Magna Metals Superfund Site Draft Remedial Investigation / Feasibility Study (RI/FS) Work Plan

Volume 1

United States Environmental Protection Agency
Magna Metals Superfund Site
Remedial Investigation / Feasibility Study
Town of Cortlandt
Westchester County, New York

Contract No. EP-W-09-009
Work Assignment No. 052-RICO-A28a

September 2019

EPA WORK ASSIGNMENT NUMBER: 052-RICO-A28A

EPA CONTRACT NUMBER: EP-W-09-009

HDR

RAC 2 PROGRAM

DRAFT
REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS)
MAGNA METALS SUPERFUND SITE
WORK PLAN
VOLUME I

TOWN OF CORTLANDT

WESTCHESTER COUNTY, NEW YORK

SEPTEMBER 2019

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Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
AVS-SEM	acid volatile sulfide/simultaneously extracted metals
Baker	Baker Capital Limited Partnership
BHHRA	Baseline Human Health Risk Assessment
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COPCs	Chemicals of Potential Concern
CRP	Community Relations Plan
CSF	cancer slope factor
CSIA	Compound Specific Isotope Analysis
CSM	Conceptual Site Model
DESA	Division of Environmental Science and Assessment
DESR	Data Evaluation Summary Report
EPA	United States Environmental Protection Agency
EPCs	exposure point concentrations
ESAT	Environmental Services Assistance Team
FASTAC	Field and Analytical Services Teaming Advisory Committee
HASP	Health and Safety Plan
HDR	Henningson, Durham & Richardson Architecture & Engineering, P.C. in association with HDR Engineering, Inc.
HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HI	Hazard Index
HSA	Hollow Stem Auger
HQ	Hazard Quotient
IAs	Interagency Agreements
IDW	Investigative Derived Waste
IRIS	Integrated Risk Information System
IURs	inhalation unit risks
MDC	maximum detection concentration
mg/kg	milligrams per kilogram
NCP	National Contingency Plan
NTU	Nephelometric Turbidity Units
NYSDEC	New York City State Department of Environmental Conservation
OSWER	Office of Solid Waste and Emergency Response
PAR	Pathway Analysis Report
PCBs	polychlorinated biphenyls
PDI	Pre-Design Investigation
PFAS	Per- and polyfluoroalkyl substances
PP	Proposed Plan
ppb	parts per billion
PPRTVs	Provisional Peer Reviewed Toxicity Values
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan

QMP	Quality Management Plan
RAC	Remedial Action Contract
RAGS	Risk Assessment Guidelines for Superfund
RfC	reference concentration
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RSCC	Regional Sample Control Coordinator
RSL	Regional Screening Level
SAS	Specific Analytical Services
SOP	Standard Operating Procedures
SOW	Statement of Work
SVOCs	semi-volatile organic compounds
TAL	target analyte list
TBC	to be considered
TCE	trichloroethene
TCL	target compound list
TOC	total organic carbon
UFP	Uniform Federal Policy
UCL	upper confidence limit
VOCs	Volatile Organic Compounds
WAM	Work Assignment Manager
WCHD	Westchester County Health Department

SECTION 1 - INTRODUCTION

1.1 General Information

This draft Work Plan was prepared for the United States Environmental Protection Agency (EPA) by Henningson, Durham and Richardson Architecture and Engineering, P.C. in association with HDR Engineering, Inc. (HDR) to provide a scope of work for the Remedial Investigation and Feasibility Study (RI/FS) activities to investigate the overall nature and extent of contamination and develop remedial alternatives at the former Magna Metals Superfund Site (Site), in Cortlandt, Westchester County, New York (Figure 1). This draft Work Plan was prepared based upon the March 28, 2019 Statement of Work (SOW), discussions with the EPA during the scoping meeting held on April 23, 2019, and the September 11, 2019 SOW Amendment Number 3, The RI/FS is being performed under Work Assignment Number 052-RICO-A28A, under the EPA Remedial Action Contract (RAC) 2 Contract Number EP-W-09-009.

In accordance with Work Assignment Amendment 3, the current period of performance is September 21, 2018 to December 30, 2019; however, the initial SOW (under Task 1.1) assumes the period of performance extends through March 4, 2021, which was used to prepare the project schedule. The anticipated RI/FS project schedule is included as Figure 2 and a deliverables schedule is included as Table 1 of this Work Plan (Volume 1). A Work Plan Cost Estimate is submitted separately to EPA as Volume 2.

Tasks that will be conducted during the RI/FS include:

- Review and evaluation of existing information, including review of existing files from the New York State Department of Environmental Conservation (NYSDEC);
- Limited site surveys and reconnaissance;
- Collection and analyses of soil, sediment, surface water, and groundwater samples; and
- Completion of reports.

The proposed task list above reflects the tasks identified in the SOW and SOW Amendment. Additional activities for the RI/FS will include project administration, data reduction and evaluation, risk assessment, the generation of RI and FS reports, and remedial alternatives screening and evaluation. No work beyond that described in EPA's SOW, SOW Amendment, or this Work Plan will be initiated prior to obtaining EPA approval.

1.2 Purpose

The purpose of this Work Plan is to describe the framework and requirements for performing the RI/FS which will determine the nature and extent of the contamination at the site. During the RI/FS, investigations will take place to assess the nature and extent of contamination, and develop and evaluate potential remedial alternatives for use at the Site. A primary goal is to develop the minimum amount of data necessary to support the

selection of an approach for site remediation, and then use this data in the preparation of a Proposed Plan (PP) and a Record of Decision (ROD).

SECTION 2 - SITE BACKGROUND INFORMATION

2.1 Site Description

The former Magna Metals site is located at 510 Furnace Dock Road in Cortlandt, Westchester County, New York. The site is surrounded to the north, south and east by residential areas, and a NYSDEC regulated wetland to the south. Furnace Brook traverses the site, approximately 300 feet (ft) west of the former Magna Metals building, flowing south into the wetland area and pond. An unnamed tributary, flows southwest along the southern property line from the direction of Furnace Dock Road, and discharges to Furnace Brook in the vicinity of the wetland area and off-site pond. The property is currently zoned MD – Designed Industrial which is intended to permit industrial development and commercial activities.

The property is approximately 26 acres and consists of small and large buildings located in the southern portion of the property. The northern portion of the property is wooded. The property is currently owned by Baker Capital Limited Partnership (Baker) who acquired the property by ISC Properties, Inc. in 1982. Baker currently leases the buildings for uses such as offices, a laboratory, and warehousing.

The former Magna Metals building was demolished in 2013 during work performed by the NYSDEC and only the concrete slab and footings remain.

2.2 Site Background/History

Magna Metals conducted metal plating, polishing, and lacquering operations at the facility from 1955 to June 1979. During operations, liquid waste containing metals was discharged to a series of leach pits located behind the former Magna Metals building resulting in contamination of on-site and off-site soils and sediments. Spent trichloroethene (TCE) was drummed on-site, and alleged to have also been discharged to the septic system.

Initial investigations at the property were conducted by the Westchester County Health Department (WCHD) in October 1978. Both water/wastewater and soil and sediment samples were collected. Exact sample locations are unknown but sample results exceeded the groundwater standards and health based soil standards for one or more contaminants. Subsequent to that initial sampling event WCHD conducted additional investigations in the leach pit overflow area in December 1978 with personnel from the NYSDEC.

As a follow up to the investigations EP toxicity testing of four samples collected from the leach pits was conducted in August 1982. Based on the results NYSDEC determined no remedial action was required at that time.

In December 1982; February 1983; and March 1983 the WCHD conducted additional water pollution investigations on the site property and in Furnace Brook. Results of the investigations showed that several chlorinated volatile organic compounds (VOCs) were

detected in Furnace Brook and levels of TCE were detected in the septic tank and the leaching pit off the septic tank.

In 1984 NYSDEC conducted another investigation and collected water samples, surface water samples, sediment and sludge samples. Surface water samples consistently resulted in detections of low concentrations (i.e., generally less than detection limits) of 12 of the 13 priority pollutant metals analyzed. Water samples from the septic tank and leaching pit contained elevated concentrations of arsenic, selenium, copper, nickel, and zinc. Trace metals in sediment samples indicated similar trends, i.e., the 12 priority pollutants were essentially present at background levels; copper was slightly elevated. Sludge samples collected from leaching pits however, contained elevated arsenic, selenium, cadmium, chromium, copper, nickel, silver, and zinc. Pesticides and polychlorinated biphenyls (PCBs) were not detected in any of the water samples. EP Toxicity tests for the two sludge samples resulted in concentrations below the allowable maximum EP toxicity concentration and generally less than detection limits. Water samples indicated elevated TCE levels in the septic tank (15,000 ppb) and in leaching pit 4 (190 ppb). Trans-1,2-dichloroethene was also detected in the surface water samples, with concentrations in the downstream and in the septic tank samples. Sediment and sludge samples contained detectable concentrations of six VOCs. Acetone, trans-1,2-dichloroethene, TCE, and vinyl chloride were present in the brook sediments, while TCE, xylenes, and ethylbenzene were detected in the sludge samples collected from leaching pits.

In May 1996 the prior owner ISC Properties, Inc. (ISC), entered into an Order of Consent with NYSDEC to complete an RI/FS. The RI activities were conducted from 1997 to 2003 and included the location of septic/seepage pits, installation of 12 monitoring wells (10 overburden and 2 bedrock), and the collection of soil, sediment, surface water and groundwater samples. Samples were analyzed for VOCs, semi-volatile-VOCs (SVOCs), target compound list (TCL) pesticides and PCBs and Target Analyte List (TAL) metals and cyanide. Based on the seepage pit/septic tank survey a total of 13 leach pits/septic tanks were identified. Analytical results indicated the presence of arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, selenium, and zinc at concentrations significantly above background levels and above NYSDEC recommended soil cleanup criteria.

In 2006 and 2007 ISC conducted a soil vapor intrusion study for the on-site building. As a result of the investigation a sub slab depressurization was installed in the larger building located on site.

Following issuance of the ROD in 2011, a Pre-Design Investigation (PDI) was conducted from 2013 to 2015. Results from soil and sediment samples collected as part of the PDI confirmed the presence of contaminated soil; analytical results showed arsenic, cadmium, chromium, copper, cyanide, lead, nickel, selenium, and zinc at concentrations significantly above background levels.

SECTION 3 - TASK DESCRIPTIONS AND ASSUMPTIONS

3.1 Task 1- Project Planning and Support

3.1.1 Subtask 1.1: Project Administration

HDR will provide project administration and management support to complete the work assignment. The HDR project team will consist of the Program Manager, Project Manager, Project Engineers/Scientists, and support staff, as appropriate. The Project Manager will be the primary interface between the EPA Work Assignment Manager (WAM) and technical staff. The Project Manager will manage day to day activities, interface with the EPA WAM on a weekly basis, provide bi-weekly invoice inputs to HDR EBS (HDR's automated financial management system), attend project meetings, oversee and coordinate the project, and manage project staff, budget, and task schedules.

Project Administration time has been estimated to direct and manage efforts including staffing plans, budget tracking, project scheduling and establishing internal quality management procedures. The activities under Project Administration include project initiation, financial and recordkeeping/filing, monthly coordination and preparation of monthly reports, weekly status calls with the WAM and associated follow-up calls.

Efforts will be made to minimize production of hardcopy documents, where appropriate, in favor of electronic deliverables and transmittals. Where hardcopies are produced HDR will utilize paper made from a minimum 50% postconsumer recovered material in accordance with the contract requirements.

In accordance with the initial SOW, Project Administration will be provided through the end of the period of performance, March 4, 2021.

3.1.2 Subtask 1.2: Scoping Meeting

The HDR project team (Project Manager, Program Manager, and a technical person via teleconference) participated in a scoping meeting with EPA at the EPA Region 2 Office in New York, NY on April 23, 2019. Draft meeting minutes were distributed for review on April 26, 2019 and finalized on April 30, 2019.

3.1.3 Subtask 1.3: Conduct Site Visit

HDR conducted a site visit with the WAM on May 6, 2019. The site visit included two HDR personnel, the Project Manager and one technical person.

3.1.4 Subtask 1.4: Prepare Draft Work Plan and Cost Estimate

This draft work plan was prepared by HDR in accordance with the contract terms and conditions, the EPA issued SOW, SOW Amendment, and other available background/existing site information. This draft work plan provides a detailed description of the technical approach for the RI/FS activities in accordance with the SOW and SOW Amendment and specifies the necessary procedures, inspections, deliverables, and schedule.

3.1.5 Subtask 1.5: Negotiate and Prepare Final Work Plan and Budget

Following the preparation of this draft Work Plan, HDR will negotiate the Work Plan with EPA via teleconference. HDR will prepare teleconference meeting minutes and submit a revised Work Plan and budget that will incorporate the agreements made during the negotiations including a summary of the negotiations. HDR will submit the revised Work Plan and budget in both hardcopy and electronic formats (e.g., Word.doc files and Excel spreadsheets).

3.1.6 Subtask 1.6: Evaluate Existing Data and Documents

HDR will review and evaluate available existing site background information and documentation pertaining to the site, including all studies and investigations performed at the site, as provided or identified by the EPA WAM. The documents to be reviewed by HDR include the following:

- EPA and NYSDEC files and records

3.1.7 Subtask 1.7: Quality Assurance Project Plan

HDR will prepare a Quality Assurance Project Plan (QAPP) in accordance with the current Uniform Federal Policy (UFP) for QAPPs Manual (EPA-505-B-04-900A), current EPA Region 2 RAC QAPP guidance and procedures, and HDR's EPA-approved quality management plan and QAPP for this contract. The QAPP will provide for collection of data sufficient to delineate site-related contamination in potentially affected media, to the extent necessary to select an appropriate remedy; to evaluate cross-media contaminant transport (e.g., groundwater to surface water or soil to groundwater) as necessary to support the assessment of risks associated with potential or actual exposures to site-related contamination under current and reasonably likely future conditions; and to evaluate remedial alternatives that address site-related contamination.

Information to be provided in the QAPP includes:

- Project sampling objectives;
- A project organizational chart;
- Standard Operating Procedures (SOPs) for the RI field activities, including required sampling equipment;
- Quantitative and/or qualitative criteria to evaluate achievement of objectives;
- Sample documentation and chain-of-custody procedures;
- Sample handling, preservation, and shipment procedures;
- A table of sample numbers, matrices, locations, collection frequencies, and analytical methods;
- A breakout of samples to be analyzed via the EPA Contract Laboratory Program (CLP), the EPA Region 2 Division of Environmental Science and Assessment (DESA) Laboratory, and/or other Non-CLP providers;
- Calibration and maintenance procedures and requirements;
- Quality assurance/quality control (QA/QC) protocols and sample requirements;

- Requirements for project assessments/audits;
- Procedures for data reduction, validation, and reporting;
- Description of report deliverables; and
- Corrective action procedures.

The sampling activities to be completed under this Work Plan include the collection of soil, sediment, surface water, and groundwater samples.

3.1.8 Subtask 1.8: Health and Safety Plan

HDR will prepare a site-specific Health and Safety Plan (HASP) that specifies employee training, protective equipment, medical surveillance requirements, SOPs and a contingency plan in accordance with 29 Code of Federal Regulations (CFR) 1910.120 (l)(1) and (l)(2). The plan will address employee training, protective equipment, medical surveillance requirements, SOPs, and a contingency plan in accordance with 40 CFR 300.150 of the National Contingency Plan (NCP) and 29 CFR 1910.120 1(1) and (1)(2).

3.1.9 Subtask 1.9: Non-RAS Analyses

HDR will follow EPA Region 2's Field and Analytical Services Teaming Advisory Committee (FASTAC) procedures. For all non-time critical data collection projects, the FASTAC approach requires that a sequential decision tree for procuring Superfund analytical services be followed, which includes:

- Tier 1: EPA Region 2 DESA laboratory (with Environmental Services Assistance Team [ESAT] support);
- Tier 2: National Analytical Services Contract laboratories (CLP and Non-RAS);
- Tier 3: Region Specific Analytical Services (SAS) Contract laboratories; and
- Tier 4: Contractor, Interagency Agreements (IAs), and Field Contractor Subcontract laboratories.

HDR will follow the FASTAC strategy unless written direction is provided by the EPA to deviate from it. This letter will be submitted to the Regional Sample Control Coordinator (RSCC) along with the sample.

In the event that analytical services cannot be provided through Tiers 1 through 3, HDR will subcontract these services. HDR will provide oversight of subcontract laboratories through periodic performance evaluation sample analyses and/or on-site audits of operations. HDR will be prepared to implement corrective actions in any cases in which the subcontract laboratory's performance does not meet the standards called for in this work assignment. The following activities are included:

- HDR will prepare Laboratory Services Requests (e.g., statements of work) for all non-RAS parameters. The Laboratory Services Request(s) will include the following elements:

- digestion/analytical methods
- data deliverable requirements
- quality control (QC) requirements
- estimated number of samples
- method restrictions and penalties for non-compliance
- turn-around times

- HDR will develop QC criteria for each parameter provided in the approved QAPP that will be incorporated in the Laboratory Service Request.

- At EPA's request, HDR will provide copies of Laboratory Services Requests for review by the EPA WAM. Prior to acquiring analytical services by subcontract, HDR shall make use of Tier 1, 2, and 3 alternatives for these services under the FASTAC approach, which is described below:

Validation of data generated using Tier 1 and Tier 2 of the FASTAC strategy will be performed by EPA Region 2 staff (discussed under Task 5). All HDR procured data validation through Tier 4 of the FASTAC strategy will be validated by personnel not connected to the laboratory performing the analysis.

HDR anticipates a subcontracted laboratory will be required at least for Compound Specific Isotope Analysis (CSIA) and evaluation, geotechnical, sediment toxicity, and per- and polyfluoroalkyl substances (PFAS) sample analyses.

3.1.10 Subtask 1.10: Meetings

HDR will participate in progress meetings during the course of this work assignment. HDR has assumed two face-to-face meetings at the EPA Region 2 office in New York and two face-to-face meetings at the Site. Each meeting will be attended by two persons which will include the PM and one technical person. HDR will submit meeting minutes to the EPA within five calendar days after each meeting.

3.1.11 Subtask 1.11: Subcontract Procurement

HDR will solicit and award subcontracts necessary to perform the requirements of the SOW. Subcontractors will include:

- Driller for groundwater well installation and soil sampling;

- Surveyor;

- Investigative Derived Waste (IDW) Management, Transportation and Disposal;

- Borehole geophysics;

- Stenographer, and

- Equipment rental.

3.1.12 Subtask 1.12: Subcontract Management

HDR will perform management and oversight of all subcontracts needed to support the remedial design activities. HDR will institute procedures to monitor progress and maintain systems and records to demonstrate that the work proceeds in accordance with the requirements of the SOW and the contract. HDR will review and approve the subcontractors' invoices and issue any necessary subcontract modifications.

3.1.13 Subtask 1.13: Pathway Analysis Report (PAR)

HDR will prepare a Pathways Analysis Report (PAR) in accordance with OSWER Directive 9285.7-01D-1 dated December 2001 entitled, "*Risk Assessment Guidelines for Superfund Part D*" (RAGS Part D) (EPA 2001b) and input from the EPA Regional Risk Assessor assigned to the project. The PAR will be submitted 21 days after submission of the Data Evaluation Summary Report (DESR) described in Subtask 6.4.

The PAR will describe the risk characterization process and how the risk assessment will be prepared, in order to allow the risk assessors to demonstrate that the proper guidance and methodologies are followed. The PAR will contain information necessary for a reviewer to understand how the risks associated with contaminants detected in the study area will be addressed, including the statistical treatment of the data, the methods to select the contaminants of concern, the exposure pathways, receptors, parameters to be used and current toxicological values. It will include RAGS, Part D Tables 1 through 6, as well as the necessary explanatory text. Because the PAR includes RAGS, Part D Tables 1 through 6, it cannot be completed until all analytical data are available. If HDR recommends additional modeling to address vapor intrusion as part of the Human Health Risk Assessment (HHRA), a description of the model(s) and an explanation of the inputs and assumptions will be included in the PAR so that their appropriateness can be determined. Outputs/results will be provided in the Draft HHRA.

The PAR will precede preparation of the Draft HHRA (Subtask 7.1) for the OU2 study area. The PAR will present the methodologies used for the background review, data evaluation, exposure assessment, toxicity assessment, and associated RAGS Part D tables required for the Draft HHRA. Preparation of the Draft HHRA, which is contingent upon approval of the PAR by EPA Region 2, is discussed in detail in Section 3.7.1 of this Work Plan.

The following subsections discuss the anticipated components of the PAR.

Background Review / Exposure Setting

The background review will summarize the site history, current and future land use scenarios, and present a BHHRA Conceptual Site Model for the Site. The human health CSM may evolve throughout the RI/FS, based on information obtained and interpretations made.

A site reconnaissance will be conducted and will include field surveys to identify potential environmental migration pathways, potential human receptors, possible human exposure

routes, and site conditions / human activities of relevance (e.g., exposure to potentially impacted sediment / surface water via trespassing or recreating). Information collected during the site reconnaissance activities will be incorporated into the PAR.

The PAR will present the project's BHHRA Conceptual Site Model that will be developed based on the background review and site reconnaissance work. One or more tables (based on RAGS guidance) will identify the human health receptors / land uses, scenario time frames, exposure media and exposure points, receptor populations and ages, and rationales for selecting or excluding potential exposure pathways. Based on a preliminary review of available background information, the following have been identified as potential exposure areas and exposure pathways to be presented and addressed in the PAR. Current and future land use scenarios will be identified and discussed as appropriate.

- Former Magna Metals Building and Property – Soils, groundwater, air (adult worker; adolescent trespasser) *It is noted that an active sub-slab depressurization system (SSDS) is operational in a commercial building at the site*
- Residential areas – surface soil, groundwater (child; adult plus construction worker exposures) *It is assumed that off-site vapor intrusion will not be addressed in the PAR or BHHRA*
- Recreation areas (waterbodies) – sediment and surface water (Furnace Brook, unnamed tributary and ponds) (child and adult recreators, including potential exposure by school occupants)
- Recreation areas (upland) – surface soils (child and adult recreators)

Note that the above inventory may be modified following the exposure setting review and site reconnaissance.

Media of interest for the PAR may include all or a subset of the following:

- Surface soil
- Subsurface soil
- Groundwater-to-Indoor Air / Soil Gas (as provided by EPA for inclusion in risk assessment documents; it is noted that an active SSDS is operational in a commercial building at the site, and that it is assumed that off-site vapor intrusion will not be addressed in the PAR or BHHRA)
- Surface Water (including drainage structures)
- Sediment
- Groundwater (direct contact; potable pathway)

The background review will also obtain an updated summary of any vapor intrusion assessment work being conducted by EPA and present descriptions of existing sub-slab soil gas and indoor data, forecasted sampling and assessment work, and mitigation measures (such as installation of sub-slab depressurization systems) that have been implemented or planned. As such, evaluation of soil gas or indoor air data is not assumed to be required for the PAR or BHHRA. For developing scopes and budget estimates for

the PAR and BHHRA, HDR also notes that evaluation of fish tissue data and the fish ingestion exposure route is **not** assumed to be required for these tasks.

Data Evaluation

HDR will review available information on the contaminants present in all soil, groundwater, surface water, sediment, and air at the site and will identify the major Chemicals of Potential Concern (COPCs). Data sets to be evaluated in the risk assessment include:

- RI data to be collected by HDR (see Section 3.3 [Task 3] of this Work Plan);
- NYSDEC PDI data (2013 - 2015)

Historic data (e.g., 2007 and earlier) will be evaluated qualitatively in the RI and in the PAR and BHHRA.

Information to be used in identifying COPCs will be derived from site-specific findings made during the site reconnaissance, select historic analytical data (i.e., NYSDEC, or other sources, as noted above), and analytical results acquired during the RI. HDR assumes for this Work Plan that separate exposure units aside from the ones noted above will not be necessary for the PAR and BHHRA tasks. However, if the need to separate areas and data groupings is identified, the risk assessment scopes may need to be modified.

Once the analytical data are compiled and tabulated, a multi-step screening process will be used to identify the COPCs to be retained for the BHHRA. The specific steps followed in this process are described in EPA RAGS Part A (EPA, 1989) and presented below. Validated data as defined in RAGS Part A (EPA, 1989) and the "Guidance for Data Usability in Risk Assessment (Part A)," (EPA, 1992b) will be used in the BHHRA. However, other existing data that does not meet the above-referenced data validation requirements may be evaluated to present a separate qualitative discussion in the BHHRA.

The COPC selection process will be conducted as follows:

Frequency of Detection – Constituents occurring at a low frequency of detection (less than 1 detection in 20 samples) may be eliminated from the COPC list in accordance with RAGS guidance (EPA, 1989).

Known Human Carcinogens - A chemical classified as a known human carcinogen (weight-of-evidence classification A) will be retained as a COPC, regardless of concentration or frequency of detection. EPA's weight-of-evidence classification system will be discussed in greater detail in the BHHRA.

Essential Nutrients - Naturally occurring elements considered essential for human nutrition (calcium, magnesium, potassium, and sodium) will be eliminated from the COPC list in accordance with RAGS Part A guidance (EPA, 1989). In addition, area "background" data for inorganics concentrations in soils (as may be available from EPA or NYSDEC) may also be evaluated to screen COPCs.

Comparison to Risk-Based Screening Criteria - The maximum concentration of each chemical will be compared to a risk-based screening value. Chemicals whose maximum detected concentration (MDC) are below the screening value will be eliminated from the COPC list. Screening toxicity values will be derived from the most up-to-date version of EPA's "Regional Screening Levels (RSL) for Chemical Contaminants at Superfund Sites for residential-use soil (to evaluate soil and sediment data), tap water (for groundwater and surface water data), and for residential air concentrations (if needed) (EPA 2019). The RSLs will correspond to the screening toxicity values associated with a 10^{-6} risk for carcinogenic effects or a noncarcinogenic hazard index of 0.1. (Note: Using 10 percent of the screening criteria for noncarcinogens [i.e., HI of 0.1] is recommended by EPA).

Chemicals without Available Toxicological Data - If there is no screening toxicity value for a detected chemical, that chemical will be retained as a COPC.

The resulting COPCs will be summarized in tables titled, "Occurrence, Distribution, and Selection of Chemicals of Potential Concern." The following information will be included in the table: minimum and maximum concentrations, data qualifiers, units, detection frequency, range of detection limits, concentration used for screening, background value, screening toxicity value, potential Applicable or Relevant and Appropriate Requirement (ARAR)/To Be Considered (TBC) value (s), whether or not that chemical was selected as a COPC for this risk assessment (COPC flag), and the rationale for the chemical's deletion or selection.

Exposure Pathway Analysis / Exposure Assessment

An exposure assessment will be performed to identify potential human receptors and exposure routes, and calculate magnitudes of actual or potential human exposures based on contaminant concentrations, frequency of occurrence, and duration of exposure. The exposure assessment addresses each potential current and future exposure pathway, focusing primarily on the media of interest identified above at the various locations identified throughout the Site.

Exposure point concentrations (EPCs) will be calculated for each media, by site and/or specific area of interest (e.g., water body or residential area), as appropriate. The EPCs will be presented in RAGS tables titled, "Medium-Specific Exposure Point Concentration Summary." The EPCs will represent the lesser of the maximum detected concentration or the calculated 95% upper confidence limit (UCL) for the arithmetic mean concentration. The UCL will be calculated using the statistical methods, as recommended or approved

by EPA Region 2. The data distribution for each COPC will be determined and a UCL concentration will be selected.

The exposure parameters for the proposed scenarios will be presented in RAGS tables, "Values Used For Daily Intake Calculations." They will represent EPA's Reasonable Maximum Exposure (RME) scenario in order to facilitate risk management. Relevant equations for assessing intakes and exposure factors will be obtained from RAGS Part A (USEPA, 1989), Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry (USEPA, 1994), EPA's Exposure Factors Handbook (EFH) and OSWER exposure factor updates (2014), EPA's most recent guidance on assessing risks to dermal exposures presented in RAGS Part E (EPA, August 16, 2004), and recent EPA guidance. CT scenarios will be evaluated if the risk estimates exceed EPA's acceptable target risk criteria. The RME case will generally be based on default exposure factors and 95th percentile exposure values from the EFH. The CT case will generally be based on the standard default exposure factors (EPA, 1991) and, where appropriate, the 50th percentile exposure values from the EFH. Bioavailability of all constituents will conservatively be assumed to be 100 percent, except where alternate factors are available for specific chemicals.

Fate and transport modeling (e.g., modeling particulate and volatile emissions from soil and modeling VOC release during showering) will be considered with EPA R2 as additional site reconnaissance information and data are assessed and become available. No additional fate and transport modeling is included in the budget estimate at this time. It is understood that indoor air vapor intrusion pathway assessments may be conducted by EPA R2, and data obtained from the EPA WAM will be incorporated into the BHHRA.

Toxicological Evaluation

For the PAR, tables presenting the toxicological information for COPCs will be included for EPA review. The COPCs will be evaluated based on their intrinsic toxicological properties as either non-carcinogens (i.e., systemic toxicants) or carcinogens. Quantitative toxicity indices that describe the relationship between exposure resulting in a calculated dose (concentration x chemical intake), and the likelihood of that exposure to result in adverse health effects (response), will be selected in the PAR for EPA review and for use in the BHHRA. For non-carcinogens, the toxicity indices are reference doses (RfDs) or reference concentrations (RfCs). For carcinogens, the toxicity indices are cancer slope factors (CSFs) or inhalation unit risks (IURs). Toxicity data for the selected COPCs will be obtained from the EPA with the following hierarchy of sources: EPA RSL Table (most up-to-date version); the Integrated Risk Information System (IRIS) database (EPA), EPA's Provisional Peer Reviewed Toxicity Values (PPRTVs), other toxicity values, including those of the Agency for Toxic Substances and Disease Registry (ATSDR) and the Health Effects Assessment Summary Tables (HEAST) (EPA, 1997b).

Oral RfDs and CSFs are typically based on administered dose (i.e., oral or inhalation exposure routes). The methodologies for evaluating dermal absorption are based on an estimation of absorbed dose. Therefore, for evaluating dermal exposures, oral toxicity

factors will be adjusted to represent an absorbed rather than an administered dose. Consistent with the EPA guidance on dermal risk assessment (EPA, 2004d) and in consultation with EPA Region 2, an adjustment will be made when the following conditions are met:

- The toxicity factor from the critical study is based on an administered dose; and
- A scientifically defensible database demonstrates that the gastrointestinal absorption of the chemical is significantly less than 100% (i.e., 50%).

If these conditions are not met, no adjustment will be made and a default value of complete (i.e., 100%) absorption will be conservatively assumed.

3.2 Task 2 - Community Relations

The HDR project team will provide community relations support to EPA throughout the RI/FS in accordance with the Superfund Community Involvement Handbook, EPA, Office of Emergency and Remedial Response, EPA 540-K-05-003, April 2005.

3.2.1 Subtask 2.1 Community Interviews – Not Applicable

3.2.2 Subtask 2.2 Community Relations Plan – Not Applicable

3.2.3 Subtask 2.3 Public Meeting Support

HDR will perform the following activities:

- Make arrangements for the public meetings/availability sessions, including the reservation of appropriate meeting space (assumed to be at no cost to the Government).
- Attend two public meetings (RI/FS Scoping and Proposed Plan) and prepare presentation materials/handouts.
- Prepare Draft and Final Public Meeting Visual Aids in Power Point. HDR will develop draft visual aids (i.e. slides and handouts) and final visual aids incorporating all EPA comments. For budgeting purposes HDR has assumed 25 PowerPoint slides and 50 handouts for each public meeting.
- Reserve a court reporter for the public meeting associated with the release of the Proposed Plan. HDR will provide a full-page original and an electronic version of the transcript.

3.2.4 Subtask 2.4 Fact Sheet Preparation

HDR will prepare draft information letters/updates/fact sheets in accordance with the approved Community Relations Plan (CRP) Tasks include the following:

- Draft Fact Sheets: HDR will prepare 2 fact sheets (1 fact sheet for each meeting), each consisting of 6 to 8 pages in length and with 2 illustrations. HDR will research, write, edit, design, layout, and photocopy the fact sheets.

- Final Information Letters/Updates/Fact Sheets: HDR will prepare final documents incorporating all EPA review comments. HDR will then attach mailing labels to the fact sheets before delivering them to EPA from where they will be mailed.

3.2.5 Subtask 2.5 Proposed Plan Support

EPA will prepare the Proposed Plan. HDR will provide administrative and technical support for the preparation of the draft and final Proposed Plan describing the preferred alternative and other alternatives evaluated in the FS.

3.2.6 Subtask 2.6 Public Notices

HDR will prepare a newspaper announcement/public notice in local newspapers, in support of the two public meetings. One announcement will be published for each meeting.

3.2.7 Subtask 2.7 Information Repositories

HDR will maintain a local repository. Only documents designated by EPA for inclusion will be placed in the repository.

3.2.8 Subtask 2.8 Site Mailing List

HDR will update the existing Site Mailing list. HDR has assumed 100 entries on the existing list that will need to be reviewed and updated. HDR will provide EPA a copy of the mailing list in an EPA acceptable format on a compact disk.

3.2.9 Subtask 2.9 Responsiveness Summary Support

HDR will provide administrative and technical support for the Site Responsiveness Summary. HDR will prepare a draft Responsiveness Summary compiling and summarizing comments received during the public comment period on the Proposed Plan. HDR will also prepare technical reviews and draft responses for selected technical comments, for EPA's review and use in preparing the formal responses. For budgeting purposes, HDR has assumed receipt of 25 separate comments (including duplicates) and preparation of 25 technical responses.

3.3 Task 3 –Field Investigations

HDR will perform field activities for data acquisition in accordance with the EPA-approved QAPP prepared under Task 1.

3.3.1 Subtask 3.1: Site Reconnaissance

HDR will conduct site surveys covering property, boundary, utility rights-of-way, and topographic information. HDR will use previously performed surveys by other contractors (provided by EPA) and update as necessary. These surveys will include the following activities:

- Topographic Survey: For this activity, HDR has assumed that the previous survey and bathymetry conducted for the onsite areas, lower pond and residential properties will be sufficient for use during the RI/FS activities. A new topographic survey will be conducted for the lower stream and pond area as shown on Figure 3. The new survey work will begin just south of Cross Road and extend along the stream to the Blue Mountain Middle School Property. The topographic survey will be of sufficient quality to use as a base map for remedial alternative evaluation and will include all visible structures within and directly adjacent to the stream and property lines based on tax map information available in GIS. The topographic survey is anticipated to be conducted using aerial photogrammetry. Additionally a bathymetric survey of the lower pond will also be provided.

- On-Property and adjacent properties buildings and other structures delineation: HDR has assumed that the existing survey of the on-site property, upper pond area, wetland and tributary are sufficient for use during the RI/FS activities. No additional survey work to delineate on-site structures is anticipated. During the topographic survey any structures located immediately adjacent to the stream bed and lower pond will be located as part of that work.

- Storm/sanitary sewer line delineation: A majority of the site to be investigated will be along an existing stream bed. Delineation of storm/sanitary sewer lines are not anticipated to be necessary, however any of these features within the boundary of the area proposed to be surveyed will be included as part of the survey.

- HDR will conduct a groundwater well inventory including residential and monitoring wells. Locations of wells which have not already been surveyed will be surveyed as part of the work.

- HDR will have a NYS licensed surveyor locate all borings and samples collected during the RI. Locations of existing samples collected are available to HDR and will be used in evaluating necessary RI/FS activities.

- Photographic Documentation: HDR will take representative photographs to document the field activities and significant events or observations made during the RI activities. Those activities will include mobilization, installation of monitoring wells, collection of samples, and demobilization. HDR will photograph these activities so that the photographs will serve as a clear record of the procedures required to carry out each activity. HDR will also store and maintain the photographs in electronic form and submit them to EPA on CD or DVD. For each photograph, HDR will provide the time, date, location and a brief explanation of what is being photographed.

3.3.2 Subtask 3.2: Mobilization and Demobilization

HDR will provide the necessary personnel, equipment, and materials for mobilization and demobilization to and from the Site. Per the SOW one mobilization and one demobilization is assumed.

Details on the mobilization area, including health and safety zones, the project field office, and IDW staging areas will be presented in the site-specific QAPP and HASP. Mobilization will consist of the following:

- Prepare a list of required field equipment;
- Identify field office space and arrange for staging area for HDR and subcontractor equipment;
- Arrange for field office utilities, as necessary;
- Set-up of health and safety field files;
- Arrange delivery, storage and setup of all equipment, as necessary;
- Receive field activity and health and safety equipment;
- Perform general site preparation/organization;
- Conduct initial health and safety briefing for site personnel; and
- Set-up field computer equipment, office equipment, furniture and field office supplies.

Upon completion of the field activities, demobilization will occur. The following activities will be performed:

- Complete site restoration activities and cleanup;
- Arrange for the transportation and disposal of wastes, including IDW, from the Site;
- Return rental equipment;
- Terminate field office lease and disconnect utilities; and
- Demobilize field, office and computer equipment.

3.3.3 Subtask 3.3: Hydrogeological Assessment/Monitoring Well Installation, Development and Testing

HDR will perform the following activities under this subtask:

- Geophysical surveys that may be applicable and will support the placement of monitoring wells.

- Installation and development of monitoring wells and/or piezometers. For budgeting purposes, HDR has assumed 20 borings will be drilled. Proposed locations will be provided in the QAPP.HDR will record formation cuttings, type, and sorting and drilling rates during the monitoring well installation activities. HDR will also prepare and maintain geophysical logs (gamma, resistivity, and caliper) for each boring.

- Groundwater elevation measurements.

- Compound specific isotope analysis

- Surface water elevation measurements (if surface water areas of concern are identified)

- Well hydraulic testing (i.e., cross-hole testing, pump tests, borehole packer tests)

Geophysical Surveys

Borehole geophysics, mainly gamma logging, will be completed for five of the 20 monitoring wells to document the lithology of the geologic formation and to locate potential confining layers. The borehole geophysics will be limited to gamma logging because it will be completed in PVC wells.

Gamma logging provides measurements of naturally occurring gamma radiation. This method is effective at detecting clay layers as they emit more gamma radiation than sand and gravel due to the potassium, thorium and uranium content that is common in the clay.

A geophysical firm will be subcontracted to log the wells. Data will be recorded in digital form in the field in a portable computer and will be processed in the office using commercially licensed software. The borehole equipment will be decontaminated after logging each borehole.

Monitoring Well Installation and Development

HDR assumes that 20 monitoring wells will be installed. Locations of the 20 monitoring wells will be identified in the QAPP prepared under Subtask 1.7 and will be based on the evaluation of existing data. Well depths have been assumed to be a maximum depth of 20 feet. Monitoring wells will be using the following sequence of steps:

- A minimum 7-inch diameter borehole will be drilled to the final depth using Hollow Stem Auger (HSA) methods.

- A 2.0-inch inside diameter well will be constructed in the borehole. Each well will be constructed with 10-feet of Schedule 40 PVC well screen (10-slot) and sufficient Schedule 40 PVC riser to reach ground surface. The screen will be surrounded by an appropriately sized sand pack from the bottom of the borehole to about 5

feet above the top of the screen. Bentonite pellets (2-feet) will be placed on top of the sand pack to create a seal and to prevent the grout from penetrating the sand pack. The remainder of the borehole annulus will be filled with neat cement grout using the tremie method.

It is anticipated that flush-mount curb boxes will be used on most of the wells. If the well is in a secured area, a stick-up protective casing may be installed with a 2x2 foot cement pad.

Wells will be developed within one week, but not less than 48 hours. During well development wells will be purged until turbidity measurements for the discharged groundwater are recorded at less than 50 Nephelometric Turbidity Units (NTU) for three consecutive measurements taken at 10 minute intervals.

Groundwater and Surface Water Elevation Measurements

HDR will conduct two rounds of groundwater and surface water elevations. The first round will include only the existing 14 monitoring wells and one surface water measurement from the upper pond. The second round will include the 14 existing monitoring wells, 20 newly installed wells and one surface water measurement from the upper pond. The synoptic evaluation will be scheduled one day prior to the groundwater sampling events discussed in Subtask 3.5. Upon opening each well, a head space measurement will be collected using a photoionization detector (PID). Depth to water, total depth of the well, and time of recording will be reported in a field log. In addition HDR will conduct a well assessment survey on the existing monitoring wells to confirm the wells are in good working condition. Results of the well assessment survey will be recorded and provided to EPA.

Compound Specific Isotope Analysis (CSIA)

HDR will collect samples for CSIA from 10 groundwater wells sampled during the second round of groundwater sampling. CSIA is a forensic tool that can be used to establish a link between groundwater contamination detected in monitoring wells and one or more contaminant sources and can also be used to determine the extent of degradation. It can be described as a type of contaminant 'finger-printing'. The results of CSIA groundwater samples will provide chemical fingerprints for chlorinated solvents detected in groundwater samples collected from monitoring wells. The CSIA results will be reviewed to establish a link between the impacted monitoring wells and one or more potential source areas, and thus, assist in the determination of one or more potentially responsible parties. HDR proposes to conduct CSIA using three isotope ratios ($^{13}C/^{12}C$, $^{37}Cl/^{35}Cl$, and $^{2}H/^{1}H$, referred to as 3D-CSIA) to allow for potential source identification and determination of degradation for TCE. CSIA samples have to be collected in conjunction with VOC samples because the analyzing laboratory requires VOC results prior to their analysis.

CSIA sampling and analysis will follow EPA's 'Guide for Assessing Biodegradation and Source Identification of Organic Ground Water Contaminants using Compound-Specific

Isotope Analysis (CSIA)' (EPA 2008) and procedures and requirements specified by the analytical laboratory. A SOP for the CSIA analytical method that documents the identification of the three isotope pairs and their ratios (($^{13}C/^{12}C$, $^{37}Cl/^{35}Cl$, and $^{2}H/^{1}H$) was previously developed by HDR and submitted to EPA-QA staff for review and approval for another Superfund site. As the SOP has been finalized and approved, it will be included in the QAPP.

Well Hydraulic Testing

HDR proposes to conduct a maximum 72-hour continuous pump test at a newly installed pumping well in in the shallow unconsolidated aquifer in the vicinity of the Site. The pumping well will be installed as follows:

- A minimum 11-inch diameter borehole will be drilled to the final depth using Hollow Stem Auger (HSA) methods.
- A 6.0-inch inside diameter well will be constructed in the borehole. Each well will be constructed with 10-feet of Schedule 80 PVC well screen (20-slot) and sufficient Schedule 80 PVC riser to reach ground surface. The screen will be surrounded by an appropriately sized sand pack from the bottom of the borehole to about 5 feet above the top of the screen. Bentonite pellets (2-feet) will be placed on top of the sand pack to create a seal and to prevent the grout from penetrating the sand pack. The remainder of the borehole annulus will be filled with neat cement grout using the tremie method.
- A minimum of 48-hours after installation, the well will be developed.

Under this task HDR will perform the following activities:

- Select and contract with a drilling subcontractor to supply the pump, plumbing and power source. The selected subcontractor will perform the test under HDR oversight.
- Prepare and submit discharge permits to NYSDEC for discharge to surface water.
- Rental of monitoring equipment such as pressure transducers. It is estimated that up to 11 transducers will be installed, one in the test well and 10 in adjacent monitoring wells. Location of pumping well and wells to be monitored during the pump test will be identified in the QAPP.
- Installation and monitoring of installed transducers.
- Rental of frac tanks and temporary water treatment system (if needed)
- Monitor and sample collection of discharge water.
- Rental of treatment equipment for discharge of treated water to surface water.

3.3.4 Subtask 3.4: Monitoring Well Installation, Development and Testing

Activities for this Subtask have been described above in Subtask 3.3.

3.3.5 Subtask 3.5: Environmental Sampling

HDR will perform the following activities under this subtask:

- Sampling of existing and newly installed groundwater monitoring wells
- Sampling of vertical profile boring intervals and boreholes
- Sampling of soils or other media identified in potential source areas

HDR has assumed the following activities will be included:

- Field screening
- Groundwater sampling
- Surface and subsurface soil sampling
- Soil boring/permeability sampling
- Surface water and sediment sampling
- Air monitoring

Sampling of Existing and Newly Installed Groundwater Monitoring Wells

HDR will conduct two rounds of groundwater sampling. The first round will include the collection of groundwater samples from the 9 existing monitoring wells (Figure 4). The second round will include sampling from the 9 existing monitoring wells and up to 20 newly installed monitoring wells.

Monitoring wells will be sampled using EPA Region II Low Flow sampling method. During groundwater sampling well head space and groundwater field chemistries including specific conductivity, oxygen/reduction potential (ORP), temperature, pH, dissolved oxygen (DO) and turbidity will be measured and recorded on data sheets to document the stabilization of parameters prior to sampling. Upon stabilization, the samples will be collected in certified-clean glassware and placed on ice for preservation. Chain of custodies will be prepared to track the shipment of the samples to the laboratory. Collection, preparation, and shipment of samples is completed under Subtask 5.1. Groundwater samples collected from monitoring wells will be analyzed for TCL VOCs by Method 8260B, SVOCs by Method 8270D (i.e., SOM02.4), TAL metals by Method 6020B (i.e. ISMO2.4), cyanide, and PCBs and pesticides for both rounds of groundwater sampling. In addition PFAS by Modified Method 537.1 and 1,4-dioxane (included with SOM02.4) will be analyzed in the first round of groundwater sampling. PFAS and 1,4-

dioxane samples will be collected from three of the nine existing monitoring wells. Wells selected for this sampling and sampling procedures specific to collection of PFAS samples will be identified in the QAPP. Field parameters will be recorded during low flow sampling (see above) and quality assurance/quality control (QA/QC) samples will be collected as prescribed in the QAPP. Analysis of samples is completed under Task 4.

Sampling of Vertical Profile Boring Intervals and Boreholes

HDR will drill up to 55 borings using direct push technology on the Magna Metals property and the pond, wetland area, and residential properties directly down gradient of the Magna Metals property. Samples will be collected to supplement existing data for horizontal and vertical delineation in these areas. Preliminary locations for samples with the exception of samples to be collected on the Magna Metals property, are shown on Figure 4.

Ten (10) borings are assumed to be drilled on the Magna Metals property and are assumed to be completed to a maximum depth of 10-ft with up to five sample intervals collected at each boring for a total of 50 samples. Final locations will be shown in the QAPP prepared under Subtask 1.7 (Work Plan section 3.1.7).

Twenty five (25) borings will be drilled on the residential properties. Borings conducted on the residential properties will be advanced to a maximum depth of 3-ft. Up to three sample intervals will be collected from each boring for a total of 75 samples.

The remaining 20 borings will be completed in the upper pond and wetland area to delineate the vertical and horizontal extent of impacts in the upper pond and wetland area. Of the 20 sample locations six samples are assumed to be collected within the pond using a boat-mounted geoprobe rig and 14 samples are assumed to be collected within the wetland area and unnamed tributary using a track-mounted geoprobe rig. Borings in the pond will be advanced to bedrock to determine the depth of bedrock. No samples will be collected for chemical analysis at these locations. Samples collected from the 14 locations in the wetland area will be advanced to a maximum depth of 8-ft and up to 4 samples will be collected from each location for a total of 56 samples.

Collected soil/sediment from borings will be transferred to certified-clean glassware and placed on ice for preservation. Chain of custodies will be prepared to track the shipment of the samples to the laboratory. All soil samples will be analyzed for TAL metals. Approximately 10% (18 samples) of the samples collected will be analyzed for cyanide, TCL VOCs, SVOCs, PCBs and pesticides. Analysis of samples is completed under Task 4 (Work Plan Section 3.4).

Additionally up to five soil samples collected from the Magna Metals property will be analyzed for PFAS and 1,4-dioxane. The locations for these samples and sampling procedures specific to collection of PFAS samples will be identified in the QAPP.

Soil Boring/Permeability Sampling

HDR will collect samples for geotechnical analysis in up to five borings completed for monitoring well installation. Up to three samples are estimated to be collected from each boring for a total of 15 samples. Samples will be collected at intervals representing distinct geologic layers present within the subsurface. Samples will be collected in designated sampling jars and shipped under chain of custody to a geotechnical laboratory certified to perform the geotechnical analyses required. Geotechnical samples will be analyzed for grain size (ASTM D6913/D7928), moisture content (ASTM D2216), density (ASTM D2937), specific gravity (ASTM D854), and porosity (ASTM D854).

Surface Water and Sediment Sampling

HDR will collect 18 surface water and 1,113 sediment samples from the upper pond and wetland area located directly downgradient from the Magna Metals property and the lower portions of Furnace Brook, lower pond and associated wetlands down to the Furnace Woods Elementary School. Figures 4 through 8 show the areas discussed below.

Upper Pond and Wetland Area:

HDR assumes up to seven surface water and seven surface sediment samples will be collected within the upper pond and wetland area. Of these samples three will be collected at uncontaminated areas to use as background samples. These samples will be collected in support of the Ecological Risk As23sessment to be conducted under Subtask 7.2. Samples will be collected as grab samples at locations identified in the QAPP prepared under Subtask 1.7.

Collected samples will be transferred to certified-clean glassware and placed on ice for preservation. Chain of custodies will be prepared to track the shipment of the samples to the laboratory. Sediment samples will be analyzed for TAL metals, acid volatile sulfide/simultaneously extracted metals (AVS-SEM) and total organic carbon (TOC). Surface water samples will be analyzed for total and dissolved TAL metals. An additional 3 surface water samples from the upper pond area, 3 surface sediment from the wetland area will be collected and analyzed for PFAS and 1,4-dioxane. Locations for these samples and sampling procedures specific to collection of PFAS samples will be identified in the QAPP. Analysis of samples is completed under Task 4.

Furnace Brook – Cross Road to Lower Pond (~6,200 linear feet):

HDR will collect up to six surface water and 930 sediment samples along Furnace Brook to delineate the horizontal and vertical extent of contamination. HDR assumes sediment samples will be collected using transects spaced every 100 feet. Transects will consist of up to five sample locations for a total of 265 sample locations. Samples are assumed to be collected using hand tools to a maximum depth of 3 feet with three samples collected at each location for a total of 795 samples. The six surface water samples and up to six surface sediment samples will be collected in support of the Ecological Risk Assessment to be conducted

under Subtask 7.2. Sample locations will be identified in the QAPP prepared under Subtask 1.7.

Collected samples will be transferred to certified-clean glassware and placed on ice for preservation. Chain of custodies will be prepared to track the shipment of the samples to the laboratory. All sediment samples will be analyzed for TAL metals. The six sediment samples collected in support of the ecological risk assessment will additionally be analyzed for AVS-SEM and TOC. Surface water samples will be analyzed for total and dissolved TAL metals. Analysis of samples is completed under Task 4.

Lower Pond:

HDR will collect up to five surface water and 132 sediment samples in the Lower Pond to delineate the horizontal and vertical extent of contamination. HDR assumes up to 66 sample locations will be collected within and along the banks of the lower pond. Sample locations will be advanced to a depth of 12 inches and up to two sample intervals will be collected at each location for a total of 132 samples. Samples will be collected as grab samples using a boat and hand tools. The five surface water samples and up to five surface sediment samples will be collected in support of the Ecological Risk Assessment to be conducted under Subtask 7.2. Sample locations will be identified in the QAPP prepared under Subtask 1.7.

Collected samples will be transferred to certified-clean glassware and placed on ice for preservation. Chain of custodies will be prepared to track the shipment of the samples to the laboratory. All sediment samples will be analyzed for TAL metals. The five sediment samples collected in support of the ecological risk assessment will additionally be analyzed for AVS-SEM and TOC. Surface water samples will be analyzed for total and dissolved TAL metals. Analysis of samples is completed under Task 4.

Outlet of Lower Pond to Furnace Woods Road (~200 linear feet):

HDR will collect up to 20 sediment samples in the Lower Pond to delineate the horizontal and vertical extent of contamination. HDR assumes sediment samples will be collected using transects spaced every 100 feet. Transects will consist of up to five sample locations for a total of 10 sample locations. Samples are assumed to be collected using hand tools to a maximum depth of 2 feet with two samples collected at each location for a total of 20 samples. Sample locations will be identified in the QAPP prepared under Subtask 1.7.

Collected samples will be transferred to certified-clean glassware and placed on ice for preservation. Chain of custodies will be prepared to track the shipment of the samples to the laboratory. All sediment samples will be analyzed for TAL metals. Analysis of samples is completed under Task 4.

Furnace Woods Road to Furnace Wood Elementary School (~2,400 linear feet):

HDR will collect up to 24 sediment samples along the centerline of the stream from Furnace Woods Road to just beyond the Furnace Woods Elementary School to assess the potential for metals contamination beyond the dam at the lower pond. HDR assumes sediment samples will be collected along the centerline of the stream at 100-ft intervals for a total of 24 sample locations. One sample will be collected at each location. Samples are assumed to be collected using hand tools to a maximum depth of 6 inches. Sample locations will be identified in the QAPP prepared under Subtask 1.7.

Collected samples will be transferred to certified-clean glassware and placed on ice for preservation. Chain of custodies will be prepared to track the shipment of the samples to the laboratory. All sediment samples will be analyzed for TAL metals. Analysis of samples is completed under Task 4.

Air Sampling

HDR will collect air samples within the existing occupied buildings on site. HDR assumes up to 10 air samples will be collected and analyzed for VOCs using EPA Method TO-15.

3.3.6 Subtask 3.6: Ecological Characterization

HDR will perform the following activities under this subtask:

- Wetland and Habitat delineation/function and value assessment
- Wildlife observations
- Identification of endangered species and others of special concern

Wetland and Habitat Delineation/Function and Value Assessment

Wetland habitats will be delineated by searching the National Wetlands Inventory Database within a half-mile radius of the upper pond (located down gradient from the site), Furnace Brook, and the lower pond (located next to Watch Hill Road).

In addition, the habitat conditions, the potential aquatic and terrestrial exposure pathways, and the major aquatic and terrestrial receptor groups associated with the habitats will be identified during a site visit by two field biologists.

Wildlife Observations

A site visit by two field biologists will be performed to document observed and potential wildlife in areas associated with the upper pond, Furnace Brook, and the lower pond.

Identification of Endangered Species and Others of Special Concern

A list of endangered species and species and habitats of potential concern at or near the site will be obtained through a search of the New York Natural Heritage Program Database.

3.3.7 Subtask 3.7: Geotechnical Survey – Not Applicable

3.3.8 Subtask 3.8: Investigation-Derived Waste (IDW) Characterization and Disposal

HDR will manage and dispose of all IDW in accordance with local and Federal regulations as specified in the QAPP.

A subcontractor will be procured to sample, characterize, and dispose of the waste. Characterization determination will be completed in coordination with HDR and EPA. Parameters required for characterization will be dependent on disposal facility requirements. The subcontractor will identify a primary and an alternate disposal facility at the beginning of the work for EPA approval.

3.4 Task 4 – Sample Analysis

HDR will arrange for the analysis of environmental samples collected under Task 3. This task includes only the cost of the sample analysis. Efforts associated with sample collection are included in Task 3, efforts associated with shipment and data validation are included in Task 5, and efforts associated with data evaluation are included in Task 6. All sample analysis will be conducted in accordance with the approved QAPP for this work assignment.

3.4.1 Subtask 4.1 Innovative Methods/Field Screening Sample Analysis

The use of CSIA is an innovative method that will be completed under Subtask 3.3. HDR will make provisions to subcontract this analytical service as it is completed by specialty laboratories and is not part of the FASTAC program.

3.4.2 Subtask 4.2 Analytical Services Provided Via CLP, DESA or EPA-ERT

HDR will secure Routine Analytical Services (RAS) for the sample analyses available through either the EPA CLP and/or the EPA Region 2 DESA Laboratory in Edison, New Jersey in accordance with the FASTAC approach described in the EPA Region 2 SOP "Policy for Implementing the National Strategy for Procuring Analytical Services for all OSWER Programs (Superfund, RCRA and Brownfields) (EPA 2009). These analyses include TAL metals, with a subset of samples analyzed for TCL VOCs, SVOCs including 1,4-dioxane, PCBs, pesticides, and TOC. Sample media include surface water, groundwater, sediment and soil.

3.4.3 Subtask 4.3 Non-Routine and Sub-Contract Laboratory Analytical Services

HDR will arrange for the analysis of the Non-Routine samples including geotechnical, sediment toxicity analyses (AVS-SEM) and PFAS collected under Task 3 in accordance with Task 1.9 of the SOW and SOW Amendment Number 3.

3.5 Task 5 – Analytical Support and Data Validation

HDR will generate five types of samples during the field investigation for this project. These samples are:

- Groundwater samples,
- Surface water samples,
- Sediment samples, and
- Soil samples, and
- Air samples.

DESA or CLP samples analyzed under Task 4 will be validated by EPA. HDR will arrange for all other data validation of environmental data as necessary. Sample validation under this task will begin with the completion of the field sampling program and reservation of sample slots with the RSCC for DESA/CLP, and will end with validation of the analytical data received from the laboratory. HDR will oversee all subcontracted laboratory analyses are performed in accordance with EPA methods and will submit all analytical data from subcontracted laboratories to EPA in EPA Region 2 deliverable format.

3.5.1 Subtask 5.1: Prepare and Ship Samples

HDR will collect, prepare and ship all samples collected under Task 3 in accordance with the approved QAPP.

3.5.2 Subtask 5.2: Sample Management

HDR will provide sample management covering the following activities:

- Coordinate with appropriate Region 2 sample management personnel and HWSS and DESA laboratory sample management offices regarding analytical, data validation, and quality assurance issues.
- Coordinate with the RSCC, and/or the DESA regarding analytical, data validation, and quality assurance issues.
- Implement EPA-approved laboratory QA program to provide oversight of in-house and/or subcontract laboratories.
- Prepare trip report(s) for all samples that will be analyzed by the CLP.

- Prepare ANSETs form for all subcontracted analytical services.

- Provide Chain of Custody, Sample Retention, and Data Storage functions in accordance with the approved contract-wide QAPP, QMP, and contract.

3.5.3 Subtask 5.3: Data Validation

Based on the types of projected samples, HDR is not anticipating the need for data validation. It is anticipated that samples that will require validation will be analyzed by DESA or CLP and will be validated by EPA. HDR will perform an overall data usability under Subtask 6.1 to determine whether data and chain of custodies are accurate and defensible. Should validation of data be required by HDR (e.g., for subcontracted analyses), HDR will perform the following activities as part of this subtask:

- Review analysis results against validation criteria

- Review the data and make a data usability determination

- Develop a Data Usability Report after all the data has been validated that will be included with the Data Evaluation Report (Task 6.4).

3.6 Task 6 – Data Evaluation

Under this task, HDR will organize and evaluate existing data (NYSDEC PDI and RI data) and data gathered during the RI field effort to prepare the RI and FS reports. Data evaluation begins with the receipt of analytical data from the data acquisition task and ends with the submittal of the Data Evaluation Summary Report.

3.6.1 Subtask 6.1: Data Usability Evaluation

HDR will evaluate the usability of data obtained during the field investigation, including any uncertainties associated with the data. If statistical methods are used to evaluate the usability of the data, the guidance used will be “Data Quality Assessment: A Reviewer’s Guide” EPA QA/G-9R EPA/240/B-06/002, February 2006. Section 5 of the UFP-QAPP Manual also provides information on what will be presented in the Data Evaluation Report.

3.6.2 Subtask 6.2: Data Reduction, Tabulation, and Evaluation

HDR will evaluate, interpret, and tabulate data in an appropriate presentation format for final data tables. Historic or soil data are not anticipated to be part of this tabulation. Current data collected as part of this Work Assignment will be entered into an environmental database, created as part of this task. The data formatting will be consistent with the EDD requirements. The following will be used as general guidelines in the preparation of the environmental database and the data for the RI Report:

- Tables of analytical results will be organized in a logical manner such as by sample location number, sampling zone, or some other logical format. Well identification numbers within each set will be assigned in accordance with the alphanumeric

system used for the well identification numbers. HDR will coordinate the table organization with the EPA WAM.

- The sample location/well identification number will always be used as the primary reference for the analytical results. The sample location number will also be indicated if the laboratory sample identification number is used.

- Analytical tables will indicate the sample collection dates.

- The detection limit will be indicated in instances where a parameter was not detected.

- Detection limits will be consistent with the EPA-approved QAPP unless otherwise approved by EPA.

- Analytical results will be reported in the text, tables and figures using a consistent convention such as µg/l for groundwater analyses and mg/kg for soil analyses.

- EPA's protocol for eliminating field sample analytical results based on laboratory/field blank contamination results will be clearly explained.

- Discussion of approved sampling results will not be qualified by suggesting that a particular chemical is a common lab contaminant or was detected in the lab blank. If the reported result has passed QA/QC it shall be considered valid. In cases where the chemical in question was known to have been used and/or disposed of on site, positively identified at high levels in other environmental media, and passes QA/QC protocols, the sampling results shall not be questioned as being due to laboratory contaminants.

- Field equipment rinsate blank analyses results will be discussed in detail if decontamination solvents are believed to have contaminated field samples.

3.6.3 Subtask 6.3: Modeling

HDR will evaluate the existing data collected under the field investigation and make an assessment of the need for modeling to complete an accurate characterization of the nature, extent, distribution and movement of site contamination. This evaluation will also cover the historical distribution and movement of site contamination (forensic modeling) to help identify potential source areas, utilizing the results of the chemical fingerprinting analysis. Types of modeling that will be evaluated by HDR under this subtask include modflow and sediment transport models. HDR will provide a technical memorandum to the EPA summarizing the results of this evaluation and recommendations concerning performance of modeling for this RI/FS. Based on review of this technical memorandum, EPA will determine whether modeling will be conducted for this RI/FS and provide direction to perform modeling as required.

This subtask is an optional requirement. In accordance with the SOW, in the event that EPA determines that performance of this subtask is necessary, a Work Assignment amendment will be issued to incorporate these requirements into this Work Assignment.

3.6.4 Subtask 6.4: Data Evaluation Summary Report

Per the SOW, HDR will evaluate and present results in a Data Evaluation Summary Report, to be submitted to EPA for review and approval. The report will include:

- An evaluation of historical data (NYSDEC RI and PDI data);
- A summary of data gathered as part of the field investigation and identification of data gaps for future investigations; and,
- A presentation of findings and conclusions as to the acceptance of the data validity, areas where data exceed acceptable regulatory or guidance values, and any concerns regarding the data.

3.7 Task 7 – Assessment of Risk

The Risk Assessment will determine whether contaminants found in the study area pose a current potential risk to human health and the environment in the absence of any remedial action. HDR will address the contaminant identification, exposure assessment, toxicity assessment, and risk characterization. The Risk Assessment will be used to determine whether remediation is necessary, provide justification for performing remedial action, and determine what exposure pathways need to be remediated.

3.7.1 Subtask 7.1: Baseline Risk Assessment (Human Health)

HDR will perform a Human Health Risk Assessment (HHRA) in accordance with EPA RAGS as described in the Part D tables included in the approved PAR. The requirements for the PAR are described in Subtask 1.13 (Section 3.1.13). The HHRA will incorporate the information presented in the Draft PAR. The PAR will be commented on by the EPA, and the draft HHRA report will not be initiated before receipt of EPA's comments on the PAR, which will be incorporated into the draft HHRA. The draft HHRA will be submitted 30 days after EPA approval of the PAR.

The HHRA report will be prepared in accordance with applicable EPA guidance documents, including, for example, RAGS, the Exposure Factors Handbook (EPA, 2009), and site-specific guidance provided by EPA Region 2. The following subsections present the principal elements to be addressed in the Draft and Final HHRA reports.

<u>Draft Human Health Risk Assessment Report</u>

HDR will prepare a Draft HHRA Report covering the flowing requirements:

- Hazard Identification. HDR will identify and describe the Chemical of Potential Concern (COPCs) based on their presence and distribution in the study area and their intrinsic toxicological properties.

- Dose-Response Assessment. HDR will select the contaminants of concern based on their intrinsic toxicological properties.

- Characterization of study area and Potential Exposure Pathways. HDR will identify and characterize exposure setting and human receptor populations.

- Exposure Assessment. The exposure assessment will identify the magnitude of actual or potential human exposures, the frequency and duration of these exposures and routes by which receptors are exposed. In preparing the exposure assessment, HDR will develop reasonable maximum and central tendency (when appropriate) estimates of exposure for both current and potential land use conditions in the study area. The rationale for use of any site-specific, rather than default, exposure factors will be clearly explained and justified.

- Toxicological Assessment. HDR will list all toxicity values (e.g., slope factors and reference doses) for the COPCs and the sources of toxicity values, according to EPA's current toxicity hierarchy (OSWER Directive 9285.7-53). Those chemicals without toxicity values in Tiers 1 and 2 will be submitted to EPA to determine the appropriate value.

- Conceptual Site Model (CSM). Based on contaminant identification, exposure assessment, toxicity assessment, and risk characterization, HDR will develop a CSM.

Further, the BHHRA report will address the following aspects not previously described in the PAR:

- Risk Characterization. During risk characterization, HDR will compare chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment, to measured levels of contaminant exposure and levels predicted through environmental fate and transport modeling. These comparisons will be used to estimate non-cancer hazards and cancer risks and determine whether concentrations of contaminants at or near the study rea are affecting or could potentially affect human health.

- Identification of Limitations/Uncertainties. HDR will identify critical assumptions and uncertainties in the report (examples of uncertainties and limitations such as background concentrations, modeling inputs, toxicity data, and environmental data, will be provided).

These two elements of the BHHRA (not addressed in the PAR) are described in greater detail below.

Risk Characterization

Chemical-specific toxicity information will be combined with quantitative and qualitative data from the exposure assessment presented in PAR. Collectively, this information will be used to calculate non-carcinogenic hazards and carcinogenic risks for individual receptors and exposure routes identified in the BHHRA Conceptual Site Model.

The operative EPA model for dose-response of non-carcinogenic COPCs assumes that a minimum threshold dose or intake exists below which adverse effects are not associated with exposure. Therefore, the potential for non-carcinogenic effects is calculated by dividing the chemical-specific chronic daily intake (CDI) by the reference dose (RfD) of reference concentration (RfC) for each COPC. The resulting quotient or ratio is the hazard quotient (HQ) and is calculated for individual COPCs. HQs will be summed over all chemicals and all complete exposure pathways to estimate a cumulative hazard index (HI) for each receptor and will be presented in RAGS table formats ("Calculation of Chemical Cancer Risks and Non-Cancer Hazards"). Since the units of the RfD are mg/kg-day and the units of the CDI are mg/kg-day, the HQ and HI are dimensionless. HI ratios less than or equal to 1.0 indicate that adverse non-carcinogenic health effects are unlikely. Ratios greater than 1.0 indicate the potential for adverse non-carcinogenic health effects to occur at that exposure level and additional evaluation may be warranted. However, a ratio greater than 1.0 does not mean that adverse effects will definitely be observed, since the RfDs used in the calculation of these ratios incorporate uncertainty factors to reduce the potential that the likelihood of occurrence of adverse health effects will be underestimated. This procedure assumes that the risks from exposure to multiple chemicals are additive, an assumption that is probably valid for compounds that have the same target organ or cause the same toxic effect. HIs estimated to be in exceedance of 1.0 will be segregated and summed by target organ for further consideration.

Carcinogenic effects are expressed as excess lifetime cancer risks (ELCRs). Quantitative risk calculations for potentially carcinogenic COPCs estimate the potential ELCR for an individual in a specified population. This unit of risk refers to a potential cancer risk that is above the background cancer risk in unexposed individuals. For example, an ELCR of 1×10^{-6} indicates that an exposed individual has an increased probability of one in one million of developing cancer as a result of the projected exposure, over the course of their lifetime. ELCRs will be estimated as the product of the CDI and the cancer slope factor (CSF) or inhalation unit risk (IUR). Since the units of the CDI and CSF are mg/kg-day and kg-day/mg, respectively, the resulting ELCR is dimensionless. For quantitative estimation of risk, it is assumed that cancer risks from various exposure routes are additive. Estimated ELCR values will also be presented in RAGS Part D table formats ("Calculation of Chemical Cancer Risks and Non-Cancer Hazards") and will be discussed relative to the 1×10^{-6} to 1×10^{-4} target risk range of ELCR values considered by the EPA to represent an acceptable (i.e., *de minimis*) risk.

The purposes of the Cancer Risks and Non-Cancer Hazards tables are summarized in the following items:

- To present the EPCs and CDIs used in the risk calculations;
- To present non-carcinogenic hazards and carcinogenic risks calculated for each exposure route for each COPC; and
- To provide the total HIs and total ELCRs for all current and future exposure routes, environmental media of concern, and receptors.

All non-carcinogenic and carcinogenic risks calculated will be summarized in appropriate RAGS table formats ("Summary of Receptor Risks and Hazards for COPCs") for each receptor, by environmental medium, exposure route, and exposure point. RAGS Part D Table 10 ("Risk Summary") will summarize only those non-carcinogenic hazards and carcinogenic risks for each receptor, by environmental medium, exposure route, and exposure point that exceed the 1 x 10^{-6} ELCR level or the 1.0 HI level. RAGS Part D Tables will be presented for the CT exposure scenario only when the RME exposure scenario indicates potentially unacceptable risk and as directed by EPA.

Identification of Limitations/Uncertainties

Uncertainties are encountered throughout the process of performing a risk assessment. This component will address the sources of uncertainty inherent in the main components of the BHRRA to be performed for the Site. Potential areas of uncertainties associated with each component of the BHHRA include: Sampling and Analysis, Selection of COPCs, Exposure Assessment, Toxicological Assessment, and Risk Characterization. The uncertainty analysis of the BHHRA will qualitatively discuss these items (and others that may be identified). No quantitative uncertainty analysis is assumed for the BHHRA.

Final Baseline Human Health Risk Assessment Report

Following a review of the comments provided by EPA Region 2 on the Draft BHHRA report, any clarifications required will be discussed with the EPA Region 2 Risk Assessment staff. Following resolution of these comments, a Final BHHRA incorporating final EPA comments on the Draft BHHRA will be submitted to EPA. The Final BHHRA will be submitted to EPA 14 days after the receipt of the final EPA comments.

3.7.2 Subtask 7.2: Baseline Risk Assessment – Ecological Risk Assessment

This activity is optional. In accordance with the SOW, a Screening Level Ecological Risk Assessment (SLERA) will be at the discretion of the EPA. In the event that EPA determines that performance of a SLERA will be necessary, a work assignment amendment will be issued to formally implement the requirements for this effort.

Under this subtask HDR will perform a Screening-Level Ecological Risk Assessment (SLERA) and a Baseline Ecological Risk Assessment (BERA), only if directed by EPA.

SLERA (Optional)

HDR will perform a screening-level ecological risk assessment (SLERA) in accordance with Superfund ecological risk assessment guidance (Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments [ERAGS], USEPA, 1997 [EPA/540-R-97-006]). HDR will compare the maximum contaminant concentrations measured in each medium of concern to appropriate conservative ecotoxicity screening values to identify the contaminants of potential ecological concern (COPECs) that need to be investigated further in the Baseline Ecological Risk Assessment (BERA).

EPA will review and approve the SLERA and determine if a full BERA is required.

BERA (Optional)

HDR will not start on the BERA until formally directed to do so by EPA.

The Baseline Ecological Risk Assessment was broken into two phases (Phase I and Phase II). Phase I would rely exclusively on new surface water and sediment analytical data collected under Subtask 3.5, and the sediment analytical data collected in 2013-2015 during the PDI conducted by NYSDEC. If required/approved by EPA, "Phase II" of the BERA would involve obtaining additional lines of evidence based on surface water and sediment toxicity testing, tissue residue analysis of field-collected biota for use in wildlife food chain modeling, and benthic invertebrate community surveys.

As part of the Phase I BERA, HDR will perform the following activities:

- Hazard Identification (Sources): HDR will review available information on the hazardous substances present at the Site and identify all the COPECs in surface water and sediment.

- Dose-Response Assessment: HDR will select published numeric standards, criteria, and/or benchmarks for all the surface water and sediment COPECs based on their intrinsic toxicological characteristics.

- Characterization of Site and Potential Receptors: HDR will identify and characterize environmental exposure pathways associated with the major receptor groups that may be exposed to the COPECs in surface water and sediment.

- Select Chemicals, Indicator Species, and End Points: HDR will select representative chemicals, indicator species (species that are especially sensitive to environmental contaminants), and end points on which to concentrate the risk evaluation.

- Exposure Assessment: The exposure assessment will identify the magnitude of actual or environmental exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment will include an evaluation of the likelihood of such exposures occurring and will provide the basis for developing acceptable exposure levels. HDR will

calculate central tendency exposures (CTEs) and reasonable maximum exposures (RME).

- Risk Characterization: HDR will calculate hazard quotients by comparing chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment to measured contaminant exposure levels. These comparisons will determine if COPEC levels are affecting or could potentially affect the environment.

- Identify Limitations/Uncertainties: HDR will identify critical assumptions, limitations, and uncertainties with the BERA to provide more context for use in risk-based decision making.

- Conceptual Site Model. HDR will update the CSM based on contaminant identification, exposure assessment, toxicity assessment, and risk characterization.

Final Phase I BERA

After the Draft Phase I BERA Report has been reviewed and commented on by EPA, HDR will incorporate EPA comments and submit the Final Phase I BERA. EPA may then decide to proceed with Phase II of the BERA, depending on the outcome of the Phase I effort.

3.8 Task 8 – Treatability Study and Pilot Testing

Under this subtask HDR will identify technologies that may be suitable for the site to determine whether there is a need to conduct treatability studies to better estimate costs and performance capabilities. At present, it is unknown whether bench-scale testing and/or a pilot-scale study will be necessary. Should bench-scale testing and/or a pilot-scale study be determined to be necessary, HDR will submit a testing plan identifying the types and goals of the study(ies). The bench-scale testing and/or pilot-scale study will determine the suitability of remedial technologies to site conditions and problems.

The three levels of treatability studies are laboratory screening, bench-scale testing, and pilot-scale testing. The laboratory screening is used to establish the validity of a technology to treat waste and is normally conducted during the FS. Bench-scale testing is used to identify the performance of the technology specific to a type of waste for an operable unit. Pilot-scale testing is used to provide quantitative performance, cost, and design information for remediation and is typically performed during the FS (see the Fact Sheet, *Guide for Conducting Treatability Studies under CERCLA*, November, 1993).

3.8.1 Subtask 8.1: Literature Search

Under this subtask HDR will research viable technologies which may be applicable to the contaminants of concern and the site conditions encountered. HDR will provide a technical memorandum summarizing the literature research.

The remainder of this subtask is an optional requirement. In accordance with the SOW, in the event that EPA determines that treatability study and testing is necessary, a Work Assignment amendment will be issued to incorporate these requirements into this Work Assignment. Additionally, HDR anticipates preparing an addendum to the Work Plan at such time that would identify the types and goals of the study and the suitability of remedial technologies to site conditions and problems.

3.9 Task 9 – Remedial Investigation Report

HDR will prepare an RI report that accurately establishes the Site characteristics such as the contaminated media, extent of and movement of contamination, the physical boundaries of the contamination, and the potential sources of contamination. In support of this objective, HDR will obtain only the minimum essential amount of detailed data necessary to determine these parameters for the key contaminants. HDR will select the key contaminants based on their persistence and mobility in the environment and their degree of hazard. HDR will evaluate the key contaminants identified for receptor exposure and prepare an estimate of the levels of key contaminants reaching human or environmental receptors. HDR will use existing standards and guidelines such as drinking-water standards, water quality criteria, and other criteria accepted by EPA as appropriate for the situation, to evaluate effects on human receptors that may be exposed to the key contaminants above appropriate standards or guidelines. The RI will be consistent with the baseline human health risk assessment.

HDR will prepare the RI report in accordance with the "*Guidance for Conducting Remedial Investigations/Feasibility Studies under CERCLA*," OSWER Directive 9355.3-01, October 1988, and "*Guidance for Data Usability in Risk Assessment, Parts A and B*" (EPA 9285.7-09A, April 1992 and 9285.7-09B, May 1992). The WAM will provide the format for the report if Region 2-specific requirements or other special requirements are called for.

3.9.1 Subtask 9.1: Draft Remedial Investigation Report

HDR will prepare a draft Remedial Investigation report in accordance with the above guidance and the schedule in the final approved RI/FS work plan. An outline of the structure for the RI report, including a discussion of the guidelines for the subject areas and material to be covered are provided below.

1) Executive Summary

2) Introduction

    a) Purpose of the report

    b) Site background: HDR will assemble and review available facts about regional conditions and the conditions specific to the Site under investigation.

        i) Site description

        ii) Site history

iii) Previous investigations

iv) Previous remedial action

v) Report organization.

3) Study Area Investigation

a) Description of field activities associated with site characterization, including as appropriate physical and chemical monitoring of the following:

i) Surface features (e.g., topographic mapping, natural and manmade features)

ii) Field methodologies

iii) Contaminant source investigations

iv) Meteorological Investigations (if applicable)

v) Surface water and sediment investigations (if applicable)

vi) Description of formation cuttings, type, sorting and drilling rates

vii) Soil and vadose Investigations

viii) Human populations surveys

ix) Ecological investigation (if applicable)

b) Technical memoranda documenting field activities shall be summarized in this chapter and included as an appendix to the RI report. The following guidelines shall be followed in presenting the field investigation discussion:

4) Physical Characteristics of the Study Area

a) Description of the results of field activities to determine physical characteristics, including the following, as appropriate:

i) Geology

ii) Hydrogeology

iii) Meteorology

iv) Surface water hydrology (if applicable)

v) Soils

vi) Ecology

vii) Demography and land use

5) Nature and Extent of Contamination. *(Note: HDR will obtain EPA approval of the values used to determine the nature and extent of contaminants prior to submittal of the draft Remedial Investigation report.)*

a) Presentation of the results of site characterization, both natural and chemical components and contaminants, as appropriate, in the groundwater media:

i) Sources

ii) Soils and Vadose Zone

iii) Groundwater

iv) Surface water hydrology (if applicable)

v) Air

vi) Subsurface gases

6) Contaminant Fate and Transport

a) Potential routes of migration (e.g.; air, groundwater, soils)

b) Contaminant persistence: Descriptions of estimated persistence in the study area environment and physical, chemical, and/or biological factors of importance for the media of interest, as applicable;

c) Contaminant Migration:

i) Discussions of factors affecting contaminant migration for the media of interest (e.g., sorption onto soils, solubility in water, movement of groundwater, etc.)

ii) Discussions of modeling methods and results if applicable

7) Baseline Risk Assessment

a) Human health risk assessment

i) Hazard identification

ii) Exposure assessment

iii) Toxicity assessment

iv) Risk characterization/uncertainty discussion

b) Environmental Evaluation (if applicable)

8) Summary and Conclusions

a) Summary

i) Nature and extent of contamination

ii) Fate and transport

iii) Risk assessment

b) Conclusions

i) Data limitations and recommendations for future work

ii) Recommended remedial action objectives

9) References

10) Tables and Figures

11) Appendices (including log books, soil boring logs, test pit/trenching logs, monitoring well construction diagrams, private and public well records, analytical data and QA/QC evaluation results)

3.9.2 Subtask 9.2: Final Remedial Investigation Report

HDR will submit the final Remedial Investigation report incorporating all EPA review comments.

3.1 Task 10 – Remedial Alternatives Screening

HDR will investigate only those hazardous waste management alternatives that will remediate or control contaminated media (soil, surface water, groundwater, sediments) remaining at the Site, as determined necessary in the RI to provide adequate protection of human health and the environment. The potential alternatives will encompass a range of alternatives in which treatment is used to reduce the toxicity, mobility, or volume of wastes but vary in the degree to which long-term management of residuals or untreated waste is required, and will include one or more alternatives involving containment with little or no treatment as well as a no-action alternative.

3.1.1 Subtask 10.1: Draft Remedial Alternatives Screening Technical Memorandum

HDR will prepare a draft technical memorandum presenting the potential alternatives and including the following information:

- Establish Remedial Action Objectives. Based on existing information, HDR will identify site-specific remedial action objectives that will be developed to protect human health and the environment. The objectives will specify the contaminants and media of concern, the exposure routes and receptors, and an acceptable contaminant level or range of levels for each exposure route (i.e., preliminary remediation goals).

- Establish General Response Actions. HDR will develop general response actions for each medium of interest by defining contaminant treatment, excavation, pumping, or other actions, singly or in combination, to satisfy remedial action

objectives. The response actions will take into account requirements for protectiveness as identified in the remedial action objectives as well as the chemical and physical characteristics of the Site.

- Identify & Screen Applicable Remedial Technologies. HDR will identify and screen technologies based on the developed general response actions. HDR will identify and screen hazardous waste treatment technologies so that only those technologies applicable to the contaminants present, their physical matrix, and other site characteristics will be considered. This screening will be based primarily on a technology's ability to address the contaminants at the Site effectively, but will also take into account a technology's implementability and cost. HDR will select representative process options, as appropriate, to carry forward into alternative development. HDR will identify the need for treatability testing for those technologies that are probable candidates for consideration during the detailed analysis.

- Develop Remedial Alternatives in accordance with NCP.

- Screen Remedial Alternatives for Effectiveness, Implementability, and Cost. HDR will screen alternatives to identify the potential technologies or process options that will be combined into media-specific or site-wide alternatives. HDR will define the developed alternatives with respect to the size and configuration of the representative process options; time for remediation; rates of flow or treatment; spatial requirements; distances for disposal; and required permits, imposed limitations and other factors necessary to evaluate the alternatives. If many distinct, viable options are available and developed, HDR will screen the alternatives that will undergo the detailed analysis in order to provide the most promising process options. HDR will screen these alternatives on a general basis with respect to their effectiveness, implementability, and cost.

3.1.2 Subtask 10.2: Final Remedial Alternatives Screening Technical Memorandum

HDR will incorporate EPA's review comments on the draft technical memorandum into the draft Feasibility Study report prepared under Subtask 12.1. HDR will not submit a separate final technical memorandum for the sections of the FS report covered in Task 10.

3.2 Task 11 – Remedial Alternatives Evaluation

This task covers efforts associated with the assessment of individual alternatives against each of the nine current evaluation criteria and a comparative analysis of all options against the evaluation criteria. EPA will make the determination regarding final selection of the remedial alternative.

The nine criteria the HDR will employ in the evaluation of remedial alternatives are:

- Overall protection of human health and the environment

- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction in toxicity, mobility or volume through treatment
- Short-term effectiveness
- Implementability - technical and administrative
- Cost
- State acceptance
- Community acceptance

3.2.1 Subtask 11.1: Draft Remedial Alternatives Evaluation Technical Memorandum

HDR will prepare a technical memorandum that addresses the following:

1) a technical description of each alternative that outlines the waste management strategy involved and identifies the key Applicable or Relevant and Appropriate Requirements (ARARs) associated with each alternative; and

2) a discussion that profiles the performance of that alternative with respect to each of the evaluation criteria. HDR will provide a table summarizing the results of this analysis.

After presentation of the complete analysis of each individual alternative, HDR will compare and contrast the alternatives to one another with respect to each of the evaluation criteria.

3.2.2 Subtask 11.2: Final Remedial Alternatives Evaluation Technical Memorandum

HDR will incorporate EPA's review comments on the draft technical memorandum into the draft Feasibility Study report prepared under Subtask 12.1. HDR will not submit a separate final technical memorandum for the sections of the FS report covered in Task 11.

3.3 Task 12 – Feasibility Study Report

HDR will prepare a FS report, consisting of a detailed analysis of alternatives and a cost-effectiveness analysis in accordance with the NCP and current EPA FS guidance. EPA will make the determination regarding final selection of the remedial alternative.

3.3.1 Subtask 12.1: Draft Feasibility Study Report

HDR will submit a draft FS report in accordance with the performance schedule in the approved RI/FS work plan. To expedite the completion of the report, HDR will submit draft chapters of the report to the WAM as they are completed. The FS report will contain the following:

- Feasibility Study objectives
- Remedial objectives
- General response actions
- Identification and screening of remedial technologies
- Description of remedial alternatives
- Detailed analysis of remedial alternatives
- Summary and Conclusions

HDR's technical feasibility considerations will address in detail any problems that may prevent a remedial alternative from mitigating site problems. Accordingly, HDR will present the technical feasibility of each remedial alternative considering the Site characteristics from the RI. HDR will also address the reliability, safety, and operation and maintenance of each alternative, the ease with which the alternative can be implemented, and the time needed for implementation.

3.3.2 Subtask 12.2: Final Feasibility Study Report

After EPA's review of the draft FS report, HDR will submit the final FS report incorporating all EPA review comments.

3.4 Task 13 – Post RI/FS Support

HDR will provide technical support required for preparation of the ROD for the Site, excluding the community relations activities addressed under Task 2 of this SOW. HDR's support will include the following activities:

- Attendance at public meetings, briefings and technical meetings to provide site updates.
- Review of presentation materials.
- Technical support for presentation of draft and final Responsiveness Summary, Proposed Plan, and ROD.

3.5 Task 14 – Work Assignment Closeout

Upon direction from EPA that the technical work under this work assignment is complete, HDR will perform the necessary activities to close out the work assignment in accordance with contract requirements.

3.5.1 Subtask 14.1: Revised Work Plan Budget

As part of work assignment closeout, HDR will provide a revised work plan budget with the actual costs incurred and an estimate to complete the closeout activities. The revised work plan budget will be submitted to EPA within 30 days of closeout direction.

3.5.2 Subtask 14.2: Document Indexing

At the conclusion of this work assignment, HDR will organize the work assignment files in our possession and provide the index to the Project Officer. The index will be submitted with the long-term storage submittal required under Task 14.3. At a minimum, the index will contain the following information:

- Project Name and Work Assignment Number (in a heading on top of the list)
- Document Date (The documents indexed will be sorted chronologically by date, beginning to end), description /subject of document, who sent the document and who received the document.

The documents to be indexed will include, but are not limited to, all final deliverables, work assignment amendments, and working files that may need to be accessed to provide information on why certain technical decisions were made.

3.5.3 Subtask 14.3: Document Retention/Conversion

HDR will convert all relevant paper files into long-term storage electronic format, CDs or DVDs. The media will then be delivered to the PO within 45 days of approval of the revised Work Plan budget.

SECTION 4 - PROJECT MANAGEMENT APPROACH

4.1 Project Organization

The project organizational structure is provided in Figure 9.

4.2 Key Personnel

Bradley Williams is the Program Manager for the EPA Region 2 RAC under which the Magna Metals Superfund Site RI/FS will be conducted.

The Project Manager is Thomas Connors. The Project Manager is responsible for the development of the Work Plan; acquisition of scientific, engineering, or additional specialized technical support; and other aspects of the day-to-day activities associated with the project. The Project Manager identifies staff requirements, directs and monitors progress, oversees implementation of quality procedures and adherence to applicable codes and regulations, and is responsible for performance within the established budget and schedule.

Project team members include project task leads and key technical personnel from various technical disciplines. They are: Shannon Kling, P.E. for Remedial Investigation Task Leader, Michael Pantliano, P.G., for field activities, geology and modeling/hydrogeology; Melissa LaMacchia for QAPP and data quality and QA/QC; Michael Musso, P.E., for human health risk assessment; Stan Pauwels, Ph.D., for ecological risk assessment; Shannon Kling, P.E. and Amita Patel, P.E. for the feasibility study; and Jeff Kleinfelter (Corporate Safety, Health and Environmental Director) and John. J. Guzewich as health and safety coordinators. Technical discipline leads will oversee activities related to their expertise and provide their input, as needed, to the Project Manager.

4.3 Project Schedule

A project scoping meeting was held on April 23, 2019. Table 1 lists the major project deliverables. Figure 2 is the overall baseline project schedule.

4.4 Cost Estimate

The estimated cost and LOE hours and assumptions for completing the scope of work described in this Work Plan are included in the Work Plan Cost Estimate, which has been submitted under a separate cover as Volume 2.

SECTION 5 - REFERENCES

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TABLES

Table 1 Summary of Major Submittals
Magna Metals RI/FS (052-RICO-A28A)
Cortlandt, New York

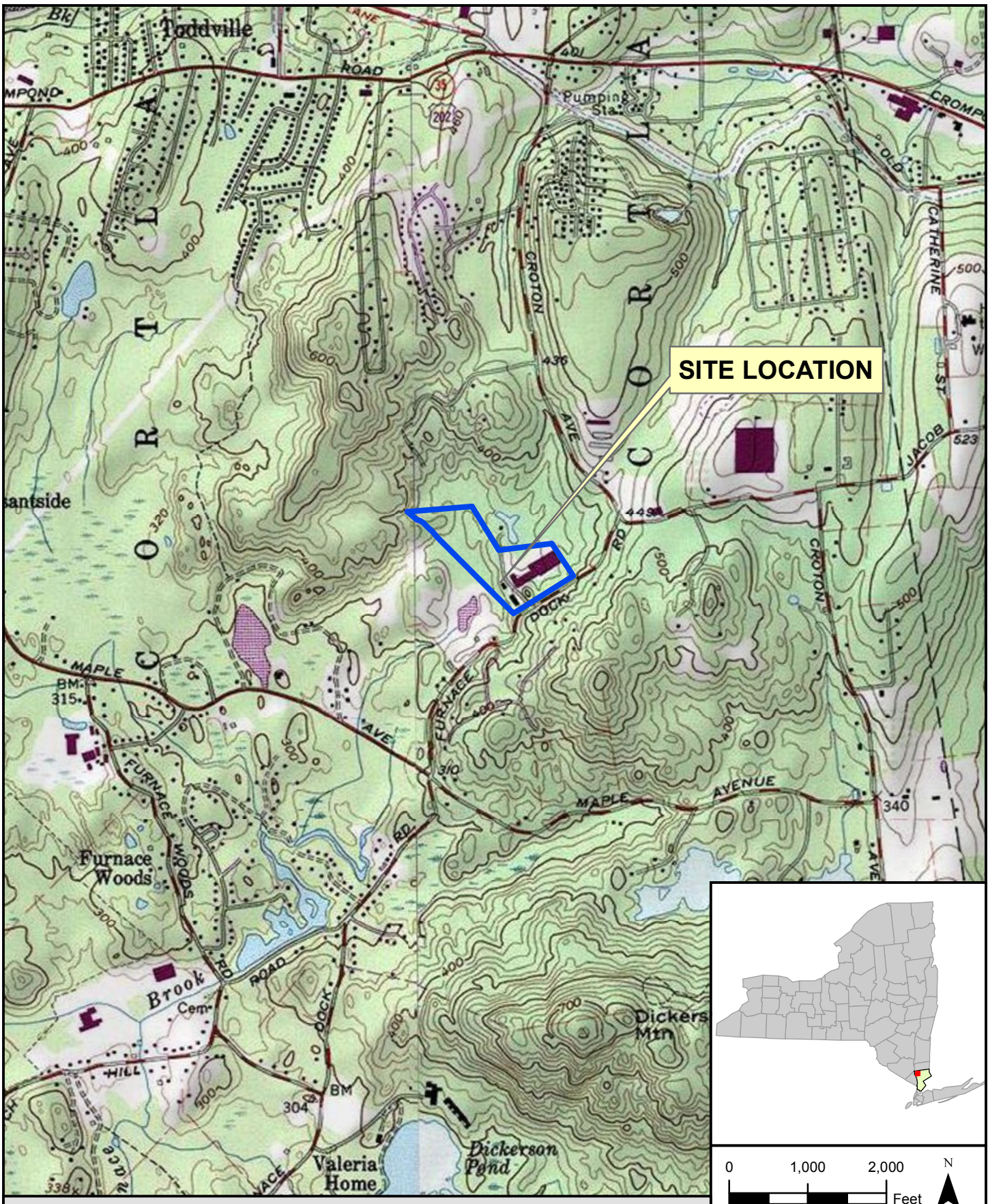
TASK	DELIVERABLE	NUMBER OF COPIES	DUE DATE (calendar days)
1.2	Scoping Meeting Minutes	2**	5 days after scoping meeting
1.4	Draft RI/FS Work Plan and Draft Budget	2**	45 days after scoping meeting
1.5	Final RI/FS Work Plan and Budget	2**	15 days after conclusion of negotiations
1.6	Evaluate Existing Data	1***	60 days after Work plan approved
1.7	Draft Quality Assurance Project Plan (QAPP)	1*	30 days after work plan approval
1.7	Final QAPP	1	15 days after receipt of EPA review comments on draft QAPP
1.8	Draft Health and Safety Plan (HASP)	1*	30 days after work plan approval; to be submitted with draft QAPP
1.8	Final HASP	1	15 days after receipt of EPA review comments on draft HASP; to be submitted with final QAPP
1.10	Meeting Minutes	1	5 days after each meeting
1.13	Pathways Analysis Report (PAR)	1*	21 days after submission of Data Evaluation Report, under task 6.4
2.3	Public Meeting Transcript	1	14 days after the Proposed Plan public meeting
2.4	Fact Sheets	1	10 days prior to each public meeting
2.6	Public Notices	1	One for each Public meeting, three weeks before the respective public meeting
2.8	Site Mailing List	0*	Four weeks prior to the first Public meeting
2.9	Responsiveness Summary Support	1	21 days after public meeting
6.4	Data Evaluation Report	1	30 days after completion of subtask 6.2
7.1	Draft Baseline Human Health Risk Assessment (HHRA) Report	1*	30 days after approval of PAR
7.1	Final Baseline HHRA Report	1	14 days after receipt of EPA review comments on Draft HHRA
7.2	Draft Screening Level Ecological Risk Assessment (SLERA) Report	1*	The Screening Level Ecological Risk Assessment shall be submitted within 45 days after submission of the DER, under task 6.4.

Table 1 Summary of Major Submittals
Magna Metals RI/FS (052-RICO-A28A)
Cortlandt, New York

TASK	DELIVERABLE	NUMBER OF COPIES	DUE DATE (calendar days)
7.2	Final SLERA Report	1	14 days after receipt of EPA review comments on Draft SLERA
9.1	Draft RI Report	1*	90 days after completion of field investigation
9.2	Final RI Report	1	30 days after receipt of EPA review comments on Draft RI report
10.1	Draft Remedial Alternatives Screening Technical Memorandum	1*	60 days after EPA approval of Final RI Report
11.1	Draft Remedial Alternatives Evaluation Technical Memorandum	1*	80 days after EPA approval of Final RI Report
11.2	Final Remedial Alternatives Evaluation Technical Memorandum	1	14 days after receipt of EPA final comments on Draft Remedial Alternatives Technical Memorandum
12.1	Draft FS Report	1*	30 days after receipt of EPA review comments on technical memoranda.
12.2	Final FS Report	1	30 days after receipt of EPA review comments on draft FS report
14.1	Revised Work Plan Budget	2**	30 Days after receipt of closeout direction
14.2	Document Index	2****	45 days after receipt of EPA approval on Revised Work Plan Budget, to be submitted with 14.3
14.3	Document Retention/ Conversion	2****	Within 45 days after EPA notification of WA completion

*All deliverable copies will be submitted to the WAM unless otherwise directed by EPA. An electronic copy of all documents will be submitted to EPA.
** One copy of the deliverable will be submitted to the PO and CO; the remainder will be submitted to the WAM.
*** Dependent on work scope. If modeling is required to identify capture zone and sources, time line will be extended by EPA accordingly
**** One copy of the deliverable will be submitted to the EPA Records manager; the remainder will be submitted to the WAM.

FIGURES



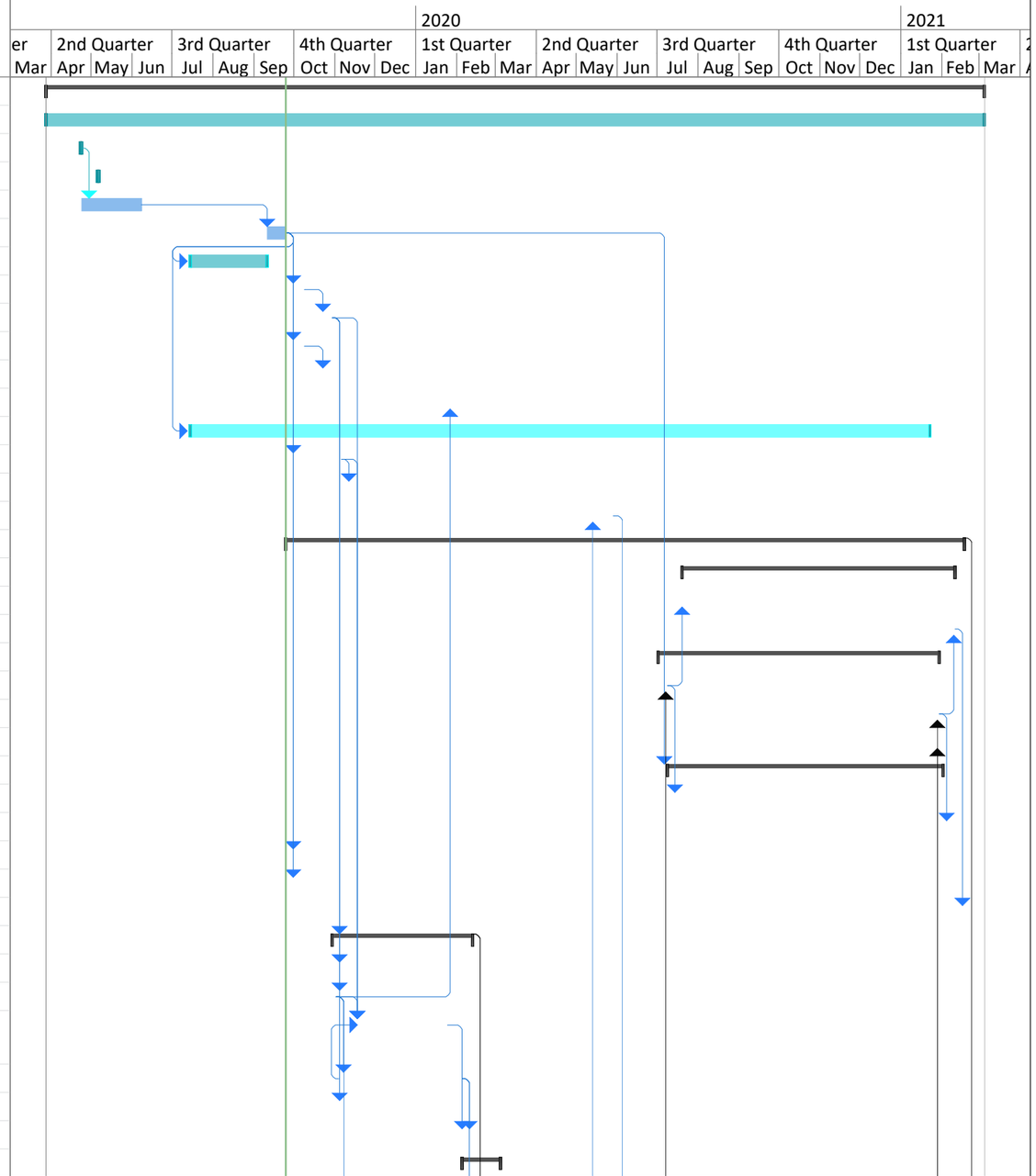
Source: United States Geological Survey Topographic Map

HDR

Magna Metals State Superfund Site (NYSDEC Site # 360003)
510 Furnace Dock Road
Westchester County, Cortlandt, New York

Figure 1
Site Location Map
September 2013

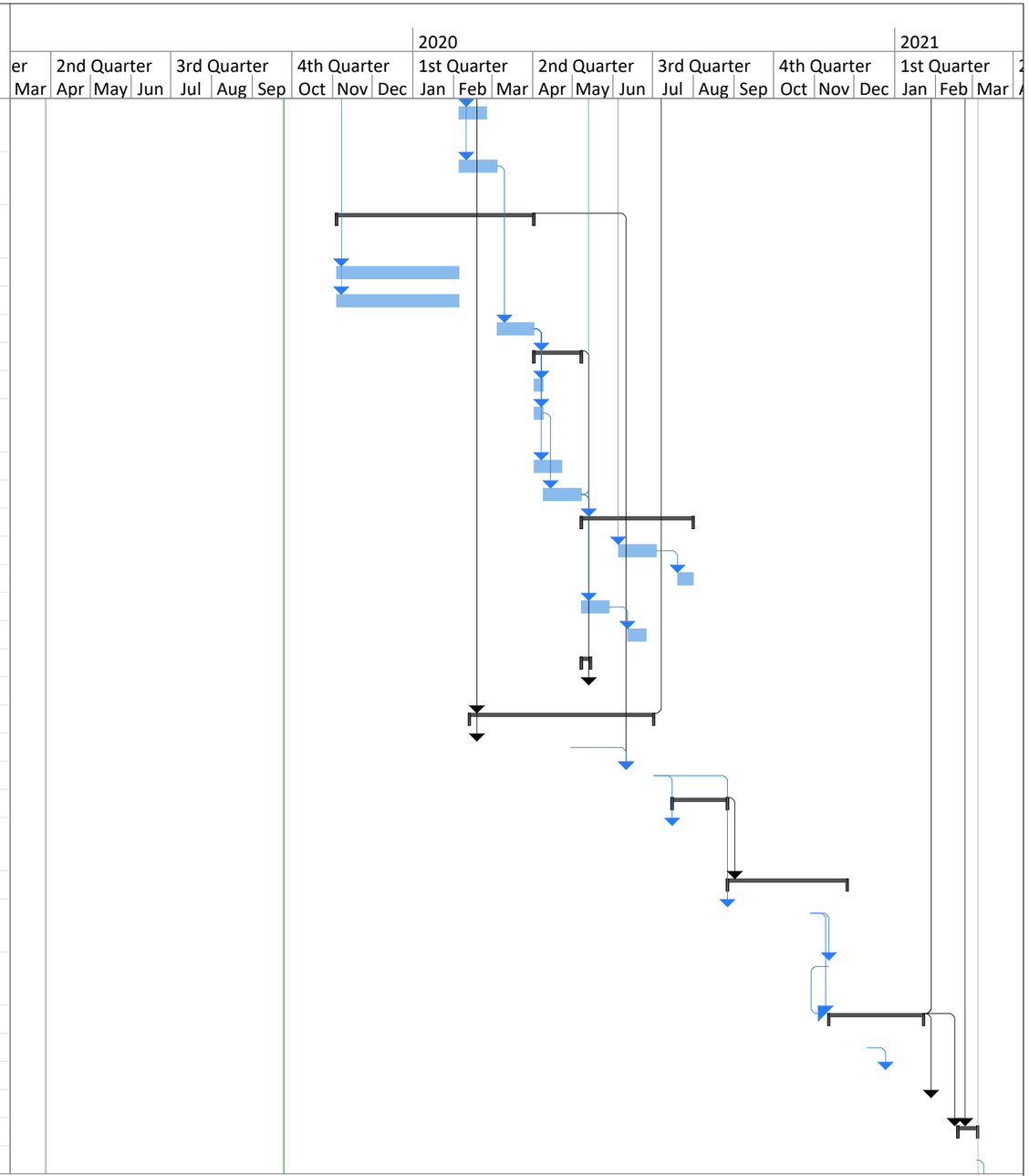
ID	Task Mode	WBS	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1		**1**	**Task 1 Project Planning and Support**	**506 days**	**Thu 3/28/19**	**Thu 3/4/21**		
2		1.1	Project Administration	506 days	Thu 3/28/19	Thu 3/4/21		
3		1.2	Scoping Meeting	1 day	Tue 4/23/19	Tue 4/23/19		
4		1.3	Site Visit	1 day	Mon 5/6/19	Mon 5/6/19		
5		1.4	Draft Work Plan	33 days	Wed 4/24/19	Fri 6/7/19	3	
6		1.5	Final Work Plan	10 days	Wed 9/11/19	Tue 9/24/19	5FS+10 days	
7		1.6	Evaluate Existing Data and Docum	42 days	Mon 7/15/19	Tue 9/10/19	6	
8		1.7	Draft Quality Assurance Project P	10 days	Wed 9/25/19	Tue 10/8/19	6	
9		1.8	Final Quality Assurance Project Pl	5 days	Wed 10/23/19	Tue 10/29/19	8FS+10 days	
10		1.9	Draft Health and Safety Plan	10 days	Wed 9/25/19	Tue 10/8/19	6	
11		1.10	Final Health and Safety Plan	5 days	Wed 10/23/19	Tue 10/29/19	10FS+10 days	
12		1.11	Non-RAS Analysis	20 days	Mon 1/27/20	Fri 2/21/20	33FS+60 days	
13		1.12	Project Meetings	400 days	Mon 7/15/19	Fri 1/22/21	6	
14		1.13	Subcontract Procurement	30 days	Wed 9/25/19	Tue 11/5/19	6	
15		1.14	Subcontract Management	99 days	Wed 11/6/19	Mon 3/23/20	14	
16		1.15	Pathway Analysis Report (PAR)	15 days	Fri 5/8/20	Thu 5/28/20	49	
17		**2**	**Task 2 Community Relations**	**366 days**	**Wed 9/25/19**	**Wed 2/17/21**		
18		**2.1**	**Public Meeting Support**	**148 days**	**Mon 7/20/20**	**Wed 2/10/21**		
19		2.1.1	RI Meeting	1 day	Mon 7/20/20	Mon 7/20/20	22FS+7 days	
20		2.1.2	Proposed Plan	1 day	Wed 2/10/21	Wed 2/10/21	23FS+7 days	
21		**2.2**	**Fact Sheet Preparation**	**152 days**	**Thu 7/2/20**	**Fri 1/29/21**		
22		2.2.1	RI Meeting	5 days	Thu 7/2/20	Wed 7/8/20	57	
23		2.2.2	Proposed Plan Fact Sheet	5 days	Mon 1/25/21	Fri 1/29/21	65	
24		2.3	Proposed Plan Support	10 days	Mon 1/25/21	Fri 2/5/21	65	
25		**2.4**	**Public Notices**	148 days	Thu 7/9/20	Mon 2/1/21	6	
26		2.4.1	RI Public Notice	1 day	Thu 7/9/20	Thu 7/9/20	22	
27		2.4.2	Proposed Plan Public Notice	1 day	Mon 2/1/21	Mon 2/1/21	23	
28		2.5	Information Repository	15 days	Wed 9/25/19	Tue 10/15/19	6	
29		2.6	Site Mailing List	20 days	Wed 9/25/19	Tue 10/22/19	6	
30		2.7	Responsiveness Summary	5 days	Thu 2/11/21	Wed 2/17/21	20	
31		**3**	**Task 3 Field Investigations**	**76 days**	**Wed 10/30/19**	**Wed 2/12/20**	**9**	
32		3.1	Site Reconnaissance	1 day	Wed 10/30/19	Wed 10/30/19	9	
33		3.2	Mobilization and Demobilization	3 days	Wed 10/30/19	Fri 11/1/19	9	
34		3.3	Hydrogological Assessment/Monitoring Well Installation	50 days	Mon 11/18/19	Fri 1/24/20	9,14,33,35SS+10 days	
35		3.4	Environmental Sampling	67 days	Mon 11/4/19	Tue 2/4/20	33	
36		3.5	Ecological Characterization	3 days	Wed 10/30/19	Fri 11/1/19	9	
37		3.6	IDW Characterization and Disposa	6 days	Wed 2/5/20	Wed 2/12/20	34,35	
38		**4**	**Task 4 Sample Analysis**	**21 days**	**Wed 2/5/20**	**Wed 3/4/20**		



Project: Magna Metals RI/FS
Date: Wed 9/25/19

Task	Project Summary	Inactive Milestone	Manual Summary Rollup	Deadline
Split	External Tasks	Inactive Summary	Manual Summary	Progress
Milestone	External Milestone	Manual Task	Start-only	Manual Progress
Summary	Inactive Task	Duration-only	Finish-only	

ID	Task Mode	WBS	Task Name	Duration	Start	Finish	Predecessors	Resource Names
39		4.1	Innovative Methods/Field Screening Analysis	15 days	Wed 2/5/20	Tue 2/25/20	35	
40		4.2	Analytical Services provided by DESA/CLP or EPA-ERT	21 days	Wed 2/5/20	Wed 3/4/20	35	
41		**5**	**Task 5 Analytical Support and Data Validation**	**108 days**	**Mon 11/4/19**	**Wed 4/1/20**		
42		5.1	Prepare and Ship Samples	67 days	Mon 11/4/19	Tue 2/4/20	33	
43		5.2	Sample Managment	67 days	Mon 11/4/19	Tue 2/4/20	33	
44		5.3	Data Validation	20 days	Thu 3/5/20	Wed 4/1/20	40	
45		**6**	**Task 6 Data Evaluation**	**26 days**	**Thu 4/2/20**	**Thu 5/7/20**	**44**	
46		6.1	Data Usability Evaluation	5 days	Thu 4/2/20	Wed 4/8/20	44	
47		6.2	Data Reduction, Tabulation, and Evaluation	5 days	Thu 4/2/20	Wed 4/8/20	44	
48		6.3	Modeling	15 days	Thu 4/2/20	Wed 4/22/20	44	
49		6.4	Data Evaluation Summary Report	21 days	Thu 4/9/20	Thu 5/7/20	47	
50		**7**	**Task 7 Assessment of Risk**	**61 days**	**Fri 5/8/20**	**Fri 7/31/20**	**49**	
51		7.1	Draft Baseline Risk Assessment	21 days	Fri 6/5/20	Fri 7/3/20	16FS+5 days	
52		7.2	Final Baseline Risk Assessment	10 days	Mon 7/20/20	Fri 7/31/20	51FS+10 days	
53		7.3	Draft SLERA	15 days	Fri 5/8/20	Thu 5/28/20	49	
54		7.4	Final SLERA	10 days	Fri 6/12/20	Thu 6/25/20	53FS+10 days	
55		**8**	**Task 8 Treatability Study/Pilot Testi**	**5 days**	**Fri 5/8/20**	**Thu 5/14/20**		
56		8.1	Literature Search	5 days	Fri 5/8/20	Thu 5/14/20	45	
57		**9**	**Task 9 RI Report**	**100 days**	**Thu 2/13/20**	**Wed 7/1/20**	**31**	
58		9.1	Draft RI Report	55 days	Thu 2/13/20	Wed 4/29/20	31	
59		9.2	Final RI Report	15 days	Thu 6/11/20	Wed 7/1/20	58FS+30 days,41FS+5 da	
60		**10**	**Task 10 Remedial Alternatives Scree**	**30 days**	**Thu 7/16/20**	**Wed 8/26/20**		
61		10.1	Draft Remedial Alternatives Screening Memo	30 days	Thu 7/16/20	Wed 8/26/20	59FS+10 days	
62		**11**	**Task 11 Remedial Alternatives Evalu**	**65 days**	**Thu 8/27/20**	**Wed 11/25/20**	**60**	
63		11.1	Draft Remedial Alternatives Evaluation Memo	45 days	Thu 8/27/20	Wed 10/28/20	59	
64		11.2	Final Remedial Alternatives Evaluation Memo	10 days	Thu 11/12/20	Wed 11/25/20	63FS+10 days	
65		**12**	**Task 12 Feasibility Study Report**	**52 days**	**Thu 11/12/20**	**Fri 1/22/21**	**63FS+10 days,64SS**	
66		12.1	Draft FS Report	21 days	Thu 11/12/20	Thu 12/10/20		
67		12.2	Final FS Report	21 days	Fri 12/25/20	Fri 1/22/21	66FS+10 days	
68		13	Task 13 Post RI/FS Support	20 days	Mon 1/25/21	Fri 2/19/21	65	
69		**14**	**Task 14 Work Assignment Closeout**	**11 days**	**Thu 2/18/21**	**Thu 3/4/21**	**65,17**	
70		14.1	Revised Work Plan Budget	10 days	Thu 2/18/21	Wed 3/3/21		



Project: Magna Metals RI/FS
Date: Wed 9/25/19

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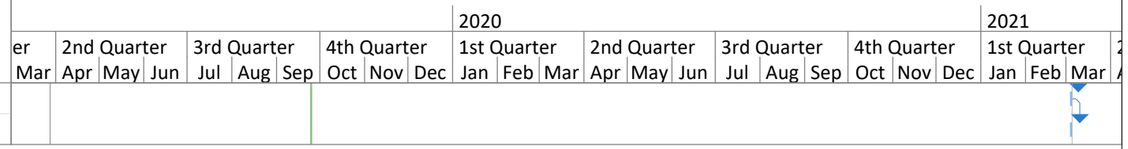
Split	External Tasks	Inactive Summary	Manual Summary	Progress
Milestone	External Milestone	Manual Task	Start-only	Manual Progress
Summary	Inactive Task	Duration-only	Finish-only	

ID		Task Mode	WBS	Task Name	Duration	Start	Finish	Predecessors	Resource Names
71			14.2	Document Indexing	1 day	Thu 3/4/21	Thu 3/4/21	70	
72			14.3	Document Retention/Conversion	1 day	Thu 3/4/21	Thu 3/4/21	71	



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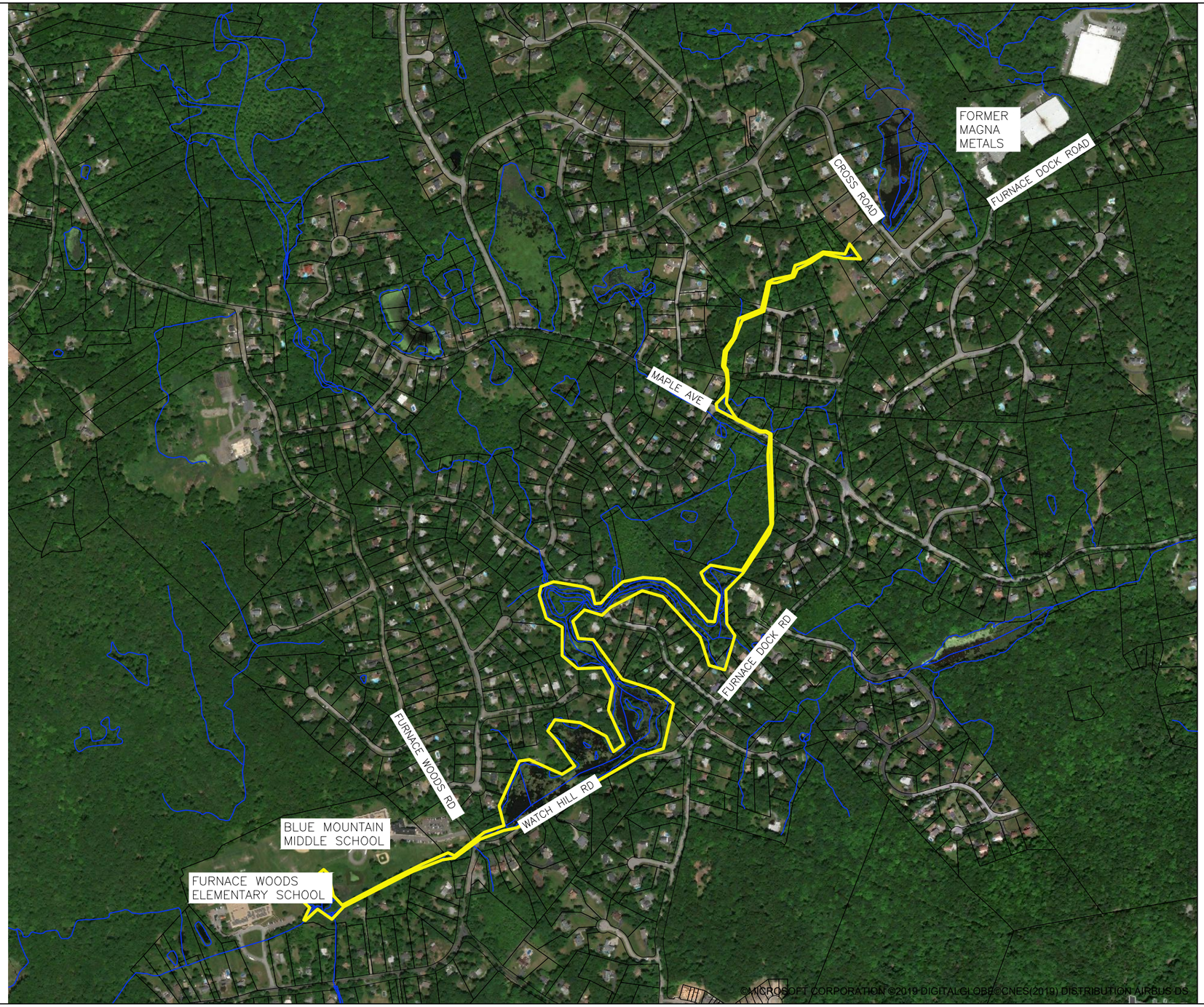

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LEGEND:

- TAX MAP PARCELS
- WATER AND WETLAND AREAS
- PROJECT AREA

NOTES:

1. TAX MAP PARCELS DOWNLOADED FROM WESTCHESTER COUNTY GEOGRAPHIC INFORMATION SYSTEMS MUNICIPAL TAX PARCEL DATA, DATED 2016.
2. WATER FEATURES WERE DOWNLOADED FROM THE WESTCHESTER COUNTY GEOGRAPHIC INFORMATION SYSTEM 2018 MUNICIPAL-WIDE BASE MAP PLANIMETRICS.

800 0 800 1,600

(IN FEET)

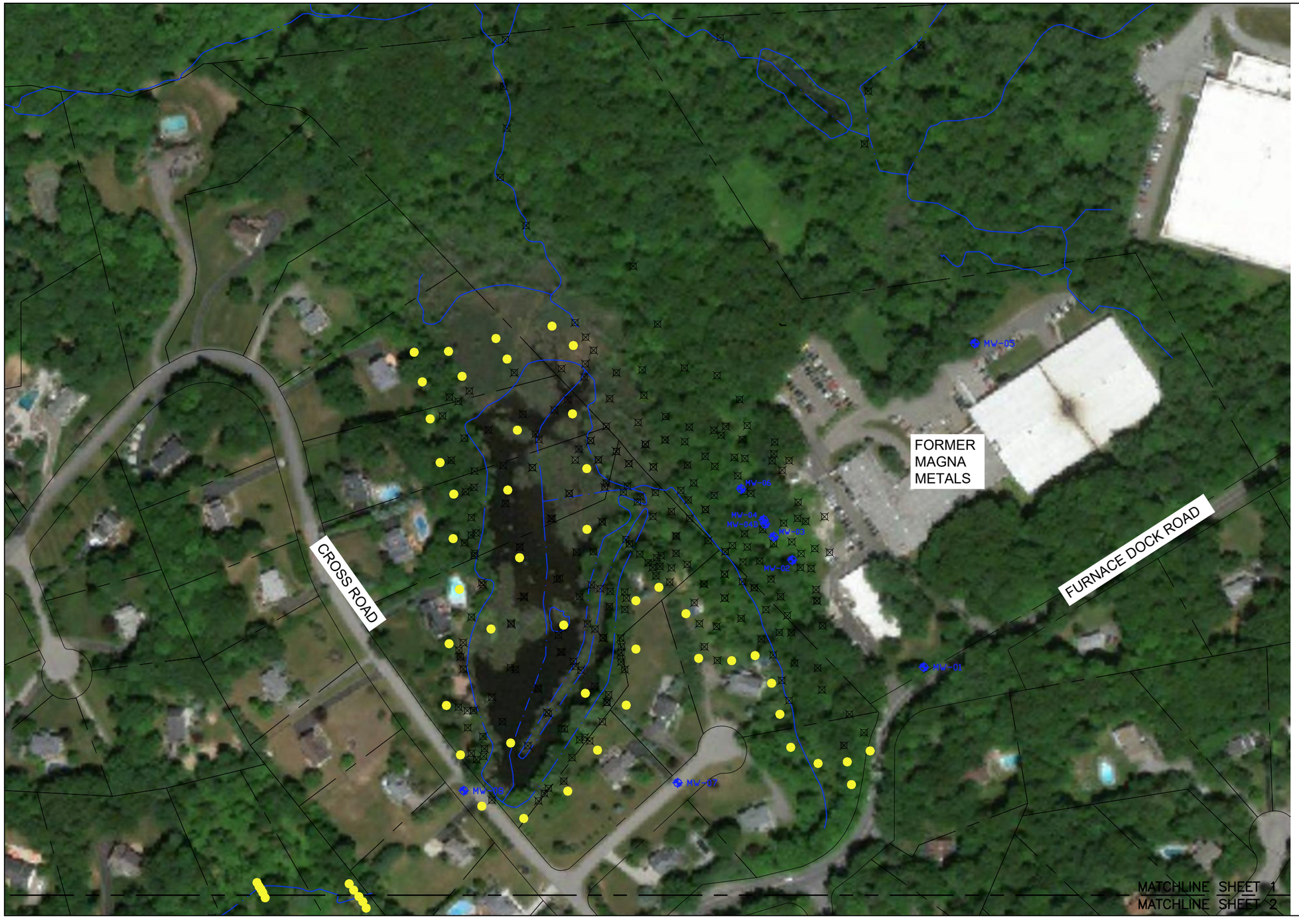
1 inch = 800 ft.

PROJECT AREA MAP

MAGNA METALS SUPERFUND SITE
CORTLANDT, WESTCHESTER COUNTY, NEW YORK

DATE 5/16/19

FIGURE 1



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LEGEND:

- TAX MAP PARCELS
- WATER AND WETLAND AREAS
- EXISTING SAMPLE LOCATION
- PROPOSED SAMPLE LOCATION
- EXISTING MONITORING WELL

NOTES:

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3. SAMPLE LOCATIONS SHOWN ARE FOR ESTIMATION PURPOSES ONLY AND ARE SUBJECT TO CHANGE DURING DEVELOPMENT OF THE QAPP.

0 800 1,600

(IN FEET)

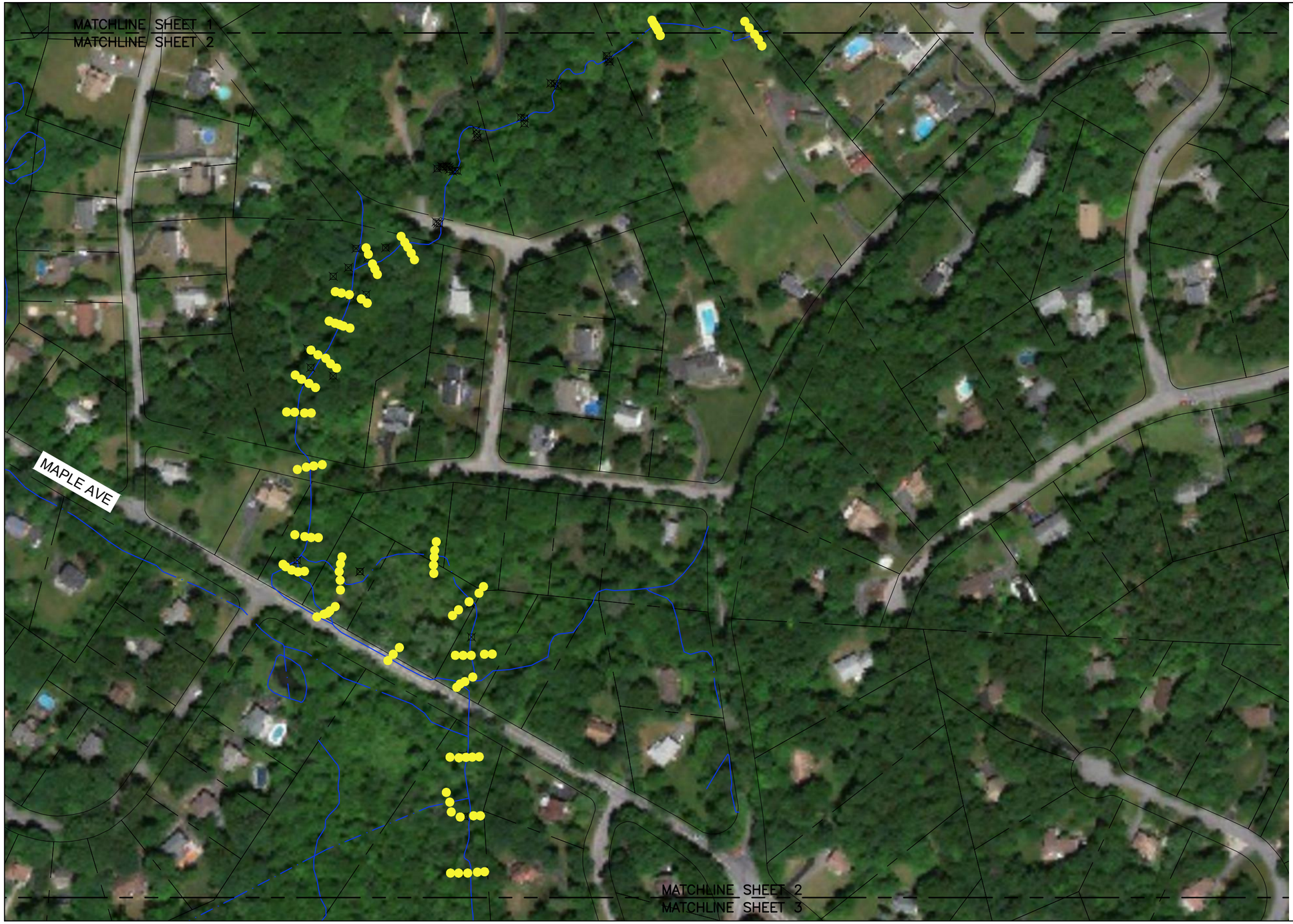
1 inch = 800 ft.

SITE AREA MAP (SHEET 1)

MAGNA METALS SUPERFUND SITE
CORTLANDT, WESTCHESTER COUNTY, NEW YORK

DATE
5/20/219

FIGURE
4



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0 800 1,600

(IN FEET)

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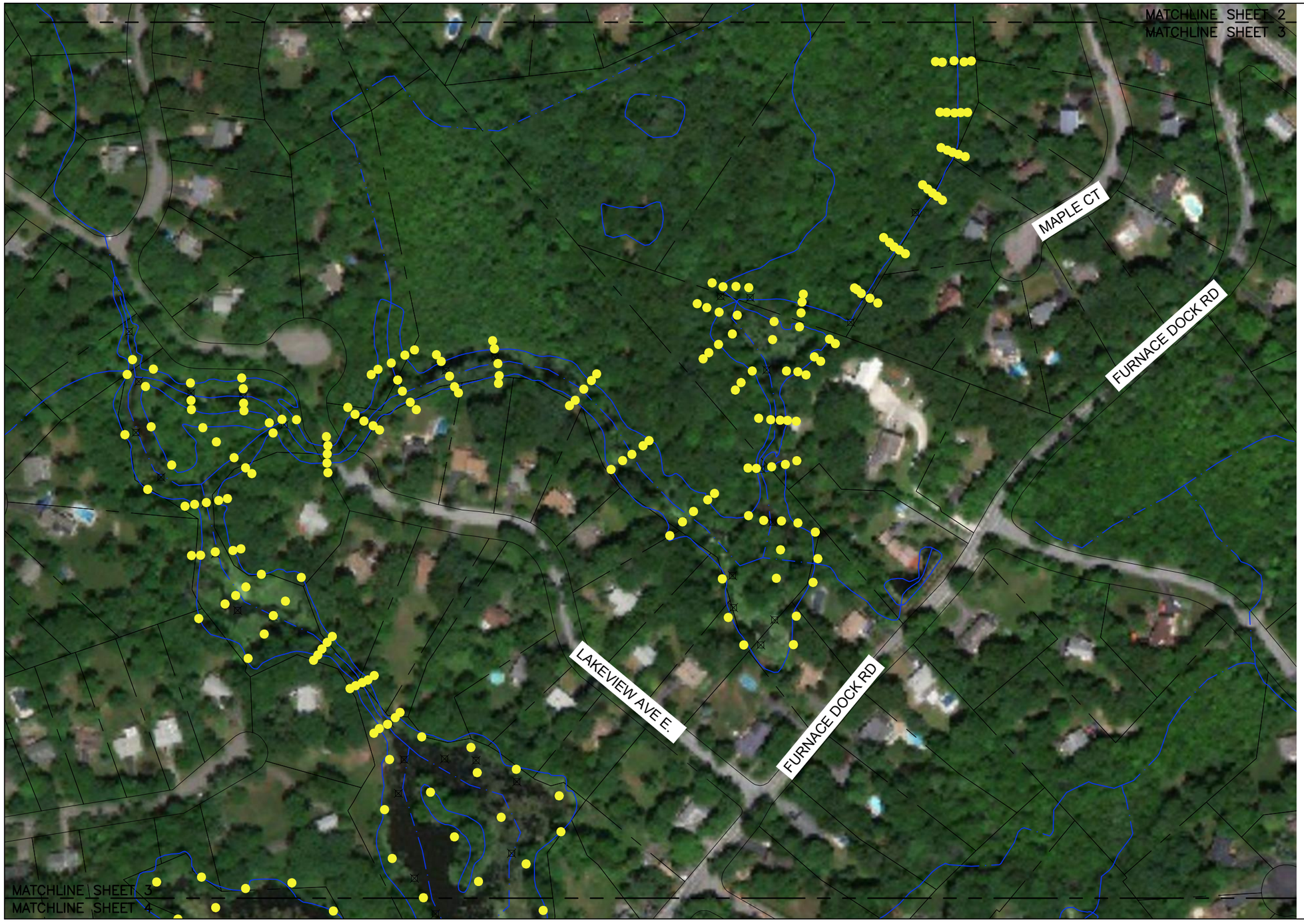
SITE AREA MAP (SHEET 2)

MAGNA METALS SUPERFUND SITE
CORTLANDT, WESTCHESTER COUNTY, NEW YORK

DATE
5/20/219

FIGURE
5



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LEGEND:

- TAX MAP PARCELS
- WATER AND WETLAND AREAS
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0 800 1,600

(IN FEET)

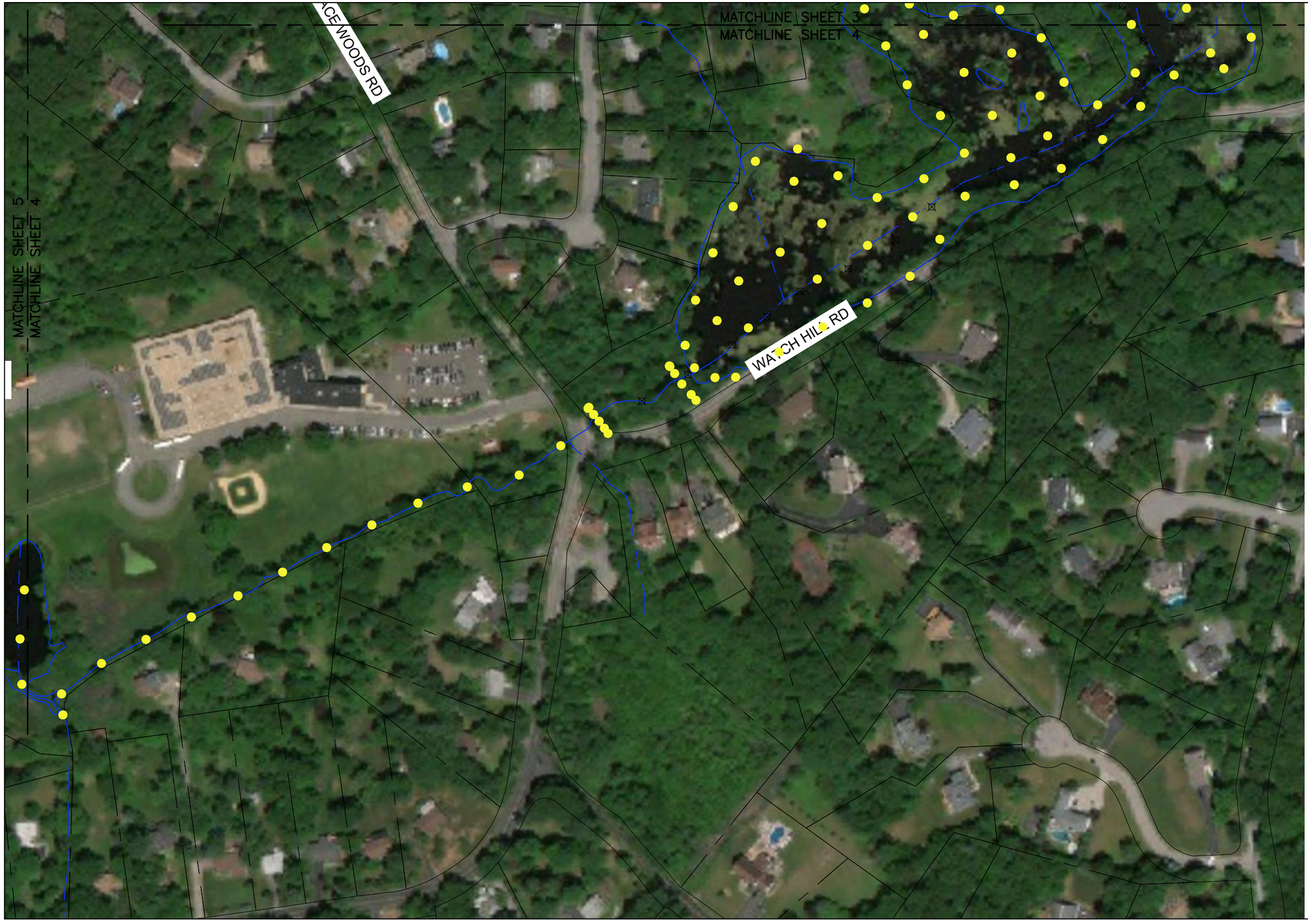
1 inch = 800 ft.

SITE AREA MAP (SHEET 3)

MAGNA METALS SUPERFUND SITE
CORTLANDT, WESTCHESTER COUNTY, NEW YORK

DATE
5/20/219

FIGURE
6



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LEGEND:

- TAX MAP PARCELS
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0 800 1,600

(IN FEET)

1 inch = 800 ft.

SITE AREA MAP (SHEET 4)

MAGNA METALS SUPERFUND SITE
CORTLANDT, WESTCHESTER COUNTY, NEW YORK

DATE
5/20/219

FIGURE
7

N

LEGEND:

- TAX MAP PARCELS
- WATER AND WETLAND AREAS
- EXISTING SAMPLE LOCATION
- PROPOSED SAMPLE LOCATION
- EXISTING MONITORING WELL

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0 800 1,600

(IN FEET)

1 inch = 800 ft.

SITE AREA MAP (SHEET 5)

MAGNA METALS SUPERFUND SITE
CORTLANDT, WESTCHESTER COUNTY, NEW YORK

DATE
5/20/219

FIGURE
8