

2017 WORK PLAN

for the
COMMUNITY ENVIRONMENTAL MONITORING PROGRAM
of the Eagle Mine



Submitted by



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Commonly Used Acronyms and Abbreviations

CEMP	Community Environmental Monitoring Program
CWB	Contact Water Basins
DEQ	Michigan Department of Environmental Quality
Eagle	Eagle Mine
EPA	U.S. Environmental Protection Agency
GW	Groundwater
GWDP	Groundwater Discharge Permit
HTDF	Humboldt Tailings Disposal Facility
Foundation	Community Foundation of Marquette County
MP	Mine Permit
PM	Particulate Matter (dust) measured in microns
SWP	Superior Watershed Partnership
TBD	To Be Determined
TDRSA	Temporary Development Rock Storage Area
TWIS	Treated Water Infiltration System
WTP	Water Treatment Plant

Diagram of Eagle Mine Facilities



Diagram of Humboldt Mill Facilities



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Introduction

The Community Environmental Monitoring Program (CEMP) of the Eagle Mine is implemented by two community-based organizations; the Superior Watershed Partnership (SWP) and the Community Foundation of Marquette County (Foundation). The CEMP is defined and governed by formal agreements between these organizations and Lundin Mining, who purchased the Eagle Mine from Rio Tinto during 2013. The CEMP is designed to build a comprehensive and accurate picture of any environmental impacts that may be a result of Eagle Mine's operations at the mine site, the Humboldt Mill, and along the designated Transportation Route. The CEMP is independent, transparent, and based on the highest scientific standards.

The CEMP consists of four main components: 1) Verification Monitoring, which includes verifying the environmental monitoring done by Eagle Mine as required by its permits 2) Additional monitoring, which includes environmental monitoring done by SWP over and above the monitoring that Eagle Mine is required to do under its permits; and 3) Publication of results and ratings of Eagle Mine's environmental performance; and 4) Community Outreach, to inform the public and provide opportunities for the community to provide input regarding CEMP activities.

In July 2016, the SWP and the Foundation negotiated renewal of the CEMP Agreement with Eagle Mine to allow for continued environmental monitoring of operations at the Mine and the Humboldt Mill through 2018. The 2017 Work Plan marks the sixth year of CEMP monitoring and the fourth year of monitoring under the "operational" phase of production. The Work Plan is organized into three sections that describe CEMP activities 1) Annual Monitoring Objectives, 2) Monitoring Results and Performance Ratings, and 3) Community Input and Public Outreach. A summary of the annual monitoring objectives including work plan tasks, standards and frequency of activities is provided in Table 1. Community Environmental Monitoring Program monitoring locations and parameters for laboratory analyses are provided in Figures 1-7 and Tables 2-12 respectively.

1. Annual Monitoring Objectives

1.1. Verification Monitoring and Data Review

1.1.1. Baseline Data Review

The SWP will continue to review and evaluate pre-mining (baseline) environmental data as it relates to data generated during monitoring of mining operations. The SWP recognizes that baseline data in and around the Eagle Mine includes data collected prior to September 2011. Data collected from the Humboldt Mill, Powell Township Air, and along the transportation route will be considered baseline through September 2014.

1.1.2. Operations Data Review

Eagle Mine will continue to provide SWP with environmental monitoring data in the form of reports, a data base or summary reports. SWP will review this data from three perspectives. The first is to verify the validity (precision, accuracy representativeness) of the data. The second is to analyze data for indications of impacts from mining operations. The last is to analyze data from background (including upgradient, baseline and reference monitoring points) for indications of local (e.g., logging), regional (e.g., atmospheric deposition) or global (e.g., climate change) impact related to other non-mine activity.

1.1.3. Procedures Review/Observations

SWP will continue to review and observe data collection at Eagle Mine and the Humboldt Mill during 2017. The objective is to verify that the procedures used are appropriate and will result in the generation of data sets that are representative of environmental conditions.

1.1.4 Interpretations Review

SWP will continue to interpret results of Eagle Mine's permit required environmental monitoring data. The interpretations review will focus primarily on assigning likely root cause (mine impacts, data quality issues or unrelated impacts) to monitoring point values that exceed permit specified benchmarks or thresholds. The SWP will utilize relevant baseline and secondary data (data from other sources) where appropriate to document interpretations of results and/or make comparisons to other local or regional environmental data.

1.1.5 Split Sampling

SWP will carry out split sampling at permit required monitoring sites at the Eagle Mine site and the Humboldt Mill (groundwater, surface water, and facilities) in conjunction with Eagle Mine's scheduled monitoring. Split sampling is when a sample taken from a single source (e.g. a groundwater well) is divided in two, with each sample analyzed by a different certified laboratory. The objective of the split sampling is to verify that the laboratories used are appropriate and the results are representative of environmental conditions. Split samples will be conducted at Eagle Mine and the Humboldt Mill at the locations shown in Figures 1-6. The frequency and number of samples collected at each site are described in Table 2. Samples will be submitted to an independent laboratory for analyses. Analytical parameters, methods and reporting limits for split sampling are presented in Tables 3-10. The samples may be analyzed for the full parameter list or a subset of the parameters specified for that monitoring point. Results will be compared to baseline data and applicable permit benchmarks and limits.

1.2 Additional Monitoring

1.2.1 Powell Township Air Quality

During November of 2012, an air quality and meteorological station was installed in Powell Township per the *CEMP Agreement*. The station is located in the community of Big Bay behind Crams General Store (Figures 7 and 8). The objective of the Powell Township air quality monitoring station is to generate data that can be used to identify potential air quality impacts in the community that may be a result of mining operations. Air quality data are compared to National Ambient Air Quality Standards and Michigan Air Toxic Screening Levels. The meteorological station measures wind speed and direction, temperature, barometric pressure, precipitation, solar radiation, and relative humidity on a continuous basis. During 2017, CEMP monitoring will measure particulate matter (dust) in the 10 micron size range (PM10) on a continuous basis. Particulate matter filters will also be sent to a laboratory for analysis of metal concentrations (Table 11) on a quarterly basis. In addition, two modems will be installed at the station to provide real-time meteorological and air quality data (PM10) via the CEMP website.

1.2.2 Edible/Traditional Plant Tissue Monitoring

Edible/traditional plant tissue monitoring began in 2015 to evaluate concerns voiced by the Keweenaw Bay Indian Community and other community members regarding potential impacts from mining activities on native plant species of high cultural value. The monitoring includes collection and analysis of berries, leaves and roots of important native plant species (including but not limited to: blueberry, Juneberry, chokecherry, pin cherry, raspberry, blackberry, strawberry, thimbleberry, cranberry, juniper berry, and wild rice). A list of parameters for analysis are provided in Table 12. Collections include plant tissue in the form of berries, leaves, and/or roots collected from sites located within a two-mile radius of the Eagle Mine and Humboldt Mill as well as a control location (Figure 7). Plant tissue samples will be collected and sent out for analysis at a certified laboratory and compared to guidelines and daily intake recommendations including the US Environmental Protection Agency's oral Tolerable Intake Values (TDI) and the Food and Drug Administration's recommended Daily Values (DV). Following collection of 2017 data, a Final Technical Report will be developed to summarize results from test and control sites (2015-2017) and provide recommendations for further evaluations, if applicable.

1.2.3 Install New Groundwater Monitoring Well

As a result of community concerns regarding potential impacts to the Salmon Trout River from Eagle Mine's operations, an additional groundwater monitoring well cluster will be installed near the Eagle Mine site; outside of the mine perimeter (fence) between the Treated Water Infiltration System (TWIS) and headwaters of tributaries to the Salmon Trout River (TBD). The objective of the new monitoring well cluster is to expand the existing monitoring infrastructure to further evaluate potential groundwater impacts as a result of Eagle Mine's Water Treatment Facility discharge. Once the new monitoring well cluster is installed, groundwater data will be collected on a quarterly basis and compared to results from Eagle Mine's permit required groundwater monitoring sites.

1.2.4 Other Based on Results or New Activities

The SWP may also collect additional data near the mine, mill, and along the transportation route during 2017 based on results or new information, community input, and/or new

activities. SWP will provide Eagle Mine with a plan (including locations, procedures, methodologies and standards) for any additional monitoring prior to commencing with monitoring activities.

2 Monitoring Results and Performance Ratings

2.1 Data Processing/Publication

2.1.1 Data Processing

SWP laboratory(s) will deliver monitoring results in electronic format to SWP no later than 45 days of receipt of samples and the data will be processed by SWP within 5 working days of receipt from the laboratory. Data processing procedures will be conducted in a manner consistent with the *CEMP Agreement*, the *CEMP Notification Plan* and other agreed upon standards/operating procedures. Primary processing consists of verification that samples, parameters, analytical methods, and detection limits were completed as requested. Secondary processing will consist of the evaluation of laboratory quality control data and duplicate data for evidence of quality control issues. Tertiary processing consists of comparison of data to appropriate baseline data, permit specified criteria/benchmarks, or other agreed upon state or federal criteria. The final data processing step follows receipt of Eagle data and consists of the comparison of Eagle's laboratory derived values with values produced by SWP's laboratory(s).

2.1.2 Data Publication/Notification

Data publication and notification processes are defined in the *CEMP Agreement*, as amended, and the *CEMP Notification Plan*. This includes procedures for 1) data sharing; 2) data anomalies and/or other events; 3) serious risks and/or breaches of permits or other applicable environmental regulations; and 3) release of data/information. Once data has been received from the laboratory and processed according to the procedures described above, SWP will make results available to the public on the CEMP website (www.swpcemp.org) in the form of quarterly summaries.

2.2 Performance Ratings

2.2.1 CEMP Report Card

The CEMP Report Card is located on the CEMP website and includes a red light, orange light, yellow light, and green light system used by SWP to rate Eagle Mine on its environmental performance on a quarterly basis by location (Mine or Mill) and type of monitoring (facilities, groundwater, surface water, flora/fauna, etc.). The red light used in the rating indicates potential harm to the environment/potential permit violation; an orange light indicates an area of concern and/or potential impact to the environment, a yellow light indicates an area that is being tracked but currently poses no threat to the environment; and a green light indicates no known risks to the environment. A white or blank light indicates an area that was not rated. These “lights” also serve as links (via a click and a pop-up box) to data summary tables, an explanation of the reason for a “tracking” or “area of concern color rating”, and/or a more detailed Monitoring Report.

2.2.2 CEMP Monitoring Reports

In addition to quarterly data summaries, CEMP will develop annual monitoring reports summarizing results of environmental monitoring at the Mine and Mill as it relates to regulatory/permit limits. The annual reports summarize deviations from regulatory limits by location, parameter, permit limit or benchmark value, and quarterly monitoring results. Annual summary reports will describe any issues, potential risks to the environment or human health, and measures taken by the CEMP program and Eagle Mine to address the situation. Annual monitoring reports will be posted to the CEMP website.

3. Community Outreach

3.1. Increased Emphasis Related to Risk Communication

The SWP community outreach will incorporate information regarding potential human health risks and potential environmental risks related to Eagle Mine’s operations. During 2017, the CEMP website will be continue to be updated and serve as the primary way to convey risk information to the public via summaries of results including trends analyses; and deviations from benchmarks and permits limits. Additional risk communication will be provided through the Work Plan elements below.

3.2 Regional, Great Lakes and International Outreach

The SWP will participate in broad distribution of the CEMP *Case Studies* and other program information and findings to other communities and interested parties. This includes, but is not limited to, other communities in the Upper Peninsula, other states (ie; Minnesota, Wisconsin) and Canada. In addition, the SWP will identify opportunities to share relevant CEMP information on a Great Lakes level, national level and international level.

3.3 Community Meetings and Forums

During 2017, the SWP will host community forums as deemed necessary in the City of Marquette, Powell Township (Big Bay), Humboldt Township, and Michigamme Township to inform the public about the CEMP and to gather input regarding community concerns and suggestions for additional monitoring activities. The SWP will also present CEMP information upon request to local schools and university departments, community groups, and at other public events/forums.

3.4 Continued Public Outreach Activities

During 2017, the SWP will continue to conduct public outreach using the CEMP website, local news/media outlets, social media (Facebook and Twitter), printed materials, and publications to inform the public about CEMP activities. The SWP will respond to questions and inquiries and gather public input from public meetings, email requests, phone calls, and the CEMP website (via email).

3.5 Performance Metrics for Community Outreach

Performance metrics will be used to track community outreach and overall program success in informing the public about CEMP activities. Metrics including number of contacts made, number of hits to the CEMP website, number of press releases/news articles, etc. will be summarized quarterly and posted to the CEMP website.

Community Environmental Monitoring Program

2017 WORK PLAN

CEMP 2017 BUDGET			
			2017 Budget
MCCF Management Fee			\$ 15,000
Project Management, Oversight, and Outreach	Rate	Hours	
Executive Director (286 hrs @ \$118.75/hr Fee for Service Rate*)	118.75	286	\$ 33,960
Senior Planner (538 hrs @ \$90.25/hr Fee for Service Rate)	90.25	538	\$ 48,550
Field Technician/Public Outreach (648 hrs @ \$42.75/hr Fee for Service Rate)	42.75	648	\$ 27,700
Field Technician (1360 hrs. @ \$42.75/hr Fee for Service Rate)	42.75	1360	\$ 58,140
Administrator (260 hrs @ \$38/hr Fee for Service Rate)	45.00	260	\$ 11,700
TOTAL PROJECT MANAGEMENT AND STAFFING			\$ 180,050
*Fee for Service Rates for SWP staff include 10-40% in fringe benefits (health insurance, social security, workers compensation, retirement, etc.) and approximately 35% in overhead costs (lease, utilities, office equipment, etc.).			
Contractual	# Samples	Cost/Sample	Total Cost
Eagle Mine - Water Treatment Plant	4	\$ 592	\$ 2,368
Eagle Mine - GWDP Groundwater	8	\$ 574	\$ 4,592
Eagle Mine - Mine Permit Groundwater	8	\$ 504	\$ 4,032
Eagle Mine - Mine Permit Surface Water	8	\$ 660	\$ 5,280
Eagle Mine - Temp Development Rock Storage Area	4	\$ 329	\$ 1,315
Humboldt Mill - Water Treatment Plant	8	\$ 381	\$ 3,048
Humboldt Mill - Mine Permit Groundwater	8	\$ 626	\$ 5,008
Humboldt Mill - Mine Permit Surface Water	8	\$ 720	\$ 5,760
Air Station - Metals	4	\$ 286	\$ 1,144
Edible/Traditional Plant Study	9	\$ 443	\$ 3,987
Air Station Lease Fee			\$ 900
Training/Certifications			\$ 450
Website Maintenance/Updates			\$ 3,000
Air/Met Station Modem/Website Setup			\$ 10,000
Consultant(s) - data interpretation, public outreach, etc.			\$ 30,000
Eagle Mine - New well cluster sampling	4	\$ 574	\$ 2,296
TOTAL CONTRACTUAL			\$ 83,180
Supplies and Materials			
Printing (educational materials, reports, etc.)			\$ 1,200
Shipping - Fed Ex			\$ 3,250
Field and Office Supplies			\$ 4,600
Public Meetings (media announcements, room rental, etc.)			\$ 500
TOTAL OUTREACH & SUPPLIES			\$ 9,550
Travel			
Travel for sampling/meetings	4150 Miles	\$ 0.535	\$ 2,220
TOTAL TRAVEL			\$ 2,220
TOTAL 2017 BUDGET			\$ 290,000
TOTAL 2015/2016 RESERVE FUND CARRYOVER			\$ 88,307
2016 Reserve Designated for New Well Cluster Installation			\$ 61,000
2015/2016 Reserve Fund Carryover for Emergency/Unanticipated Monitoring			\$ 27,307

Table 1.
Summary of 2017 Annual Monitoring Objectives

WORK PLAN TASK	SITE(S)	PARAMETERS	STANDARDS	PERIOD	FREQUENCY
Verification Monitoring and Data Review					
Baseline Data Review	Permit compliance and background monitoring sites (Mine and Mill)	Review of pre-mining data (groundwater, surface water, air, aquatics, and flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	Mine data collected prior to September 2011, Mill data through September 2014	Ongoing
Operations Data Review	Permit compliance and background monitoring sites (Mine and Mill)	Review of operations data (groundwater, surface water, and wastewater, solid waste, air, aquatics, flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	Mine data collected after September 2011, Mill data collected after September 2014	Ongoing, based on Eagle Mine scheduled monitoring
Procedures Review/Observations	Permit compliance and background monitoring sites (Mine and Mill)	Review of procedures and field data collection (groundwater, surface water, and wastewater, solid waste, air, aquatics, flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2017	Ongoing, based on Eagle Mine scheduled monitoring
Interpretation Review	Permit compliance and background monitoring sites (Mine and Mill)	Interpretation of results: groundwater, surface water, and facilities wastewater (quantity, elevation, flow, and quality)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2017	Ongoing, based on Eagle Mine scheduled monitoring
Split Sampling	Permit compliance and background monitoring sites (Mine and Mill)	Groundwater, surface water, and facilities wastewater quality	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2017	Ongoing, based on Eagle Mine scheduled monitoring
Additional Monitoring					
Powell Township Air Quality	Stationary Air/Meteorological Station in Big Bay	PM10, metals analysis; wind speed and direction, air temperature, relative humidity, and solar radiation	National Ambient Air Quality Standards and Michigan Air Toxic Screening Levels	2012-2017	Continuous (PM10 and meteorological data) and Quarterly (Metals)
Eagle Mine Air Quality	Stationary Air/Meteorological Station near Eagle Mine	PM10; wind speed and direction, air temperature, relative humidity, and solar radiation	National Ambient Air Quality Standards	2007-2017	Continuous (PM10 and meteorological data)
Edible/Traditional Plant Study	Eagle Mine, Humboldt Mill, and Control Area	Metals analysis plant tissue and fruit	US Environmental Protection Agency's (US EPA) oral tolerable intake values (TDI) and the Food and Drug Administration's (FDA) recommended Daily Values (DV)	2015-2017	Annually
New Groundwater Monitoring Well	Eagle Mine - between TWIS and Salmon Trout River	Groundwater quality	Comparison with Eagle Mine Part 632 Mining Permit and Groundwater Discharge Permit Monitoring Sites	2017	Quarterly

Table 2
Summary of Permit Required “Split Sampling” Monitoring Sites at
Eagle Mine and the Humboldt Mill

Monitoring Location/Type	Data Range (years)	Permit	Frequency	Number of Monitoring Sites	2017 CEMP Samples/Year
EAGLE MINE					
Surface Water	2002-2016	Mine Permit	Quarterly	11	8
Groundwater	2011-2016	Mine Permit	Quarterly	24 (10 background and 14 compliance)	8
Facilities: Temporary Development Rock Storage Area (TDRSA) Contact Water Sump and Leak Detection Sump, Contact Water Basins/WTP Influent, and Underground	2012-2016	Mine Permit	Quarterly (Varies)	4	4
Facilities: Water Treatment Facility (Effluent and RO Influent)	2012-2016	Groundwater Discharge Permit	Weekly	2	4
Groundwater	2008-2016	Groundwater Discharge Permit	Quarterly	15 (7 background and 8 compliance)	8
Total Eagle Mine				55	32

Monitoring Location/Type	Data Range (years)	Permit	Frequency	Number of Monitoring Sites	2017 CEMP Samples/Year
HUMBOLDT MILL					
Groundwater	2014-2016	Mine Permit	Quarterly	23	8
Surface Water	2014-2016	Mine Permit	Quarterly	8	8
Facilities: Water Treatment Facility	2014-2016	Surface Water Discharge Permit	Monthly	2	8
Total Humboldt Mill				35	24

2017 Additional Monitoring

- Powell Township Air Station Metals: 1 sample/quarter = 4 analyses/year
- New Groundwater Well Cluster at Eagle Mine (Year 1): 2 samples per quarter = 4 water samples/year
- Berry Study (Year 3): 3 samples per site (Mine, Mill, Control) = 9 tissue/berry samples/year

Total Additional Monitoring: 17 samples/year

Table 1.
Summary of 2017 Annual Monitoring Objectives

WORK PLAN TASK	SITE(S)	PARAMETERS	STANDARDS	PERIOD	FREQUENCY
Other Based on Community Input, Results and/or New Activities	Sites (TBD) near Eagle Mine, Humboldt Mill, and/or Transportation Route	TBD	TBD	2017	TBD
Monitoring Results and Performance Ratings					
Data Processing/Publication	N/A	Process results from CEMP/Eagle Mine Monitoring; post summaries of results on CEMP website (www.swpcemp.org)	CEMP Agreement and Notification Plan	2017	Quarterly
Performance Ratings	N/A	Report Card ratings of environmental performance on CEMP website (www.swpcemp.org)	CEMP Agreement and Notification Plan	2017	Quarterly
Community Outreach					
Meetings/Forums	N/A	Meetings/forums and presentations to community groups, etc.	CEMP Agreement and Notification Plan	2017	Ongoing
Public Outreach Activities	N/A	CEMP website, local news/media, email updates, social media, CEMP hotline, etc.	CEMP Agreement and Notification Plan	2017	Ongoing

Table 3
Eagle Mine - Mine Permit Surface Water Monitoring
Parameters, Frequency, Analytical Method and Laboratory Reporting Limits

		White Water Associates Laboratory			
Parameters	Eagle Frequency	Analytical Method ¹	Limit of Detection (LOD)	Units	Unit Price
Field					
Temperature	Quarterly	Field	na	°C	-
Dissolved Oxygen	Quarterly	Field	na	mg/L	-
Flow	Quarterly	Field	na	cfs	-
pH	Quarterly	Field	na	SU	-
Specific Conductance	Quarterly	Field	na	umhos/cm	-
Anions					
Alkalinity, Bicarbonate	Annual	310.2	2	mg/L	\$12
Alkalinity Carbonate	Annual	310.2	2	mg/L	\$12
Chloride	Annual	4500-Cl- E	3	mg/L	\$12
Flouride	Annual	300.0	0.017	mg/L	\$25
Nitrate Nitrogen	Annual	4500-NO3-	0.1	mg/L	\$15
Sulfate	Quarterly	4500-SO4-	2.5	mg/L	\$15
Cations					
Calcium	Annual	200.7	0.03	mg/L	\$10
Magnesium	Annual	200.7	0.04	mg/L	\$10
Potassium	Annual	200.7	0.12	mg/L	\$10
Sodium	Annual	200.7	0.15	mg/L	\$10
General					
Total Dissolved Solids	Quarterly	2540C	10	mg/L	\$12
Metals					
Aluminum	Annual	200.7	50	ug/L	\$10
Antimony	Annual	200.8/6020	0.1	ug/L	\$10
Arsenic	Quarterly	200.8/6020	0.17/0.17	ug/L	\$10
Barium	Annual	200.7	0.3	ug/L	\$10
Beryllium	Annual	200.7	0.2	ug/L	\$10
Boron	Quarterly	200.7	20	ug/L	\$10
Cadmium	Annual	200.8/6020	0.10/0.10	ug/L	\$10
Chromium	Annual	200.7	0.6	ug/L	\$10
Cobalt	Quarterly	200.7	2	ug/L	\$10
Copper	Quarterly	200.7	1	ug/L	\$10
Iron	Quarterly	200.7	10	ug/L	\$10
Lead	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Lithium	Annual	200.7	6	ug/L	\$10
Manganese	Quarterly	200.7	0.2	ug/L	\$10
Mercury	Quarterly	1631E	0.1	ng/L	\$110
Molybdenum	Annual	200.7	3	ug/L	\$10
Nickel	Quarterly	200.7	2	ug/L	\$10
Selenium	Quarterly	200.8/6020	1.4/0.5	ug/L	\$10
Silver	Annual	200.8/6020	0.2 /0.2	ug/L	\$10
Zinc	Quarterly	200.7	10	ug/L	\$10

Table 4
Eagle Mine - Mine Permit Groundwater Monitoring
Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits

		White Water Associates Laboratory			
Parameters	Eagle Frequency of Analysis	White Water Associates Analytical Method	Limit of Detection (LOD)	Units	Unit Price
Field					
Static Water Elevation	Quarterly	Field	--	ft/msl	-
Redox	Quarterly	Field	--	meV	-
Temperature	Quarterly	Field	--	°C	-
Dissolved Oxygen	Quarterly	Field	--	mg/L	-
pH	Quarterly	Field	--	su	-
Specific Conductance	Quarterly	Field	--	umhos/cm	-
Anions					
Alkalinity, Bicarbonate	Quarterly	310.2	2.0	mg/L	\$12
Alkalinity Carbonate	Quarterly	310.2	2.0	mg/L	\$12
Nitrate Nitrogen	Quarterly	4500-NO3- F	0.100	mg/L	\$15
Sulfate	Quarterly	4500-SO4- E	2.5	mg/L	\$15
Flouride	Annual	300.0	0.017	mg/L	\$25
Chloride	Quarterly	4500-Cl- E	3	mg/L	\$12
Cations					
Calcium	Annual	200.7	0.03	mg/L	\$10
Sodium	Quarterly	200.7	0.15	mg/L	\$10
Magnesium	Annual	200.7	0.04	mg/L	\$10
Potassium	Annual	200.7	0.12	mg/L	\$10
Metals					
Aluminum	Annual	200.7	50	ug/L	\$10
Antimony	Annual	200.8/6020	0.1	ug/L	\$10
Arsenic	Quarterly	200.8/6020	0.17/0.17	ug/L	\$10
Barium	Annual	200.7	0.3	ug/L	\$10
Beryllium	Annual	200.7	0.2	ug/L	\$10
Boron	Quarterly	200.7	20	ug/L	\$10
Cadmium	Annual	200.8/6020	0.10/0.10	ug/L	\$10
Chromium	Annual	200.7	0.6	ug/L	\$10
Cobalt	Annual	200.7	2	ug/L	\$10
Copper	Quarterly	200.7	1	ug/L	\$10
Iron	Quarterly	200.7	10	ug/L	\$10
Lead	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Lithium	Annual	200.7	6	ug/L	\$10
Manganese	200.7	0.2	ug/L	ug/L	\$10
Mercury	Quarterly	1631E	0.1	ng/L	\$110
Molybdenum	Annual	200.7	3	ug/L	\$10
Nickel	Quarterly	200.7	2	ug/L	\$10
Selenium	Quarterly	200.8/6020	1.4/0.5	ug/L	\$10
Silver	Annual	200.8/6020	0.2 /0.2	ug/L	\$10
Strontium	Annual	200.7	0.2	ug/L	\$10
Thallium	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Vanadium	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Zinc	Quarterly	200.7	10	ug/L	\$10

Table 5
Eagle Mine - Mine Permit Facilities (TDRSA and CWB) Monitoring
Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits

		White Water Associates Laboratory			
Parameters	Eagle Frequency of Analysis	Analytical Method ¹	Limit of Detection (LOD)	Units	Unit Price
Field					
pH	Quarterly	Field	--	su	-
Specific Conductance	Quarterly	Field	--	umhos/cm	-
Metals					
Aluminum	Annual	200.7	50	ug/L	\$10
Antimony	Annual	200.8/6020	0.1	ug/L	\$10
Arsenic	Quarterly	200.8/6020	0.17/0.17	ug/L	\$10
Barium	Annual	200.7	0.3	ug/L	\$10
Beryllium	Annual	200.7	0.2	ug/L	\$10
Boron	Quarterly	200.7	20	ug/L	\$10
Cadium	Annual	200.8/6020	0.10/0.10	ug/L	\$10
Chromium	Annual	200.7	0.6	ug/L	\$10
Cobalt	Annual	200.7	2	ug/L	\$10
Copper	Quarterly	200.7	1	ug/L	\$10
Iron	Quarterly	200.7	10	ug/L	\$10
Lead	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Lithium	Annual	200.7	6	ug/L	\$10
Manganese	Quarterly	200.7	0.2	ug/L	\$10
Mercury	Quarterly	1631E	0.1	ng/L	\$110
Molybdenum	Annual	200.7	3	ug/L	\$10
Nickel	Quarterly	200.7	2	ug/L	\$10
Selenium	Quarterly	200.8/6020	1.4/0.5	ug/L	\$10
Silver	Annual	200.8/6020	0.2 /0.2	ug/L	\$10
Strontium	Annual	200.7	0.2	ug/L	\$10
Thallium	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Vanadium	Annual	200.8/6020	0.3/0.3	ug/L	\$10
Zinc	Quarterly	200.7	10	ug/L	\$10
Major Anions					
Alkalinity, Bicarbonate	Quarterly	310.2	2	mg/L	\$12
Alkalinity Carbonate	Quarterly	310.2	2	mg/L	\$12
Chloride	Quarterly	4500-Cl- E	3	mg/L	\$12
Flouride	Annual	300.0	0.017	mg/L	\$25
Nitrogen, Ammonia	Quarterly	350.1	0.2	mg/L	\$15
Nitrogen, Nitrate	Quarterly	4500-NO3- F	0.1	mg/L	\$15
Nitrogen, Nitrite	Quarterly	4500-NO3- F	0.01	mg/L	\$15
Sulfate	Quarterly	4500-SO4- E	2.5	mg/L	\$15
Major Cations					
Calcium	Annual	200.7	0.03	mg/L	\$10
Magnesium	Annual	200.7	0.04	mg/L	\$10
Potassium	Annual	200.7	0.12	mg/L	\$10
Sodium	Annual	200.7	0.15	mg/L	\$10

Table 6
Eagle Mine - Groundwater Discharge Permit WTP Effluent Monitoring
Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits

Parameters	Eagle Frequency of Analysis	White Water Associates Laboratory			
		Analytical Method ¹	Limit of Detection (LOD)	Units	Unit Price
pH (Minimum)	Continuous Measurement	-	-	SU	-
pH (Maximum)	Continuous Measurement	-	-	SU	-
Dissolved Oxygen	Weekly	-	-	mg/l	-
Specific Conductance	Continuous Measurement	-	-	umhos/cm	-
Influent Flow	Daily	-	-	GPD	-
Effluent Flow	Daily	-	-	GPD	-
Biochemical Oxygen	Weekly	-	-	mg/l	-
Ammonia Nitrogen	Weekly	350.1	0.2	mg/L	\$15
Nitrate Nitrogen	Weekly	4500-NO3- F	0.1	mg/L	\$15
Nitrite Nitrogen	Weekly	4500-NO3- F	0.01	mg/L	\$15
Total Phosphorus	Weekly	4500-P	0.01	mg/L	\$15
Total Aluminum	Weekly	200.7	50	ug/L	\$10
Total Antimony	Weekly	200.8/6020	0.1	ug/L	\$10
Total Arsenic	Weekly	200.8/6020	0.17/0.17	ug/L	\$10
Total Barium	Weekly	200.7	0.3	ug/L	\$10
Total Beryllium	Weekly	200.7	0.2	ug/L	\$10
Total Boron	Weekly	200.7	20	ug/L	\$10
Total Cadmium	Weekly	200.8/6020	0.10/0.10	ug/L	\$10
Total Chloride	Weekly	4500-Cl- E	3	mg/L	\$12
Total Chromium	Weekly	200.7	0.6	ug/L	\$10
Total Cobalt	Weekly	200.7	2	ug/L	\$10
Total Copper	Weekly	200.7	1	ug/L	\$10
Total Fluoride	Weekly	300.0	0.017	mg/L	\$25
Total Iron	Weekly	200.7	10	ug/L	\$10
Total Lead	Weekly	200.8/6020	0.3/0.3	ug/L	\$10
Total Lithium	Weekly	200.7	6	ug/L	\$10
Total Manganese	Weekly	200.7	0.2	ug/L	\$10
Total Mercury	Weekly	1631E	0.1	ng/L	\$110
Total Molybdenum	Weekly	200.7	3	ug/L	\$10
Total Nickel	Weekly	200.7	2	ug/L	\$10
Total Potassium	Weekly	200.7	0.12	mg/L	\$10
Total Selenium	Weekly	200.8/6020	1.4/0.5	ug/L	\$10
Total Silver	Weekly	200.8/6020	0.2 /0.2	ug/L	\$10
Total Sodium	Weekly	200.7	0.15	mg/L	\$10
Total Strontium	Weekly	200.7	0.2	ug/L	\$10
Total Sulfate	Weekly	4500-SO4- E	2.5	mg/L	\$15
Total Thallium	Weekly	200.8/6020	0.3/0.3	ug/L	\$10
Total Uranium	Weekly	200.8	0.0007	ug/L	\$45
Total Vanadium	Weekly	200.8/6020	0.3/0.3	ug/L	\$10
Total Zinc	Weekly	200.7	10	ug/L	\$10

Table 7
Eagle Mine - Groundwater Discharge Permit Groundwater Monitoring
Parameters, Analytical Methods, and Laboratory Reporting Limits

	Eagle			White Water Associates Laboratory			
Parameters	Frequency of Analysis	Maximum Daily Limit	Unit	Analytical Method	Limit of Detection (LOD)	Units	Unit Price
Field							
Static Water Elevation	Quarterly	Report	USGS-Ft	Field		USGS-Ft	-
Dissolved Oxygen	Quarterly	Report	mg/l	Field		mg/l	-
pH (Minimum)	Quarterly	6.5	S.U.	Field		S.U.	-
pH (Maximum)	Quarterly	9.7	S.U.	Field		S.U.	-
Specific Conductance	Quarterly	Report	umhos/cm	Field		umhos/cm	-
Anions							
Bicarbonate Alkalinity	Quarterly	Report	mg/l	310.2	2	mg/L	\$12
Chloride	Quarterly	Report	mg/l	4500-Cl- E	3	mg/L	\$12
Ammonia Nitrogen	Quarterly	10.0	mg/l	350.1	0.2	mg/L	\$15
Nitrate Nitrogen	Quarterly	10.0	mg/l	4500-NO3- F	0.1	mg/L	\$15
Nitrite Nitrogen	Quarterly	Report	mg/l	4500-NO3- F	0.01	mg/L	\$15
Total Phosphorus	Quarterly	Report	mg/l	4500-P	0.01	mg/L	\$15
Sulfate	Quarterly	250	mg/l	4500-SO4- E	2.5	mg/L	\$15
Cations							
Calcium	Quarterly	Report	mg/l	200.7	0.03	mg/L	\$10
Sodium	Quarterly	Report	mg/l	200.7	0.15	mg/L	\$10
Magnesium	Quarterly	Report	mg/l	200.7	0.04	mg/L	\$10
Potassium	Quarterly	Report	mg/l	200.7	0.12	mg/L	\$10
Metals							
Aluminum	Quarterly	150	ug/l	200.7	50	ug/L	\$10
Antimony	Quarterly	5.0	ug/l	200.8/6020	0.1	ug/L	\$10
Arsenic	Quarterly	6.0	ug/l	200.8/6020	0.17/0.17	ug/L	\$10
Barium	Quarterly	1000	ug/l	200.7	0.3	ug/L	\$10
Beryllium	Quarterly	3	ug/l	200.7	0.2	ug/L	\$10
Boron	Quarterly	285	ug/l	200.7	20	ug/L	\$10
Cadium	Quarterly	3.0	ug/l	200.8/6020	0.10/0.10	ug/L	\$10
Chromium	Quarterly	52	ug/l	200.7	0.6	ug/L	\$10
Cobalt	Quarterly	23	ug/l	200.7	2	ug/L	\$10
Copper	Quarterly	10	ug/l	200.7	1	ug/L	\$10
Fluoride, Total	Quarterly	1000	ug/l	300.0	0.017	mg/L	\$25
Iron	Quarterly	Report	ug/l	200.7	10	ug/L	\$10
Lead	Quarterly	3.0	ug/l	200.8/6020	0.3/0.3	ug/L	\$10
Lithium	Quarterly	88	ug/l	200.7	6	ug/L	\$10
Manganese	Quarterly	50	ug/l	200.7	0.2	ug/L	\$10
Mercury	Quarterly	Report	ug/l	1631E	0.1	ng/L	\$110
Molybdenum	Quarterly	22	ug/l	200.7	3	ug/L	\$10
Nickel	Quarterly	57	ug/l	200.7	2	ug/L	\$10
Selenium	Quarterly	5.0	ug/l	200.8/6020	1.4/0.5	ug/L	\$10
Silver	Quarterly	0.4	ug/l	200.8/6020	0.2 /0.2	ug/L	\$10
Strontium	Quarterly	2300	ug/l	200.7	0.2	ug/L	\$10
Thallium	Quarterly	1	ug/l	200.8/6020	0.3/0.3	ug/L	\$10
Uranium	Quarterly	Report	ug/l	200.8	0.0007	ug/L	\$45
Vanadium	Quarterly	3.1*	ug/l	200.8/6020	0.3/0.3	ug/L	\$10
Zinc	Quarterly	1200	ug/l	200.7	10	ug/L	\$10

* MWs QAL008A, QA1051A are report only for vanadium

Table 8
Humboldt Mill - Mine Permit Groundwater Monitoring
Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits

	Eagle		White Water Associates Laboratory		
Parameters	Frequency of Analysis	Sample Type	Analytical Method	Limit of Detection (LOD)	Units
Field					
Static Water Elevation	Quarterly	Measured	Field	NA	ft/msl
ORP	Quarterly	Measured	Field	NA	mV
Temperature	Quarterly	Measured	Field	NA	°C
Dissolved Oxygen	Quarterly	Measured	Field	NA	ppm
pH	Quarterly	Grab	Field	NA	SU
Turbidity	Quarterly	Grab	Field	NA	NTU
Specific Conductance	Quarterly	Grab	Field	--	umhos/cm
Anions					
Alkalinity, Bicarbonate	Quarterly	Grab	310.2	2	mg/L
Alkalinity Carbonate	Quarterly	Grab	310.2	2	mg/L
Chloride	Quarterly	Grab	4500-Cl- E	3	mg/L
Fluoride	Quarterly	Grab	300.0	0.017	mg/L
Nitrogen, Ammonia	Quarterly	Grab	350.1	0.2	mg/L
Nitrate Nitrogen	Quarterly	Grab	4500-NO3- F	0.1	mg/L
Nitrite Nitrogen	Quarterly	Grab	4500-NO3- F	0.01	mg/L
Sulfate	Quarterly	Grab	4500-SO4- E	2.5	mg/L
Sulfide	Quarterly	Grab	376.1	0.67	mg/L
Cations					
Calcium	Quarterly	Grab	200.7	0.03	mg/L
Sodium	Quarterly	Grab	200.7	0.15	mg/L
Magnesium	Quarterly	Grab	200.7	0.04	mg/L
Potassium	Quarterly	Grab	200.7	0.12	mg/L
General					
Hardness	Quarterly	Grab	2340B	0.3	mg/L
Metals					
Aluminum	Annual	Grab	200.7	50	ug/L
Antimony	Annual	Grab	200.8/6020	0.1	ug/L
Arsenic	Quarterly	Grab	200.8/6020	0.17/0.17	ug/L
Barium	Annual	Grab	200.7	0.3	ug/L
Beryllium	Annual	Grab	200.7	0.2	ug/L
Boron	Annual	Grab	200.7	20	ug/L
Cadium	Annual	Grab	200.8/6020	0.10/0.10	ug/L
Chromium	Annual	Grab	200.7	0.6	ug/L
Cobalt	Annual	Grab	200.7	2	ug/L
Copper	Quarterly	Grab	200.7	1	ug/L
Iron	Quarterly	Grab	200.7	10	ug/L
Lead	Quarterly	Grab	200.8/6020	0.3/0.3	ug/L
Lithium	Annual	Grab	200.7	6	ug/L
Manganese	Quarterly	Grab	200.7	0.2	ug/L
Mercury	Quarterly	Grab	1631E	0.1	ng/L
Molybdenum	Annual	Grab	200.7	3	ug/L
Nickel	Quarterly	Grab	200.7	2	ug/L
Selenium	Annual	Grab	200.8/6020	1.4/0.5	ug/L
Silver	Annual	Grab	200.8/6020	0.2 /0.2	ug/L
Thallium	Annual	Grab	200.8/6020	0.3/0.3	ug/L
Vanadium	Annual	Grab	200.8/6020	0.3/0.3	ug/L
Zinc	Quarterly	Grab	200.7	10	ug/L

Table 9
Humboldt Mill - Mine Permit Surface Water Monitoring
Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits

	Eagle		White Water Associates Laboratory		
Parameter	Frequency of Analysis	Sample Type	Analytical Method	Limit of Detection (LOD)	Units
Field					
Flow	Quarterly	Grab	Field	NA	cfs
Temperature	Quarterly	Grab	Field	NA	°C
Dissolved Oxygen	Quarterly	Grab	Field	NA	mg/L
Specific Conductance	Quarterly	Grab	Field	NA	µmhos/cm
pH	Quarterly	Grab	Field	NA	S.U.
ORP	Quarterly	Grab	Field	NA	mV
Turbidity	Quarterly	Grab	Field	NA	NTU
Metals					
Aluminum	Annually	Grab	200.7	50	ug/L
Antimony	Annually	Grab	200.8/6020	0.1	ug/L
Arsenic	Quarterly	Grab	200.8/6020	0.17/0.17	ug/L
Barium	Annually	Grab	200.7	0.3	ug/L
Beryllium	Annually	Grab	200.7	0.2	ug/L
Boron	Annually	Grab	200.7	20	ug/L
Cadmium	Annually	Grab	200.8/6020	0.10/0.10	ug/L
Chromium	Annually	Grab	200.7	0.6	ug/L
Cobalt	Annually	Grab	200.7	2	ug/L
Copper	Quarterly	Grab	200.7	1	ug/L
Iron	Quarterly	Grab	200.7	10	ug/L
Lead	Quarterly	Grab	200.8/6020	0.3/0.3	ug/L
Lithium	Annually	Grab	200.7	6	ug/L
Manganese	Quarterly	Grab	200.7	0.2	ug/L
Mercury (low level)	Quarterly	Grab	1631E	0.1	ng/L
Molybdenum	Annually	Grab	200.7	3	ug/L
Nickel	Quarterly	Grab	200.7	2	ug/L
Selenium	Annually	Grab	200.8/6020	1.4/0.5	ug/L
Silver	Annually	Grab	200.8/6020	0.2 /0.2	ug/L
Thallium	Annually	Grab	200.8/6020	0.3/0.3	ug/L
Vanadium	Annually	Grab	200.8/6020	0.3/0.3	ug/L
Zinc	Quarterly	Grab	200.7	10	ug/L
Anions					
Alkalinity, Bicarbonate	Quarterly	Grab	310.2	2	mg/L
Alkalinity, Carbonate	Quarterly	Grab	310.2	2	mg/L
Chloride	Quarterly	Grab	4500-Cl- E	3	mg/L
Fluoride	Quarterly	Grab	300.0	0.017	mg/L
Nitrate	Quarterly	Grab	4500-NO3- F	0.1	mg/L
Nitrite	Quarterly	Grab	4500-NO3- F	0.01	mg/L
Nitrogen, Ammonia	Quarterly	Grab	350.1	0.2	mg/L
Sulfate	Quarterly	Grab	4500-SO4- E	2.5	mg/L
Sulfide	Quarterly	Grab	376.1	0.67	mg/L
Cations					
Calcium (Total)	Quarterly	Grab	200.7	0.03	mg/L
Sodium (Total)	Quarterly	Grab	200.7	0.15	mg/L
Magnesium (Total)	Quarterly	Grab	200.7	0.04	mg/L
Potassium	Quarterly	Grab	200.7	0.12	mg/L
General Chemistry					
Hardness	Quarterly	Grab	2340B	0.3	mg/L
Total Dissolved Solids	Quarterly	Grab	2540C	10	mg/L
Total Suspended Solids	Quarterly	Grab	2540D	1	mg/L

Table 10
Humboldt Mill - NPDES Permit Water Treatment Plant Effluent Monitoring
Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits

	Eagle		White Water Associates Laboratory		
WTP Effluent	Frequency of Analysis	Sample Type	Analytical Methods	Limit of Detection (LOD)	Units
Field					
Dissolved Oxygen	Daily	Grab	Field	NA	mg/l
Outfall Observation	Daily	Grab	Field	-	-
pH	Daily	Grab	Field	NA	SU
Temperature	Continuous	Grab	Field	NA	°C
Other					
Acute Toxicity	Monthly	Grab	-	-	-
Biochemical Oxygen Demand (BOD)	2 x Month	Grab	5210B	5210B	2
Chronic Toxicity	Monthly	Grab	-	-	-
Total Dissolved Solids	Weekly	Grab	2540C	2540C	10
Total Hardness	Monthly	Grab	2340B	0.3	mg/L
Total Suspended Solids	Weekly	Grab	2540D	1	mg/L
Anions					
Ammonia Nitrogen	2 x Month	Grab	350.1	0.2	mg/L
Available Cyanide	Weekly	Grab	-	-	-
Fluoride	2 x Month	Grab	300.0	0.017	mg/L
Sulfate	Weekly	Grab	4500-SO4- E	2.5	mg/L
Total Phosphorus	Weekly	Grab	4500-P	0.01	mg/L
Total Residual Chlorine	Daily	Grab	-	-	-
Metals					
Total Antimony	2 x Month	Grab	200.8/6020	0.1	ug/L
Total Arsenic	Weekly	Grab	200.8/6020	0.17/0.17	ug/L
Total Barium	2 x Month	Grab	200.7	0.3	ug/L
Total Boron	2 x Month	Grab	200.7	20	ug/L
Total Cadmium	Weekly	Grab	200.8/6020	0.10/0.10	ug/L
Total Chromium	2 x Month	Grab	200.7	0.6	ug/L
Total Cobalt	Weekly	Grab	200.7	2	ug/L
Total Copper	Weekly	Grab	200.7	1	ug/L
Total Lead	Weekly	Grab	200.8/6020	0.3/0.3	ug/L
Total Lithium	2 x Month	Grab	200.7	6	ug/L
Total Manganese	Weekly	Grab	200.7	0.2	ug/L
Total Mercury	Weekly	Grab	1631E	0.1	ng/L
Total Molybdenum	2 x Month	Grab	200.7	3	ug/L
Total Nickel	Weekly	Grab	200.7	2	ug/L
Total Selenium	Weekly	Grab	200.8/6020	1.4/0.5	ug/L
Total Strontium	2 x Month	Grab	200.7	0.2	ug/L
Total Zinc	Weekly	Grab	200.7	10	ug/L

Table 11
Powell Township Air Station – Air Metals Monitoring
Parameters, Analytical Methods, and Laboratory Reporting Limits

Eastern Research Group
601 Keystone Park Drive
Suite 700
Morrisville, NC 27560



2013 Metals MDL - Compendium Method IO-3.5

Element	47 mm Teflon		8x10" Quartz	
	ng/filter	ng/m3 (assuming 24.04m3)	ng/filter	ng/m3 (assuming 2000 m3)
Aluminum	1481	61.6	41816	20.9
Antimony	1.14	0.048	30.0	0.015
Arsenic	4.77	0.198	140	0.070
Barium	3.14	0.130	5839	2.92
Beryllium	0.374	0.016	5.17	0.003
Cadmium	0.340	0.014	19.4	0.010
Calcium	2539	106	394287	197
Chromium	408	17.0	4912	2.46
Cobalt	0.560	0.023	31.4	0.016
Copper	10.2	0.424	2866	1.43
Iron	376	15.6	33496	16.7
Lead	2.44	0.102	241	0.121
Magnesium	193	8.05	79243	39.6
Manganese	3.25	0.135	260	0.130
Mercury	0.60	0.025	8.91	0.004
Molybdenum	2.44	0.102	278	0.139
Nickel	6.01	0.250	2481	1.24
Rubidium	0.241	0.010	22.4	0.011
Selenium	7.27	0.302	54.9	0.027
Strontium	2.02	0.084	475	0.238
Thallium	0.036	0.001	0.867	0.0004
Thorium	0.354	0.015	3.79	0.002
Uranium	0.020	0.001	11.6	0.006
Zinc	222	9.25	14372	7.19

2013 Hexavalent Chromium MDL - ASTM D7614

Element	ng/filter	ng/m3 (assuming 21.6 m3)
Hexavalent Chromium	0.0083	0.00384






Table 12
Parameters and Analytical Methods for Edible/Traditional Plant Tissue Monitoring

Parameter	Method
Aluminum	200.7
Antimony	200.8/6020
Arsenic	200.8/6020
Barium	200.7
Beryllium	200.7
Boron	200.7
Cadmium	200.8/6020
Calcium	200.7
Chromium	200.7
Cobalt	200.7
Copper	200.7
Iron	200.7
Lead	200.8/6020
Lithium	200.7
Magnesium	200.7
Manganese	200.7
Mercury	245.1/7470A
Molybdenum	200.7
Nickel	200.7
Potassium	200.7
Selenium	200.8/6020
Sodium	200.7
Strontium	200.7
Thallium	200.8/6020
Vanadium	200.8/6020
Zinc	200.7
Ammonia	350.1
Nitrate/Nitrite Nitrogen	4500-NO3- F
Total Organic Nitrogen - TKN	351.2
Sulfate	4500-SO4- E
Sulfur	200.7
Total Phosphorus	4500-P
Uranium	200.8



Mine Permit Surface Water Monitoring Locations

Legend

-  SW Monitoring Station
-  Mine Facilities
-  Road
-  Hydrography
-  Watershed Boundary

Reference

Projection & Datum: UTM NAD 83 Zone 16N

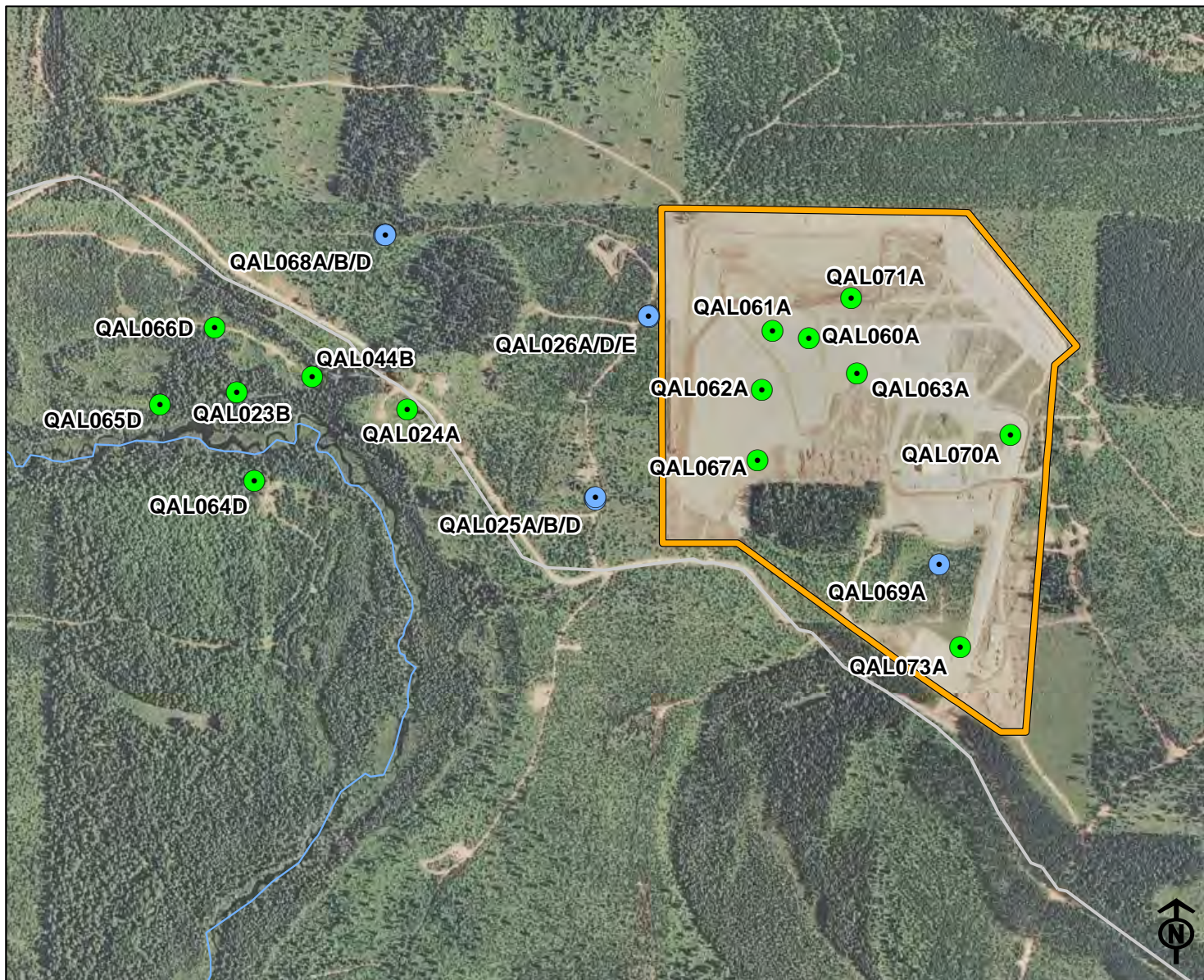
0 1.25 2.5 5 Miles

1:200,000



Community Environmental
Monitoring Program

Figure: 1



Mine Permit Groundwater Monitoring Locations

Legend

- Background Well
- Compliance Well
- Mine Facilities
- Road
- Hydrography

Reference

Projection & Datum: UTM NAD 83 Zone 18N

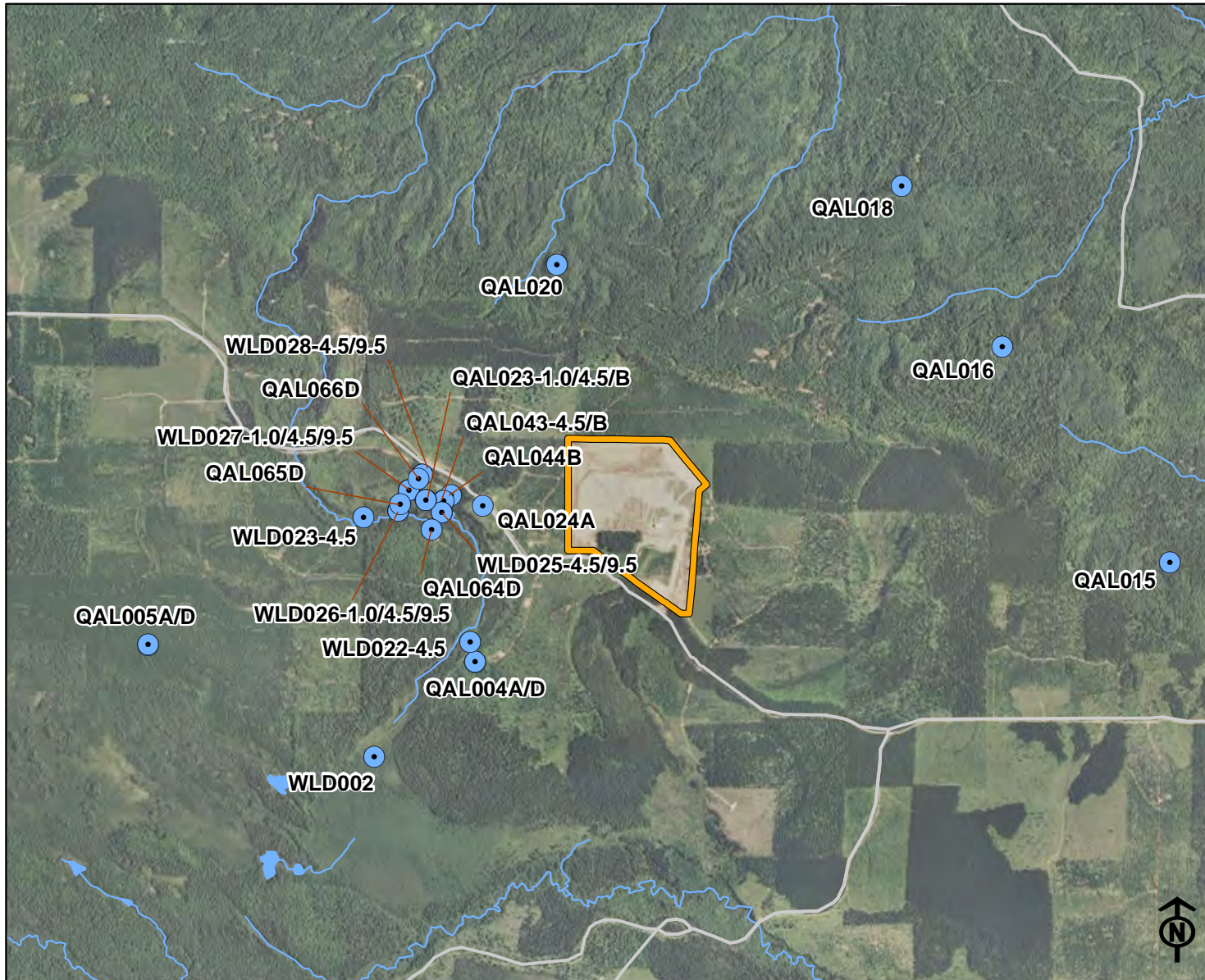
0 0.05 0.1 0.2 Miles

1:12,000



Community Environmental
Monitoring Program

Figure: 2



Mine Permit Groundwater Elevation Monitoring Locations

Legend

- GW Elevation Monitoring Well
- Mine Facilities
- Road
- ~ Hydrography

Reference

Projection & Datum: UTM NAD 83 Zone 18N

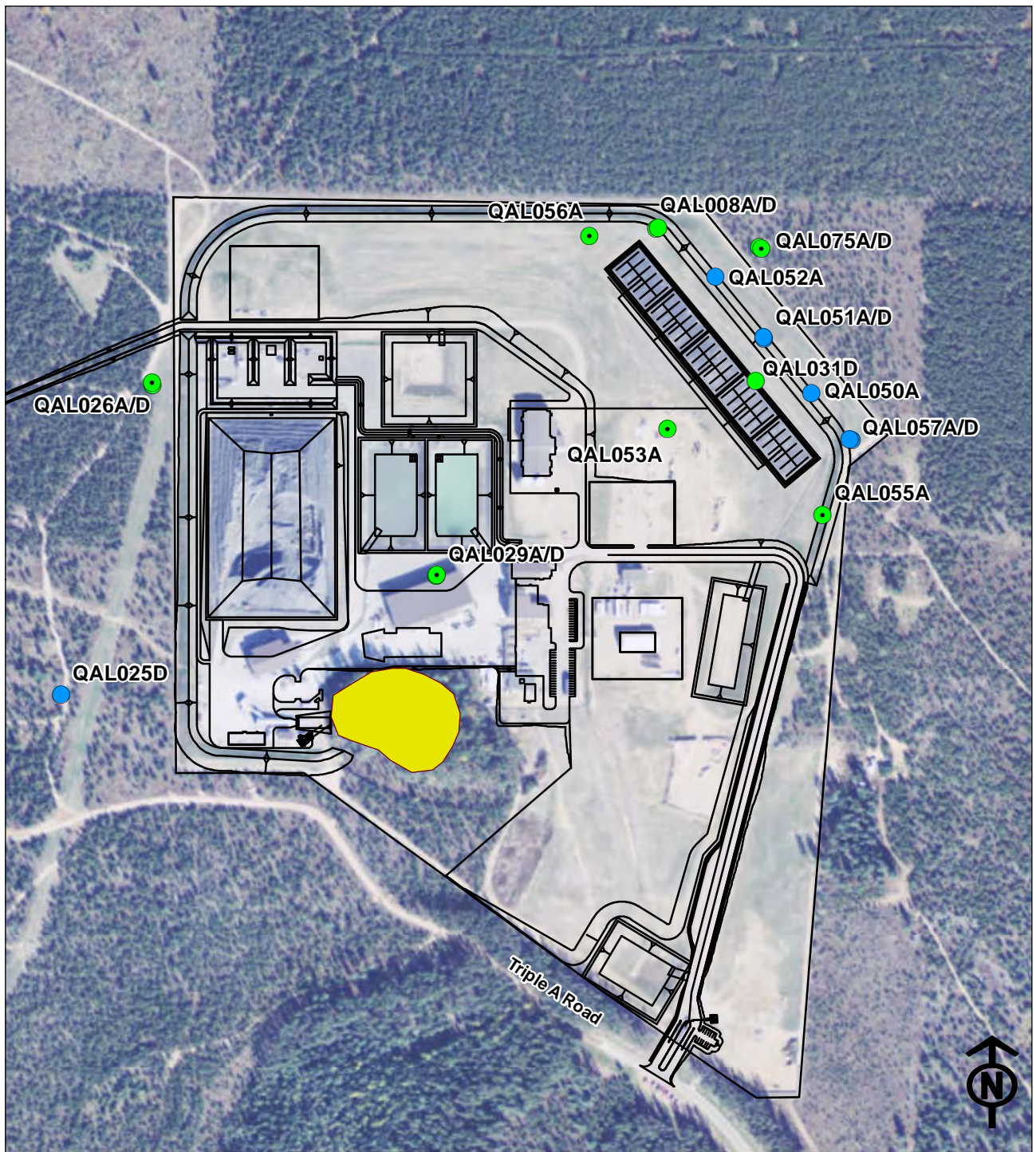
0 0.2 0.4 0.8 Miles

1:36,000



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Figure: 3



GROUNDWATER DISCHARGE PERMIT GROUNDWATER MONITORING LOCATIONS

- COMPLIANCE WATER QUALITY
- BACKGROUND WATER QUALITY
- ELEVATION
- Instrumented for continuous monitoring
- MINE FACILITIES
- OUTCROP

0 400 800 Feet
Scale: 1:6,800

Eagle Mine
a subsidiary of **ironclad mining**

Eagle Mine
Groundwater Discharge Permit
GW1810162

Reference

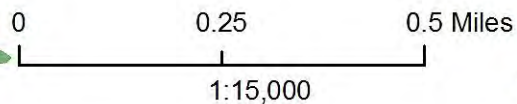
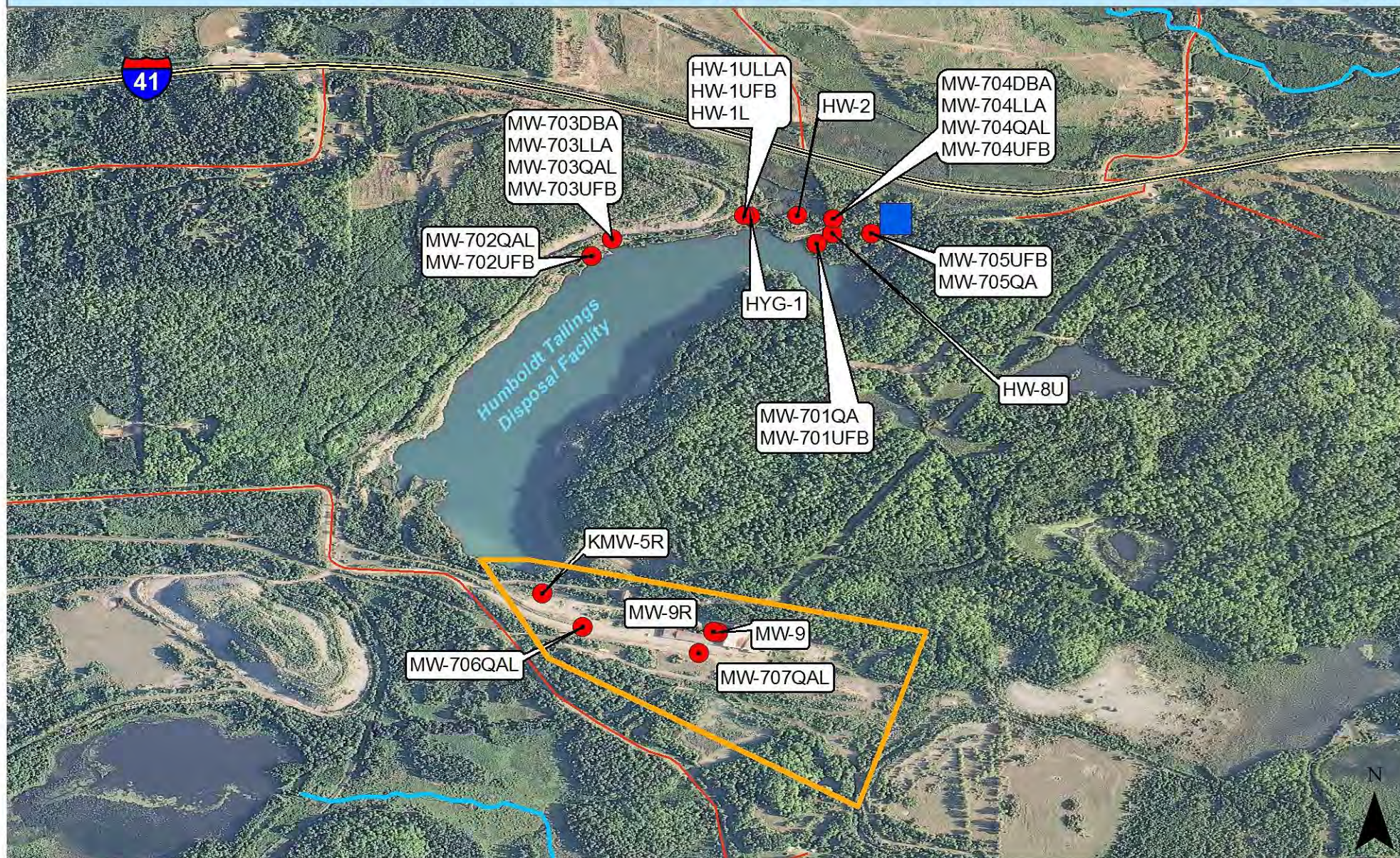
Data provided by Eagle Mine and North Jackson Company
Projection & Datum: UTM NAD 83 Zone 16N

North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Figure: 4

Figure: 5

Humboldt Mill Mine Permit Groundwater Monitoring Locations



- All Roads
- River
- == State Roads
- Groundwater Monitoring Sites
- Humboldt Mill Water Treatment Plant
- Humboldt Mill



Figure: 6

Humboldt Mill Mine Permit Surface Water/Sediment Monitoring Locations



0 0.25 0.5 Miles
1:24,000

- All Roads
- River
- State Roads
- Surface Water/Sediment Sites
- Humboldt Mill Water Treatment Plant
- Humboldt Mill



Figure: 7

Plant Tissue Analysis

Community Environmental Monitoring Program

