2014 WORK PLAN

for the

Community Environmental Monitoring Program

of the Eagle Mine

December 31, 2013

Submitted by

SUPERIOR WATERSHED PARTNERSHIP
2 Peter White Drive, • Presque Isle Park
Marquette, Michigan 49855
(906) 228-6095
www.superiorwatersheds.org

http://www.cempmonitoring.com/

Commonly Used Acronyms and Abbreviations

CEMP	Community Environmental Monitoring Program
CWBs	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
MCCF	Marquette County Community Foundation
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

Site legend

01 **Treated Water Infiltration System -** Infiltration system that slowly releases treated water back into the environment through a series of insulated, perforated pipes laying on the grounds surface.

02 **Power House -** Industrial facility for the distribution of power and backup generation of electric energy.

03 **Storage Facility -** Storage for supplies used in the mining operation.

04 **Water Treatment Plant -** A state of the art, reverse osmosis water treatment plant to purify water from operations.

05 **Truck Wash -** All vehicles leaving the main operations area are required to go through the truck wash to clean the vehicles before they leave the area. Water is captured and sent to the water treatment plant for processing. Water that is not recyclable will be routed to the water treatment plant for processing.

06 **Mine Services Buildings -** The buildings and structures utilized for supporting Eagle. These include offices, maintenance facilities, a mine dry and other mine support services.

07 **Contact Water Basins -** All water that comes into contact with mining activities will be stored in two basins and pumped into the water treatment plant for purification. The basins are designed to hold water in excess of a 100 year rain event.

08 **Non-Contact Water Basin -** Water not directly related to mining activities, such as snow and rain, will be collected in these basins. Water will flow to these basins and be naturally reabsorbed into the ground.

09 **Coarse Ore Storage -** Closed storage facility for coarse, uncrushed ore that is brought to the surface. Underground mine trucks will off load the ore which in turn will be loaded into highway trucks and taken to the Humboldt Mill.

10 **Temporary Development Rock Storage Area -** Environmentally secure storage facility for development rock, all rock removed from the underground that is not considered ore. The facility features a multilayered liner, leak detection system and sump pump to collect water which will be treated by the water treatment plant. All development rock will be returned underground as fill.

11 **Portal -** Entrance to decline leading to the underground development and ore body.

12 **County Road Triple A**

Table of Contents

List of Figures and Tables

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 Marquette County Community Foundation (MCCF). 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.

The *Annual 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 2014 Annual Monitoring Objectives including work plan tasks, standards and schedule for activities is provided in Table 1. Verification monitoring locations and parameters are provided in Figures 1-6 and Tables 2-6 respectively.

1. Annual Monitoring Objectives

1.1. Verification Monitoring and Data Review

1.1.1. Baseline Data Review

Eagle Mine will continue to provide SWP with baseline environmental data in the form of reports, a data base or summary format. Baseline monitoring data continues to be collected where activities have not been initiated and during 2014, this will be primarily at the Humboldt Mill. The focus of the baseline data review will be to develop an

understanding of pre-mining environmental conditions for use in the evaluation of 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, while data collected from other locations, including the Humboldt Mill and along the transportation route will be considered baseline until Eagle Mine commences with ore production (scheduled for fall of 2014).

1.1.2. Operations Data Review

Eagle Mine will continue to provide SWP with operational data in the form of reports, a data base or summary format. SWP will review operations data from three perspectives. The first is to verify the validity (precision, accuracy representativeness) of the environmental monitoring data. The second is to analyze data for indications of impacts from the mining operations. The last is to analyze data from background (including upgradient, baseline and reference watershed 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 field data collection during 2014. The objective of the procedures review and data collection observations are to verify that the procedures used are appropriate and will result in the generation of data sets that are representative of environmental conditions. Review and observations of procedures will be conducted at the Eagle Mine locations shown in Figures 1-6 and at the Humboldt Mill (sites TBD).

1.1.4. Interpretation 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 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. Split samples will be conducted at the Eagle Mine locations shown in Figures 1-4 and at the Humboldt Mill (sites TBD). Samples will be submitted to an independent laboratory for analyses. Analytical parameters, methods and reporting limits for permit required verification monitoring are presented in Tables 2-6. The samples may be analyzed for the full parameter list or a subset of the parameters specified for that monitoring point. The objective of the split sampling is to verify that the laboratories used are appropriate and the results are representative of environmental conditions.

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 air monitoring equipment measures particulate matter (dust) in the 10 micron size range (PM10) on a continuous basis and particulate matter in the 2.5 micron size range (PM2.5) on a biweekly basis following a schedule and standards established by the U.S. EPA's Ambient Air Monitoring Program. Particulate matter filters are also retained for quarterly laboratory analysis of metal concentrations.

The meteorological station measures wind speed and direction, temperature, barometric pressure, precipitation, solar radiation, and relative humidity. 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.

Data collected from the station will be considered baseline until Eagle Mine commences with ore production (scheduled for fall of 2014).

1.2.2. Eagle Mine Air Quality

Air quality will be monitored in and around the Eagle Mine site during 2014 using a portable particulate monitoring device that will measure particulate matter in the 10 micron size range (PM10). The equipment also has the capability to monitor particulate matter as small as 1 micron in size (PM1). Additional secondary data that will be evaluated includes air quality (PM10) and meteorological data from the Eagle Mine air/meteorological station (data provided by Eagle Mine) located just west of the surface facility (Figure 7 and 8). The objective of the portable air quality monitoring at the mine site is to provide baseline data for evaluation of potential air quality impacts from mining operations. Data collected using the portable air monitoring equipment will be compared to National Air Quality Standards and will be considered baseline until Eagle Mine commences with ore production (scheduled for fall of 2014).

1.2.3. Transportation Route Monitoring

Environmental monitoring along the transportation route will begin during 2014 as soon as the final route is identified. This includes collection of water quality data at stream crossings (sites TBD), air quality data (particulate matter) using a portable monitoring device (Figures 7, 9, and 10), and noise monitoring (sites TBD). Additional secondary data that may be evaluated and/or collected along the transportation route includes weather and traffic data. The objective of the surface water quality, portable air quality, and noise monitoring along the transportation route is to provide baseline data for evaluation of potential impacts from transportation of ore during mining operations. Data collected along the transportation route will be considered baseline until Eagle Mine commences with ore production (scheduled for fall of 2014).

1.2.4 Humboldt Mill Air Quality

Additional environmental monitoring at the Humboldt Mill during 2014 (Figures 7, 11) will include collection of baseline air quality monitoring data using a portable particulate

monitoring device that will measure particulate matter in the 10 micron size range (PM10). The equipment also has the capability to monitor particulate matter as small as 1 micron in size (PM1). Additional secondary data that will be evaluated includes meteorological data from Eagle Mine's floating meteorological station located on the water surface at the north end of the Humboldt Tailings Disposal Facility (HTDF). The objective of the portable air quality monitoring at the mill site is to provide baseline data for evaluation of potential air quality impacts from mining operations. Data collected using the portable air monitoring equipment will be considered baseline until Eagle Mine commences with ore production (scheduled for fall of 2014).

1.2.5 Other Based on Results or New Activities

The SWP may also collect additional data near the mine, mill, and along the transportation route during 2014 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. Primary processing will consist 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 will consist 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 will follow receipt of Eagle data and consist of the assessment of data precision by comparison Eagle's laboratory derived values with values produced by SWP's laboratory(s). 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.

2.1.2 Data Publication/Notification

Data publication and notification processes are defined in the *CEMP Agreement*, as amended, and the *CEMP Notification Plan* (September 2013). This includes procedures for 1) sharing information related to data anomalies and/or other events; 2) serious risks and/or breaches of permits or other applicable environmental regulations; 3) release of information; and 4) other results received by SWP or Eagle Mine. Both the *CEMP Agreement* and *CEMP Notification Plan* can be found on the CEMP website (http://www.cempmonitoring.com/resources/).

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.cempmonitoring.com). The CEMP website/data portal is designed to build a comprehensive and accurate picture of Eagle Mine's environmental data and to make this information available to the public in a format that is easy to use and easily understood.

The website includes an interactive GIS-based data portal that can display data spatially, graphically or in tabular formats. Data can also be downloaded from the site in excel or pdf formats. Spatial displays show environmental monitoring locations relative to topography, structures, hydrology and aerial imagery. Spatial displays also highlight environmental monitoring locations where parameters have been detected at concentrations that exceed permit specified criteria/benchmarks.

Graphical displays consist of charts that illustrate which parameters were sampled at a monitoring location or which environmental monitoring stations have data for a parameter. For a specified monitoring period, users can plot reported concentrations of one or two parameters at one environmental monitoring location or for one parameter at multiple environmental monitoring locations. Tables can be produced for each graphical

display conveying the information in the chart along with additional information such as data source, sampling time, or laboratory reporting limits.

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, yellow light, and green light system used by SWP to rate Eagle Mine on its environmental performance. Performance ratings, based on environmental monitoring results, will be completed on a quarterly basis or more frequently by location (Mine, Mill, or Transportation Route) and type of monitoring (facilities, groundwater, surface water, flora/fauna, etc. air, etc.). The red light used in the rating indicates potential harm to the environment/potential permit violation; a yellow light indicates an area of concern, data discrepancy, or area that is being tracked; and a green light indicates no known risks to the environment. A white or blank light indicates an area that was not rated. The Report Card webpage also includes a link to the interactive data portal for those who wish to view or download the environmental monitoring data.

2.2.2 CEMP Monitoring Reports

At a glance, the CEMP Report Card indicates if there is an area of concern related to Eagle Mine's environmental performance with either yellow or red light ratings. These "lights" also serve as links (via a click and a pop-up box) to detailed Monitoring Reports that summarize the reason(s) for the concern/color rating(s). Monitoring Reports will be continued to be developed as issues arise, using language that is easy to understand for a broad audience. The objective of the reports is to describe the issue, potential risk to the environment, and measures taken by the CEMP program and Eagle Mine to assess and report the situation.

2.2.3 Eagle Mine Scorecard

The SWP will also rate Eagle Mine on its environmental performance with a simplified version of the CEMP Report Card for inclusion in Eagle's Community Scorecard. A figure (slide and/or diagram) depicting the CEMP Report Card will be provided to Eagle

Mine at least 30 days before its scheduled community forums in a format that can be easily incorporated into Eagle's Scorecard. The Eagle Mine Scorecard will be presented at Eagle's community forums, public mine tours; posted to Eagle Mine's website (www.eaglemine.com) and published in the local newspaper. Per the *CEMP Notification Plan*, the SWP will attend Eagle Mine's community forums to answer questions about the CEMP and ratings of Eagle Mine's environmental performance.

3. Community Outreach

3.1 Community Meetings and Forums

During 2012 and 2013, the SWP held community forums in the City of Marquette, Powell Township (Big Bay), Humboldt Township, Michigamme Township, and Baraga to inform the public about the CEMP and to gather input regarding community concerns and suggestions for additional monitoring activities. During 2014, the SWP will continue to coordinate these meetings to inform the public and gather input from the community. The public meeting dates/times will be determined in cooperation with the CEMP Policy Group and will be publicized on the CEMP website, and through local media outlets and notification lists. The SWP will also present CEMP information upon request from local schools and university departments, community groups, and at other public events/forums.

3.2 Public Outreach Activities

During 2014, the SWP will conduct public outreach using the CEMP website (www.cempmonitoring.com), local news/media outlets, social media (Facebook and Twitter), printed materials, video, and publications to inform the public about CEMP activities. The SWP will respond to questions and inquiries and gather public input from public meetings, the CEMP website (via email), and the CEMP Hotline (906) 228-6095 Ext. 20; and participate in broad (regional and international) distribution of the CEMP *Case Studies* and other program information and findings.

Community Environmental Monitoring Program
2014 PROJECT SUMMARY

TOTAL 2014 BUDGET	**$ 300,000**
MCCF Management Fee	$ 15,000
TOTAL MCCF	**$ 15,000**
PROJECT MANAGEMENT and STAFFING	
Monitoring	$ 139,100
Senior Planner (728 hrs @ $95 Fee for Service Rate)*	
Project Scientist (260 hrs @ $75 Fee for Service Rate)	
Field Technician (832 hrs @ $45 Fee for Service Rate)	
Executive Director (104 hrs @ $125 Fee for Service Rate)	
Public Outreach / Meetings	$ 52,000
Public Outreach Coordinator (520 hrs @ $75 Fee for Service Rate)	
Executive Director (104 hrs @ $125 Fee for Service Rate)	
Administrative Assistance	$ 16,900
Administrator (260 hrs @ $40 Fee for Service Rate)	
Executive Director (52 hrs @ $125 Fee for Service Rate)	
TOTAL PROJECT MANAGEMENT AND STAFFING	**$ 208,000**
Note: 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	
Labaratory Analysis (Water)	$ 33,000
Laboratory Analysis (Air - PM10)	$ 2,100
Laboratory Analysis (Air - Metals)	$ 2,232
Maintenance/Calibration (Air - BAM)	$ 450
Maintenance/Calibration (Air - MET)	$ 2,000
Lease Fee Air Station	$ 900
Laboratory Analsyis (Water - mercury)	$ 6,500
Additional Monitoring (TBD)	$ 4,100
Consultant - Technical Support	$ 10,000
Consultant - REACH Hosting	$ 3,600
Website Maintenance	$ 1,700
TOTAL CONTRACTUAL	**$ 66,582**
SUPPLIES AND MATERIALS	
Printing (educational materials, reports, etc.)	$ 600
Public Meetings (media announcements, room rental, etc.)	$ 800
Field and Office supplies/materials	$ 2,118
Monitoring Equipment Purchase	$ 1,200
Monitoring Equipment Rental	$ 1,500
TOTAL OUTREACH & SUPPLIES	**$ 6,218**
TRAVEL	
Travel to meetings, field sites, etc.	$ 4,200
TOTAL TRAVEL	**$ 4,200**
TOTAL 2014 FUNDING	**$ 300,000**

Mine Permit Surface Water Monitoring Locations

Legend

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

Reference

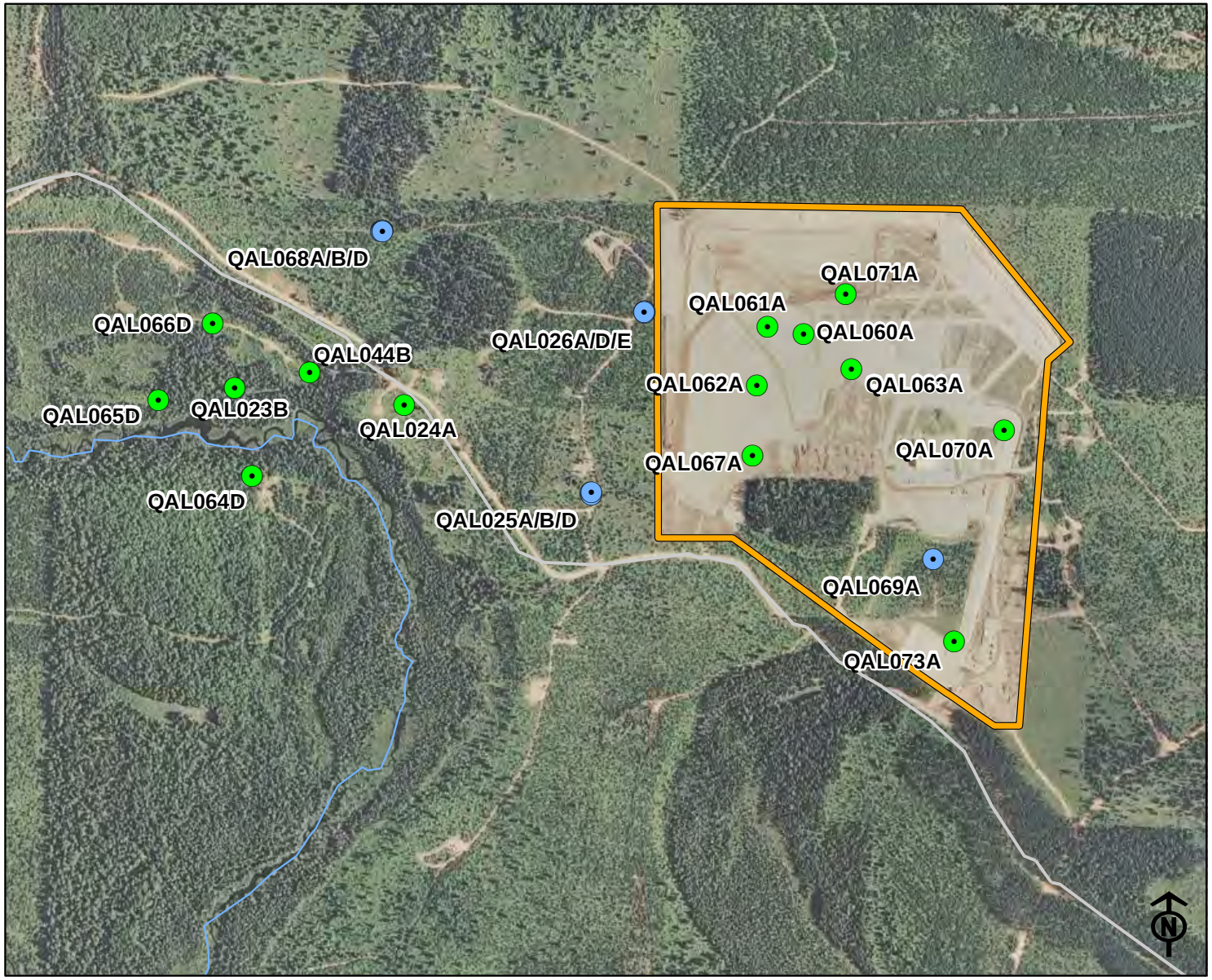
Projection & Datum: UTM NAD 83 Zone 16N

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

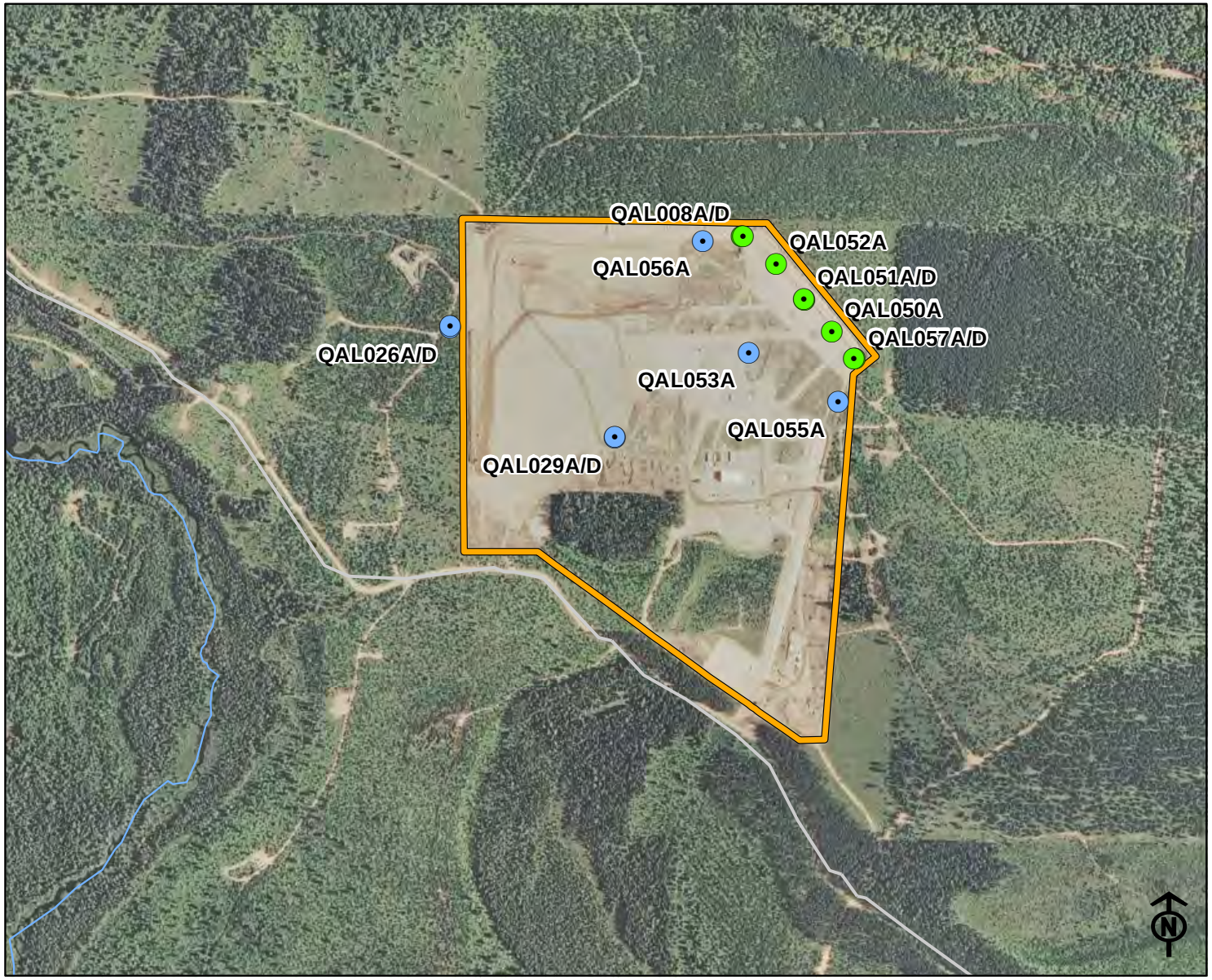
Projection & Datum: UTM NAD 83 Zone 16N

0 0.05 0.1 0.2 Miles

1:12,000

Community Environmental Monitoring Program

Figure: 2



Groundwater Discharge Permit Monitoring Locations

Legend

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

Reference

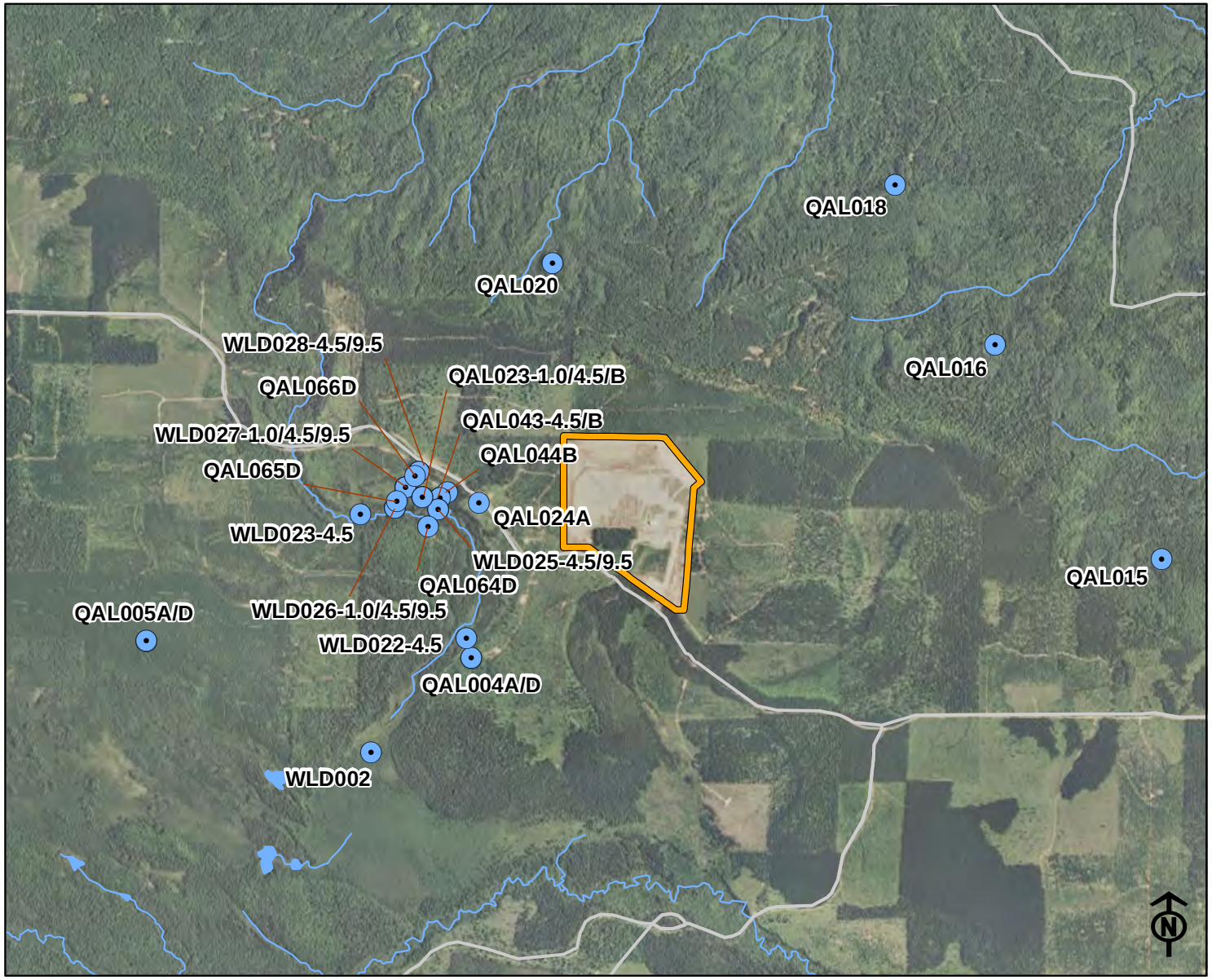
Projection & Datum: UTM NAD 83 Zone 16N

0 0.05 0.1 0.2 Miles

1:12,000

Community Environmental Monitoring Program

Figure: 3



Mine Permit Groundwater Elevation Monitoring Locations

Legend

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

Reference

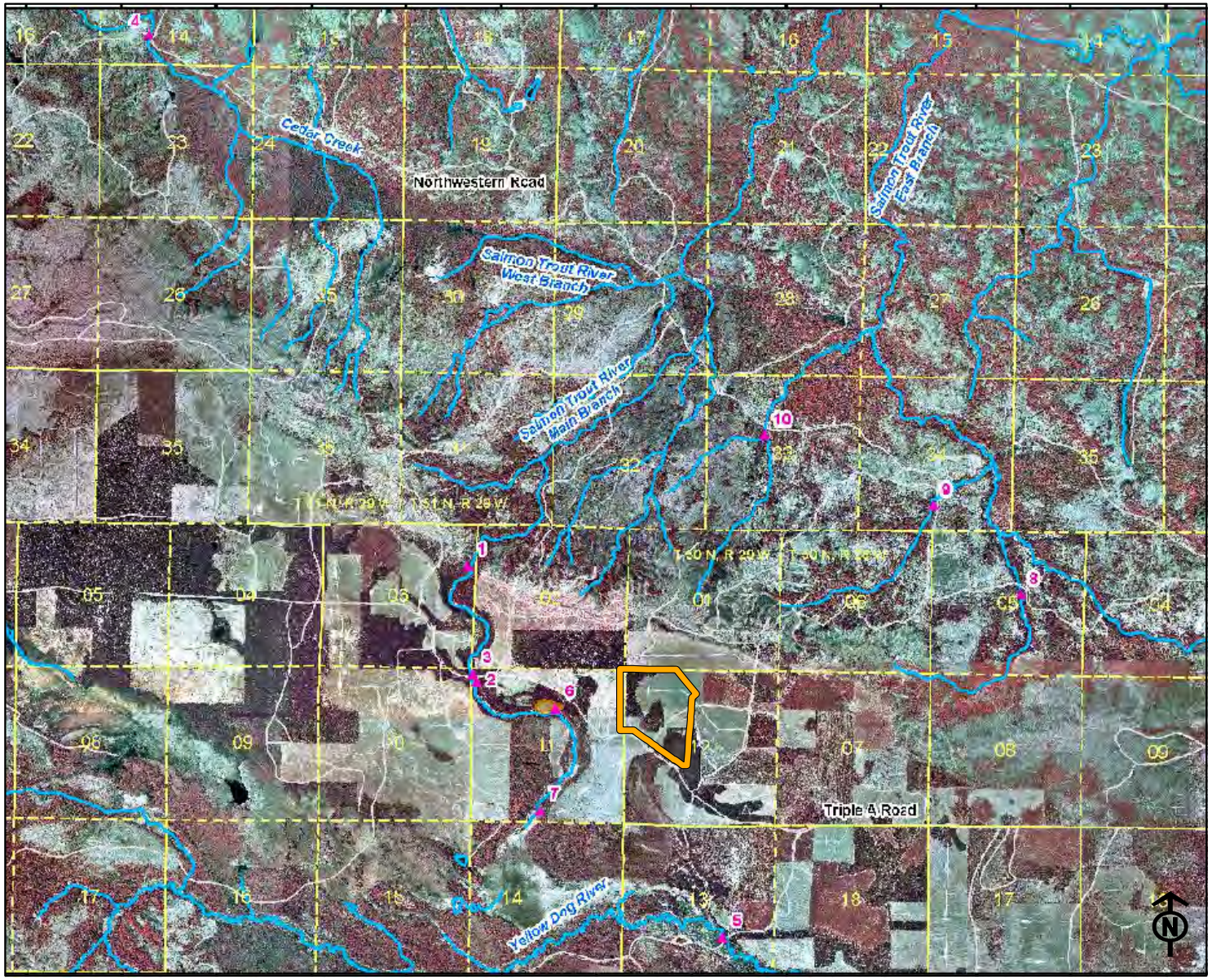
Projection & Datum: UTM NAD 83 Zone 16N

0 0.2 0.4 0.8 Miles

1:36,000

Community Environmental Monitoring Program

Figure: 4



Aquatic Sampling Monitoring Locations

Legend

- Aquatic Sampling Monitoring Station
- Mine Facilities
- Road
- Hydrography

Reference

Projection & Datum: UTM NAD 83 Zone 16N

0 0.375 0.75 1.5 Miles

1:65,000

Community Environmental Monitoring Program

Figure: 5

Mine Permit
Biological and Wetland
Monitoring Locations

Legend

- Bird Monitoring Location
- Bird and Vegetation Monitoring Location
- Bird, Vegetation and Small Mammal Monitoring Location
- Frog/Toad Monitoring Location
- Wetland Vegetation Monitoring Location
- Mine Facilities
- Biological Transects

Reference

Projection & Datum: UTM NAD 83 Zone 16N

0 0.075 0.15 0.3 Miles

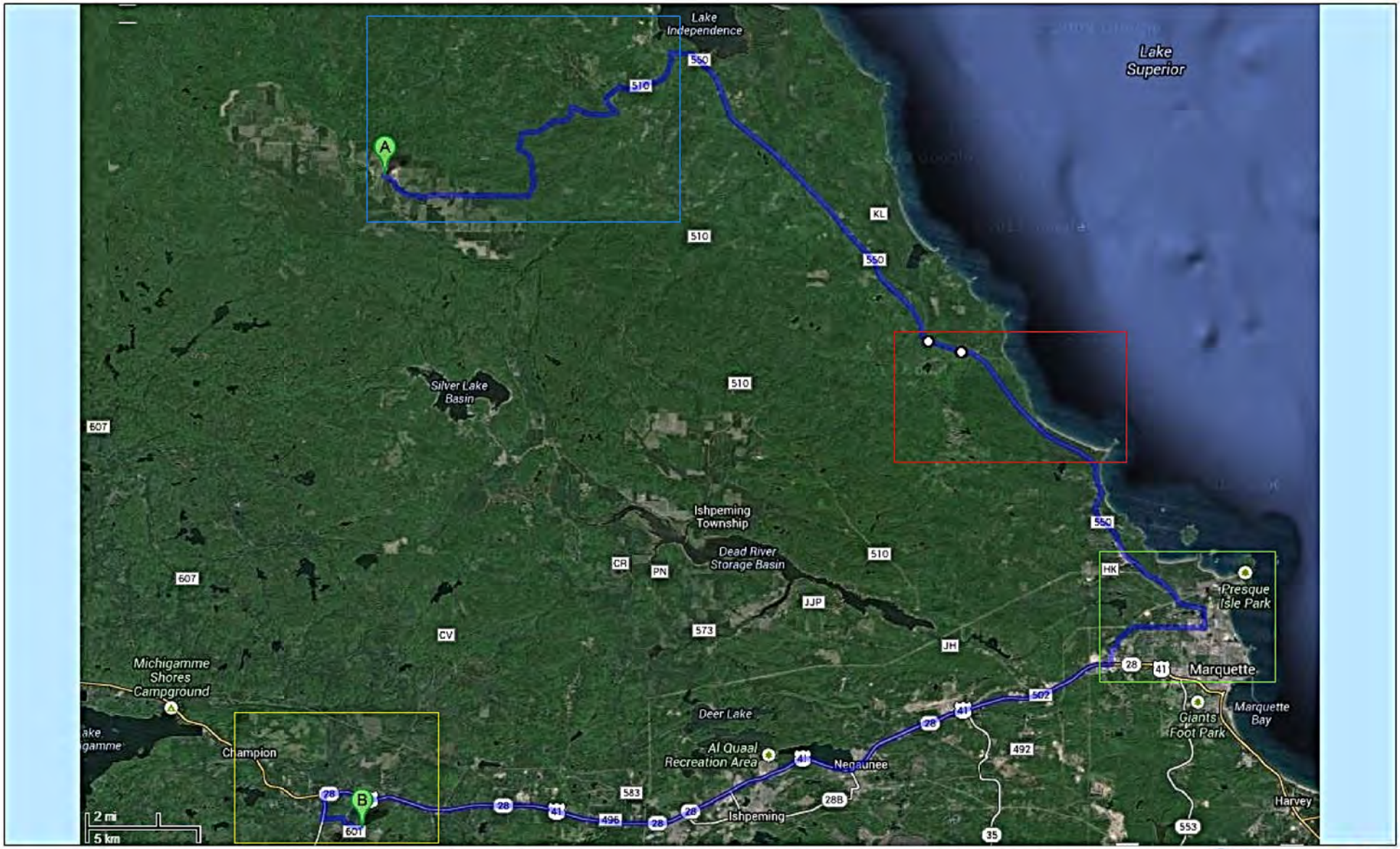
1:13,000

Community Environmental Monitoring Program

Figure: 6

Figure 7

CEMP Portable Air Quality Monitoring Sites Locator Map



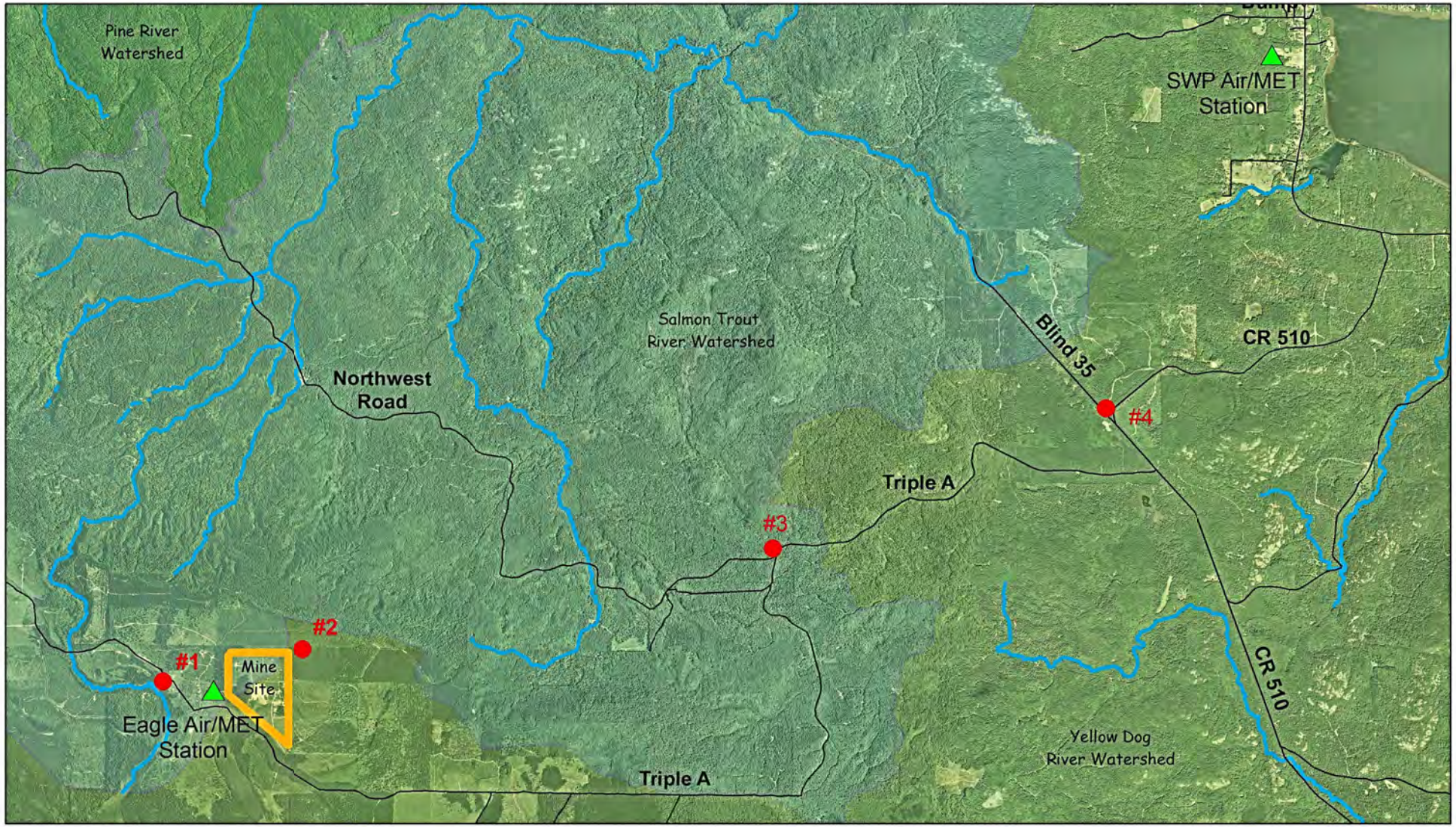
Mine Sites	Co. Rd. 550 Sites
Mill Sites	City of Marquette Sites

N
W E
S

SUPERIOR WATERSHED PARTNERSHIP AND LAND TRUST

Figure 8

CEMP Portable Air Quality Monitoring Sites



0 0.375 0.75 1.5 2.25 3 Miles

#1.....Vent Raise
#2.....Northeast of Fence at Mine
#3.....Intersection of Triple A and Northwest Road
#4.....Intersection of Co.Rd. 510 and Blind 35
Fixed.....Fixed Air Station in Big Bay

N W E S

SUPERIOR WATERSHED PARTNERSHIP AND LAND TRUST

Figure 9

CEMP Portable Air Quality Monitoring Sites

0 0.2 0.4 0.8 1.2 1.6 Miles

#5.....MCRC Wetland Restoration Site

N W E S

SUPERIOR WATERSHED PARTNERSHIP AND LAND TRUST

Figure 10

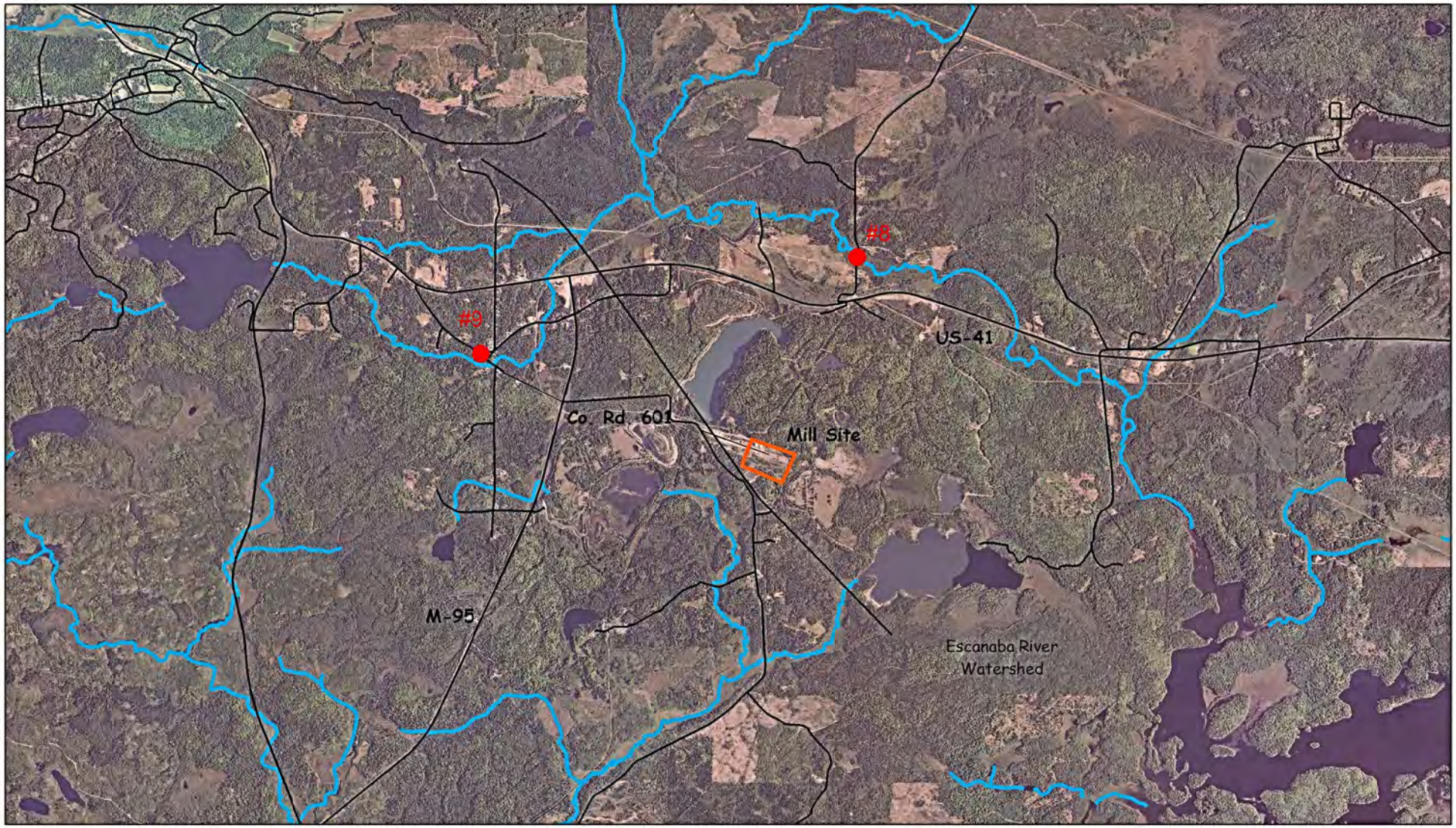
CEMP Portable Air Quality Monitoring Sites

#6.....Intersection of Sugarloaf Ave and Wright Street
#7.....Marquette Board of Light and Power Headquarters

SUPERIOR WATERSHED PARTNERSHIP AND LAND TRUST

Figure 11

CEMP Portable Air Quality Monitoring Sites



0 0.25 0.5 1 1.5 2 Miles

#8.....Wolf Lake Road at the Middle Branch Escanaba River
#9.....Co. Rd. 601 at Humboldt Cemetary

SUPERIOR WATERSHED PARTNERSHIP AND LAND TRUST

Table 1.
Summary of Annual Monitoring Objectives

WORK PLAN TASK	SITE(S)	PARMETERS	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, and wastewater, air, aquatics, 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 collected prior to start of ore production	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 start of ore production	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)	2014	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); solid waste (quantity, quality); flora and fauna, aquatics (diversity and numbers)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2014	Ongoing, based on Eagle Mine scheduled monitoring
Split Sampling	Permit compliance and background monitoring sites (Mine and Mill)	Groundwater, surface water, and facilities wastewater, solid waste	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2014	Ongoing, based on Eagle Mine scheduled monitoring

Table 1.
Summary of Annual Monitoring Objectives

WORK PLAN TASK	SITE(S)	PARMETERS	STANDARDS	PERIOD	FREQUENCY
Additional Monitoring					
Powell Township Air Quality	Stationary Air/Meterological Station in Big Bay	PM10, PM2.5, metals, wind speed and direction, air temperature, relative humidity, and solar radiation	National Ambient Air Quality Standards and Michigan Air Toxic Screening Levels	2014; Data will be considered baseline through start of ore production	Continuous (PM10, meterological data), EPA biweekly schedule (PM2.5), Quarterly (Metals)
Eagle Mine Air Quality	Sites (TBD) near Eagle Mine	Portable Air Quality Monitoring (PM10, PM2.5); Meterological/Particulate Matter data from permanent stations at Big Bay and Eagle Mine (Secondary Data)	National Ambient Air Quality Standards	2014; Data will be considered baseline through start of ore production	Quarterly
Transportation Route Air Quality	Sites (TBD) along Transportation Route	Portable Air Quality Monitoring (PM10, PM2.5); Wind/weather data from NOAA and/or Meterological/Particulate Matter data from permanent stations at Big Bay and Eagle Mine (Secondary Data); Traffic Counts (Secondary Data)	National Ambient Air Quality Standards	2014; Data will be considered baseline through start of ore production	Quarterly
Transportation Route Noise	Sites (TBD) along Transportation Route	Noise monitoring; Traffic Counts (Secondary Data)	Michigan Noise Standards (MIOSHA)	2014; Data will be considered baseline through start of ore production	Quarterly
Transportation Route Surface Water Quality	Sites (TBD) along Transportation Route	Surface water quality at road stream crossings	Michigan/EPA Surface Water Quality Standards	2014; Data will be considered baseline through start of ore production	TBD to establish baseline data
Humboldt Mill Air Qualiy	Sites (TBD) near Humboldt Mill facilities	Portable Air Quality Monitoring (PM10, PM2.5); Meterological data from floating station at Humboldt Tailings Disposal Facility	National Ambient Air Quality Standards	2014; Data will be considered baseline through start of ore production	Quarterly
Other Based on Community Input, Results and/or New Activities	Sites (TBD) near Eagle Mine, Humboldt Mill, and/or Transportation Route	TBD	TBD	2014; Data will be considered baseline through start of ore production	TBD

Table 1.
Summary of Annual Monitoring Objectives

WORK PLAN TASK	SITE(S)	PARMETERS	STANDARDS	PERIOD	FREQUENCY
Monitoring Results and Performance Ratings					
Data Processing/Publication	N/A	Results from CEMP laboratory/Eagle Mine data posted to website/data portal	CEMP Agreement and Notification Plan	2014	Monthly
Performance Ratings	N/A	CEMP Report Card, Monitoring Reports, Eagle Mine Scorecard	CEMP Agreement and Notification Plan	2014	Quarterly or as needed (Report Card/Monitoring Reports), Biannually (Eagle Scorecard)
Community Outreach					
Community Meetings/Forums	N/A	Community Forums, other meetings/presentations to community groups, etc.	CEMP Agreement and Notification Plan	2014	Ongoing
Public Outreach Activities	N/A	CEMP website, local news/media, email updates, social media, CEMP hotline, etc.	CEMP Agreement and Notification Plan	2014	Ongoing

Table 2
Mine Permit Surface Water Monitoring
Parameters, Frequency, Analytical Method and Reporting Limits

Parameters	Frequency	Analytical Method[1]	Reporting Limit	Units
Field				
Temperature	Quarterly	Field	na	^{o}C
Dissolved Oxygen	Quarterly	Field	na	mg/L
pH	Quarterly	Field	na	SU
Specific Conductance	Quarterly	Field	na	umhos/cm
Flow	Quarterly	Field	na	cfs
Anions				
Alkalinity, Bicarbonate	Annual	310.1/SM 2320 B	2.0	mg/L
Alkalinity Carbonate	Annual	310.1/SM 2320 B	2.0	mg/L
Chloride	Annual	EPA-325.2/4599-CL E	1.0	mg/L
Flouride	Annual	SM 4500 F-C	0.10	mg/L
Nitrate Nitrogen	Annual	EPA-353.2/4500 NO3F	0.050	mg/L
Sulfate	Quarterly	EPA-375.4/9038	1.0	mg/L
Cations				
Calcium	Annual	EPA-200.7/6010B	0.50	mg/L
Potassium	Annual	EPA-200.7/6010B	0.50	mg/L
Magnesium	Annual	EPA-200.7/6010B	0.50	mg/L
Sodium	Annual	EPA-200.7/6010B	0.50	mg/L
Total Dissolved Solids	Quarterly	EPA-160.1	50	mg/L
Metals				
Aluminum	Annual	EPA-200.7/6010B	50	ug/L
Lithium	Annual	EPA-200.7/6010B	10	ug/L
Antimony	Annual	EPA-200.8/6020	2.0	ug/L
Arsenic	Quarterly	EPA-200.8/6020	1.0	ug/L
Barium	Annual	EPA-200.8/6020	10	ug/L
Iron	Quarterly	EPA-200.7/6010B	20	ug/L
Beryllium	Annual	EPA-200.8/6020	1.0	ug/L
Boron	Quarterly	EPA-200.8/6020	50	ug/L
Cadium	Annual	EPA-200.8/6020	0.20	ug/L
Chromium	Annual	EPA-200.8/6020	1.0	ug/L
Copper	Quarterly	EPA-200.8/6020	1.0	ug/L
Cobalt	Quarterly	EPA-200.8/6020	10	ug/L
Lead	Annual	EPA-200.8/6020	1.0	ug/L
Manganese	Quarterly	EPA-200.8/6020	10	ug/L
Molybdenum	Annual	EPA-200.8/6020	10	ug/L
Nickel	Quarterly	EPA-200.8/6020	1.0	ug/L
Selenium	Quarterly	EPA-200.8/6020	2.0	ug/L
Silver	Annual	EPA-200.8/6020	0.20	ug/L
Zinc	Quarterly	EPA-200.8/6020	10	ug/L
Mercury[1]	Quarterly	EPA-1631E	0.00025	ug/L

[1] Acceptable by MDEQ to use 0.005 ug/L as reporting limit for mercury.

Table 3
Mine Permit Groundwater Monitoring
Parameters, Frequency, Analytical Methods, and Reporting Limits

L23 Parameters	Units	Frequency of Analysis	Analytical Method[2]	Reporting Limit
Field				
Static Water Elevation	ft/msl	Quarterly	Field	--
Redox	meV	Quarterly	Field	--
Temperature	^{o}C	Quarterly	Field	--
Dissolved Oxygen	mg/L	Quarterly	Field	--
pH	su	Quarterly	Field	--
Specific Conductance	umhos/cm	Quarterly	Field	--
Anions				
Alkalinity, Bicarbonate	mg/L	Quarterly	310.1	2.0
Alkalinity Carbonate	mg/L	Quarterly	310.1	2.0
Nitrate Nitrogen	mg/L	Quarterly	EPA-353.2	0.050
Sulfate	mg/L	Quarterly	EPA-375.4	2.0-5.0
Flouride	mg/L	Annual	SM 4500 F-C	0.10
Chloride	mg/L	Quarterly	EPA-325.2	1.0
Cations				
Calcium	mg/L	Annual	EPA-6010B	0.50
Sodium	mg/L	Quarterly	EPA-6010B	0.50
Magnesium	mg/L	Annual	EPA-6010B	0.50
Potassium	mg/L	Annual	EPA-6010B	0.50
Metals				
Aluminum	ug/L	Annual	EPA-6010B	50
Antimony	ug/L	Annual	EPA-6020	5.0
Arsenic	ug/L	Quarterly	EPA-6020	2.0
Barium	ug/L	Annual	EPA-6020	20
Beryllium	ug/L	Annual	EPA-6020	1.0
Boron	ug/L	Quarterly	EPA-6010B	100
Cadmium	ug/L	Annual	EPA-6020	0.50
Chromium	ug/L	Annual	EPA-6020	5.0
Cobalt	ug/L	Annual	EPA-6010B	10
Copper	ug/L	Quarterly	EPA-6020	5.0
Iron	ug/L	Quarterly	EPA-6010B	20
Lead	ug/L	Annual	EPA-6020	1.0
Lithium	ug/L	Annual	EPA-6010B	8.0
Manganese	ug/L	Quarterly	EPA-6010B	20
Mercury[1]	ug/L	Quarterly	EPA-1631E	0.00025
Molybdenum	ug/L	Annual	EPA-6020	10
Nickel	ug/L	Quarterly	EPA-6020	25
Selenium	ug/L	Quarterly	EPA-6020	1.0
Silver	ug/L	Annual	EPA-6020	0.20
Strontium	ug/L	Annual	EPA-6010B	50
Thallium	ug/L	Annual	EPA-200.8/6020	2.0
Vanadium	ug/L	Annual	EPA-200.8/6020	10
Zinc	ug/L	Quarterly	EPA-6020	10

[1] Acceptable by MDEQ to use 0.005 ug/L as reporting limit for mercury.

[2] Acceptable to use equivalent or improved analytical methods.

-- Indicates the permit does not specify this information.

Table 4
Mine Permit Facilities (TDRSA and CWB) Monitoing
Parameters, Frequency, Analytical Methods, and Reporting Limits

Parameters	Units	Frequency of Analysis	Analytical Method[1]	Reporting Limit
Static Water Elevation	ft	Quarterly	Field	0.01
Alkalinity, Bicarbonate	mg/L	Quarterly	310.1/SM 2320 B	2
Alkalinity Carbonate	mg/L	Quarterly	310.1/SM 2320 B	2
Nitrate Nitrogen	mg/L	Annual	EPA-353.2/4500 NO3F	0.05
pH	su	Quarterly	Field	--
Specific Conductance	umhos/cm	Quarterly	Field	--
Sulfate	mg/L	Quarterly	EPA-375.4/9038	1
Chloride	mg/L	Quarterly	EPA-325.2/4599-CL E	1
Sodium	mg/L	Annual	EPA-200.7/6010B	0.5
Antimony	ug/L	Annual	200.8/6020	2
Arsenic	ug/L	Quarterly	200.8/6020	1
Barium	ug/L	Annual	200.8/6020	10
Beryllium	ug/L	Annual	200.8/6020	1
Boron	ug/L	Quarterly	200.8/6020	50
Cadium	ug/L	Annual	200.8/6020	0.2
Calcium	mg/L	Annual	200.7/6010B	0.5
Chromium	ug/L	Annual	200.8/6020	1
Cobalt	ug/L	Annual	200.8/6020	10
Copper	ug/L	Quarterly	200.8/6020	1
Flouride	mg/L	Annual	SM 4500 F-C	0.1
Iron	ug/L	Quarterly	200.7/6010B	20
Lead	ug/L	Annual	200.8/6020	1
Lithium	ug/L	Annual	200.7/6010B	10
Magnesium	mg/L	Annual	200.7/6010B	0.5
Manganese	ug/L	Quarterly	200.8/6020	10
Mercury	ug/L	Quarterly	1631/----	0.00025
Molybdenum	ug/L	Annual	200.8/6020	10
Nickel	ug/L	Quarterly	200.8/6020	1
Potassium	mg/L	Annual	200.7/6010B	0.5
Selenium	ug/L	Quarterly	200.8/6020	2
Silver	ug/L	Annual	200.8/6020	0.2
Strontium	ug/L	Annual	200.8/6020	50
Thallium	ug/L	Annual	200.8/6020	2
Vanadium	ug/L	Annual	200.8/6020	10
Zinc	ug/L	Quarterly	200.8/6020	10

[1] Acceptable to use equivalent or improved analytical methods.

-- Indicates the permit does not specify this information.

Table 5
Groundwater Discharge Permit WTP Effluent Monitoring
Parameters, Frequency, Analytical Methods, and Reporting Limits

Parameters	Units	Frequency of Analysis	Analytical Method[1]	Reporting Limit
Inffluent Flow	GPD	Daily	--	--
Effluent Flow	GPD	Daily	--	--
Biochemical Oxygen	mg/l	Weekly	--	--
Dissolved Oxygen	mg/l	Monthly	--	--
Ammonia Nitrogen	mg/l	Monthly	--	--
Nitrate Nitrogen	mg/l	Monthly	--	--
Nitriite Nitrogen	mg/l	Monthly	--	--
pH (Minimum)	S.U.	Continuous Measurement	--	--
pH (Maximum)	S.U.	Continuous Measurement	--	--
Total Phosphorus	mg/l	Monthly	--	--
Specific Conductance	umhos/cm	Continuous Measurement	--	--
Total Aluminum	mg/l	Monthly	--	--
Total Antimony	ug/l	Monthly	200.8/6020	1
Total Arsenic	ug/l	Weekly	200.8/6020	1
Total Barium	ug/l	Monthly	200.8/6020	5
Total Beryllium	ug/l	Monthly	200.8/6020	1
Total Boron	ug/l	Weekly	200.8/6020	20
Total Cadmium	ug/l	Weekly	200.8/6020	0.2
Total Chloride	mg/l	Monthly	--	--
Total Chromium	ug/l	Monthly	200.8/6020	1
Total Cobalt	ug/l	Monthly	200.8/6020	15
Total Copper	ug/l	Weekly	200.8/6020	1
Total Fluoride	ug/l	Monthly	--	--
Total Iron	ug/l	Monthly	--	--
Total Lead	ug/l	Monthly	200.8/6020	1
Total Lithium	ug/l	Monthly	200.8/6020	8
Total Manganese	ug/l	Monthly	200.8/6020	5
Total Mercury	ug/l	Weekly	1631/----	0.0005
Total Molybdenum	ug/l	Monthly	200.8/6020	25
Total Nickel	ug/l	Monthly	200.8/6020	2
Total Potassium	ug/l	Monthly	--	--
Total Selenium	ug/l	Weekly	200.8/6020	1
Total Silver	ug/l	Weekly	200.8/6020	0.2
Total Sodium	mg/l	Monthly	--	--
Total Strontium	ug/l	Monthly	200.8/6020	5
Total Sulfate	ug/l	Monthly	--	--
Total Thallium	ug/l	Monthly	200.8/6020	2
Total Vanadium	ug/l	Monthly	200.8/6020	2
Total Zinc	ug/l	Monthly	200.8/6020	10

[1] Acceptable to use equivalent or improved analytical methods.

-- Indicates the permit does not specify this information.

Table 6
Groundwater Discharge Permit Groundwater Monitoring
Parameters, Analytical Methods, and Reporting Limits

Parameters	Units	Frequency of Analysis	Analytical Method[1]	Reporting Limit
Field				
Static Water Elevation	USGS-Ft	Quarterly	Field	--
Dissolved Oxygen	mg/l	Quarterly	Field	--
pH (Minimum)	S.U.	Quarterly	Field	--
pH (Maximum)	S.U.	Quarterly	Field	--
Specific Conductance	mmhos/cm	Quarterly	Field	--
Anions				
Bicarbonate	mg/l	Quarterly	--	--
Chloride	mg/l	Quarterly	--	--
Ammonia Nitrogen	mg/l	Quarterly	--	--
Nitrate Nitrogen	ug/l	Quarterly	--	--
Nitrite Nitrogen	ug/l	Quarterly	--	--
Total Phosphorus	mg/l	Quarterly	--	--
Sulfate	mg/l	Quarterly	--	--
Cations				
Calcium	mg/l	Quarterly	--	--
Sodium	mg/l	Quarterly	--	--
Magnesium	mg/l	Quarterly	--	--
Potassium	mg/l	Quarterly	--	--
Metals				
Antimony	ug/l	Quarterly	200.8/6020	1
Arsenic	ug/l	Quarterly	200.8/6020	1
Barium	ug/l	Quarterly	200.8/6020	5
Beryllium	ug/l	Quarterly	200.8/6020	1
Boron	ug/l	Quarterly	200.8/6020	20
Cadium	ug/l	Quarterly	200.8/6020	0.2
Chromium	ug/l	Quarterly	200.8/6020	1
Cobalt	ug/l	Quarterly	200.8/6020	15
Copper	ug/l	Quarterly	200.8/6020	1
Iron	mg/l	Quarterly	--	--
Lead	ug/l	Quarterly	200.8/6020	1
Lithium	ug/l	Quarterly	200.8/6020	8
Manganese	mg/l	Quarterly	200.8/6020	5
Mercury	ug/l	Quarterly	1631/----	0.0005
Molybdenum	ug/l	Quarterly	200.8/6020	25
Nickel	ug/l	Quarterly	200.8/6020	2
Selenium	ug/l	Quarterly	200.8/6020	1
Silver	ug/l	Quarterly	200.8/6020	0.2
Strontium	ug/l	Quarterly	200.8/6020	5
Thallium	ug/l	Quarterly	200.8/6020	2
Vanadium	ug/l	Quarterly	200.8/6020	2
Zinc	ug/l	Quarterly	200.8/6020	10

[1] Acceptable to use equivalent or improved analytical methods.

-- Indicates the permit does not specify this information.