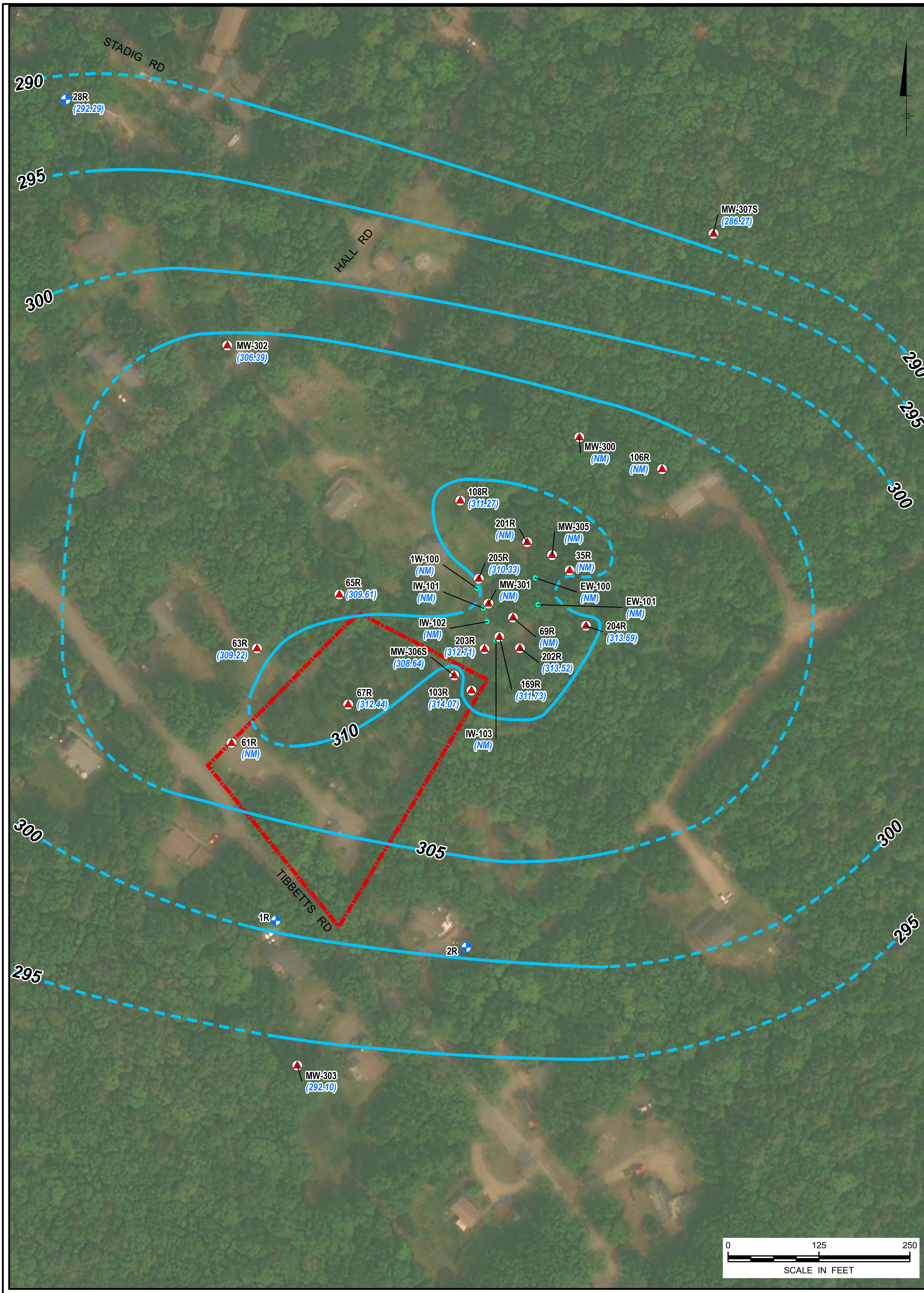
BEDROCK FRACTURE SUMMARY

ARCADIS

FIGURE
2-7

CITY: KNOXVILLE DIV: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
G:\GIS\Ford\TibbettsRoad\Documents_AnnualReport_2013\A14_Bedrock Hydraulics.mxd PLOTTED: 4/10/2014 9:55:01 PM BY: aasmith

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: T:_ENV\NOVIBRIGHTON_MI\FORD\TIBBETSROAD\2021\F1 TBT_15AN GWE 202105_V1_NEW.MXD SAVED: 10/28/2021 BY: PSI01045



PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

LEGEND

- Former Residential Well - Existing
- Bedrock Monitoring Well
- Site Property Boundary
- (311.73) Groundwater Elevation (ft. amsl)
- Groundwater Elevation Contour (ft. amsl) (inferred where dashed)

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

Groundwater Elevation Contour Map (Shallow Bedrock Wells) - May 2021

ARCADIS

FIGURE
2-8

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: T:_ENV\NOVIBRIGHTON_MI\FORD\TIBBETSROAD\2022\2021 CONCEPTUAL SITE MODEL\UPDATE\F3-4_TBT_15AN_HISTORICAL_EXTENT OF BENZENE TCE IN OVERBURDEN.MXD SAVED: 2/4/2022 BY: MSMILLER

0 150 300
SCALE IN FEET

NOTES:
1. ICL: interim groundwater cleanup level
2. < - result less than indicated reporting limit (shown in parentheses)
3. µg/L - Microgram per liter
4. TCE - Trichloroethene
5. Benzene and TCE values are from May 2021 sampling event

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

LEGEND

- Monitoring Well (Active)
- Abandoned/Decommissioned Monitoring Well
- Site Property Boundary
- Benzene Plume Extent (Historical)
- TCE Plume Extent (Historical)

52S — Well ID
< 1.0 / < 1.0 — Values in µg/L
Trichloroethene
Benzene

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

Historical Extent of Benzene/TCE in Overburden Groundwater

ARCADIS

FIGURE
3-1

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: U:_ENV\NOVIBRIGHTON_MI\FORD\TIBBETSROAD\2020\F1 TBT_OVERBURDENWELLS.MXD SAVED: 11/16/2020 BY: AKENS

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

LEGEND

- Location with Historical Exceedance(s) of ICLs
- Location with Historical Detection(s) above Laboratory Reporting Limits
- Location with No Historical Detection(s) above Laboratory Reporting Limits
- No Historical Data Collected

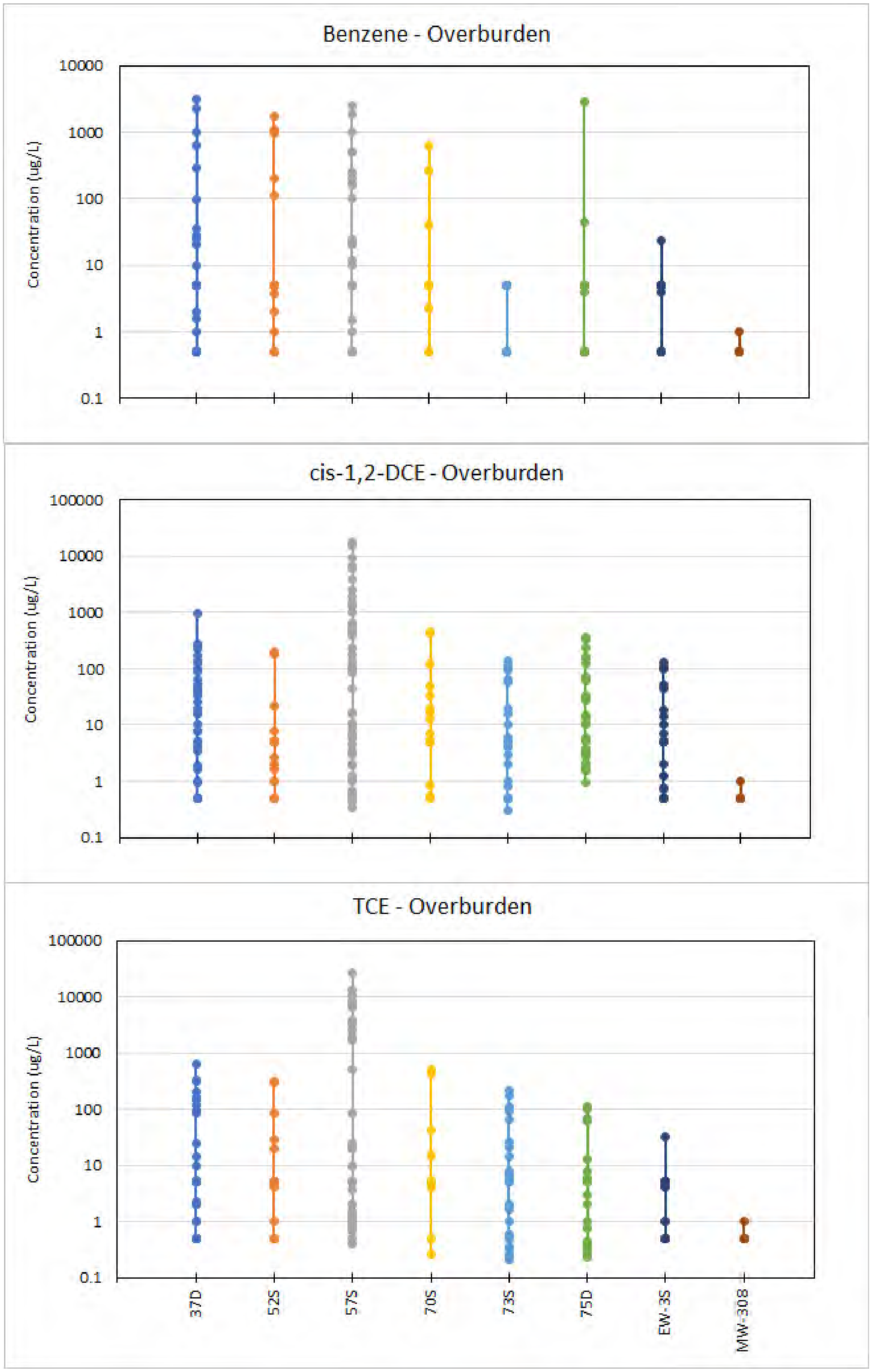
Note: Historical site-related VOCs include: benzene, cis-1,2-dichloroethene, ethylbenzene, methyl tertiary butyl ether, tetrachloroethene, trichloroethene, vinyl chloride, and total xylenes

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

Historical Extent of VOC Impacts in Overburden Groundwater

ARCADIS

FIGURE
3-2



FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

BENZENE, CIS-1,2-DCE, AND TCE HISTORICAL CONCENTRATIONS IN OVERBURDEN GROUNDWATER

ARCADIS

FIGURE
3-3

LEGEND

- VER EXTRACTION WELL
- OTHER WELL USED FOR GROUNDWATER EXTRACTION
- VACUUM MONITORING POINTS
- PROPERTY BOUNDARY
- FORMER DRUM STORAGE AREA
- OVERBURDEN GROUNDWATER TREATMENT SYSTEM AREA

SOURCE:

Aerial Image Source: ArcGIS Online, ESRI World Imagery Aerial Service accessed 02/06/13.

0 60 120

SCALE IN FEET

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE

2022 CONCEPTUAL SITE MODEL

GROUNDWATER VER TREATMENT SYSTEM AND WELLS (1995 - 2002)

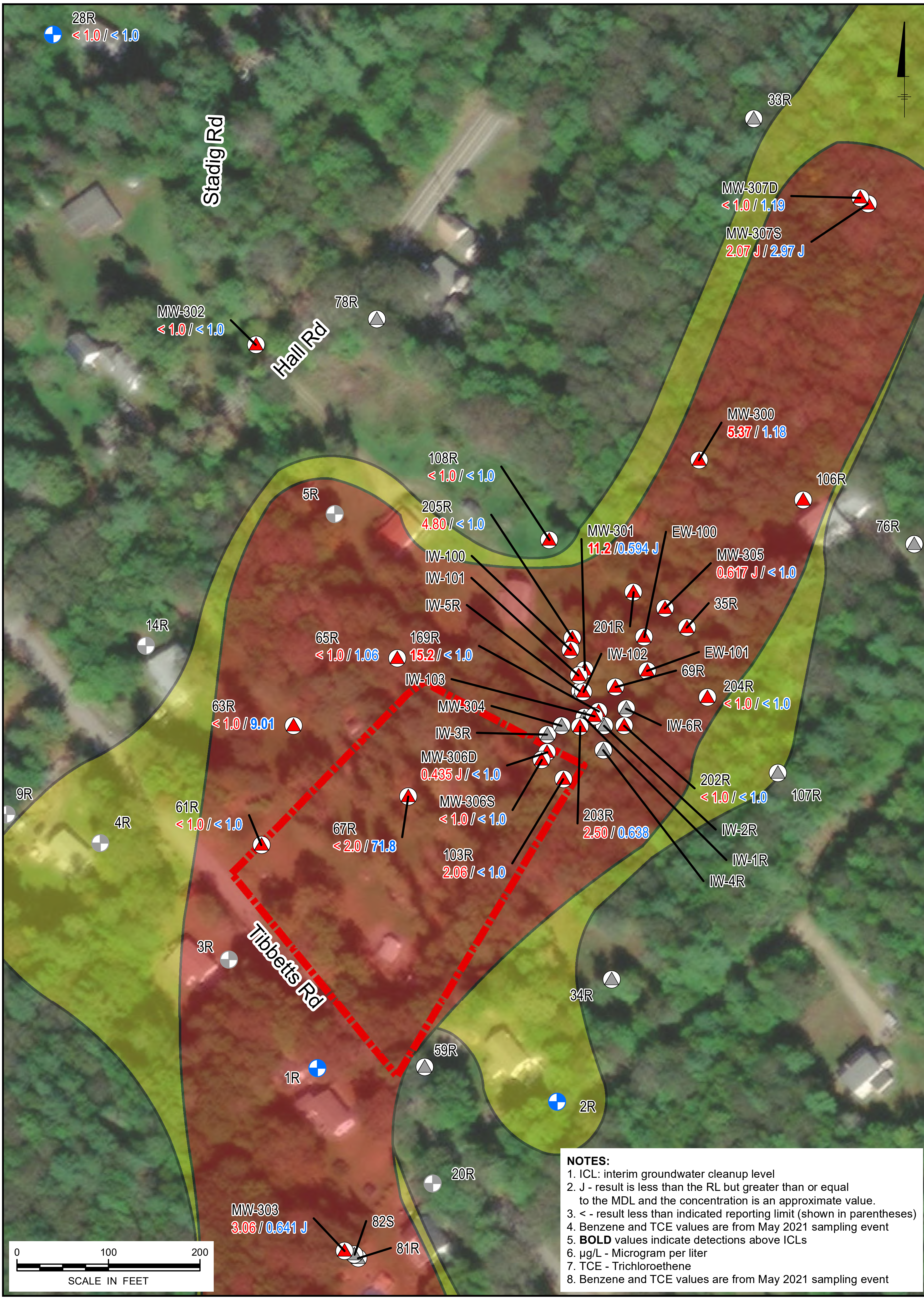
ARCADIS

FIGURE

3-4

CITY: KNOXVILLE DIV: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
T:_ENV\NoviBrighton_MI\Ford\TibbetsRoad\2022\2021 Conceptual Site Model\Update\F3-4_Groundwater_VER_System.mxd PLOTTED: 3/18/2022 11:54:20 AM BY: MSMiller

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: T:_ENV\NOVIBRIGHTON_MI\FORD\TIBBETSROAD\2022\2021 CONCEPTUAL SITE MODEL\UPDATE\F3-5_TBT_15AN_HISTORICAL_EXTENT OF BENZENE TCE IN BEDROCK.MXD SAVED: 2/4/2022 BY: MSMILLER



NOTES:

1. ICL: interim groundwater cleanup level
2. J - result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
3. < - result less than indicated reporting limit (shown in parentheses)
4. Benzene and TCE values are from May 2021 sampling event
5. **BOLD** values indicate detections above ICLs
6. µg/L - Microgram per liter
7. TCE - Trichloroethene
8. Benzene and TCE values are from May 2021 sampling event

LEGEND

- Monitoring Well (Active)
- Monitoring Well (Decommissioned)
- Former Private Water Well (Existing)
- Former Private Water Well (Decommissioned)
- Site Property Boundary

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

PLUMES_EXTENT2022

TYPE

- Benzene Plume Extent (Historical)
- TCE Plume Extent (Historical)

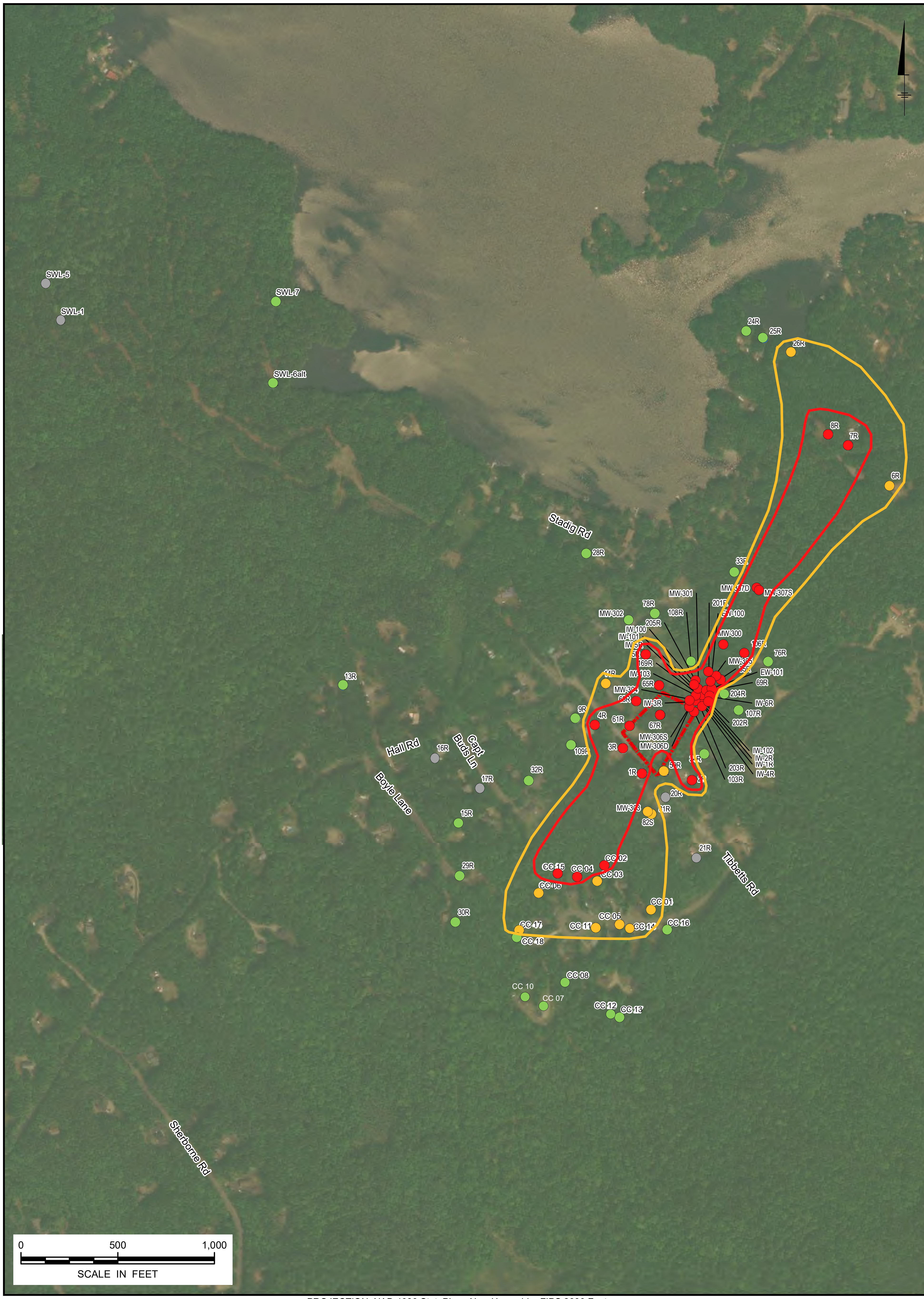
MW-303 — Well ID
3.06 / 0.641 J — Values in µg/L
Trichloroethene
Benzene

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

Historical Extent of Benzene/TCE in Bedrock Groundwater

ARCADIS

FIGURE
3-5



LEGEND

- Location with Historical Exceedance(s) of ICLs
- Location with Historical Detection(s) above Laboratory Reporting Limits
- Location with No Historical Detection(s) above Laboratory Reporting Limits
- No Historical Data Collected

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

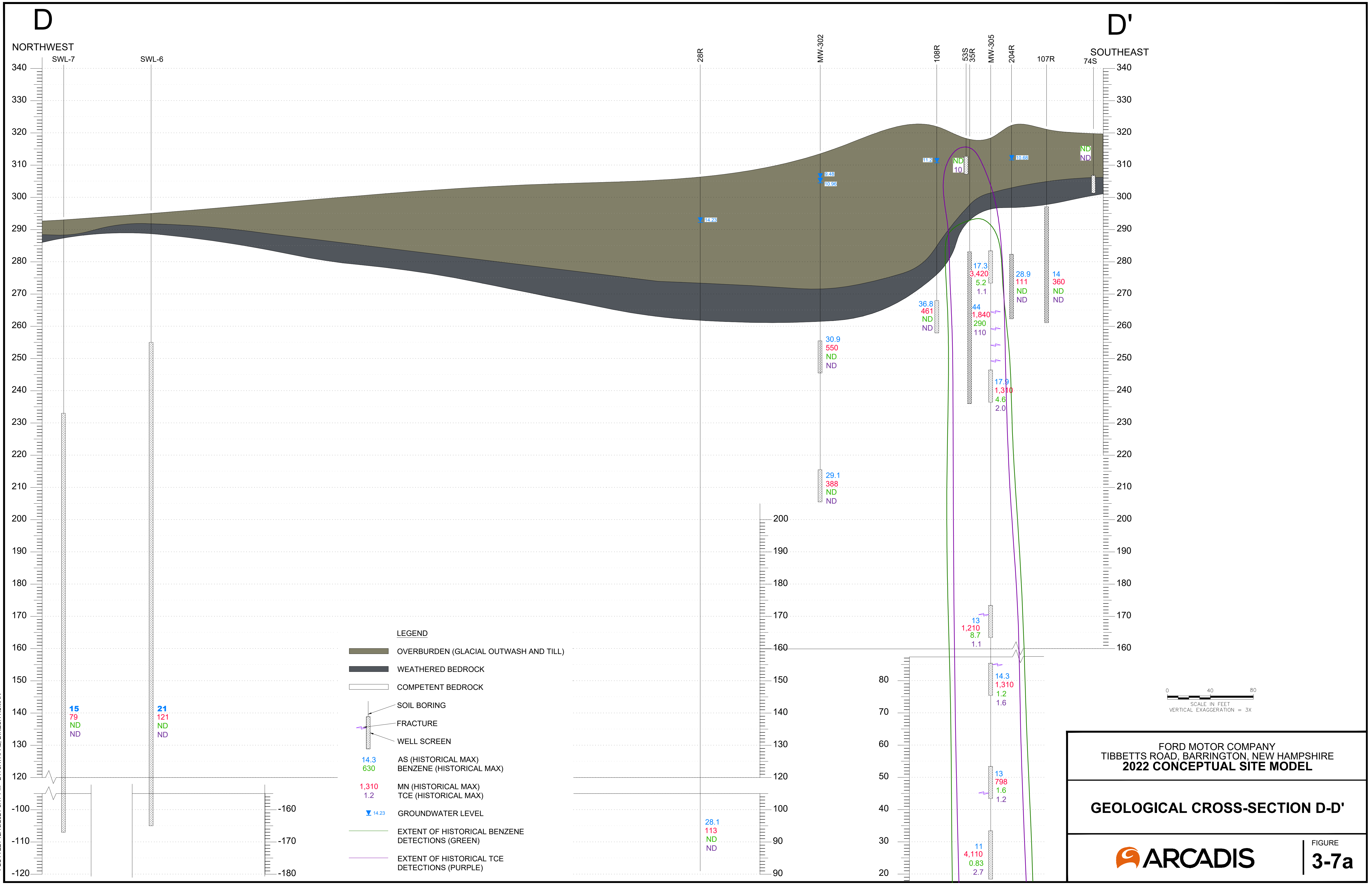
Note: Historical site-related VOCs include: benzene, cis-1,2-dichloroethene, ethylbenzene, methyl tertiary butyl ether, tetrachloroethene, trichloroethene, vinyl chloride, and total xylenes

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

Historical Extent of VOC Impacts in Bedrock Groundwater

ARCADIS

FIGURE
3-6

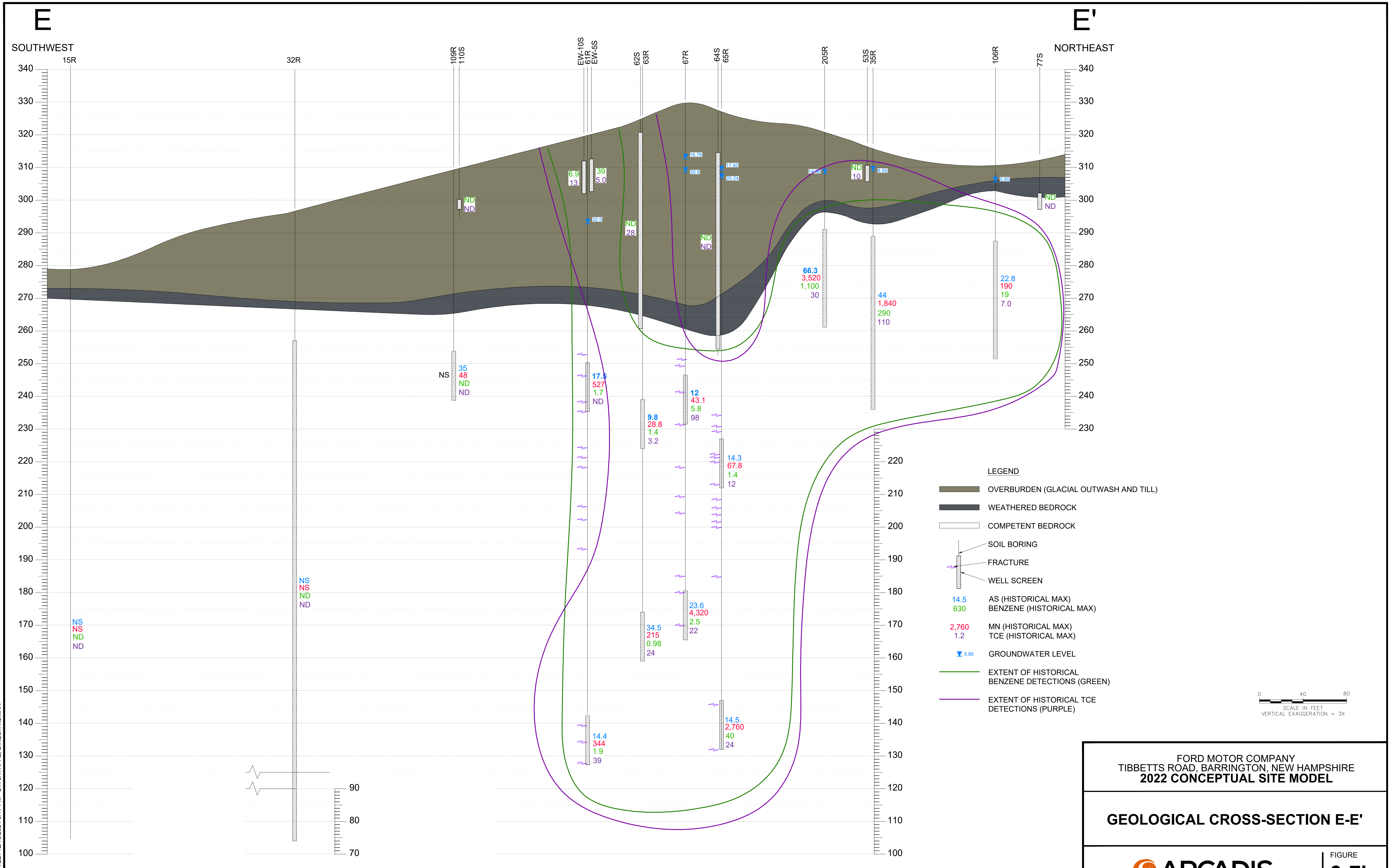


FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

GEOLOGICAL CROSS-SECTION D-D'

ARCADIS

FIGURE
3-7a

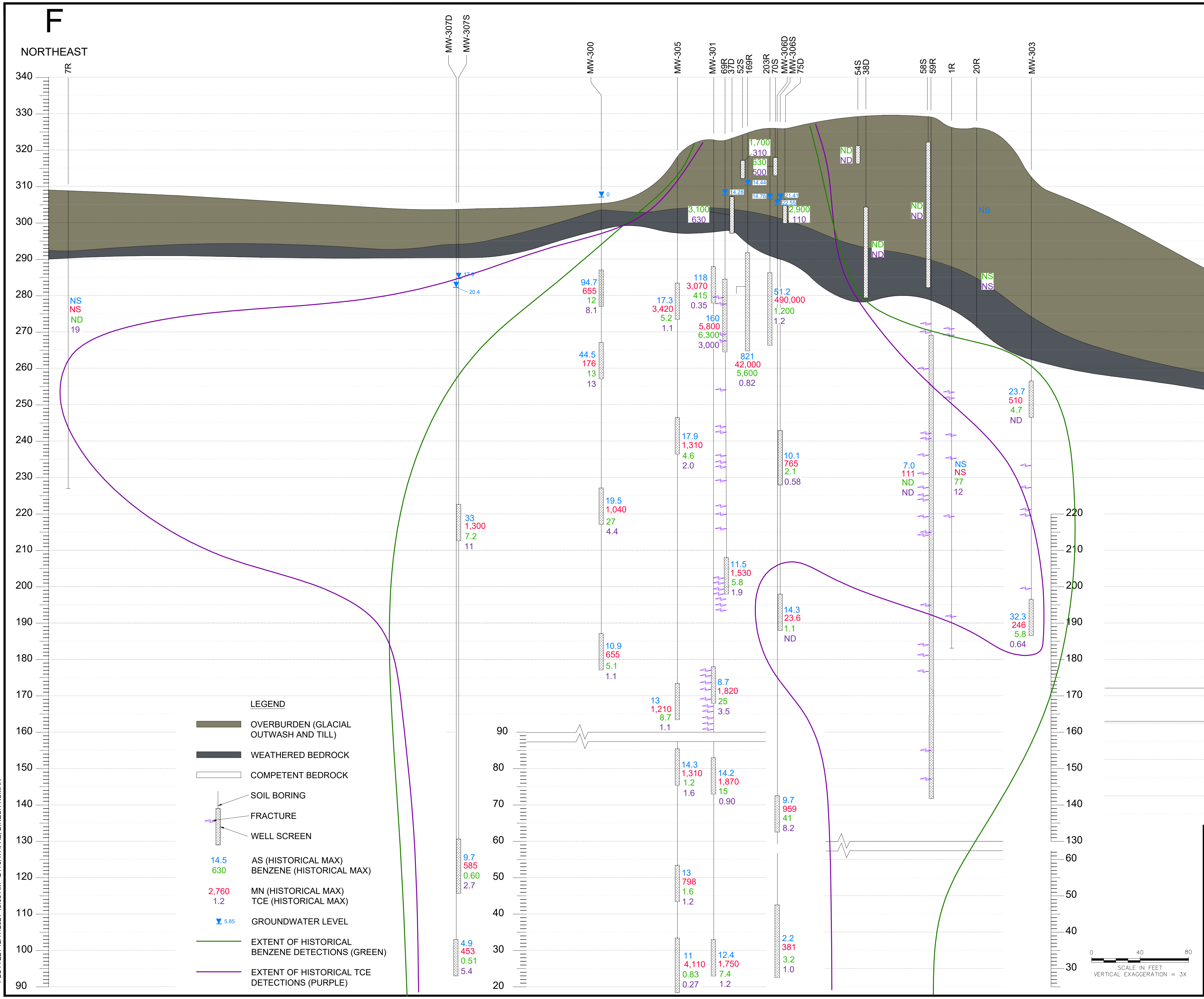


FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

GEOLOGICAL CROSS-SECTION E-E'

ARCADIS

FIGURE
3-7b

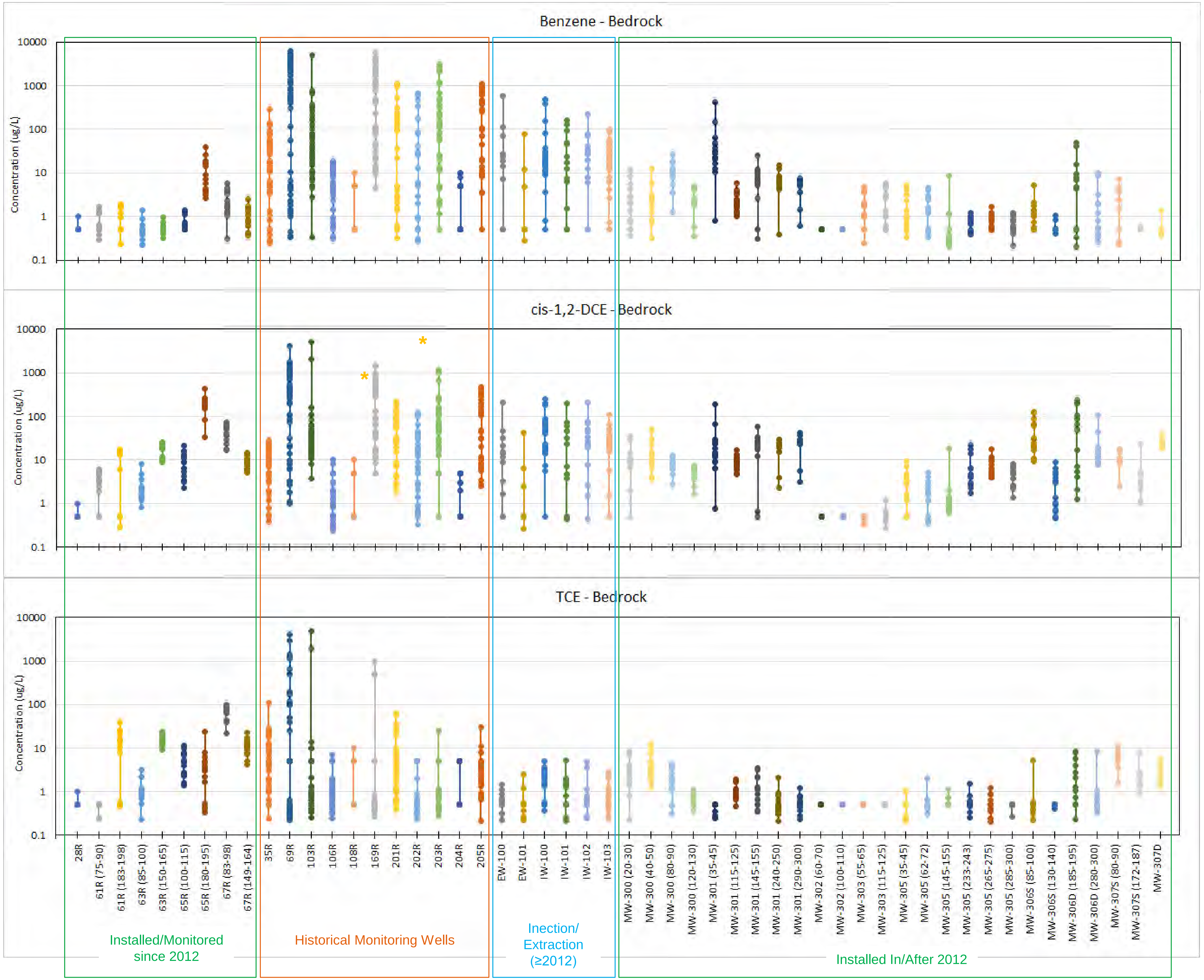


FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

GEOLOGICAL CROSS-SECTION F-F'

ARCADIS

FIGURE
3-7c



Notes:
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

BENZENE, CIS-1,2-DCE, AND TCE HISTORICAL CONCENTRATIONS IN BEDROCK GROUNDWATER

ARCADIS

FIGURE
3-8

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: T:_ENV\NOVIBRIGHTON_MI\FORD\TIBBETSROAD\2022\2021 CONCEPTUAL SITE MODEL\UPDATE\F3-9 HISTORICAL RESIDENTIAL WATER WELL LOCATIONS.MXD SAVED: 3/14/2022 BY: MSMILLER

LEGEND

- Monitoring Well (Active)
- Monitoring Well (Decommissioned)
- Former Private Water Well (Existing)
- Former Private Water Well (Decommissioned)
- SLVWD Water Supply Wells
- Site Property Boundary

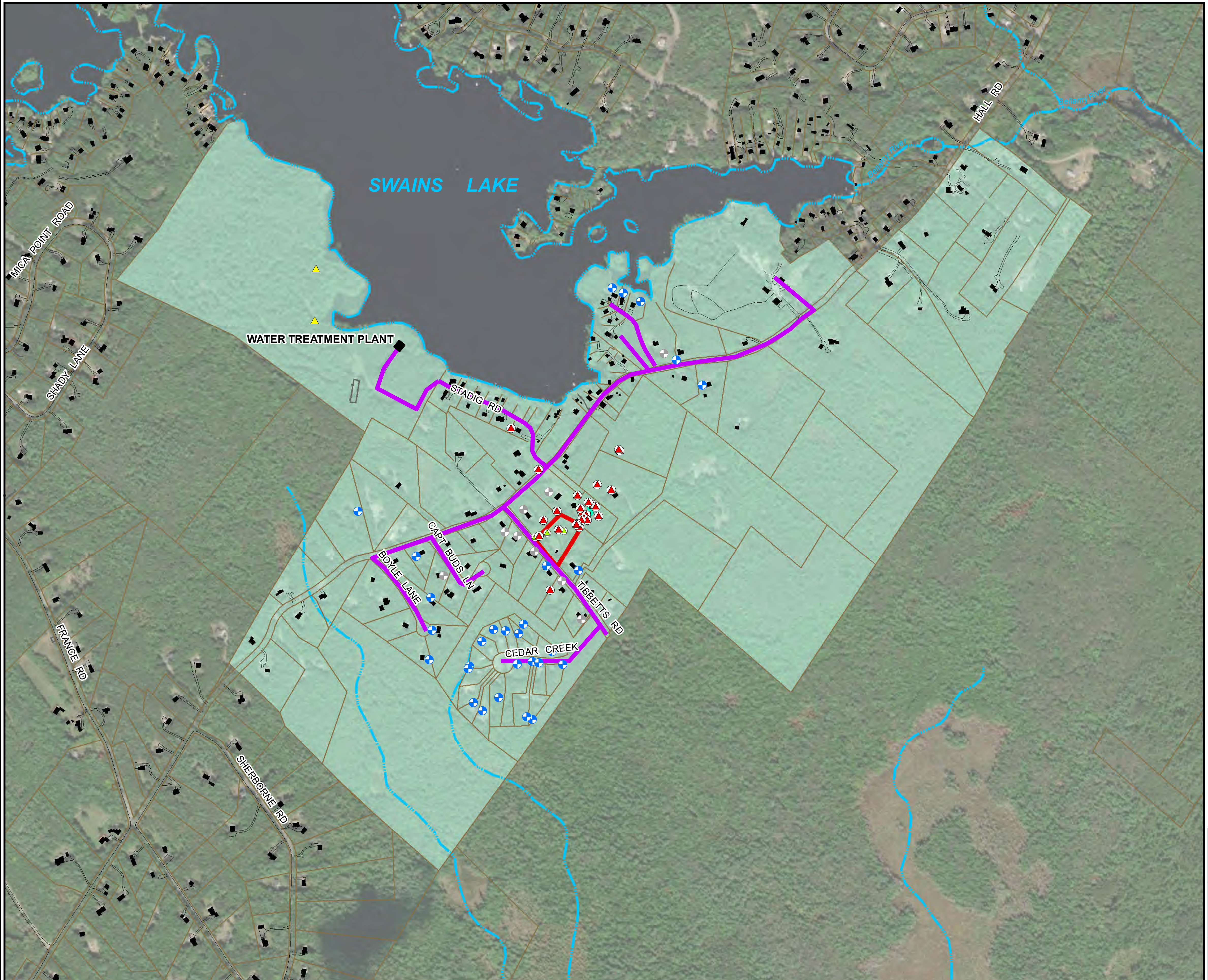
PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

Historical Residential Water Well Locations

ARCADIS

FIGURE
3-9



LEGEND

- Site Property Boundary
- River/Stream
- Bedrock Monitoring Well
- Overburden Monitoring Well
- Injection/Extraction Well
- SLVWD Water Supply Wells
- Former Private Water Well (Existing)
- Former Private Water Well (Decommissioned)
- Property Line
- Building
- Water Distribution Line
- Groundwater Management Zone

0 800 1,600

SCALE IN FEET

PROJECTION: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
AERIAL SOURCE: ESRI Online Imagery (NAIP, July 2014).

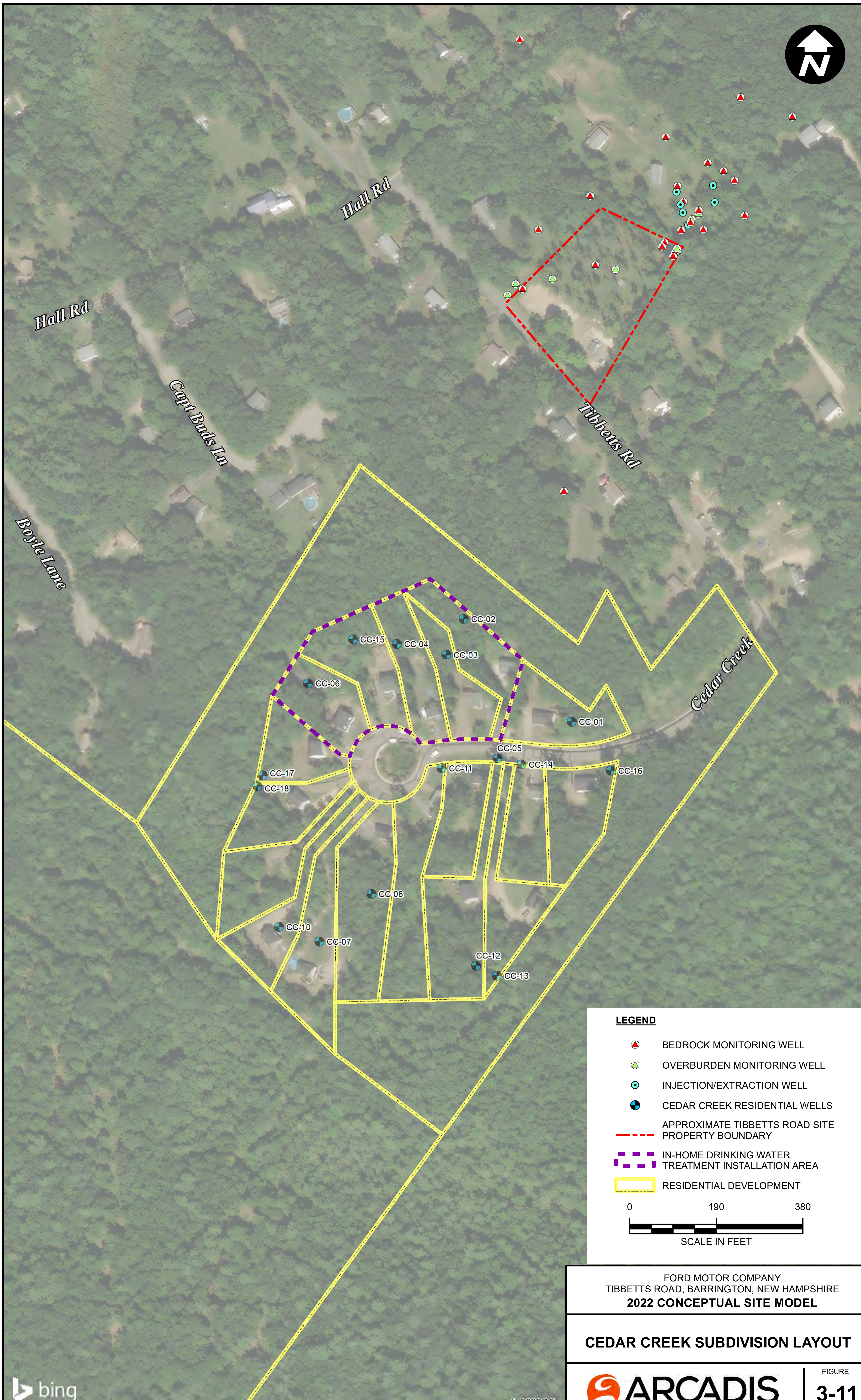
FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

Swains Lake Village Water District and Distribution System

ARCADIS

FIGURE
3-10

CITY: (KNOXVILLE) DIV/GROUP: (ENV/GIS) LD: (B.ALTOM) PIC: ( ) PM: ( ) TM: (I.MARTZ)
PROJECT: MA000725.2015 PATH: T:_ENV\NOVI\BRIGHTON MIFORD\TIBBETSROAD\2022\2021 CONCEPTUAL SITE MODEL\UPDATE\F3-10 TBT_15AN SWAINSLK DIST.MXD SAVED: 3/18/2022 BY: MSMILLER



FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

CEDAR CREEK SUBDIVISION LAYOUT

ARCADIS

FIGURE
3-11

CITY: KNOXVILLE DIV.: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
T:_ENV\NoviBrighton_MI\Ford\TibbetsRoad\2022\2021 Conceptual Site Model\Update\F3-11 Cedar Creek Subdivision Layout.mxd PLOTTED: 2/4/2022 1:10:57 PM BY: MSMiller

LEGEND

MONITORING WELL

INJECTION WELL

ISCO Area

Property Boundary

SOURCE:

Aerial Image Source: ArcGIS Online, ESRI World Imagery Aerial Service accessed 02/06/13.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE

2022 CONCEPTUAL SITE MODEL

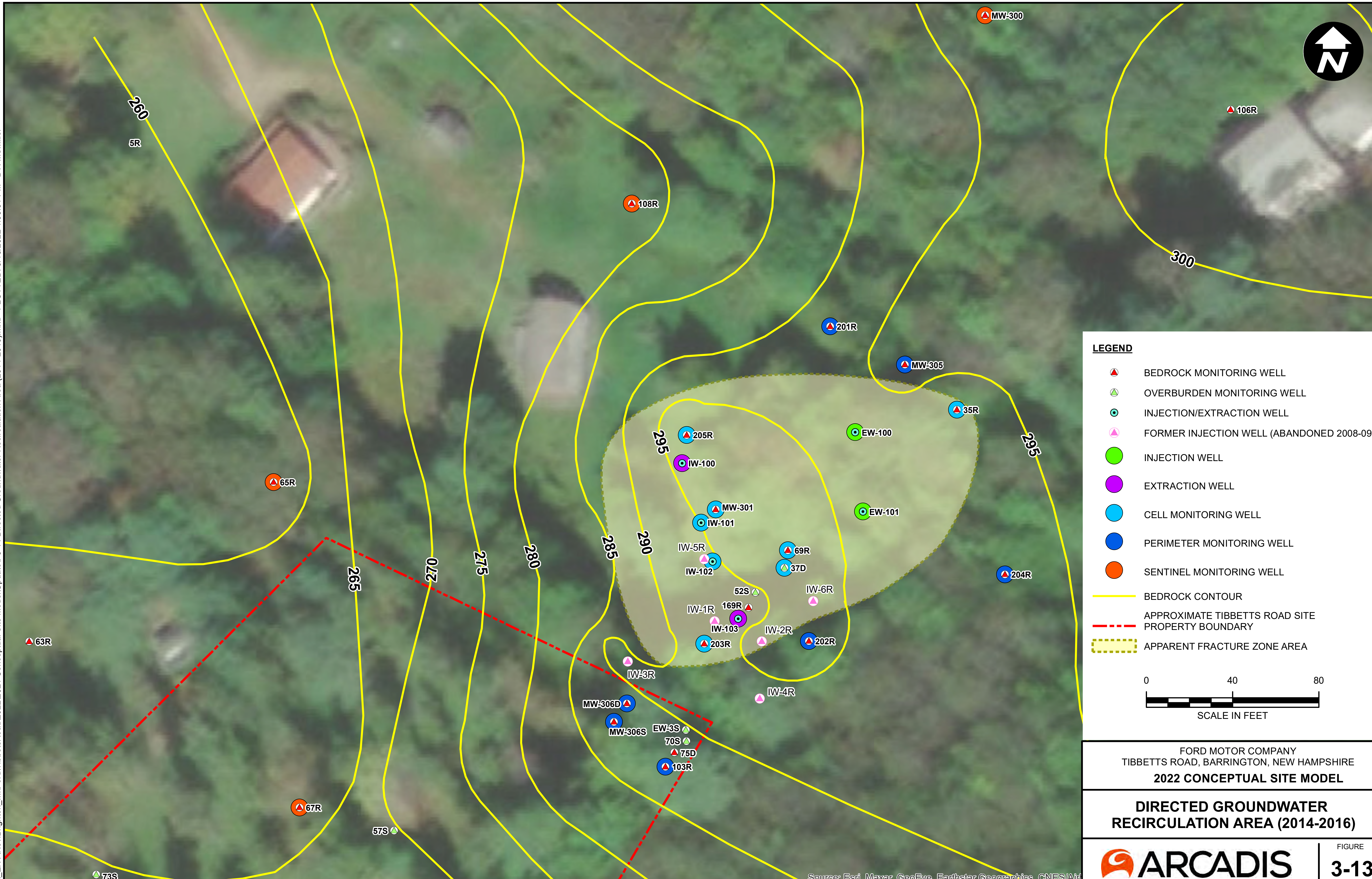
IN-SITU CHEMICAL OXIDATION AREA 2003-2006

ARCADIS

FIGURE

3-12

CITY: KNOXVILLE DIV: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
G:\GIS\Ford\TibbetsRoad\Documents_AnnualReport_2012\A16_ISCO_Area_2003-2006.mxd PLOTTED: 4/25/2013 5:33:32 PM BY: ASmith



FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE

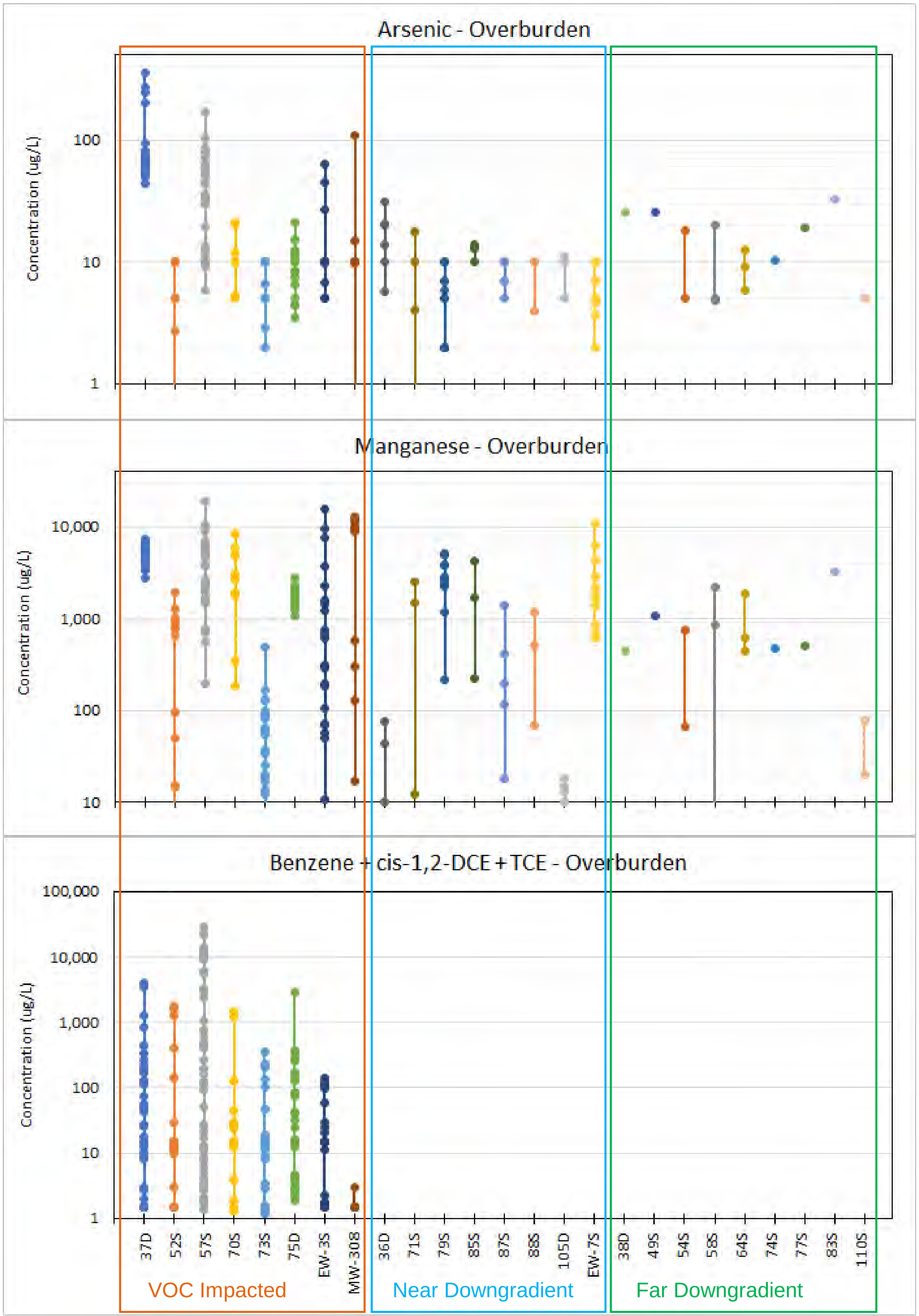
2022 CONCEPTUAL SITE MODEL

DIRECTED GROUNDWATER RECIRCULATION AREA (2014-2016)

ARCADIS

FIGURE
3-13

CITY: KNOXVILLE DIV: ENV DB: A.SMITH PIC: PM: TM: TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
T:_ENV\NoviBrighton_MI\Ford\TibbettsRoad\2022\2021 Conceptual Site Model\Update\F3-11 Directed Groundwater Recirculation Area (2014-2016).mxd PLOTTED: 3/18/2022 1:03:51 PM BY: MSMiller



Notes:
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

ARSENIC AND MANGANESE CONCENTRATIONS IN OVERBURDEN GROUNDWATER

ARCADIS

FIGURE
4-1

Notes:

* Wells denoted with asterisk include some elevated manganese concentrations likely influenced by permanganate ISCO injections.

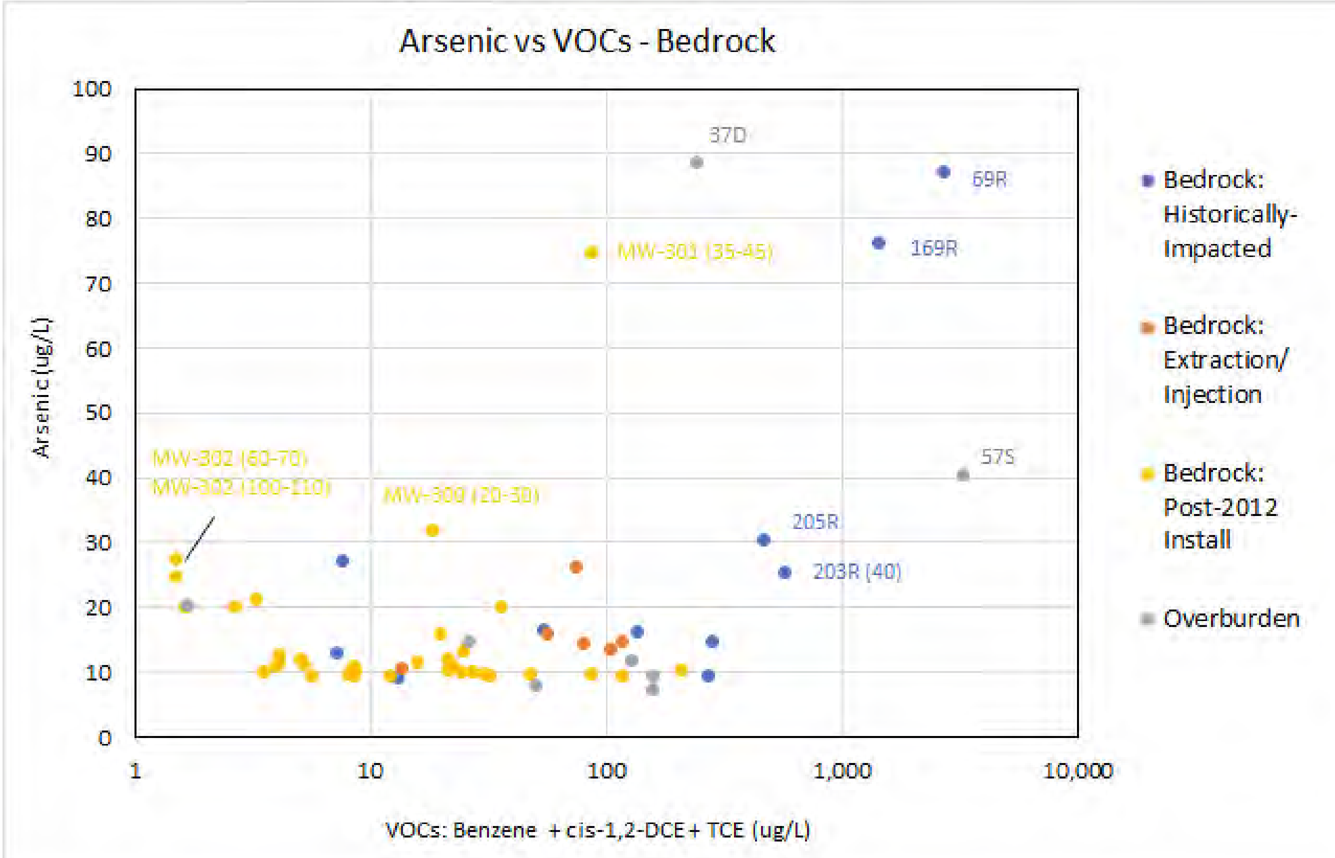
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

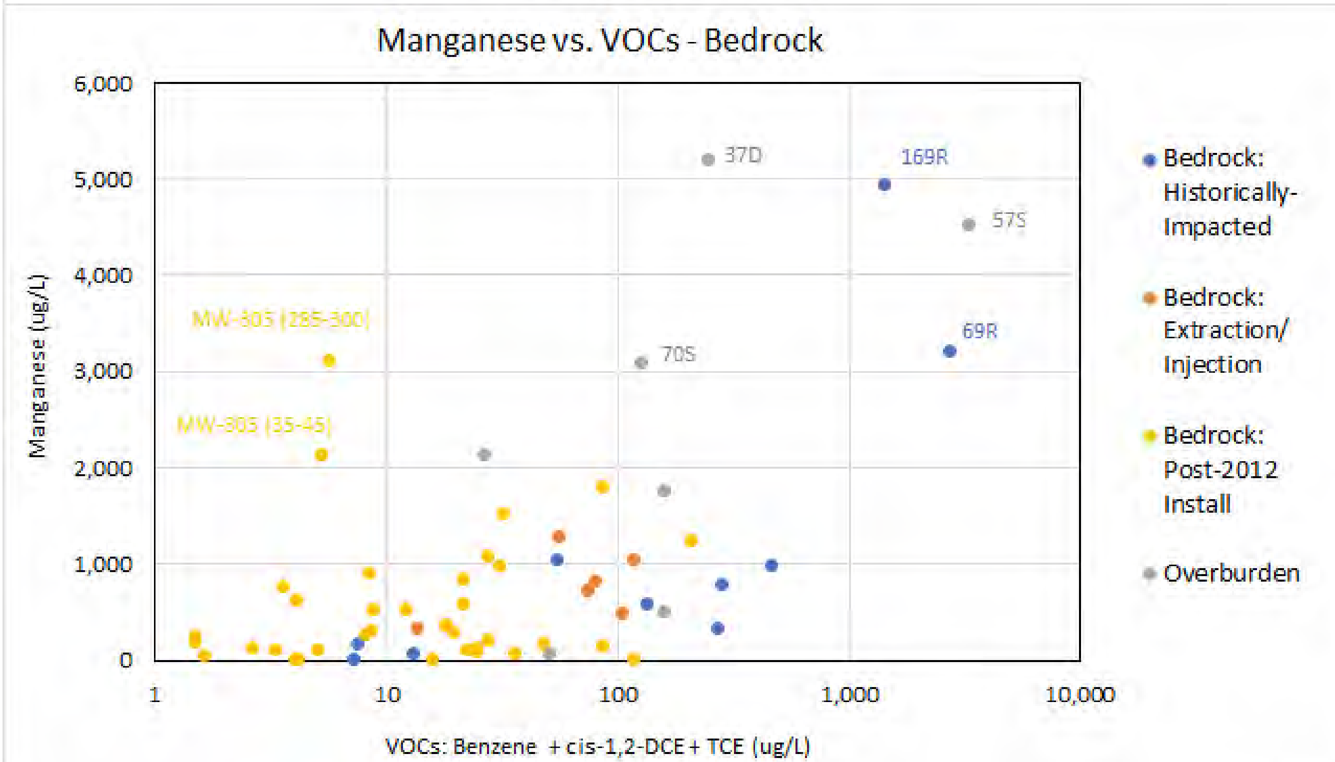
FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

ARSENIC AND MANGANESE CONCENTRATIONS IN VOC-IMPACTED BEDROCK GROUNDWATER

ARCADIS

FIGURE
4-2





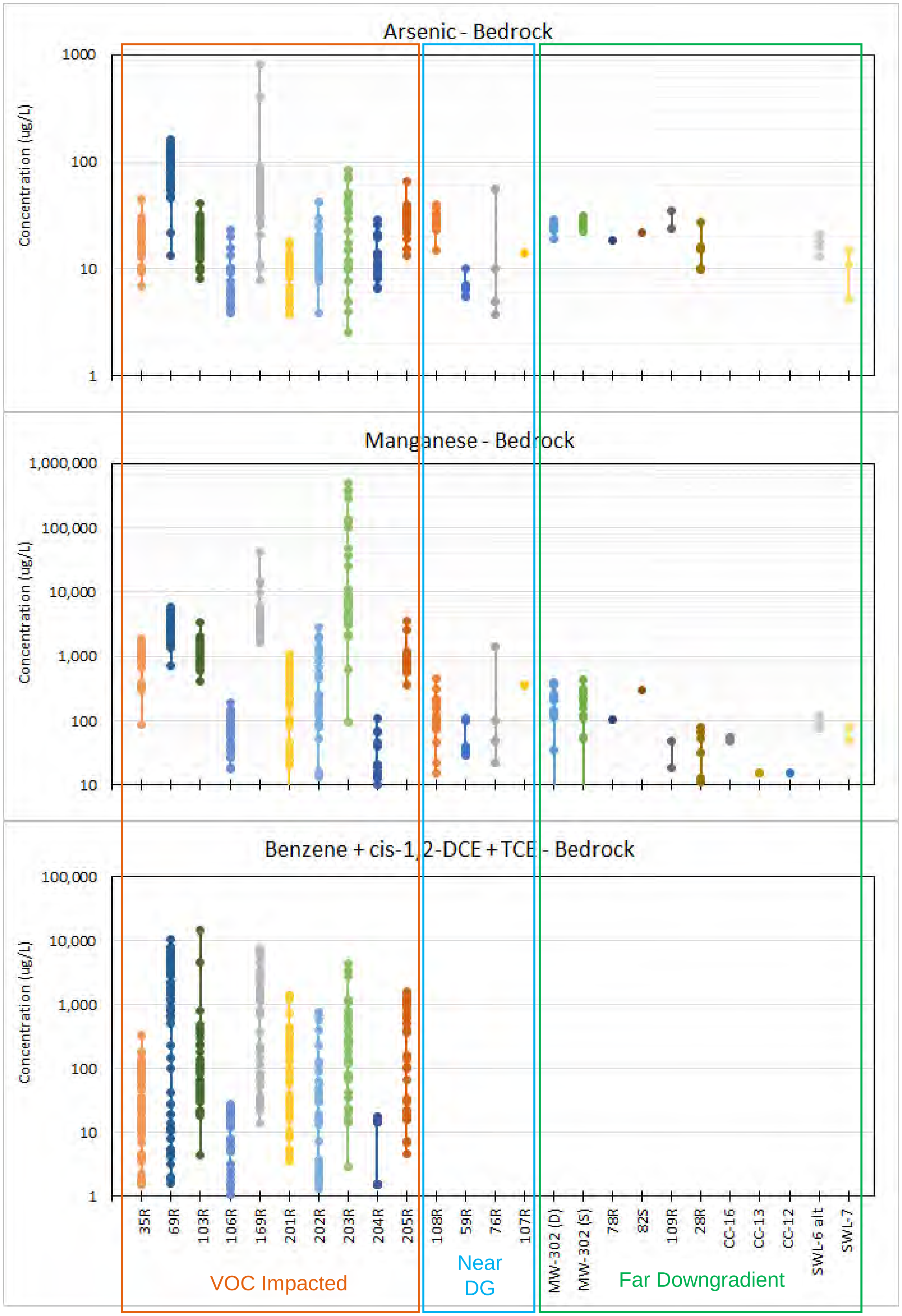
Notes:
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

AVERAGE ARSENIC AND MANGANESE VS. VOC CONCENTRATIONS OVERBURDEN AND BEDROCK

ARCADIS

FIGURE
4-3



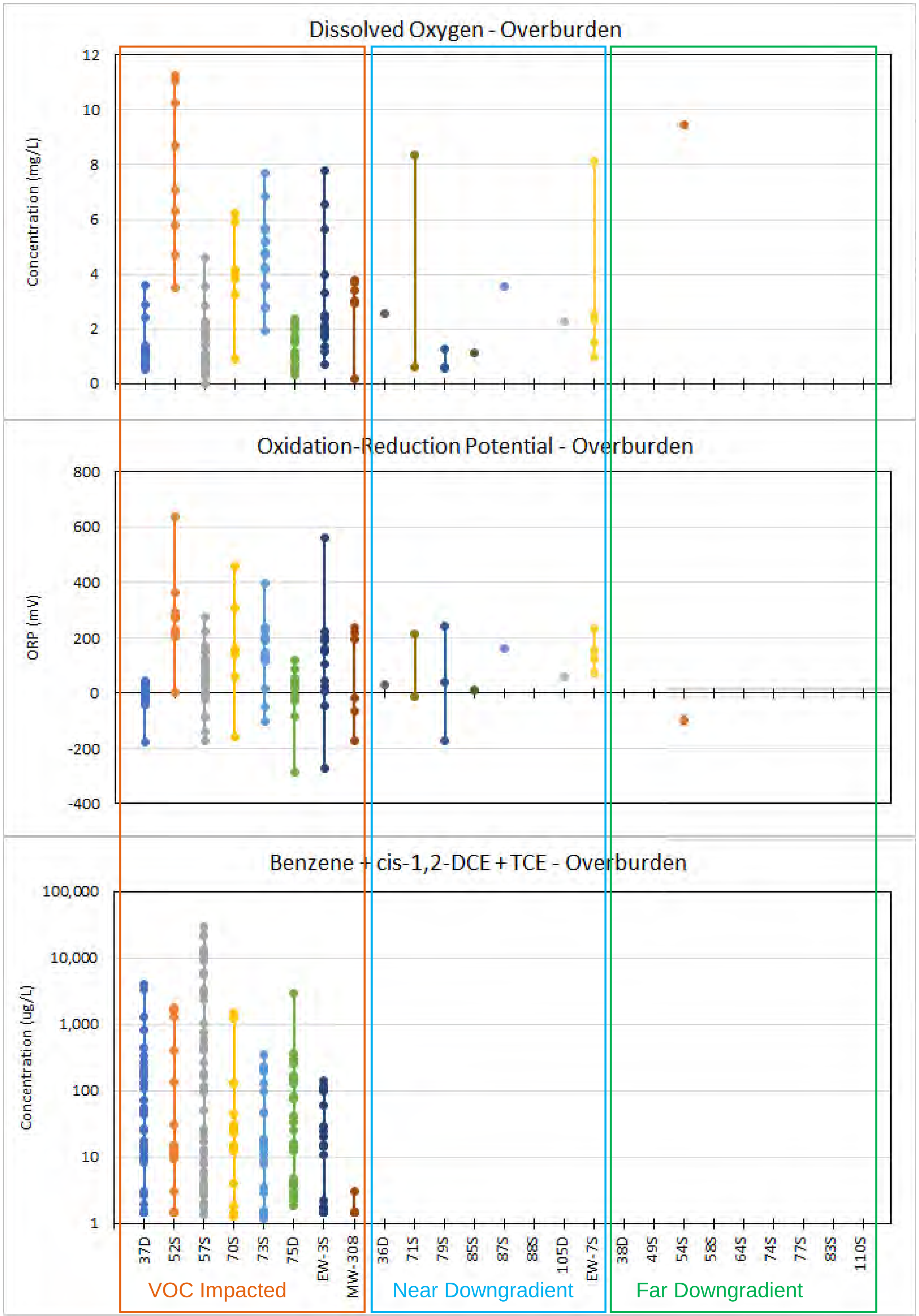
FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

ARSENIC AND MANGANESE IN VOC-IMPACTED AND UNIMPACTED BEDROCK GROUNDWATER

ARCADIS

FIGURE
4-4

Notes:
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.



Notes:
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

DO AND ORP IN OVERBURDEN GROUNDWATER

ARCADIS

FIGURE
4-5

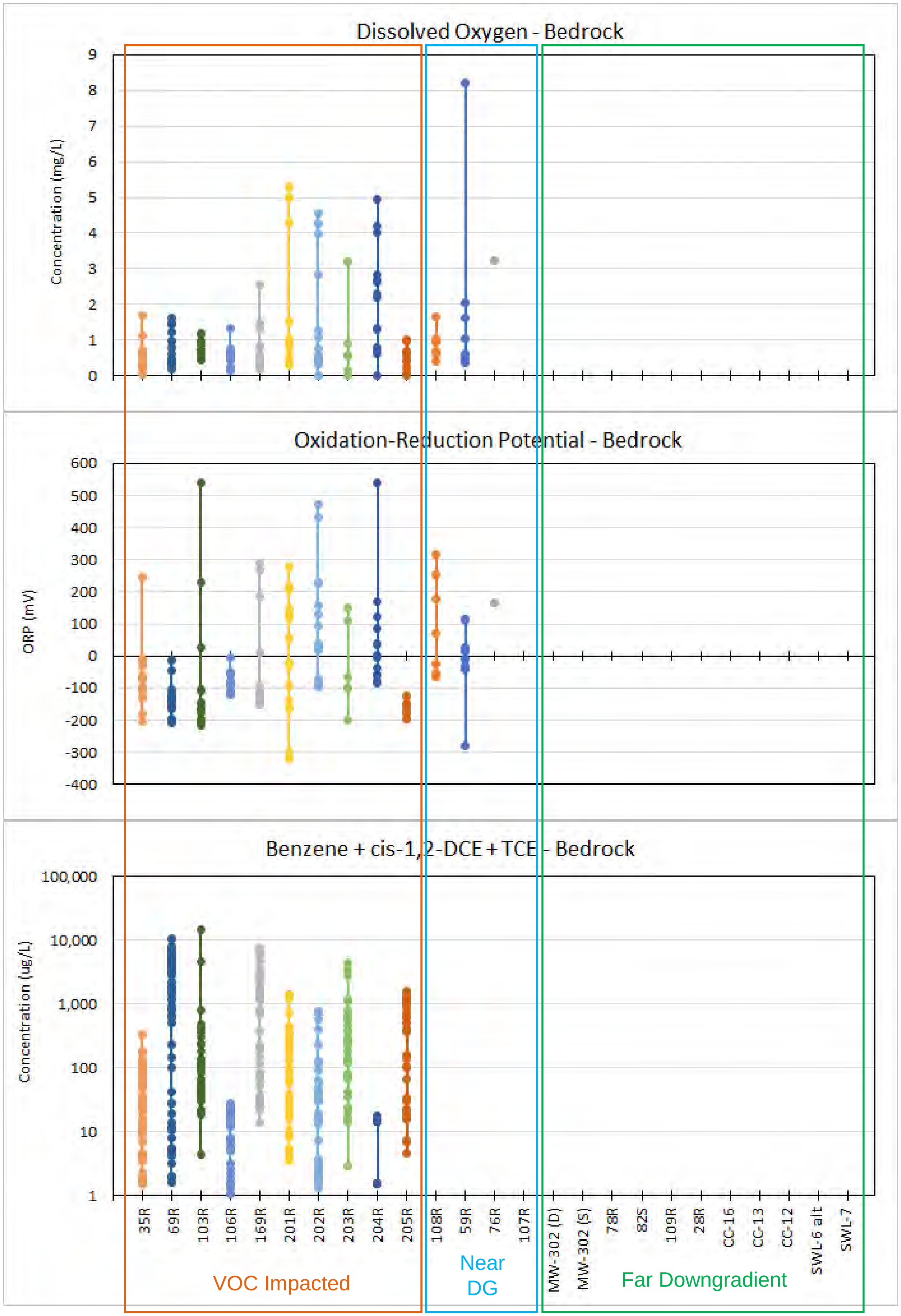
Notes:
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

DO AND ORP IN VOC-IMPACTED BEDROCK GROUNDWATER

ARCADIS

FIGURE
4-6



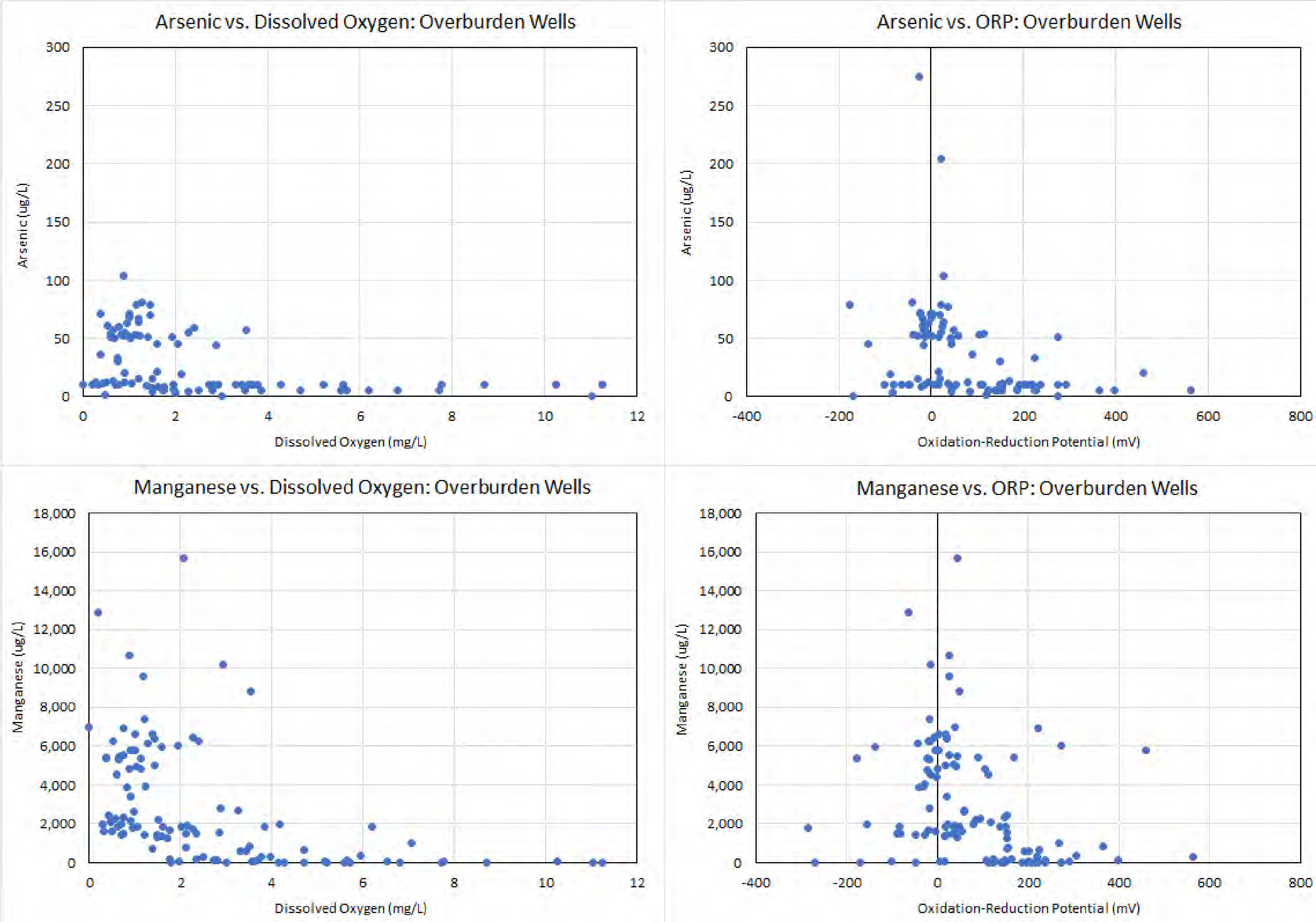
Notes:
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

DO AND ORP IN VOC-IMPACTED AND UNIMPACTED BEDROCK GROUNDWATER

ARCADIS

FIGURE
4-7



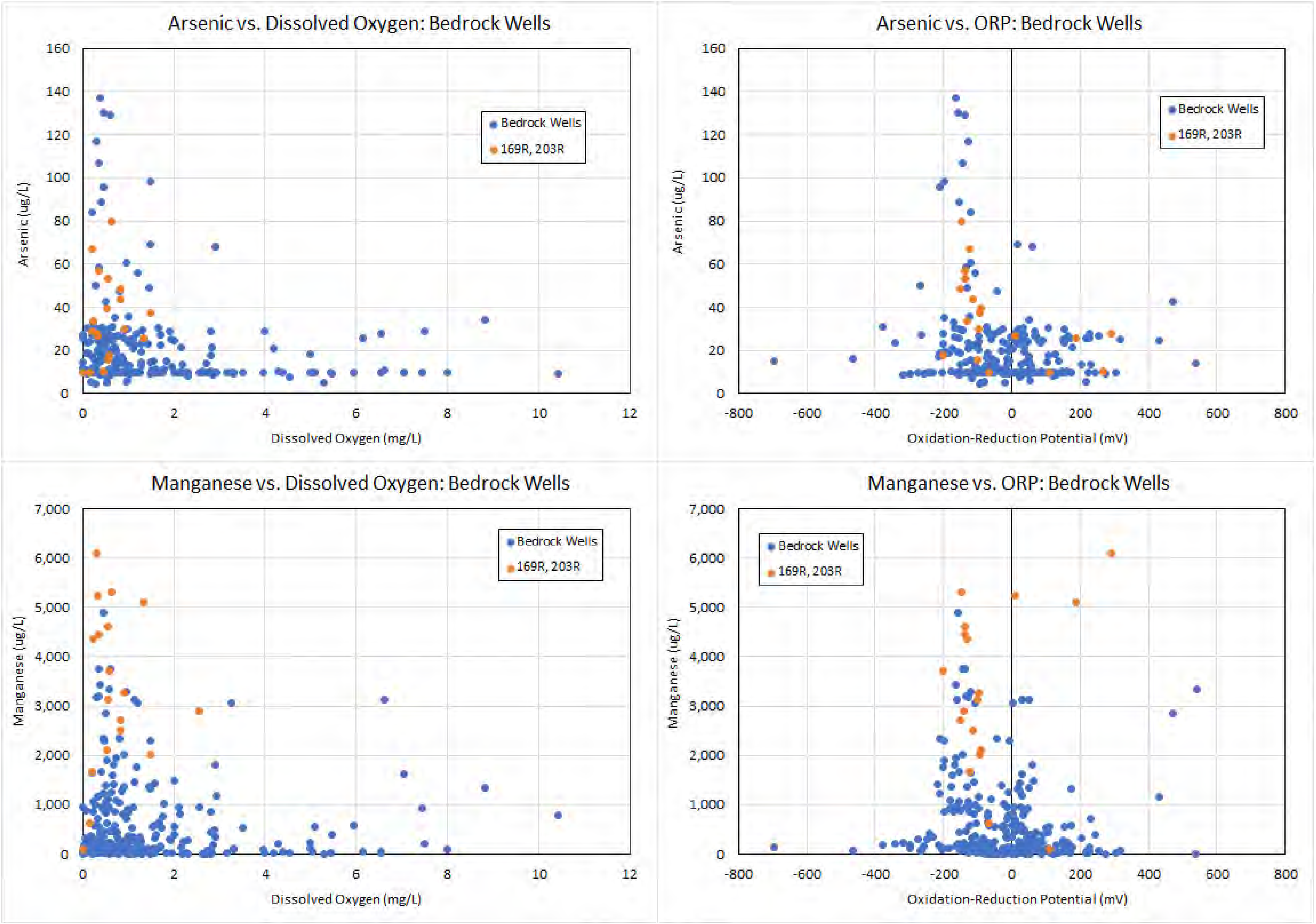
Notes:
Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

ARSENIC AND MANGANESE VS. REDOX PARAMETERS – OVERBURDEN GROUNDWATER

ARCADIS

FIGURE
4-8



Notes:

Non-detect concentrations have been plotted at the laboratory reporting limit applicable at the time of sampling.

FORD MOTOR COMPANY
TIBBETTS ROAD, BARRINGTON, NEW HAMPSHIRE
2022 CONCEPTUAL SITE MODEL

ARSENIC AND MANGANESE VERSUS REDOX PARAMETERS – BEDROCK GROUNDWATER

ARCADIS

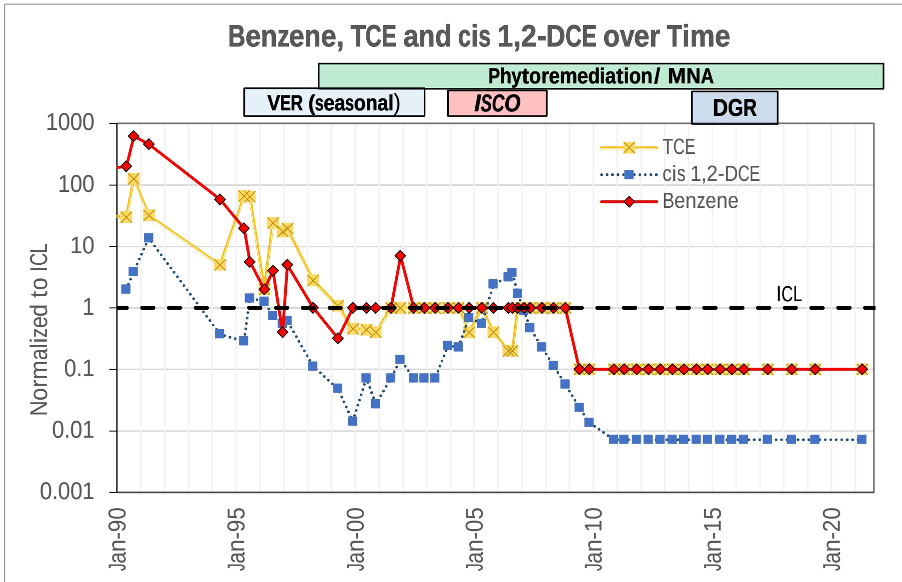
FIGURE
4-9

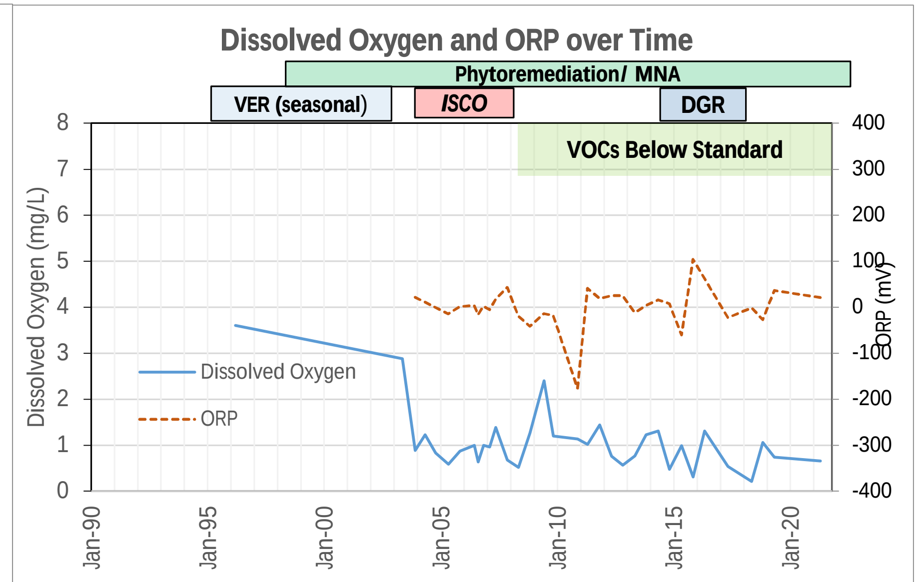
Appendix A

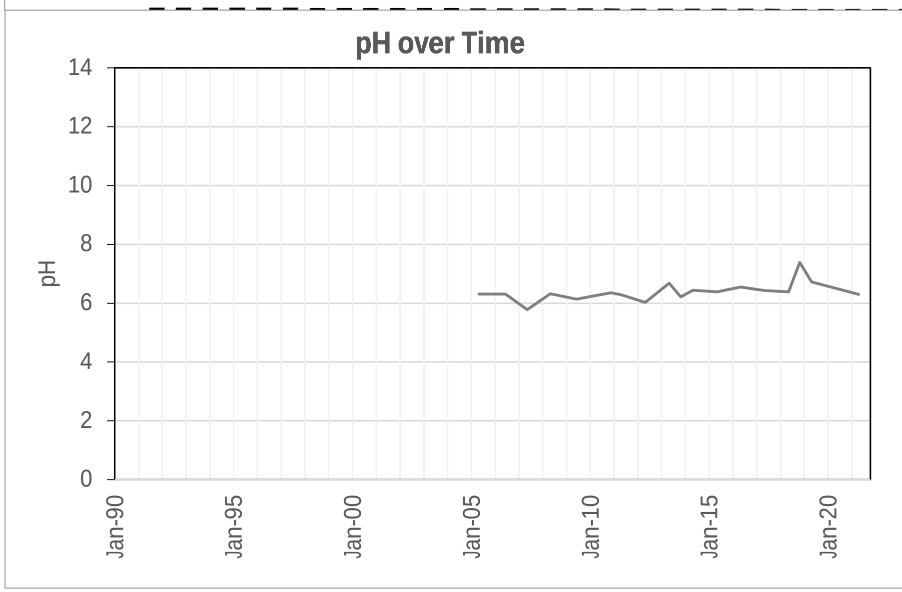
Concentration Trend Charts of VOCs, Field Parameters, and Arsenic/Manganese for Select Wells

Appendix A

Figure A-1 - Monitoring Well 37D Trend Charts







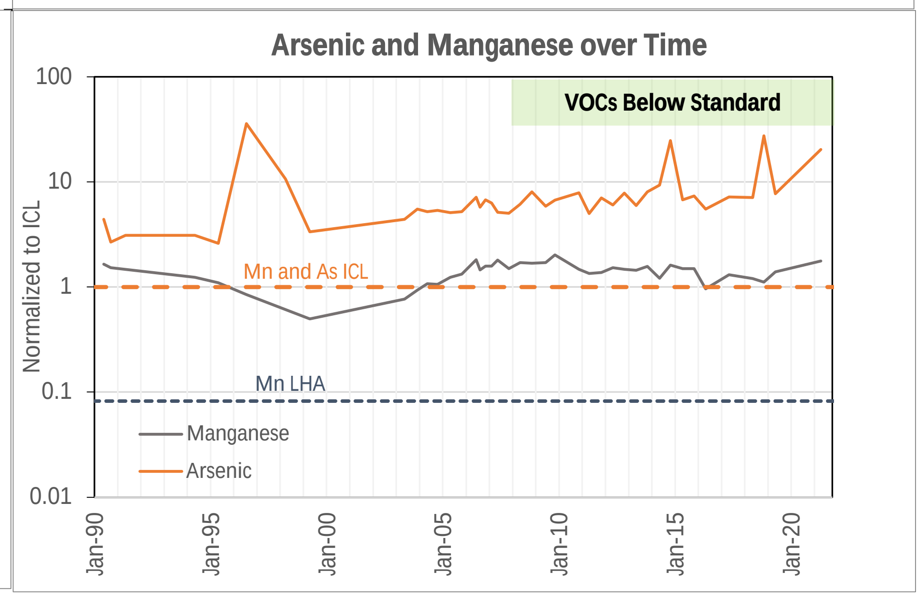
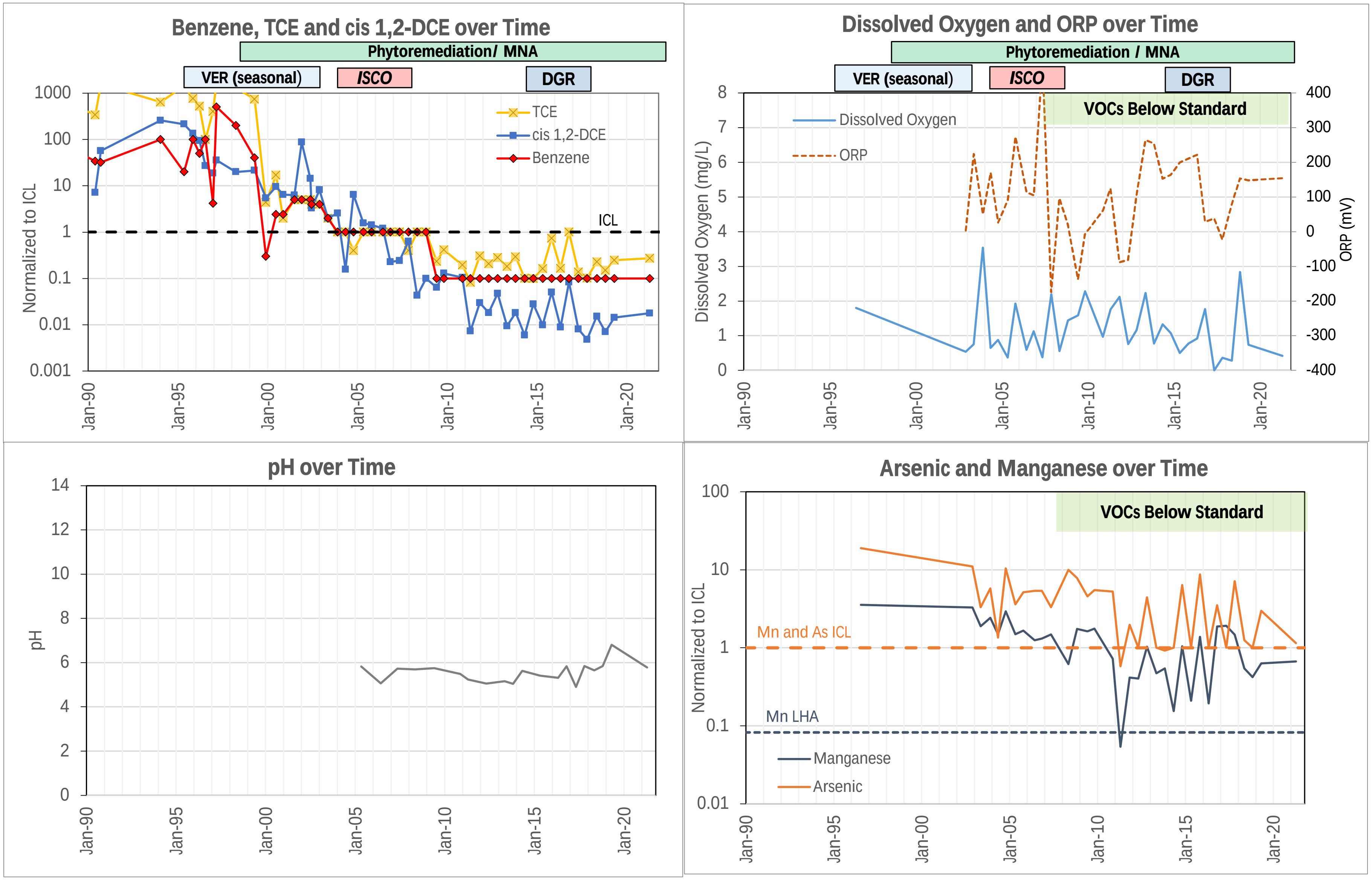
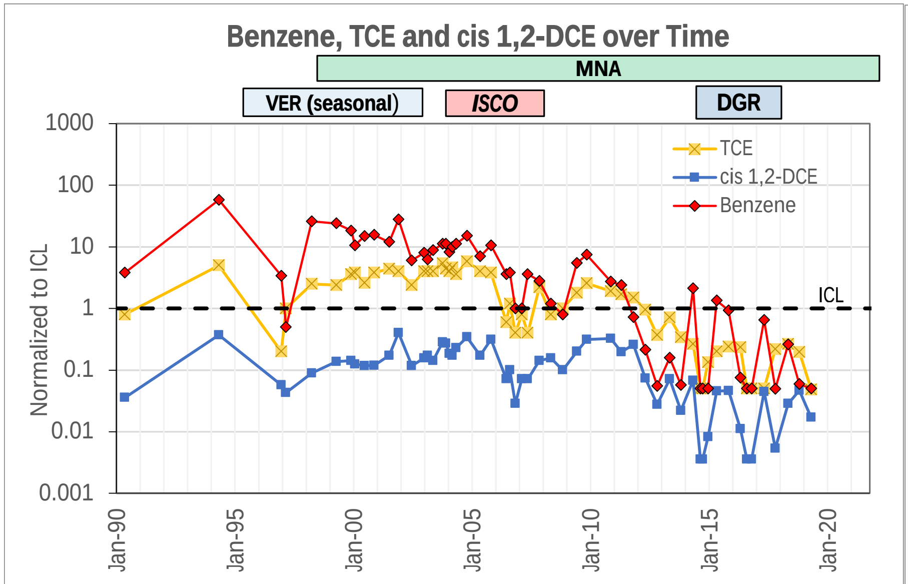


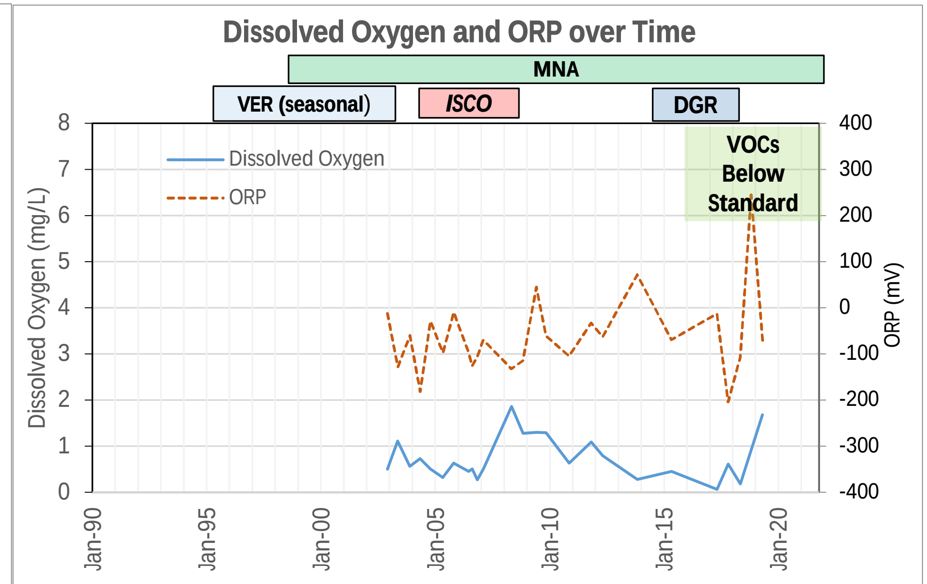
Figure A-2 - Monitoring Well 57S Trend Charts

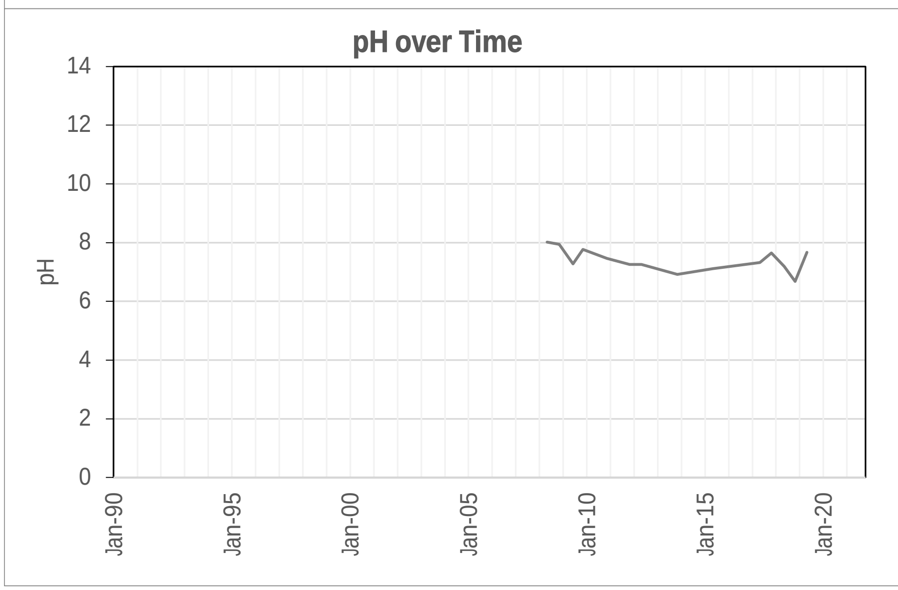


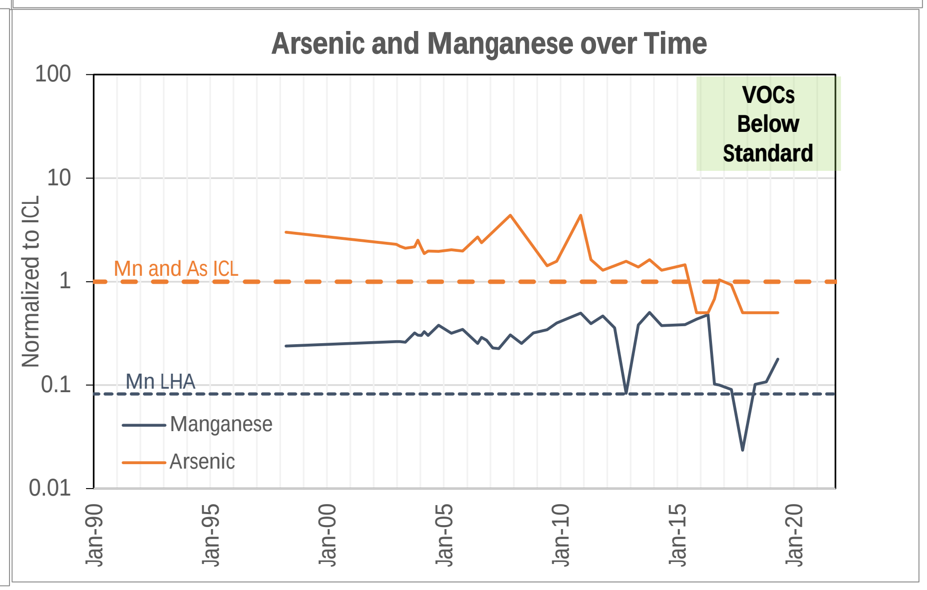
Appendix A

Figure A-3 - Monitoring Well 35R Trend Charts



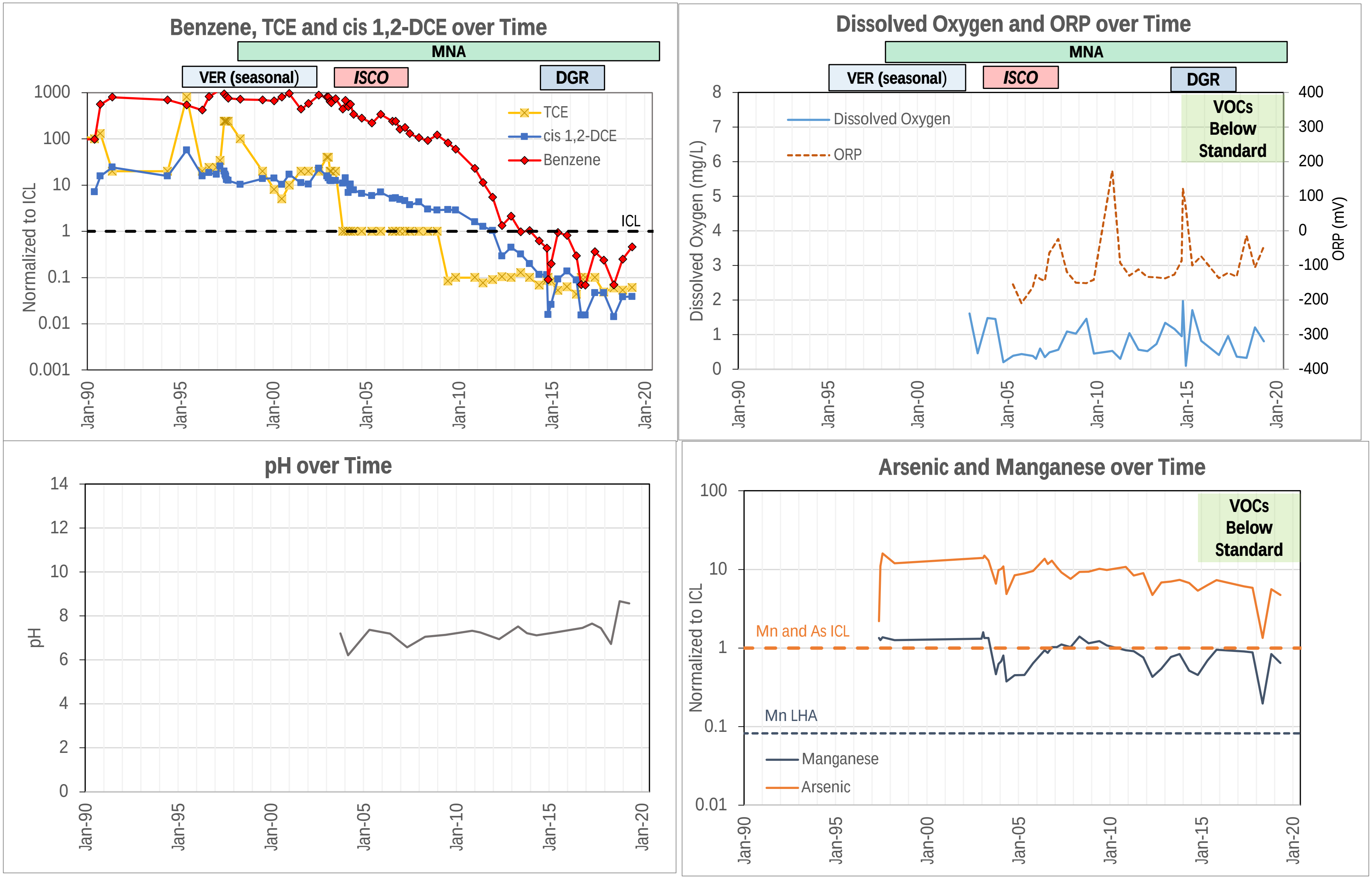






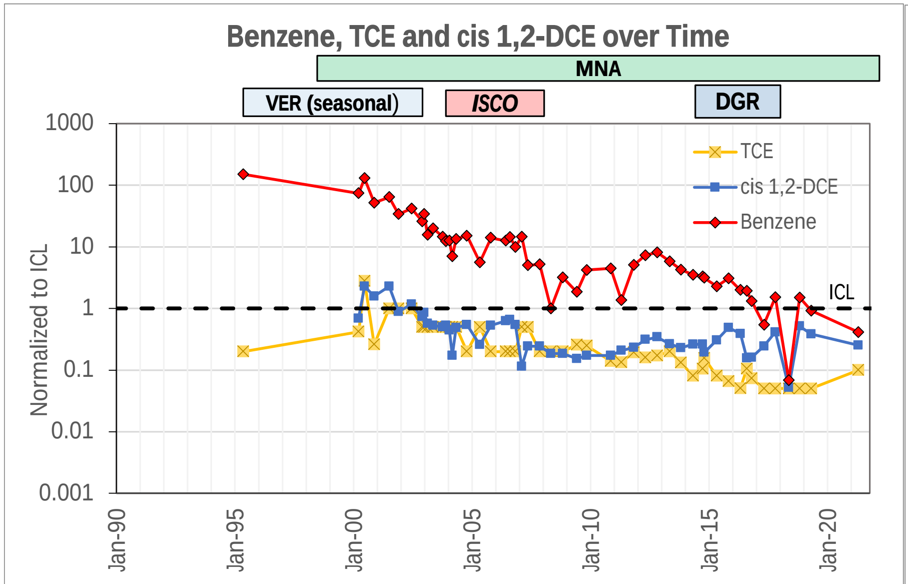
Appendix A

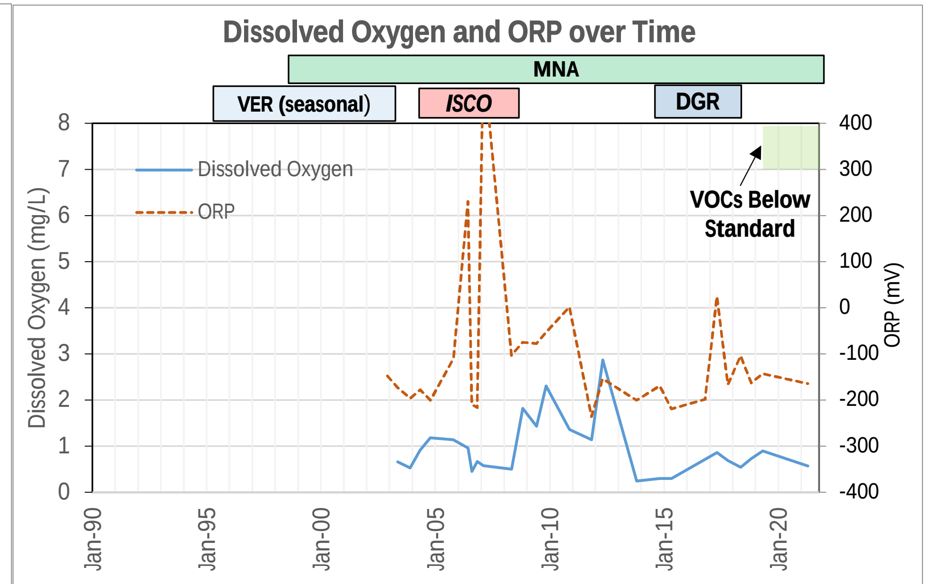
Figure A-4 - Monitoring Well 69R Trend Charts

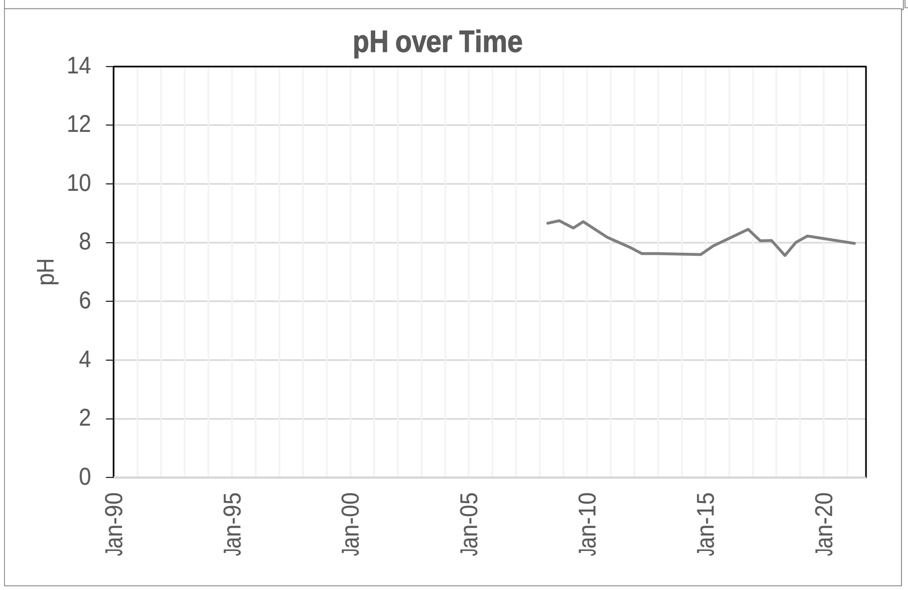


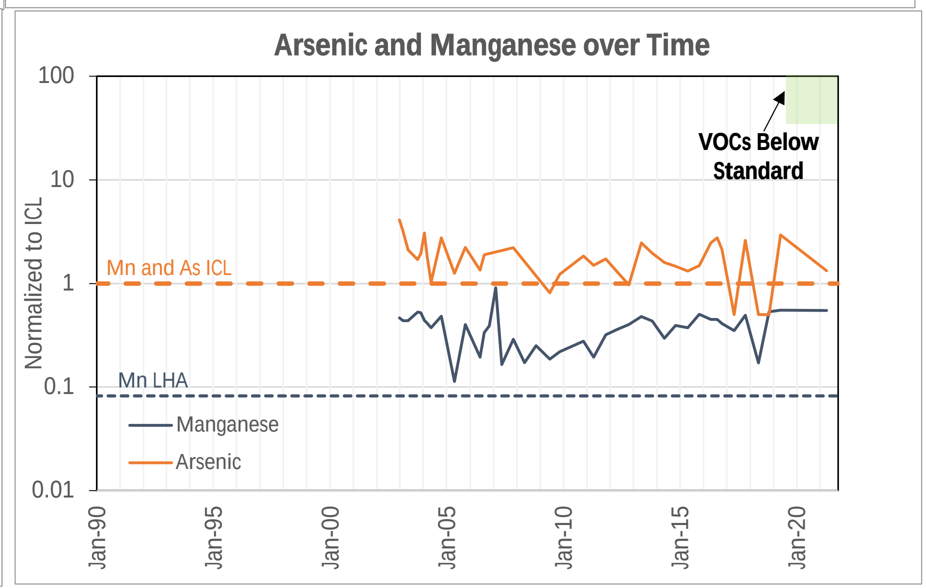
Appendix A

Figure A-5 - Monitoring Well 103R Trend Charts



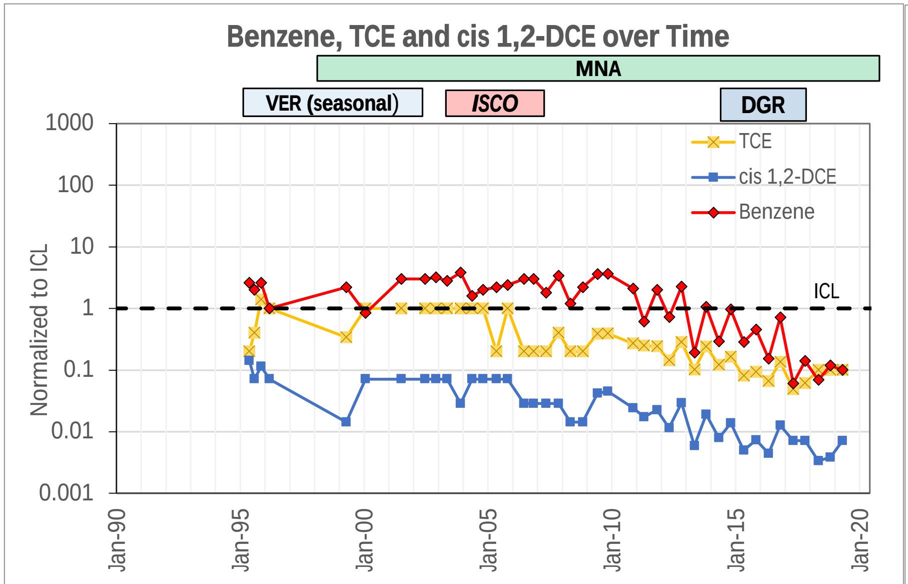


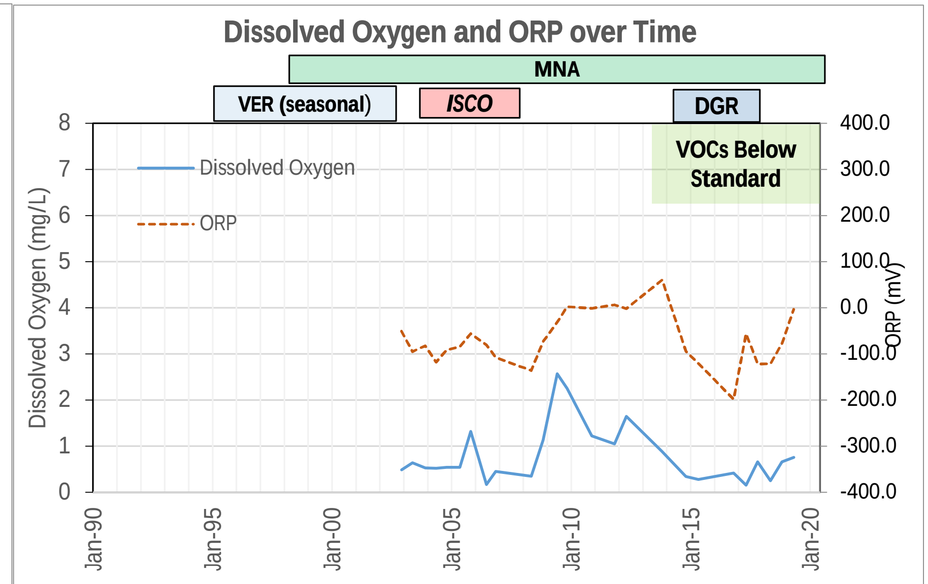


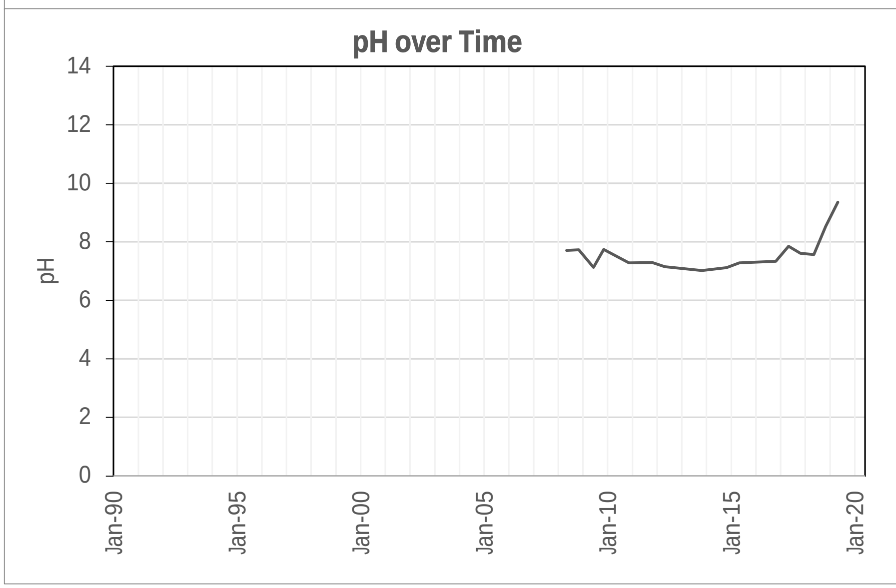


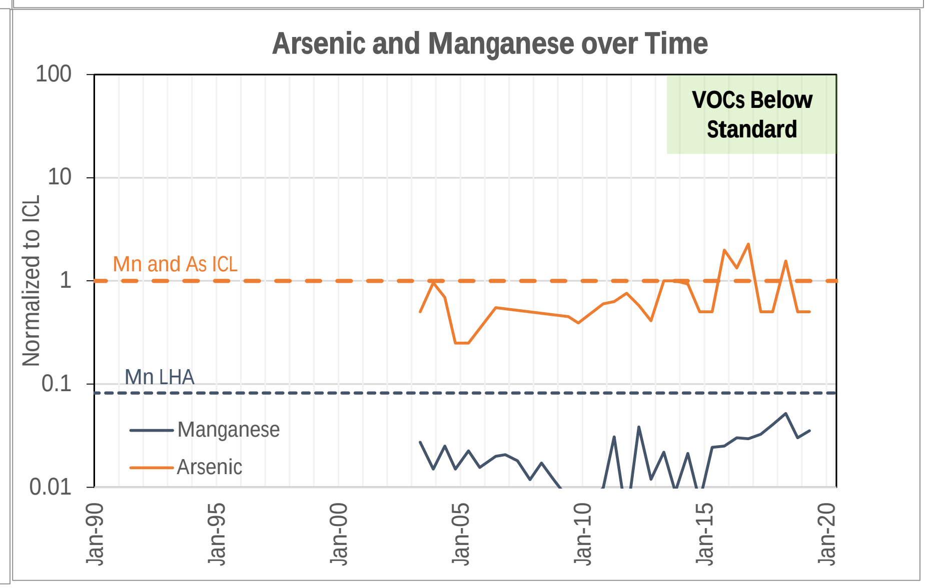
Appendix A

Figure A-6 - Monitoring Well 106R Trend Charts



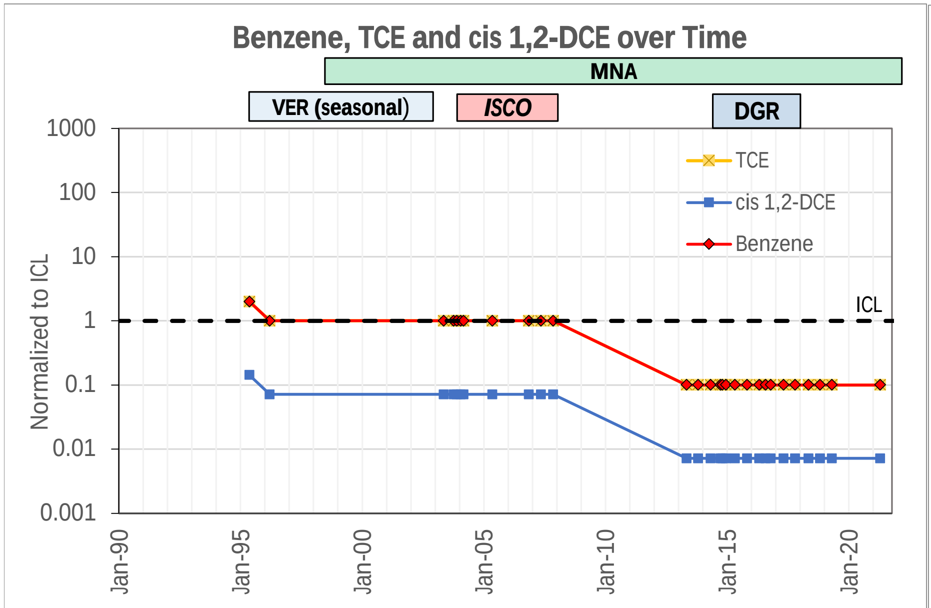


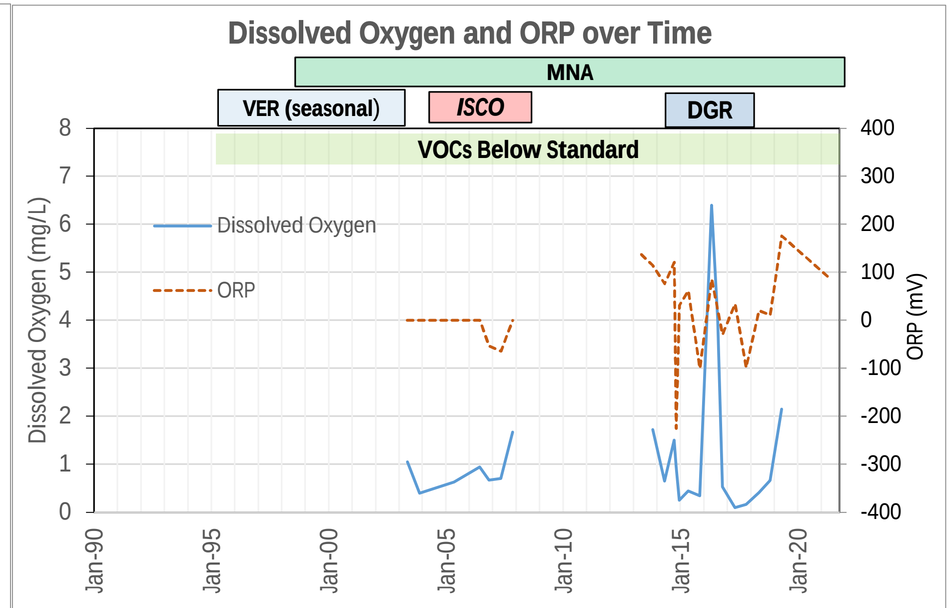


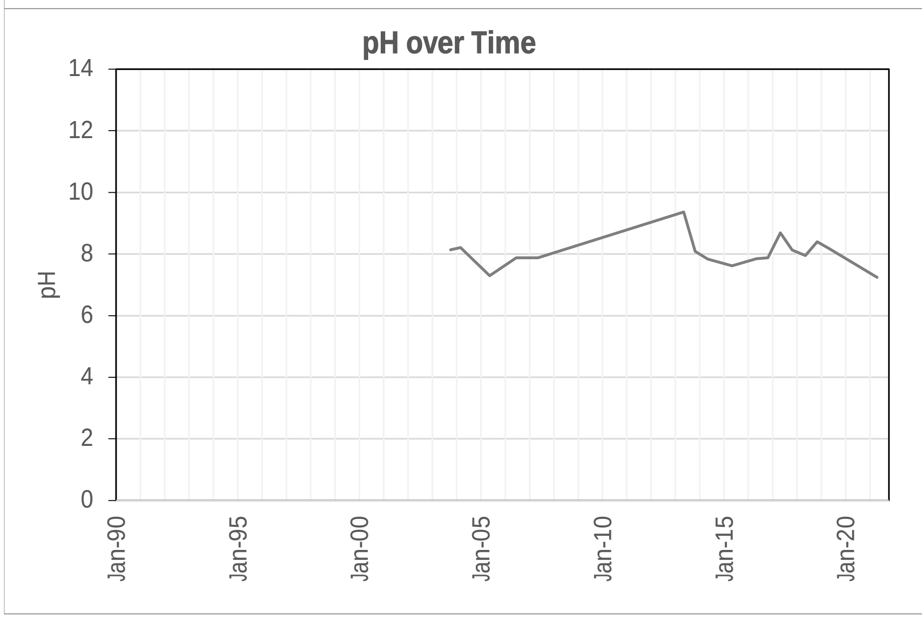


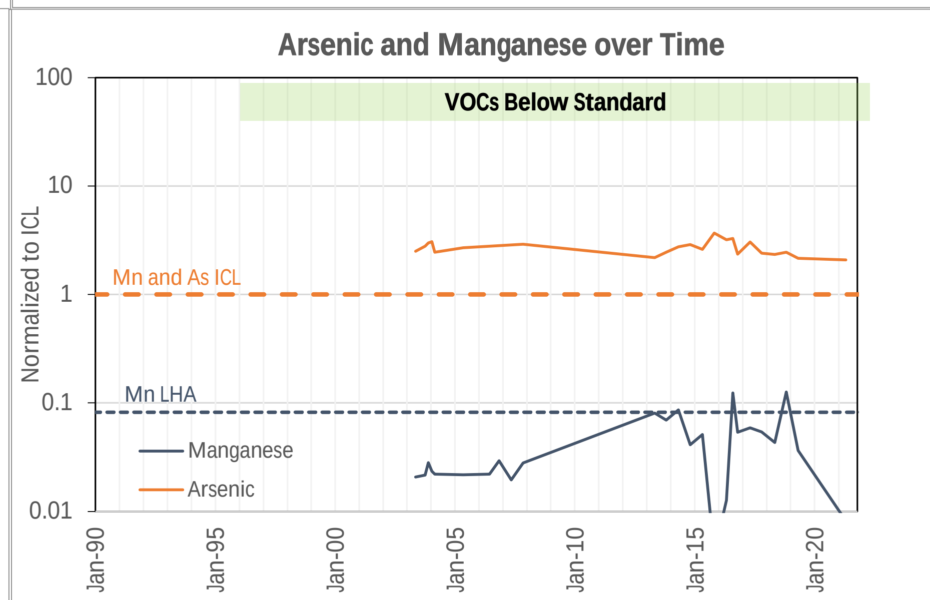
Appendix A

Figure A-7 - Monitoring Well 108R Trend Charts



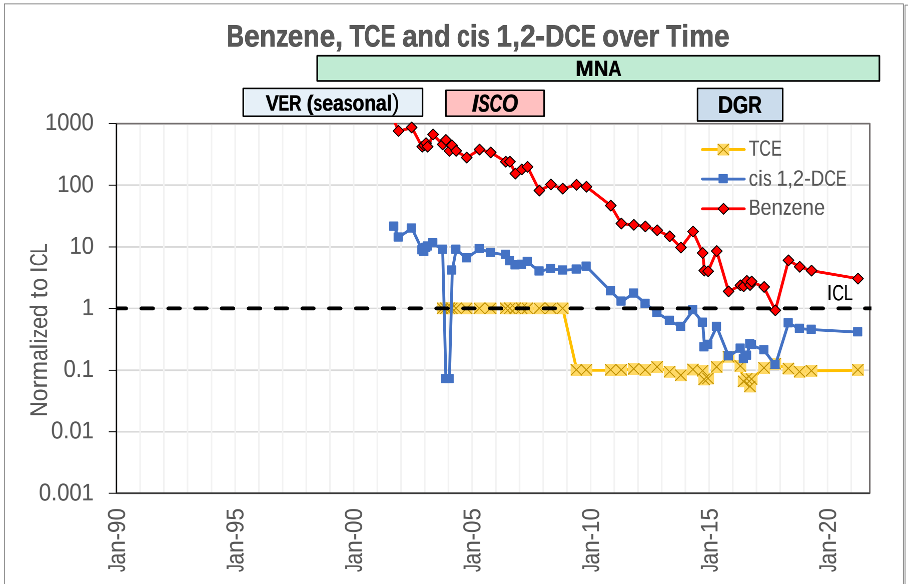


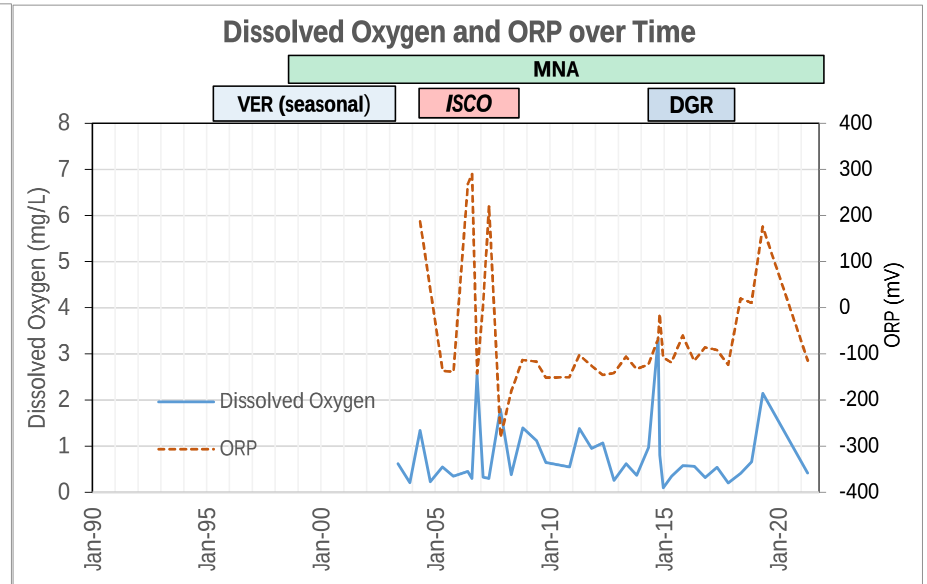


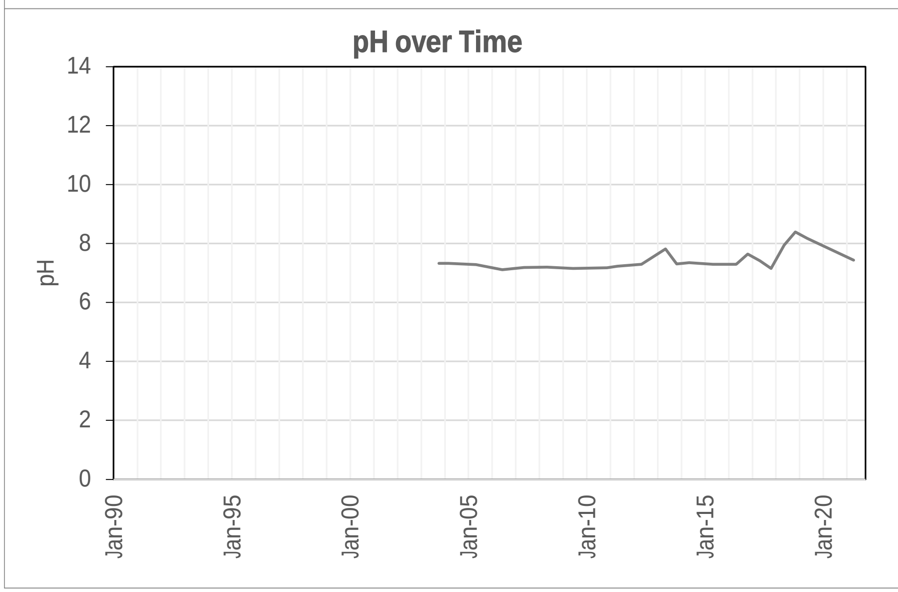


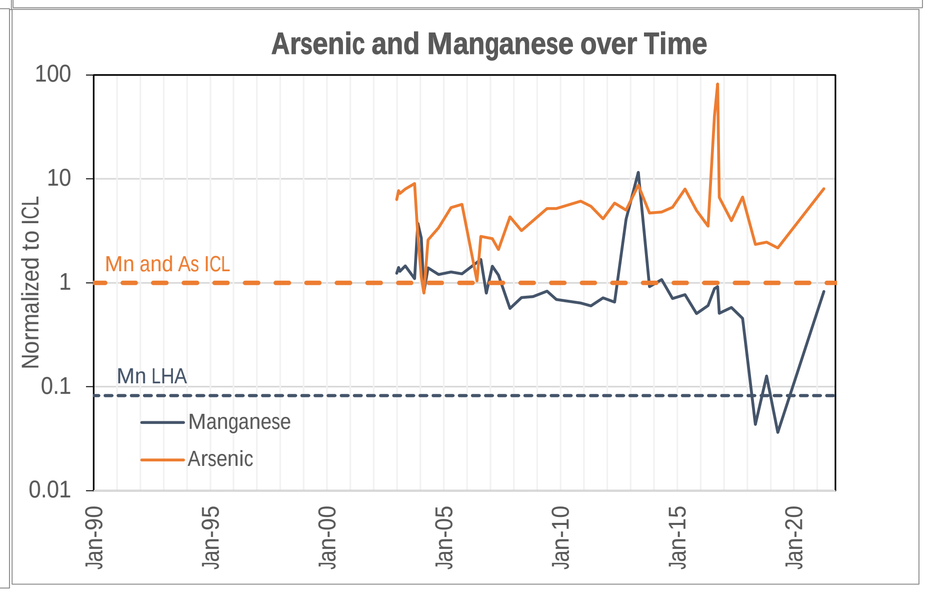
Appendix A

Figure A-8 - Monitoring Well 169R Trend Charts



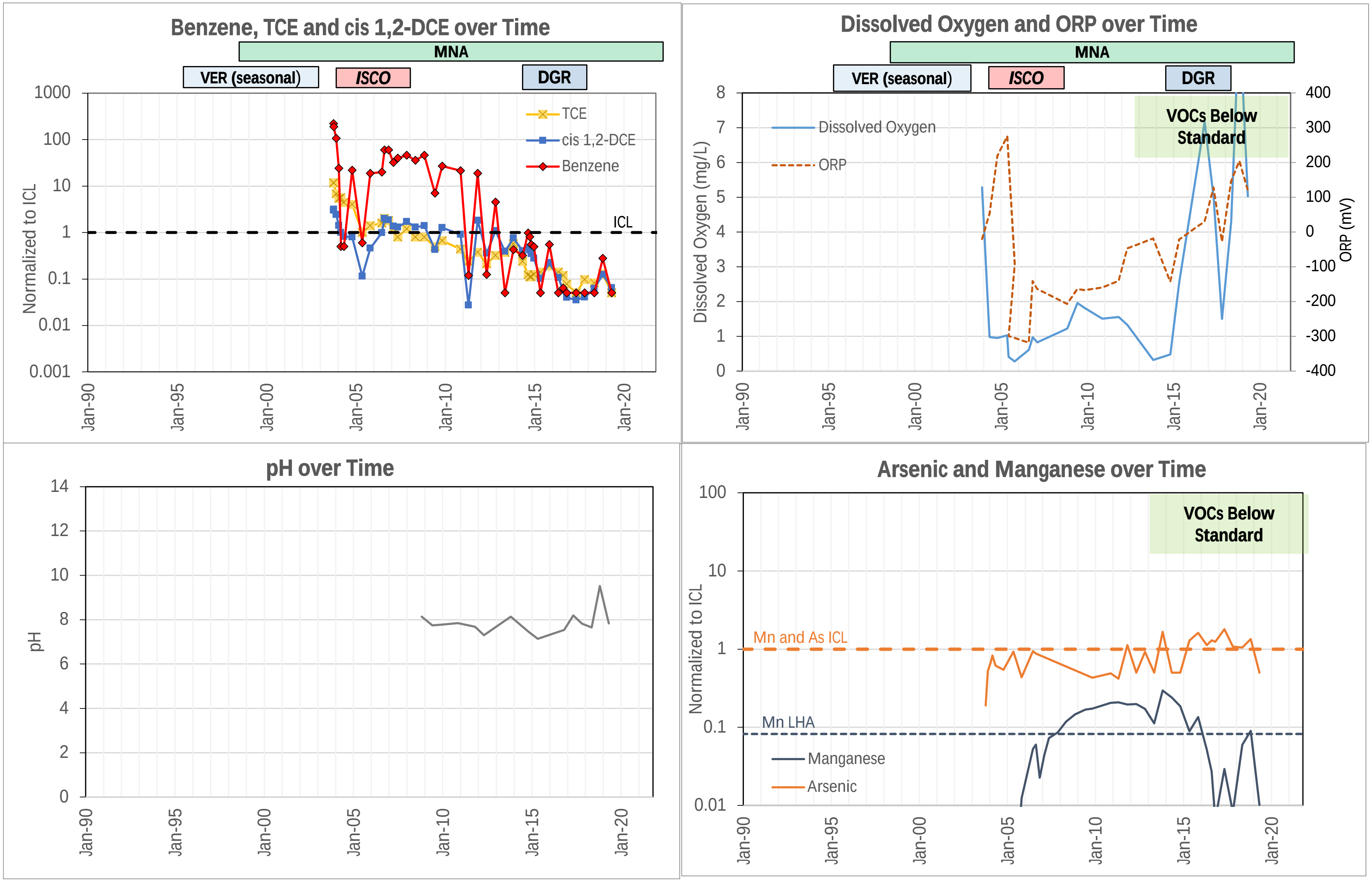






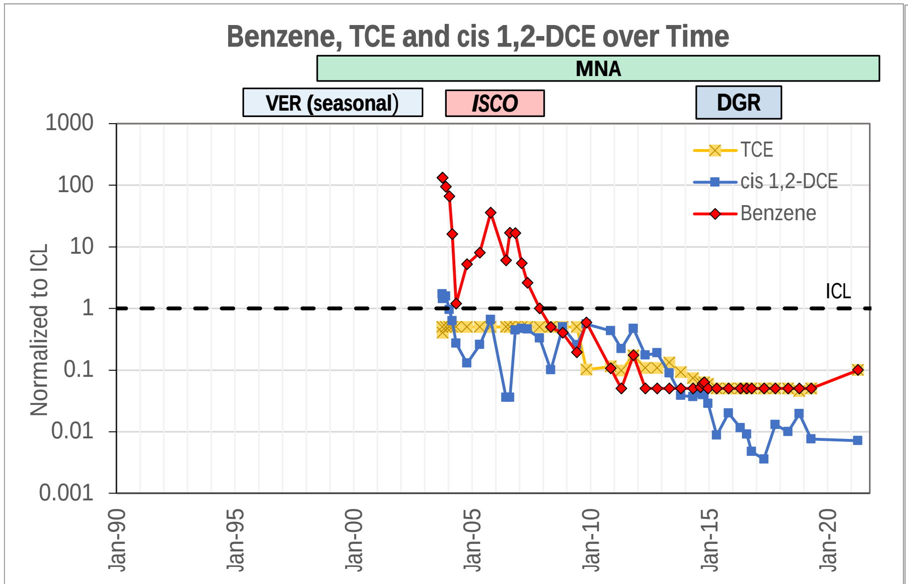
Appendix A

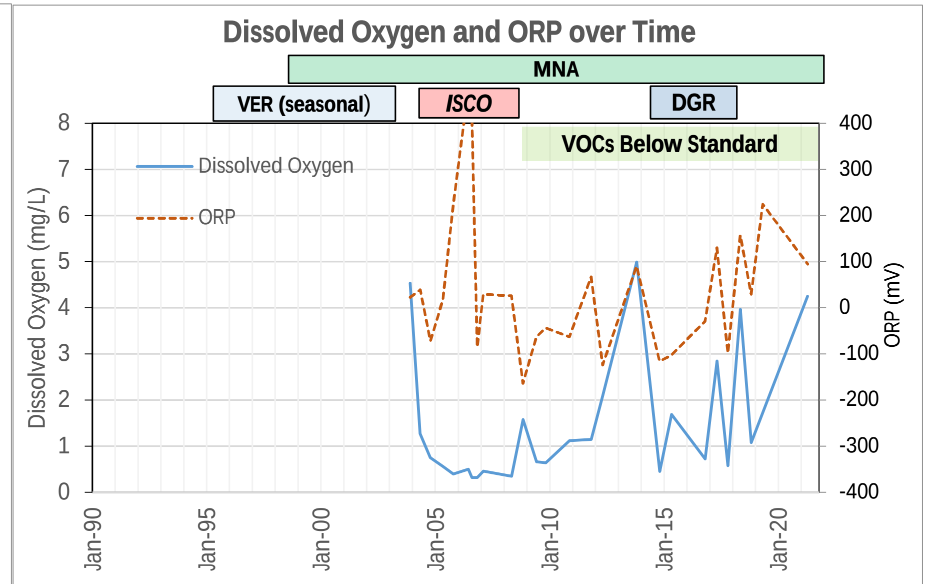
Figure A-9 - Monitoring Well 201R Trend Charts

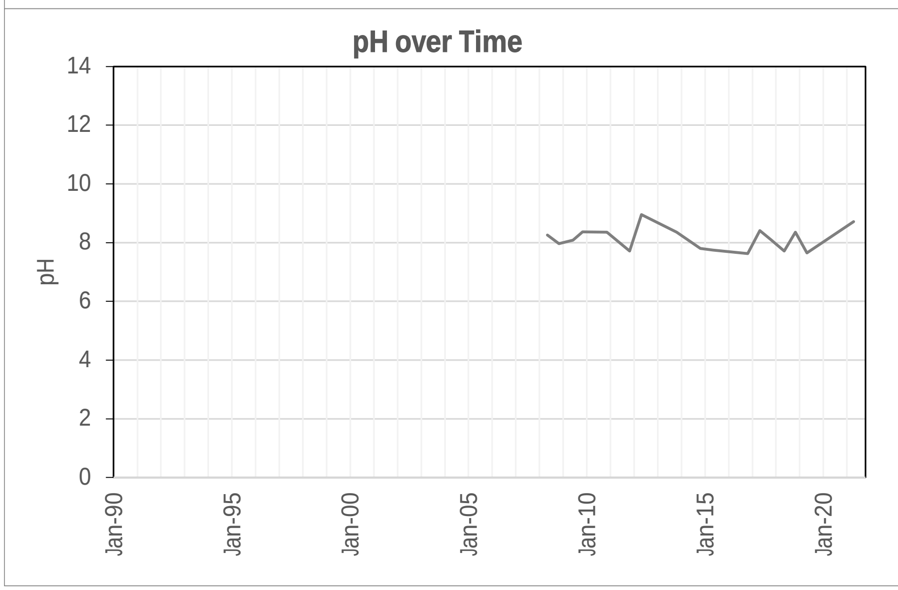


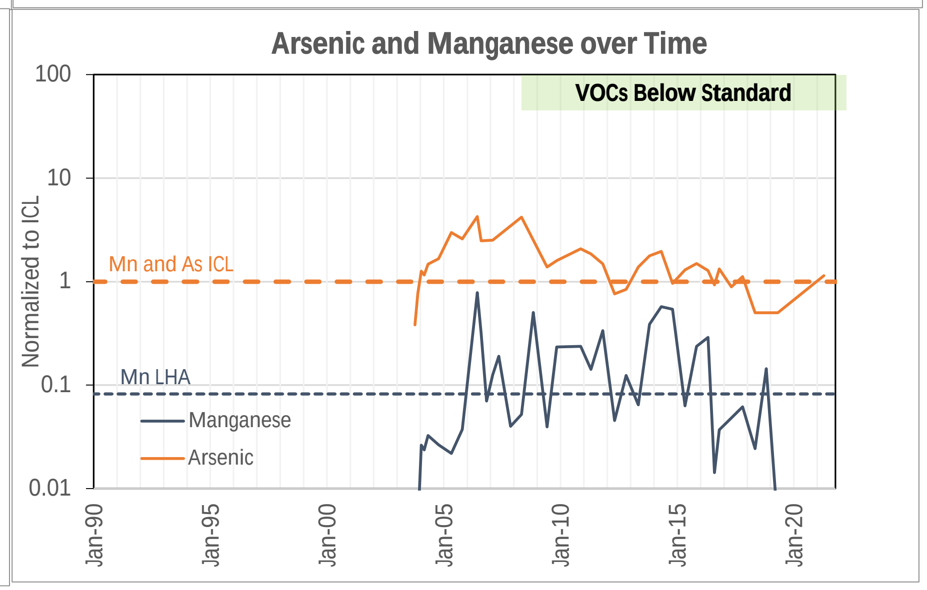
Appendix A

Figure A-10 - Monitoring Well 202R Trend Charts



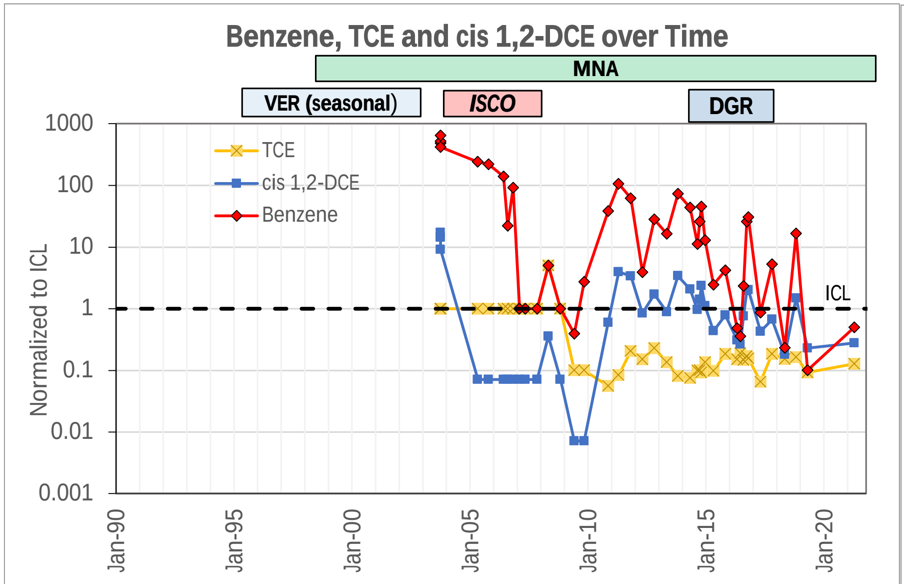


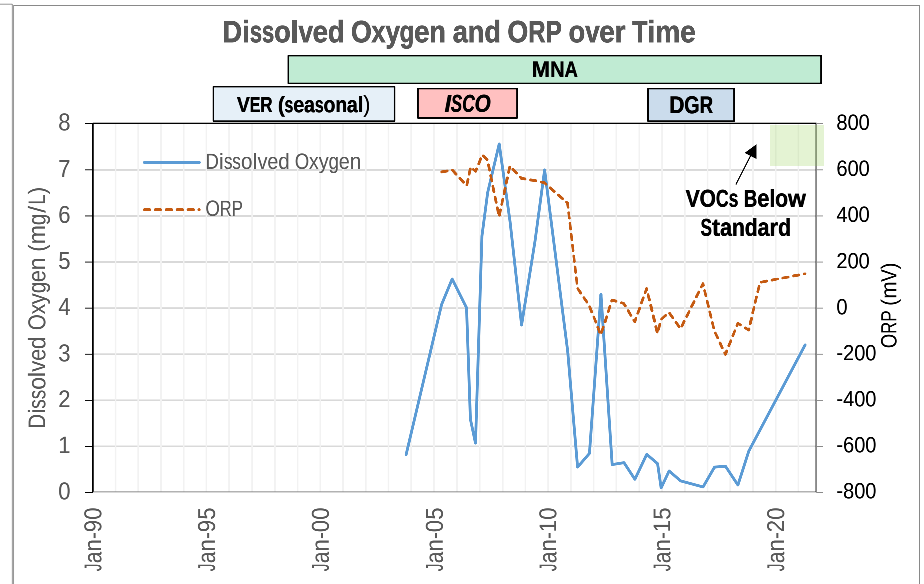


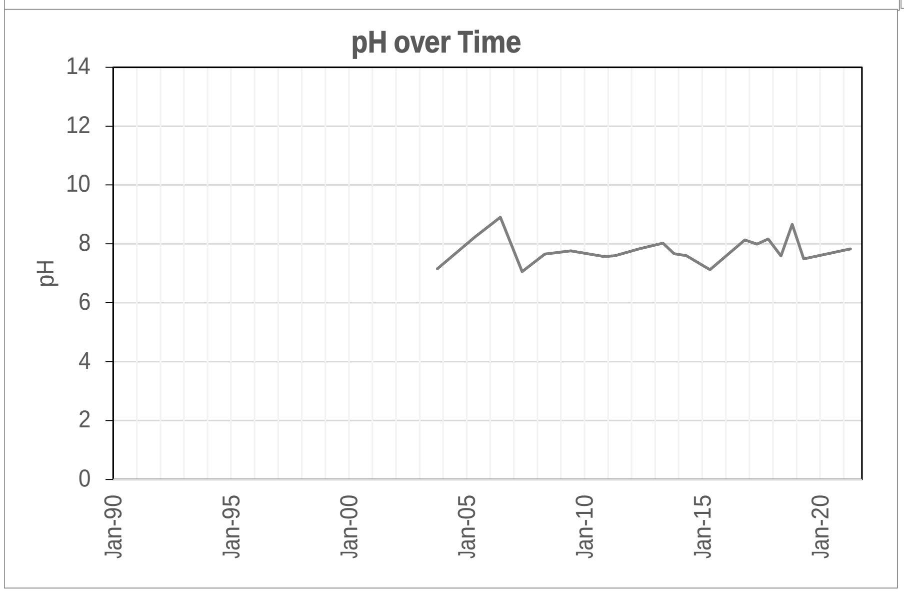


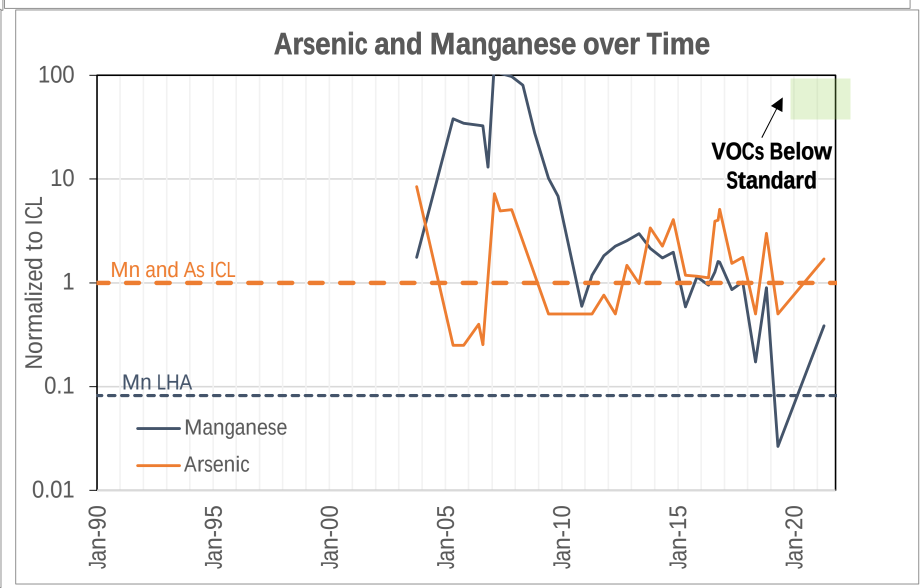
Appendix A

Figure A-11 - Monitoring Well 203R Trend Charts



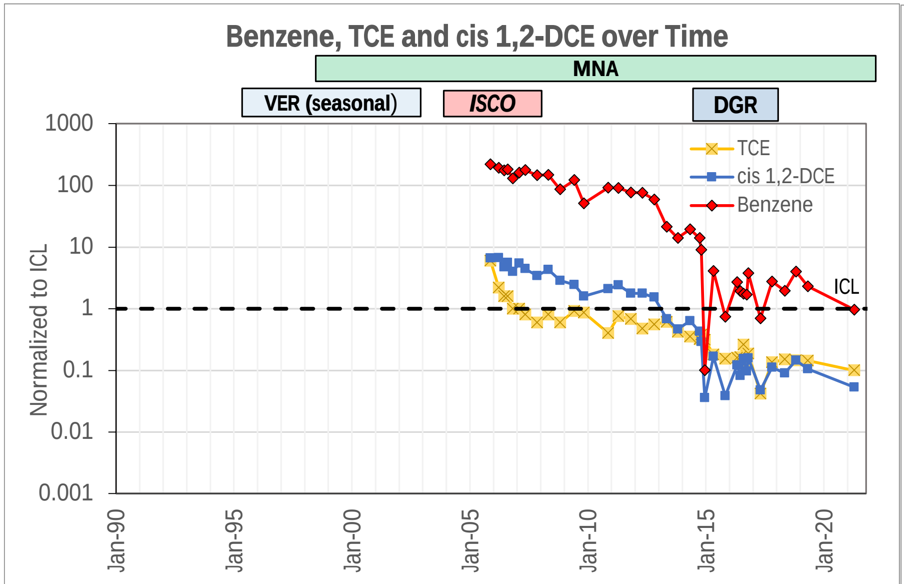


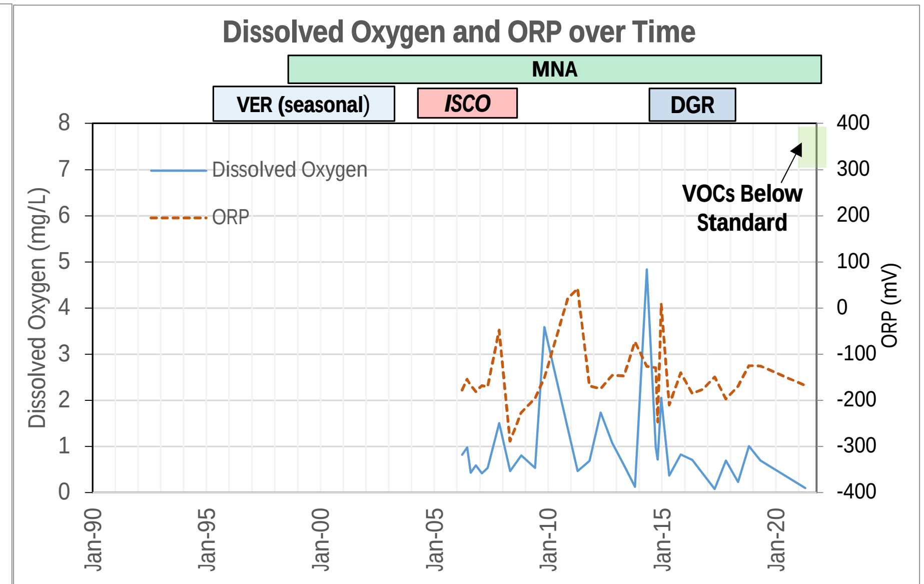


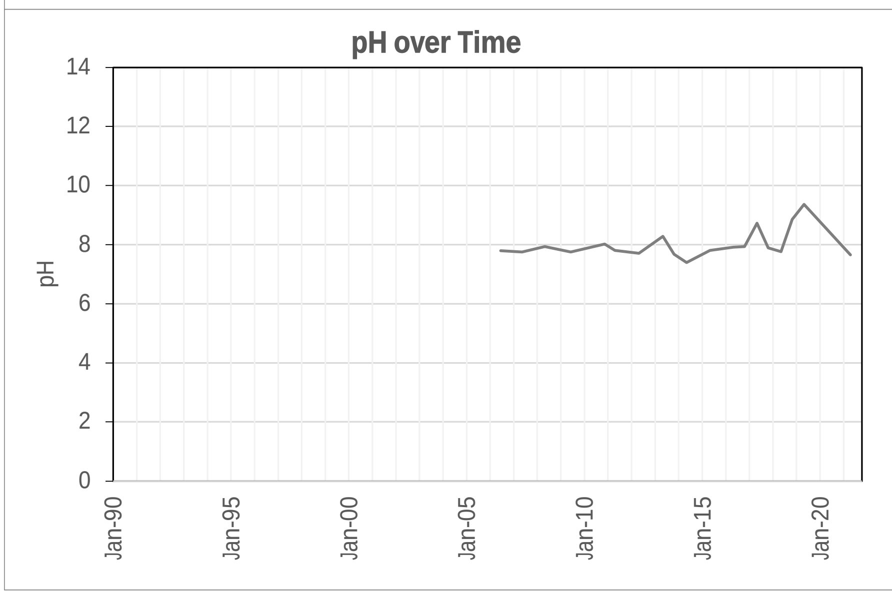


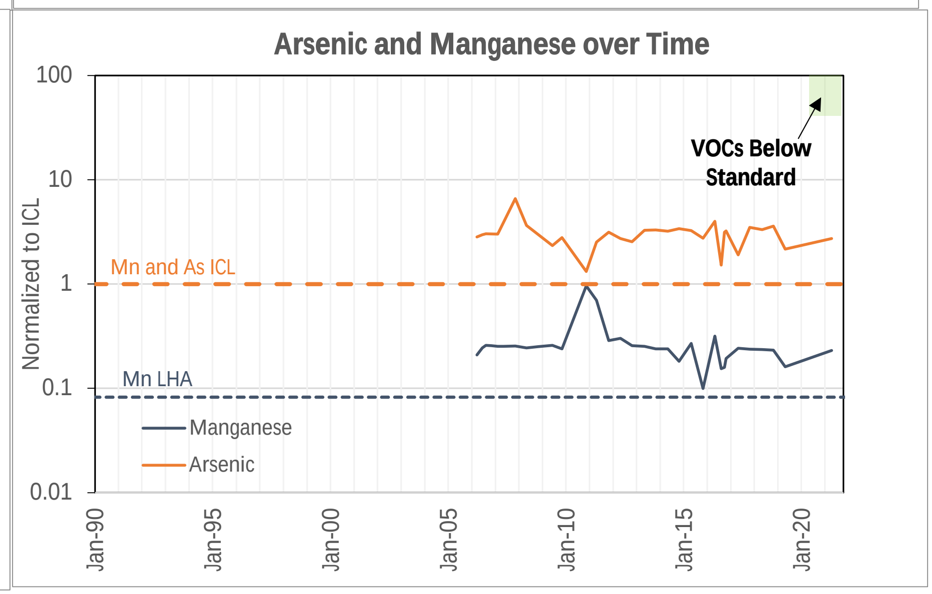
Appendix A

Figure A-12 - Monitoring Well 205R Trend Charts









Appendix B

USEPA Correspondence and Response-to-Comments

REGION 1
BOSTON, MA 02109

November 14, 2023

Charles Pinter
Fairlane Plaza North, Suite 800
290 Town Center Drive
Dearborn, Michigan 48126

Dear Mr. Pinter:
Enclosed are the comments from the New Hampshire Department of Environmental Services (NHDES) and EPA regarding the *Manganese and Arsenic Background Evaluation Work Plan*, July 2022 (the Work Plan).

Comments on the Work Plan have been delayed while EPA prepared, and then signed a Five-Year Review (FYR) on August 15, 2023. The FYR cited three issues to address before the end of 2026. The recommendations of those issues include:

- Determine the background concentrations and controlling factors of metal contaminants.
- Expand the analyte list to the original CoCs identified in the 1992 ROD to compare to present standards.
- Evaluate potential active and passive remedies and determine approximate cleanup times for all contaminants in groundwater.

The first two bullets can be incorporated into the Work Plan and the timing of the investigation could fit with sampling for the 2028 FYR. The third bullet calls for a Focused Feasibility Study (FFS). Although the FFS does not need to be incorporated into the Work Plan, the Work Plan should collect data that an FFS would need. We can discuss the FFS scope and schedule later; however, the issues in the FYR have a due date in 2026 and the next FYR will be in 2028.

These actions are needed because it has been 26 years since active remedial efforts ended at the Site, the last bedrock pilot test ended more than 7 years ago, and yet, groundwater remains contaminated. The Agencies need an estimate of when ICLs and regulatory criteria for all contaminants will be attained. Although the last sentence in Section 6 of the Work Plan mentions these goals, it is difficult to determine the nature of these tasks within the Work Plan. Therefore, the comments that follow attempt to clarify the Work Plan in its broader effort to understand contamination at the Site, collect data to evaluate potential remedies, and determine the means to either restore groundwater or continue to prevent exposure and maintain institutional controls.

General comments that are not directed at specific text are intended as global comments to the entire document. Please apply those needed revisions to the entirety of the document to make clear the work. The comments:

1. **Section 1, second paragraph**. Based on the needs cited in the Five-Year Review as discussed on the preceding page and to make consistent with the last paragraph of Section 6, please revise to clarify the goals summarized in the preceding bullets.

2. **Section 1, second paragraph, last sentence, and as a general comment throughout the Work Plan**. Revise: "…the absence of Site-related influences resulting from the *release of wastes at the Site*~~historical volatile organic compound (VOC) impacts~~. Throughout the document replace similar statements such as "…VOC impacts" with "releases."

3. **Section 1.2.1, first sentence**. Add to the first sentence, or create a second sentence, that speaks to the present regulatory limits and typical cleanup levels. For instance, the AGQS for arsenic is 5 µg/L and a typical risk-based cleanup level for Manganese is 300 µg/L. The AGQS may not become the ICL but as the State's standard it should be discussed.

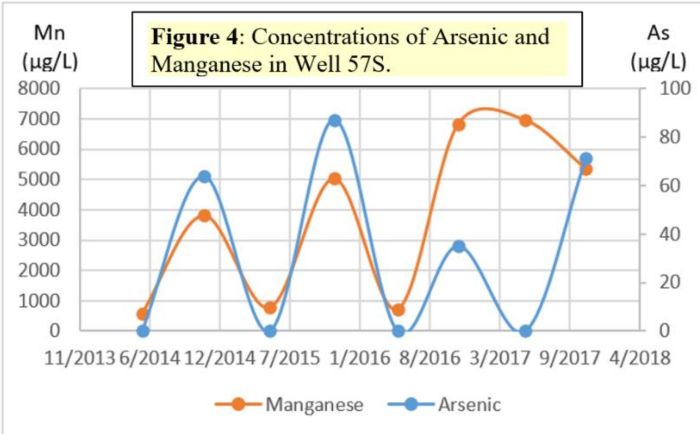
4. **Section 1.2.1, second sentence, and throughout the Work Plan**. Revise to "…but rather ~~are~~ *may be* present in groundwater as a result of geochemical processes…."

The possibility that arsenic and manganese were part of the release has not been eliminated as metals may be present in the paint pigments present in the waste solvents released at the Site. The Agencies agree that this is an unlikely source of arsenic and manganese, but release-related sources cannot be presently eliminated. The Agencies also agree that results from this Work Plan must provide a compelling logic based on multiple lines of evidence: geologic, geochemical, analytical, and statistical and that this Work Plan must present a detailed description of the means and methods to that report.

Much of the support for the geochemical mobilization is the USGS Report, SIR2012-5156. The Report is general, applied over a large region, and indicates that additional work would be needed to determine any association of arsenic concentrations with geology.[1] The USGS Report did cite the Berwick formation as having the potential for higher concentrations of arsenic. The regional geologic map (Lyons, et al., 1997) does show the bedrock in this area to be the Berwick formation. However, there are several factors that render this a starting point and not a conclusion. The Reports conclusions are a starting point because they are based on general, regional bedrock maps that require additional field work to determine the local mineralogy. In addition, the Report cannot consider local factors such as organic carbon concentrations or co-contaminant interactions that may affect potential mobilization of redox sensitive elements.

Consider adding drilling information or an additional area of sampling. Past drill core data may be useful, but if inadequate, it may be worthwhile to take a bedrock core during any new drilling to identify the facies and perform leaching studies. Establishing a comparison site that is geologically similar but remote to the contamination and chemistry impacts imposed by the contamination may be

[1] *Estimated Probability of Arsenic in Groundwater from Bedrock Aquifers in New Hampshire, 2011*, USGS, SIR2012-5156, Ayotte, et.al., p. 13, Summary and Conclusions, paragraphs 4 & 5.



an option. The comparison site would perhaps provide a baseline to understanding controlling conditions. For instance, the overburden materials 500 meters east and southeast of the Site (Tamposi property) should be similar material and unaffected by the Site contamination and altered geochemistry. Monitoring at such a location, spring and fall, may provide insight into mechanisms that govern the concentration trends seen in Well 57S.

Determining the mechanisms controlling inorganic mobilization is necessary because the continued exceedance of arsenic and manganese in the overburden despite the lack of VOCs indicates that they are not the factor. Figure 4 from page 38 of the FYR demonstrates that the concentrations of both As and Mn are controlled by seasonal factors.

5. **Section 1.2.2, second bullet**. Replace: "…are also representative of zones to which they would be applied…," with: "…are similar geologically and geochemically to the Site prior to the release of hazardous materials."

6. **Section 1.2.3**. Add a second paragraph that references Section 4 (parameters) and discusses how the geochemical analytes will meet the goals of the evaluation. Discuss the considerations and parameters that are important in determining what is true background versus a sample being affected by releases from the Site. This should tie into the Section 2 summary of the geochemical CSM. This would support the second bullet in this section.

7. **Section 1.2.5, general**. Consistent with Comment #4, statistics cannot be the sole component of this effort. Consider geochemical characterization and modeling that defines the conditions in the Site aquifers, geochemical analyte plots (cation/anion compositions, e.g., Piper diagrams) to group results and compare to the range of redox conditions. The Mn natural attenuation model should include modeling the MnCO3 (rhodochrosite) saturation state in groundwater. The main attenuation mechanisms are expected to be oxidation/precipitation of MnO_2-type precipitates at high redox potential and $MnCO_3$ precipitation under most groundwater conditions. The main controlling factors for $MnCO_3$ precipitation/dissolution are redox conditions, Mn concentration, pH, and PCO_2. Arsenic transport and fate processes should be evaluated to include sorption/desorption in addition to co-precipitation with other species, especially iron. The Site poses a complex array of chemistry that needs to be characterized and explained conceptually.

8. **Section 2.1, fifth bullet**. The last sentence needs an ending.

9. **Section 2.1 and 2.2**. It is suggested that this section reference the appropriate figures in the CSM.

10. **Section 2.3**. Revise the first three sentences, thusly:

> Dissolved metals are present in groundwater at the Site~~, both as a natural condition and because of VOC impacts~~. ~~Specifically, m~~Manganese and arsenic are a concern at the Site due to exceedances above ICLs. Elevated levels of m~~M~~anganese and arsenic have been theorized to be~~are naturally occurring in groundwater~~ related to the underlying geology of southeastern New Hampshire and have been observed in far-downgradient wells (i.e., not impacted with VOCs or related water chemistry) at the Site. (needs attached references to Ayotte's paper and the last statement – which far-downgradient wells?)

11. **Section 2.3, second paragraph, second sentence**. Where is the correlation of DO and ORP with concentration shown? Please reference.

12. **Section 2.3 Site Geochemistry, general**. Because Section 2 is a summary of the CSM, Section 2.3 should summarize the known geochemical conditions to provide an idea of what has been done – and what remains to be done. This section should also segregate its discussion into overburden and bedrock aquifers *and* organic vs. inorganic contaminants in each. Revise Section 2.3 to summarize what is known about the present Site geochemistry including portions of Sections 4.2, 3, and 4 of the CSM. Portions of Section 5 of the CSM may be appropriate; however, it does make some conclusory statements that are not referenced or accepted by the Agencies presently. The discussion in Section 4.4 of the CSM was helpful in addressing the idea of what is driving redox in the absence of VOCs such as with well 57S. Further work along those lines will help reviewers understand groundwater geochemistry.

13. **Section 3, last paragraph, first sentence**. "…which were in locations ~~amendable~~ amenable for inclusion in the background evaluation."

14. **Section 4, general**. The selection of wells that qualify as "background" may change as additional information regarding the geochemistry for each becomes available. Based on review by the Agencies of the eventual Evaluation Report, some wells may be reclassified based on the data. The overburden background wells, especially MW-401, may have issues, as it appears to be on the flowpath from the Site.

15. **Sections 4.1 & 4.2**. The driller and surveyor should be changed to New Hampshire-licensed contractors.

16. **Section 4.3**. Modify the sampling to add:
- Arsenic speciation in selected wells (EPA Method 1632; filtered samples, HCl-preserved, amber plastic bottles) – important for redox evaluation (ORP is insufficient) and Fe(II).
- Turbidity measurements to keep track of well development and well status, low turbidity samples, collection of filtered & unfiltered samples [not a big issue for Mn but extremely important for As].
- 1992 ROD ICL contaminants: Benzene, ethylbenzene, 4-methyl-2-pentanone, styrene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, and xylene. SVOCs: Bis (2-ethylhexyl) phthalate, 2-methylnaphthalene, naphthalene. Inorganics: chromium, lead, nickel, and vanadium.

The analysis of anion/cation charge balance is highly supported.

17. **Section 4.6**. Additional analytes may require a revised QAPP. Please review to ensure all analytes are described.

18. **Section 5**. Please revise to reflect the Agencies need for multiple lines of evidence.

19. **Section 5.2.3**. The apparent conclusion of the example offered in this section presents a problem in that a summary of the data provides what appear to be results that management would likely not consider. The data from that table with other, associated data:

	As UTL	As Mean	As StDev	As Max	Mn UTL	Mn Mean	Mn StDev	Mn Max
Overburden	74	19.5	7.2	32.7	8,819	122.5	109.8	3290
Bedrock	42.3	17.8	10.9	35	455	1323.6	1334.6	550

Although it is recognized that this is an example, the statistical result must pass a straight-faced test. In this instance, the maximum concentration is less than the UTL in 3 of the 4 cases. In two of those instances, the UTL is at least twice the maximum value found in the groundwater. Management would likely not accept the UTL as background concentrations given a similar presentation.

20. **Section 5, general**. The Agencies will need to independently verify the results of any statistical analysis. EPA's statistician hasn't tried to reproduce the results in the example but assumes they were generated using the proposed hierarchical approach which may not be appropriate. Another issue is using the mean of the means for calculations is atypical and it was suggested that the data be pre-whitened as needed before making the calculations using the (whitened) "original" data and a pre-packaged software such as ProUCL (version 5.2) or a similar, common, pre-packaged software. This would make the verification step easier to implement and shorten the review.

Also, although this is an example, the arithmetic mean for Mn in Well SWL-6 alt is 95 and not 103.67, perhaps a misunderstanding or mislabeling. However, this points to the need for all data and calculations to be well documented and supported. Referencing the data source or analysis for any conclusions is vital.

Please submit a revised copy by February 13, 2024 as two copies: one as a Word document with redline & strikeout text supported by in-bedded comments explaining the edits and another as a clean pdf of the Word document. Please suggest a time to talk about the FFS and any questions once you have reviewed this comment letter. If need more time to revise the document, or if you have any questions or concerns, please do not hesitate to contact me at luce.darryl@epa.gov or at 617-918-1336.

Sincerely,

Darryl Luce, Ph.D., Remedial Project Manager
New Hampshire & Rhode Island Superfund Section

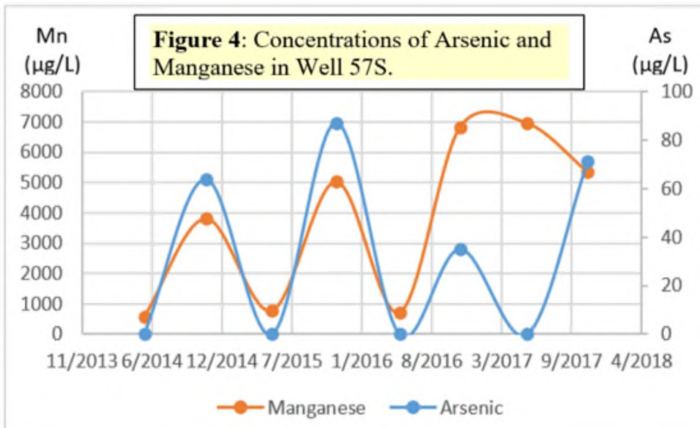
cc:
Melissa Taylor, Chief, New Hampshire & Rhode Island Superfund Section
Eve Vaudo, Senior Enforcement Counsel, USEPA
Andrew Hoffman New Hampshire Department of Environmental Services
Rick Wilkin, EPA/ORD, Ada, Oklahoma
Lee Rhea, EPA/ORD, Ada, Oklahoma

Project Name: Tibbetts Road Site			
Location: Barrington, New Hampshire		Reviewers:	Darryl Luce (USEPA)
Document Name: Manganese and Arsenic Background Evaluation Work Plan, July 2022			

No.	Ref. Page / Para.	COMMENT	RESPONSE
1.	Section 1, 2nd paragraph	Based on the needs cited in the Five-Year Review as discussed on the preceding page and to make consistent with the last paragraph of Section 6, please revise to clarify the goals summarized in the preceding bullets.	Sentence has been revised.
2.	Section 1, 2nd paragraph, last sentence	Revise: "…the absence of Site-related influences resulting from the release of wastes at the Site ~~historical volatile organic compound (VOC) impacts~~. Throughout the document replace similar statements such as "…VOC impacts" with "releases."	Sentence has been revised, and terminology adjusted throughout the text.
3.	Section 1.2.1, first sentence	Add to the first sentence, or create a second sentence, that speaks to the present regulatory limits and typical cleanup levels. For instance, the AGQS for arsenic is 5 µg/L and a typical risk-based cleanup level for Manganese is 300 µg/L. The AGQS may not become the ICL but as the State's standard it should be discussed.	Sentence has been revised to include the AGQS.
4.	Section 1.2.1, second sentence, and throughout the Work Plan	Revise to "…but rather ~~are~~ may be present in groundwater as a result of geochemical processes…." The possibility that arsenic and manganese were part of the release has not been eliminated as metals may be present in the paint pigments present in the waste solvents released at the Site. The Agencies agree that this is an unlikely source of arsenic and manganese, but release-related sources cannot be presently eliminated. The Agencies also agree that results from this Work Plan must provide a compelling logic based on multiple lines of evidence: geologic, geochemical, analytical, and statistical and that this Work Plan must present a detailed description of the means and methods to that report.	Sentence revised. Regarding the bulk of this comment: 1. Arcadis acknowledges that As/Mn could be part of the historical release, but agree that this is an unlikely source. 2. As described in the CSM and in historical reports prepared by others (1992 RI Report) bedrock cores have been collected from numerous boreholes, the bedrock lithology and mineralogy has been documented. The dominant rock type at the site is the Berwick Formation, except for wells north of Hall Road (78R and MW-303) as described in the CSM.

ARCADIS

No.	Ref. Page / Para.	COMMENT	RESPONSE
		Much of the support for the geochemical mobilization is the USGS Report, SIR2012-5156. The Report is general, applied over a large region, and indicates that additional work would be needed to determine any association of arsenic concentrations with geology. The USGS Report did cite the Berwick formation as having the potential for higher concentrations of arsenic. The regional geologic map (Lyons, et al., 1997) does show the bedrock in this area to be the Berwick formation. However, there are several factors that render this a starting point and not a conclusion. The Reports conclusions are a starting point because they are based on general, regional bedrock maps that require additional field work to determine the local mineralogy. In addition, the Report cannot consider local factors such as organic carbon concentrations or co-contaminant interactions that may affect potential mobilization of redox sensitive elements. Consider adding drilling information or an additional area of sampling. Past drill core data may be useful, but if inadequate, it may be worthwhile to take a bedrock core during any new drilling to identify the facies and perform leaching studies. Establishing a comparison site that is geologically similar but remote to the contamination and chemistry impacts imposed by the contamination may be an option. The comparison site would perhaps provide a baseline to understanding controlling conditions. For instance, the overburden materials 500 meters east and southeast of the Site (Tamposi property) should be similar material and unaffected by the Site contamination and altered geochemistry. Monitoring at such a location, spring and fall, may provide insight into mechanisms that govern the concentration trends seen in Well 57S. Determining the mechanisms controlling inorganic mobilization is necessary because the continued exceedance of arsenic and manganese in the overburden despite the lack of VOCs	The bedrock geology north of Hall Road is a metamorphic mica schist, described by others as being of the Gonic formation (1992 RI). 3. Arcadis will be collecting groundwater samples for a suite of parameters, including total organic carbon, from both overburden and bedrock wells (Section 4-3 of the workplan) to establish geochemical conditions and inorganic mobilization mechanisms. 4. Arcadis acknowledges the value of having background locations in areas which are geologically similar, and the proposed sampling locations on Figure 5 and 6 are largely in areas that fit that description. As described above, some samples will be collected north of Hall Road (bedrock well MW-303, proposed overburden well MW-402) where a different bedrock formation is present. Arcadis believes that having data from different geological areas is vital to understanding the range of geochemistry and groundwater quality that is contributing to background conditions in the study area. 5. Arcadis will be collecting groundwater samples and water levels on a quarterly basis, in order to understand the seasonal factors that the USEPA references.

No.	Ref. Page / Para.	COMMENT	RESPONSE
		indicates that they are not the factor. Figure 4 from page 38 of the FYR demonstrates that the concentrations of both As and Mn are controlled by seasonal factors. 	
5.	Section 1.2.2, second bullet	Replace: "…are also representative of zones to which they would be applied…," with: "…are similar geologically and geochemically to the Site prior to the release of hazardous materials."	Sentence updated.
6.	Section 1.2.3	Add a second paragraph that references Section 4 (parameters) and discusses how the geochemical analytes will meet the goals of the evaluation. Discuss the considerations and parameters that are important in determining what is true background versus a sample being affected by releases from the Site. This should tie into the Section 2 summary of the geochemical CSM. This would support the second bullet in this section.	A second paragraph has been added which references Sections 2 and 4 and provides more detail on the geochemical parameters to be collected to meet the study objectives.
7.	Section 1.2.5, general	Consistent with Comment #4, statistics cannot be the sole component of this effort. Consider geochemical characterization and modeling that defines the conditions in the Site aquifers, geochemical analyte plots (cation/anion	The text has been updated to include a discussion of geochemical data evaluation and modeling to be conducted to further develop the geochemical conceptual model and provide a basis for the

No.	Ref. Page / Para.	COMMENT	RESPONSE
		compositions, e.g., Piper diagrams) to group results and compare to the range of redox conditions. The Mn natural attenuation model should include modeling the MnCO3 (rhodochrosite) saturation state in groundwater. The main attenuation mechanisms are expected to be oxidation/precipitation of MnO2-type precipitates at high redox potential and MnCO3 precipitation under most groundwater conditions. The main controlling factors for MnCO3 precipitation/dissolution are redox conditions, Mn concentration, pH, and PCO2. Arsenic transport and fate processes should be evaluated to include sorption/desorption in addition to co-precipitation with other species, especially iron. The Site poses a complex array of chemistry that needs to be characterized and explained conceptually.	determination of natural background vs. release-affected groundwater.
8.	Section 2.1, fifth bullet.	The last sentence needs an ending.	Sentence revised.
9.	Section 2.1 and 2.2	It is suggested that this section reference the appropriate figures in the CSM.	The introduction paragraph in Section 2 references the CSM – all figures are in Appendix A. Section 2 includes high-level CSM summary items only.
10.	Section 2.3	Revise the first three sentences, thusly: Dissolved metals are present in groundwater at the Site~~,~~ ~~both as a natural condition and because of VOC impacts~~. ~~Specifically, m~~Manganese and arsenic are a concern at the Site due to exceedances above ICLs. Elevated levels of m~~M~~anganese and arsenic have been theorized to be~~are naturally occurring in groundwater~~ related to the underlying geology of southeastern New Hampshire and have been observed in far-downgradient wells (i.e., not impacted with VOCs or related water chemistry) at the Site. (needs attached references to Ayotte's paper and the last statement – which far-downgradient wells?)	Paragraph has been updated, including a reference for Ayotte paper and example far-downgradient wells. See comment above – Section 2 is only providing high-level CSM items. Please refer to Appendix A for the full descriptions and references.

No.	Ref. Page / Para.	COMMENT	RESPONSE
11.	Section 2.3, second paragraph, second sentence	Where is the correlation of DO and ORP with concentration shown? Please reference.	Section 2 is a high-level summary of the CSM – a discussion of DO/ORP is in Appendix A. A reference has been added.
12.	Section 2.3 Site Geochemistry, general	Because Section 2 is a summary of the CSM, Section 2.3 should summarize the known geochemical conditions to provide an idea of what has been done – and what remains to be done. This section should also segregate its discussion into overburden and bedrock aquifers and organic vs. inorganic contaminants in each. Revise Section 2.3 to summarize what is known about the present Site geochemistry including portions of Sections 4.2, 3, and 4 of the CSM. Portions of Section 5 of the CSM may be appropriate; however, it does make some conclusory statements that are not referenced or accepted by the Agencies presently. The discussion in Section 4.4 of the CSM was helpful in addressing the idea of what is driving redox in the absence of VOCs such as with well 57S. Further work along those lines will help reviewers understand groundwater geochemistry.	As described in the July 27, 2022 Arcadis email transmittal of the Work Plan to the Agencies: *"for ease of review, we would recommend reviewing the CSM first (and then the Work Plan itself), as the CSM lays the groundwork for the locations proposed to be included in the background evaluation."* Section 2 of the Work Plan is meant to be a high-level summary, instead of including all the details of that the CSM includes in Appendix A. Arcadis has added additional references to Appendix A in Section 2 to make this more clear.
13.	Section 3, last paragraph, first sentence	"…which were in locations ~~amendable~~ amenable for inclusion in the background evaluation."	Text updated.
14.	Section 4, general	The selection of wells that qualify as "background" may change as additional information regarding the geochemistry for each becomes available. Based on review by the Agencies of the eventual Evaluation Report, some wells may be reclassified based on the data. The overburden background wells, especially MW-401, may have issues, as it appears to be on the flowpath from the Site.	Noted.
15.	Sections 4.1 & 4.2	The driller and surveyor should be changed to New Hampshire-licensed contractors.	Sections have been updated.

No.	Ref. Page / Para.	COMMENT	RESPONSE
16.	Section 4.3	Modify the sampling to add: • Arsenic speciation in selected wells (EPA Method 1632; filtered samples, HCl-preserved, amber plastic bottles) – important for redox evaluation (ORP is insufficient) and Fe(II). • Turbidity measurements to keep track of well development and well status, low turbidity samples, collection of filtered & unfiltered samples [not a big issue for Mn but extremely important for As]. • 1992 ROD ICL contaminants: Benzene, ethylbenzene, 4-methyl-2-pentanone, styrene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, and xylene. SVOCs: Bis (2-ethylhexyl) phthalate, 2-methylnaphthalene, naphthalene. Inorganics: chromium, lead, nickel, and vanadium. The analysis of anion/cation charge balance is highly supported.	Turbidity has been added to the field parameter suite, see Section 4.3 update. Groundwater sample collection from new monitoring well locations will include the specified list of 1992 ROD ICL contaminants, except for 2-methylnaphthalene and lead (no ICL listed in the 1992 ROD or 1998 amended ROD). These parameters will also be incorporated into the next long-term monitoring event, scheduled for spring 2026. Arsenic speciation has been added to the sampling plan, along with a brief discussion of rationale. Although EPA Method 1632 is listed as a potential method, the text also currently provides the option of using the more modern IC-ICP-MS method, rather than the older method of hydride generation-AA specific to Method 1632.
17.	Section 4.6	Additional analytes may require a revised QAPP. Please review to ensure all analytes are described.	Noted – a revised QAPP will be prepared following Work Plan approval and prior to the start of field activities/sampling.
18.	Section 5	Please revise to reflect the Agencies need for multiple lines of evidence.	The statistical analysis presented in Section 5 is a process to compute background concentrations and has nothing to do with demonstrating the source of the arsenic and manganese in groundwater. Therefore, no revisions are deemed necessary in Section 5 in regard to lines of evidence.

<table>
<tr><th>No.</th><th>Ref.
Page / Para.</th><th>COMMENT</th><th>RESPONSE</th></tr>
<tr><td>19.</td><td>Section 5.2.3</td><td>The apparent conclusion of the example offered in this section presents a problem in that a summary of the data provides what appear to be results that management would likely not consider. The data from that table with other, associated data:

<table>
<tr><th></th><th>As UTL</th><th>As Mean</th><th>As StDev</th><th>As Max</th><th>Mn UTL</th><th>Mn Mean</th><th>Mn StDev</th><th>Mn Max</th></tr>
<tr><td>Overburden</td><td>74</td><td>19.5</td><td>7.2</td><td>32.7</td><td>8,819</td><td>122.5</td><td>109.8</td><td>3290</td></tr>
<tr><td>Bedrock</td><td>42.3</td><td>17.8</td><td>10.9</td><td>35</td><td>455</td><td>1323.6</td><td>1334.6</td><td>550</td></tr>
</table>

Although it is recognized that this is an example, the statistical result must pass a straight-faced test. In this instance, the maximum concentration is less than the UTL in 3 of the 4 cases. In two of those instances, the UTL is at least twice the maximum value found in the groundwater. Management would likely not accept the UTL as background concentrations given a similar presentation.</td><td>Acknowledged. The Agencies should note that increased documentation will be provided when the workplan is executed making clear the origin and procedure of the results that are presented.</td></tr>
<tr><td>20.</td><td>Section 5, general</td><td>The Agencies will need to independently verify the results of any statistical analysis. EPA's statistician hasn't tried to reproduce the results in the example but assumes they were generated using the proposed hierarchical approach which may not be appropriate. Another issue is using the mean of the means for calculations is atypical and it was suggested that the data be pre-whitened as needed before making the calculations using the (whitened) "original" data and a pre-packaged software such as ProUCL (version 5.2) or a similar, common, pre-packaged software. This would make the verification step easier to implement and shorten the review.

Also, although this is an example, the arithmetic mean for Mn in Well SWL-6 alt is 95 and not 103.67, perhaps a misunderstanding or mislabeling. However, this points to the need for all data and calculations to be well documented and supported. Referencing the data source or analysis for any conclusions is vital.</td><td>It is acknowledged that there will be further review from EPA's statistician.

The hierarchical approach presented in the workplan is necessary to preserve statistical independence. What is atypical is not the method but the background data set, with wells sampled at different times with differing numbers of samples per monitoring well. To pool all of the data into a "whitened" single data set would overrepresent locations that were sampled a greater number of times and create bias in favor of monitoring locations with more samples.

A pre-packaged statistical software will be used in determining the goodness of fit, including the Shapiro-Wilk testing and the outlier testing. However, the particular software package will not be specified in this</td></tr>
</table>

No.	Ref. Page / Para.	COMMENT	RESPONSE
			workplan. Arcadis will make an effort to document and reference all of the input data.
END OF COMMENTS			

Arcadis U.S., Inc.
500 Edgewater Drive, Suite 511
Wakefield, MA 01880
www.arcadis.com

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CENTER FOR ENVIRONMENTAL SOLUTIONS AND EMERGENCY RESPONSE
GROUNDWATER CHARACTERIZATION AND REMEDIATION DIVISION
919 KERR RESEARCH DRIVE • ADA, OK 74820

February 27, 2024

OFFICE OF
RESEARCH AND DEVELOPMENT

MEMORANDUM

SUBJECT: Groundwater Background Concentrations of Manganese and Arsenic in Overburden and Bedrock Fractures at the Tibbets Road Site in Barrington, New Hampshire (24-R01-01)

FROM: Lee Rhea, PhD
Hydrologist, ORD/CESER/GCRD/SRB

TO: Darryl Luce, PhD
RPM Region 1 SEMB/RB/NRSS

Per your request for technical support, this memorandum supports the development and selection of background concentration thresholds for Manganese (Mn) and arsenic (As) dissolved in groundwater (Background) in the vicinity of the Tibbets Road site in Barrington, New Hampshire. If you have any questions or comments, please contact me at your convenience.

General Comments

1. If an argument is to be made that the elevated arsenic (As) and manganese (Mn) concentrations observed at the site are due to natural variation in their background concentrations, then wells representative of other localities within the greater site area could be sampled several times. The maximum concentrations from wells identified as background could be taken as site background, as the non-parametric 95-95 Upper Tolerance Limit (UTL) is approximately equal to this value.

2. Why are travel times between the near edge of the source area and wells outside it not plotted on figures and discussed? Given that the site is a groundwater divide this information is important to identify candidate background wells in the site locality.

3. Is the weathered bedrock treated hydrologically as part of the overburden or bedrock?

4. It is recommended to not skip wells when gathering water levels. This practice reduces the observed variation and makes contour plan maps appear smoother and more certain than they actually are.

5. Agreed, the available groundwater head contour plans for bedrock do not appear to comport with historical plume extents because the bedrock groundwater is preferentially flowing in fractures. More groundwater contour plans are needed for both the overburden and bedrock. Plans should be prepared for the dates of overall-average low-water-levels, overall-average average-water-levels, and overall-average high-water-levels. Perhaps groundwater contaminant concentrations could be used to co-Krige the piezometric

surfaces? It is difficult, without this information, to assess the likelihood of a locality well as a background well, and locations for additional background wells.

6. It is recommended that wells not be abandoned yet. The monitoring well network should be sampled after remediation goals are met to "ensure" rebound does not exceed applicable regulatory standards.

Specific Comments

- **Section 1.2.1:** There is reasonable disagreement about whether As and Mn are safely assumed to not be associated with site releases. Please add a statement that acknowledges there are not sufficient records to eliminate the possibility of metal releases at the site.

- **Section 1.2.4:** The study area should be expanded to the greater area where localities similar to the site are included. Then As and Mn background samples can be collected from them and compared to site locality concentrations.

- **Section 5:** The proposed methodology of calculating background concentrations is not recommended. The methodologies recommended by EPA do not include using derived data. The original data must be used.

- **Section 5.1.4:** How will cross-well comparisons and statistics be calculated if the wells have had different transformations applied to them? If statistics are calculated from them there is no way to back-transform the result.

- **Section 5.1.6:** Derived data (such as means) should not be used to compute background concentrations.

- **Section 5.1.6.1**: Use of a non-parametric 95-95UTL method will identify a value near the highest observed concentration of the analyte of interest as background. This method of determining background should be considered, after removing outliers as described previously in the workplan.

- **Section 5.2.2.2:** It is inappropriate to mix different measures of central tendency and compute a statistic from them, because there is no way to do a valid back-transform of the result. However, it is stated in Section 5.2.2.1 that all the data was normally distributed.

- **Table 2:** Highlighting is missing for arsenic exceedances in Private Residential Supply Wells.

- Where are the (key) Figures 1-6? Mislabeled?

- **Table 2-1:** Please sort table by Monitoring Zone, then Installation Date.

- **Table 2-3:** Please contour the vertical gradients. Add contours by dates of overall minimum, average, and maximum gradients.

- **Figure 4-2:** Why are arsenic and manganese background data for overburden not limited to upgradient wells, as evidenced by piezometric head contours and no detections of VOCs? If nonparametric methods are used the highest observed concentration from the ensemble of background wells will be equivalent to the calculated value.

- **Figure 4-2:** Why are arsenic and manganese background data for bedrock not limited to upgradient wells, as evidenced by piezometric head contours and no detections of VOCs? If nonparametric methods are used the highest observed concentration from the ensemble of background wells will be equivalent to the calculated value.

- **Figures 3-8, 4-2, 4-6:** Injection is spelled “Inection”.

- **References:** The Sanborn Head reference appears to have another reference incorporated with it, rather than stating on a separate line.

- **References:** The indentation for the USGS/USEPA reference is wrong.

REFERENCES

(1) Interstate Technology Regulatory Council (ITRC). 2021. *Soil Background and Risk Assessment*. The ITRC Soil Background and Risk Team. Interstate Technology & Regulatory Council, 50 F Street, NW, Suite 350, Washington, DC 20001

(2) U.S. Environmental Protection Agency (EPA). 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. U.S. Environmental Protection Agency, Office of Resource Conservation and Recovery, Program Implementation and Information Division. EPA 530/R-09-007.

(3) USEPA. 2022. *ProUCL: Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations*. Version 5.2.

cc: Daniel Burgo, Region 1 STL
Christopher Kelly, Region 1

REGION 1
BOSTON, MA 02109

March 19, 2024

Mr. Charles Pinter
Fairlane Plaza North, Suite 800
290 Town Center Drive
Dearborn, Michigan 48126

Dear Mr. Pinter:

The New Hampshire Department of Environmental Services (NHDES) and EPA (the Agencies) have reviewed the *Draft Manganese and Arsenic Background Evaluation Work Plan (Revised), Tibbetts Road…*, February 2024 (the Work Plan) and the *Response to Comment Matrix*, February 6, 2024 (RtC) that accompanied the Work Plan.

The Agencies approve the submitted Work Plan with the changes, comments, and clarifications contained in this letter. Comments attached from Lee Rhea, at EPA's Ada, Oklahoma lab, should be considered in the conduct of the investigation and the generation of the Final Report for this investigation. Please submit the final Work Plan by May 1, 2024, provided there are no issues with the changes.

- Changes in this letter may be discussed further with the Agencies. The changes are the Agencies position on the conduct of the investigation and must be added to the revised document and implemented as cited or as ultimately agreed to by both the Agencies and Ford following discussion.

- Comments are offered as suggestions for your consideration in the conduct of the investigation and may be adjusted in the final Work Plan as you wish.

- Clarifications are statements of the Agency's considerations in the evaluation of the resulting investigation and the product that the Agencies may produce.

CHANGES: If the foregoing changes are acceptable, revise the text as noted, mark as final, and issue to the Agencies.

1. Add to Section 1.1, Work Plan Structure: "Section 6: The investigation conducted for this Work Plan will result in a Final Report that proposes background concentrations of metal contaminants based on statistical and geochemical evaluations, determines the concentrations of Site contaminants, and estimates potential cleanup times and potential remedies for those contaminants."

The reason for Change #1: My apologies for not recognizing the need for a defined Final Report earlier. An Explanation of Significant Differences (ESD) or amended Record of Decision (ROD) is needed to change cleanup levels or a remedy. An ESD or ROD must base a decision on a document that presents evidence that is well supported and, in this case, satisfies the Issues in the 2023 FYR.

2. Schedule: A general schedule is needed. It is suggested that this be made as a new Section 4.7. Although that schedule may lack specific time frames, it should detail the tasks in their order of implementation, their approximate duration, and contingencies. The schedule should include a general schedule for field efforts and conclude with the Final Report mentioned previously.

3. Section 6 and a Final Report: As described above, the results of the investigation must result in a Final Report that present the following that should be outlined in the Work Plan:

- An overview of the investigation.
- Natural or enhanced conditions that affect metal contaminant mobility.
- Status of all contaminants at the Site that are described in the 1992 ROD and 1998 Amended ROD as well as the items mentioned above. A discussion of current and proposed ICLs for all contaminants should be included that is based on the results of both geochemical and statistical evaluations.
- An estimate of cleanup times under the current remedy, MNA; and
- develop and propose one or two possible *in-situ* remedies in the form of a Focused Feasibility Study (FFS).

COMMENTS: For your consideration and use as appropriate.

1. Quality Assurance Project Plan (QAPP): Because several analytes have been added, please submit a revised QAPP or Sampling and Analysis Plan (SAP) at least 60 days before any sampling activities are scheduled to occur. If the belief is that the current QAPP or SAP is adequate, please submit that for evaluation concurrent with the final Work Plan.

2. Section 1.2.3, last sentence, regarding references: It is understood that this investigation needs to lean on past data and conclusions. And no changes to the current text are needed; however, for the Final Report, specific references are needed to direct the reader to where the point being made is demonstrated. General statements such as in Section 1.2.3: "…demonstrated to be inversely correlated with DO and ORP…" must be referenced to where this is explicitly demonstrated, the section and page, and if not, provide a new analysis. Footnotes are preferred, and in the form shown

below by an example footnote to the three issues in the FYR.[1] You may choose other methods of referencing, but the Final Report must direct the reader to exactly where the work is shown and not just the document.

CLARIFICATIONS: A perspective of the Agency's consideration of the investigation results.

1. Sections 1.2.1 and 1.2.2, "establishing:" Although there is no need to change the text, Ford will *propose* background concentrations and the Agencies, after evaluation of the Final Report, will *establish* the background concentrations. The Agencies must do a decision document to establish new ICLs.

2. Section 3, Monitoring Well Identification and Justification: The lack of a true background requires that Ford assign characteristics to wells that may not be borne out by data collected for this investigation. As such, this section is understood to be fluid and that Ford may alter its consideration of each well as the investigation proceeds. In the Final Report any changes to a well's status must document the initial consideration, the changes, and justification for the change. The Agencies, during their review, may likewise determine that the status of a well might need to be revised and require a revision of the Final Report to accommodate that change.

3. Section 5.2.3 Results: This section may stand as-is. However, the Agencies will examine the narratives and data for both the statistical methods and the site geochemistry before issuing an analysis of the Final Report or proceeding to any decision document.

4. Final Report: The Final Report must highlight and discuss the recommendations from 2018 and brought forward into the 2023 FYR that the Final Report. To review, those issues are:

- Issue 1: Determine background concentrations of metal contaminants and the conditions responsible for continued metal contamination above ICLs, as well as potential cleanup times, in overburden and bedrock groundwater.

- Issue 2: Evaluate potential alternative active and passive remedies for all contaminants that exceed ICLs in fractured bedrock groundwater and determine cleanup times for each.

- Issue 3: Expand the analyte list for the next sampling round to determine the concentration of all contaminants assigned an ICL in the ROD as well as any identified emerging contaminants, including 1,4-dioxane, that are relevant to the Site in both overburden and bedrock groundwater.

4a. Issue 2, Lead: Although RtC #16 points out that there is no ICL for lead, the discussion in the 1992 ROD points to a need for further consideration.[2] Lead will become an analyte at this Site in the future. Consider adding lead back into the analyte list.

[1] *Fifth Five-Year Review, Tibbetts Road*…, August 15, 2023, pp. 19-20.
[2] Record of Decision, September 29, 1992, p. 47.

4b. Issue 3, emerging contaminants: Portions of Issue 3 pre-date the sampling for 1,4-dioxane and PFOS/PFOA. There is no need to sample for these analytes but the narrative for the Final Report should contain a discussion of the sampling and how it aligns with new standards. Make this discussion as explicit as possible such that the Final Report may be used as a FFS if needed.

6. Conceptual Site Model: It is expected that the current CSM will be fully revised and that revision will be included in the Final Report.

If you have any questions or concerns, please do not hesitate to contact me at luce.darryl@epa.gov or at 617-918-1336.

Sincerely,

Darryl Luce, Ph.D.
Remedial Project Manager
Superfund and Emergency Management Division
Environmental Protection Agency

cc:
Andrew Hoffman, NHDES
Eve Vaudo, EPA
Melissa Taylor, EPA
James MacLaughlin, Arcadis
Ian Martz, Arcadis
Rick Wilkin, EPA/ORD, Ada, Oklahoma
Lee Rhea, EPA/ORD, Ada, Oklahoma

Enclosure:

Groundwater Background Concentrations of Manganese and Arsenic in Overburden and Bedrock Fractures at the Tibbets Road Site in Barrington, New Hampshire (24-R01-01).
Lee Rhea, PhD, Hydrologist, ORD/CESER/GCRD/SRB

Project Name: Tibbetts Road Site			
Location: Barrington, New Hampshire		Reviewers:	Darryl Luce (USEPA), Lee Rhea (USEPA)
Document Name: Manganese and Arsenic Background Evaluation Work Plan (Revised), February 2024			

No.	Ref. Page / Para.	COMMENT	RESPONSE
Darryl Luce_March 19, 2024			
CHANGES			
1.	Add to Section 1.1, Work Plan Structure	Add "Section 6: The investigation conducted for this Work Plan will result in a Final Report that proposes background concentrations of metal contaminants based on statistical and geochemical evaluations, determines the concentrations of Site contaminants, and estimates potential cleanup times and potential remedies for those contaminants." The reason for Change #1: My apologies for not recognizing the need for a defined Final Report earlier. An Explanation of Significant Differences (ESD) or amended Record of Decision (ROD) is needed to change cleanup levels or a remedy. An ESD or ROD must base a decision on a document that presents evidence that is well supported and, in this case, satisfies the Issues in the 2023 FYR.	Section 1.1 – reference to Section 6-Summary has been added. Section 6 – Requested language has been added.
2.	Schedule	A general schedule is needed. It is suggested that this be made as a new Section 4.7. Although that schedule may lack specific time frames, it should detail the tasks in their order of implementation, their approximate duration, and contingencies. The schedule should include a general schedule for field efforts and conclude with the Final Report mentioned previously.	A general implementation sequence with estimated timing has been added as new Section 4.7.

No.	Ref. Page / Para.	COMMENT	RESPONSE
3.	Section 6 and a Final Report	As described above, the results of the investigation must result in a Final Report that present the following that should be outlined in the Work Plan: • An overview of the investigation. • Natural or enhanced conditions that affect metal contaminant mobility. • Status of all contaminants at the Site that are described in the 1992 ROD and 1998 Amended ROD as well as the items mentioned above. A discussion of current and proposed ICLs for all contaminants should be included that is based on the results of both geochemical and statistical evaluations. • An estimate of cleanup times under the current remedy, MNA; and • Develop and propose one or two possible in-situ remedies in the form of a Focused Feasibility Study (FFS).	The required Final Report content has been added to Section 6.
COMMENTS			
1.	QAPP	Because several analytes have been added, please submit a revised QAPP or Sampling and Analysis Plan (SAP) at least 60 days before any sampling activities are scheduled to occur. If the belief is that the current QAPP or SAP is adequate, please submit that for evaluation concurrent with the final Work Plan.	A revised QAPP will be submitted for Agency review at least 60 days before any sampling activities are scheduled to occur. QAPP references in Work Plan Sections 1.0 and 4.3 have been updated to reflect planned QAPP revision. The 60 day period is assumed to be sufficient for completion of Agency review.

No.	Ref. Page / Para.	COMMENT	RESPONSE
2.	Section 1.2.3, last sentence, regarding references	It is understood that this investigation needs to lean on past data and conclusions. And no changes to the current text are needed; however, for the Final Report, specific references are needed to direct the reader to where the point being made is demonstrated. General statements such as in Section 1.2.3: "...demonstrated to be inversely correlated with DO and ORP..." must be referenced to where this is explicitly demonstrated, the section and page, and if not, provide a new analysis. Footnotes are preferred, and in the form shown below by an example footnote to the three issues in the FYR. You may choose other methods of referencing, but the Final Report must direct the reader to exactly where the work is shown and not just the document.	Acknowledged. The Final Report will include specific references to direct the reader to where the point is explicitly demonstrated, the section and page, and if not, provide a new analysis.
CLARIFICATIONS			
1.	Section 1.2.1 and 1.2.2, "establishing"	Although there is no need to change the text, Ford will propose background concentrations and the Agencies, after evaluation of the Final Report, will establish the background concentrations. The Agencies must do a decision document to establish new ICLs.	Acknowledged.
2.	Section 3, Monitoring Well Identification and Justification	The lack of a true background requires that Ford assign characteristics to wells that may not be borne out by data collected for this investigation. As such, this section is understood to be fluid and that Ford may alter its consideration of each well as the investigation proceeds. In the Final Report any changes to a well's status must document the initial consideration, the changes, and justification for the change. The Agencies, during their review, may likewise determine that the status of a well might need to be revised and require a revision of the Final Report to accommodate that change.	Acknowledged.

ARCADIS

No.	Ref. Page / Para.	COMMENT	RESPONSE
3.	Section 5.2.3 Results	This section may stand as-is. However, the Agencies will examine the narratives and data for both the statistical methods and the site geochemistry before issuing an analysis of the Final Report or proceeding to any decision document.	Acknowledged.
4.	Final Report	The Final Report must highlight and discuss the recommendations from 2018 and brought forward into the 2023 FYR that the Final Report. To review, those issues are: • Issue 1: Determine background concentrations of metal contaminants and the conditions responsible for continued metal contamination above ICLs, as well as potential cleanup times, in overburden and bedrock groundwater. • Issue 2: Evaluate potential alternative active and passive remedies for all contaminants that exceed ICLs in fractured bedrock groundwater and determine cleanup times for each. • Issue 3: Expand the analyte list for the next sampling round to determine the concentration of all contaminants assigned an ICL in the ROD as well as any identified emerging contaminants, including 1,4-dioxane, that are relevant to the Site in both overburden and bedrock groundwater.	Acknowledged. These issues will be addressed in the Final Report.
5.	Issue 2, Lead	Although RTC #16 points out that there is no ICL for lead, the discussion in the 1992 ROD points to a need for further consideration. Lead will become an analyte at this Site in the future. Consider adding lead back into the analyte list.	Section 4.3 has been updated to include the following: • No ICL was established for lead at the time of the 1992 ROD or as of 2024. Per discussion in the 1992 ROD (page 47), lead present in unfiltered historical samples may not be attributable to site contamination and could be a result of historical sample collection methods employed. Lead will be analyzed to confirm background and on-site concentrations by initial comparing dissolved lead to the 15 ppb cleanup level for groundwater used for drinking water as recommended in the 1990

No.	Ref. Page / Para.	COMMENT	RESPONSE
			memo by the Office of Emergency and Remedial Response and the Office of Waste Program Enforcement.
6.	Issue 3, emerging contaminants	Portions of Issue 3 pre-date the sampling for 1,4-dioxane and PFOS/PFOA. There is no need to sample for these analytes but the narrative for the Final Report should contain a discussion of the sampling and how it aligns with new standards. Make this discussion as explicit as possible such that the Final Report may be used as an FFS if needed.	Acknowledged. Additional 1,4-dioxane sampling will not be conducted. The Final Report will contain an explicit discussion of the sampling and how results align with new standards
7.	CSM	It is expected that the current CSM will be fully revised and that revision will be included in the Final Report.	Acknowledged. A revised CSM will be included in the Final Report.
Lee Rhea_ February 27, 2024			
GENERAL COMMENTS			
1.	General	If an argument is to be made that the elevated arsenic (As) and manganese (Mn) concentrations observed at the site are due to natural variation in their background concentrations, then wells representative of other localities within the greater site area could be sampled several times. The maximum concentrations from wells identified as background could be taken as site background, as the non-parametric 95-95 Upper Tolerance Limit (UTL) is approximately equal to this value.	Wells identified for sampling in this Work Plan are intended to be sufficient for determination of background. We will sample these wells several times to assess natural variation in background concentrations.
2.	General	Why are travel times between the near edge of the source area and wells outside it not plotted on figures and discussed? Given that the site is a groundwater divide this information is important to identify candidate background wells in the site locality.	The Final Report will include estimated travel times from wells near the edge of the source area to select non-source area wells. This will in part confirm which wells are appropriate for use as background.
3.	General	Is the weathered bedrock treated hydrologically as part of the overburden or bedrock?	Weathered bedrock is treated hydrologically as part of the overburden. Additional assessment of contaminants in this zone is planned.

No.	Ref. Page / Para.	COMMENT	RESPONSE
4.	General	It is recommended to not skip wells when gathering water levels. This practice reduces the observed variation and makes contour plan maps appear smoother and more certain than they actually are.	Acknowledged and agreed.
5.	General	Agreed, the available groundwater head contour plans for bedrock do not appear to comport with historical plume extents because the bedrock groundwater is preferentially flowing in fractures. More groundwater contour plans are needed for both the overburden and bedrock. Plans should be prepared for the dates of overall-average low-water-levels, overall-average average-water-levels, and overall-average high-water-levels. Perhaps groundwater contaminant concentrations could be used to co-Krige the piezometric surfaces? It is difficult, without this information, to assess the likelihood of a locality well as a background well, and locations for additional background wells.	Acknowledged. Additional groundwater contour plans for both overburden and bedrock will be provided as part of the Final Report.
6.	General	It is recommended that wells not be abandoned yet. The monitoring well network should be sampled after remediation goals are met to "ensure" rebound does not exceed applicable regulatory standards.	Acknowledged and agreed.
SPECIFIC COMMENTS			
1.	Section 1.2.1	There is reasonable disagreement about whether As and Mn are safely assumed to not be associated with site releases. Please add a statement that acknowledges there are not sufficient records to eliminate the possibility of metal releases at the site.	The statement in Section 1.2.1 has been qualified by adding: *"Based on available site records," dissolved As and MN are not directly associated with releases at the "Site…*
2.	Section 1.2.4	The study area should be expanded to the greater area where localities similar to the site are included. Then As and Mn background samples can be collected from them and compared to site locality concentrations.	Similar to General Comment #1, wells identified for sampling in this Work Plan are intended to be sufficiently indicative of background without the need to expand the study area. These wells will be sampled several times to assess natural variation in background concentrations.

No.	Ref. Page / Para.	COMMENT	RESPONSE
3.	Section 5	The proposed methodology of calculating background concentrations is not recommended. The methodologies recommended by EPA do not include using derived data. The original data must be used.	In as much as we agree that original data is generally preferable to the method proposed, the available data does not lend itself to simply placing the original data into a single data set and computing a background threshold value (BTV). The number of samples from the wells for which we have data varies widely from well to well. To use the original data would overrepresent wells that have been sampled only once.
4.	Section 5.1.4	How will cross-well comparisons and statistics be calculated if the wells have had different transformations applied to them? If statistics are calculated from them there is no way to back-transform the result.	How a value was assigned to each monitoring well used in computing the BTVs is a separate issue from the actual calculation of the BTV itself (see response to General Comment 3). Assigning a concentration to an individual monitoring well is an independent matter from the BTV calculation. For example, what statistical distribution would one assign to a monitoring well for which only two measurements are available? What if there is one measurement?
5.	Section 5.1.6	Derived data (such as means) should not be used to compute background concentrations.	See response to General Comment 3. Arcadis does not disagree with the theory and doctrines in General Comments 3 and 7. However, we must deal with the actual available data set at hand.
6.	Section 5.1.6.1	Use of a non-parametric 95-95UTL method will identify a value near the highest observed concentration of the analyte of interest as background. This method of determining background should be considered, after removing outliers as described previously in the workplan.	We agree with the implication of this comment, that if the data from the monitoring wells were to be comingled as suggested in General Comment 3, the result would most likely fail a normality test, even after transformations were attempted. Thus, the BTV would indeed end up being the maximum, or near the maximum.
7.	Section 5.2.2.2	It is inappropriate to mix different measures of central tendency and compute a statistic from them, because there is no way to do a valid back-transform of the result. However, it is stated in Section 5.2.2.1 that all the data was normally distributed.	See responses to General Comments 3 and 4.

No.	Ref. Page / Para.	COMMENT	RESPONSE
8.	Table 2	Highlighting is missing for arsenic exceedances in Private Residential Supply Wells.	Table 2 has been modified to bold arsenic exceedances in Private Residential Supply Wells, as applicable.
9.	Figures	Where are the (key) Figures 1-6? Mislabeled?	(Key) Figures 1-6 were included in the July 27, 2022 Work Plan PDF submittal between the Tables and Appendix A- CSM.
10.	Table 2-1	Please sort table by Monitoring Zone, then Installation Date.	Work product associated with Specific Comments 10 through 16 relate to the July 2022 CSM, included as Appendix A of the Work Plan. These changes will be made when the CSM is updated as part of the Final Report.
11.	Table 2-3	Please contour the vertical gradients. Add contours by dates of overall minimum, average, and maximum gradients.	
12.	Figure 4-2	Why are arsenic and manganese background data for overburden not limited to upgradient wells, as evidenced by piezometric head contours and no detections of VOCs? If nonparametric methods are used the highest observed concentration from the ensemble of background wells will be equivalent to the calculated value.	
13.	Figure 4-2	Why are arsenic and manganese background data for bedrock not limited to upgradient wells, as evidenced by piezometric head contours and no detections of VOCs? If nonparametric methods are used the highest observed concentration from the ensemble of background wells will be equivalent to the calculated value.	
14.	Figure 4-2	Injection is spelled “Inection”.	
15.	Figure 3-8, 4-2, 4-6	The Sanborn Head reference appears to have another reference incorporated with it, rather than stating on a separate line.	
16.	References	The indentation for the USGS/USEPA reference is wrong.	
END OF COMMENTS			