Application

Kennecott
Eagle Minerals

Humboldt Mill
Mining Permit Application
Volume I

(Report Text and Figures)

Project I.D.: 06W003

Kennecott Eagle Minerals Company
Ishpeming, Michigan

December 2008

Foth

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Kennecott
Eagle Minerals

December 15, 2008

Mr. Hal Fitch
State Geologist
Michigan Department of Environmental Quality
525 West Allegan St
Lansing, MI 48909

Dear Mr. Fitch:

Re: Humboldt Mill – Mining Permit Application

This *Mining Permit Application* and associated *Environmental Impact Assessment* provides to the Michigan Department of Environmental Quality (MDEQ) information to evaluate the Kennecott Eagle Minerals Company (KEMC) proposed mining mill project (hereafter referred to as the Humboldt Mill) for approval of a *Michigan Nonferrous Metallic Mineral Mining Permit.* This document was prepared in accordance with Michigan's Nonferrous Metallic Mineral Mining Rules and direct discussions with the MDEQ. Volume I and associated Appendices in Volume IA provide the following information:

- A mining mill plan.
- A reclamation plan.
- A monitoring and environmental protection plan including a treatment and containment plan.
- A contingency plan
- A permit application form.
- A description of the amount of financial assurance that will be provided for the project.
- A list of other applicable permits.
- An organization chart.

A check covering the permit fee will be provided under a separate cover as will an electronic copy of this application. Volume II contains the *Environmental Impact Assessment* (EIA) for the Humboldt Mill. Supporting Appendices for the EIA are provided in Volume IIA through Volume IIJ. A checklist for submitting an administratively complete *Mining Permit Application* appears in Appendix A in Volume IA. That checklist contains document references addressing each listed item.

KEMC is a subsidiary of Rio Tinto headquartered in London. Rio Tinto develops, manages, operates, and participates in base metal and precious metals mining operations in North America and around the world.

Thank you for your assistance in review of this document. If you need additional information or have questions, please contact me at (906) 486-1257.

Sincerely,

Kennecott Eagle Minerals Company

Jonathan C. Cherry, P.E.
General Manager

cc: Steve Powers, Marquette County, w/o enclosure
Joe Derocha, Humboldt Township Supervisor w/o enclosure

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Foth

December 12, 2008

Mr. Jonathan Cherry
Kennecott Minerals Company
504 Spruce Street
Ishpeming, MI 49849

Dear Mr. Cherry,

Re: Humboldt Mill – Mining Permit Application

Enclosed for your distribution is the *Humboldt Mill Mining Permit Application*. This application has been prepared according to the requirements of Part 632 of the Michigan Natural Resources Environmental Protection Act, and Michigan Administrative Rules codified under R 425.101 et. seq.

Sincerely,

Foth Infrastructure & Environment, LLC

Stephen V. Donohue, P.H.
Project Director

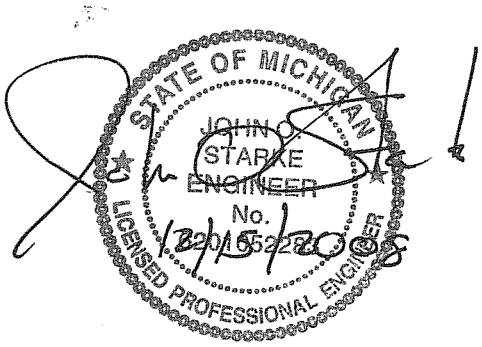
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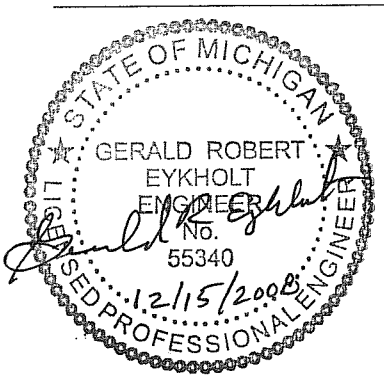
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Humboldt Mill

Mining Permit Application

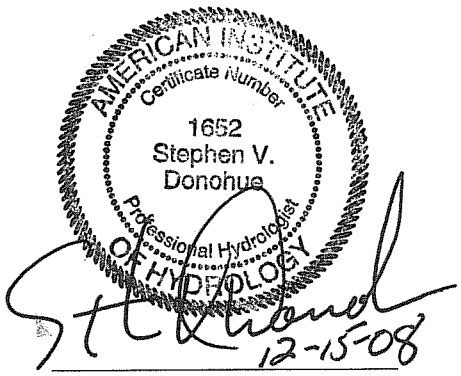


Project ID: 06W003

Prepared for

Kennecott Eagle Minerals Company

ISO 14001:2004 Registered System



Prepared by

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December 2008

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Humboldt Mill
Kennecott Eagle Minerals Company
Mining Permit Application

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Note: The appendices listed above are contained in:
Volume IA: Appendix A through Appendix G

Note: The Environmental Impact Assessment is contained in Volume II through Volume IIJ

ARD	Acid rock drainage
ASTM	American Society for Testing and Materials
BMP	Best Management Practices
ºC	degrees Celsius
$CaCO_3$	calcium carbonate
CEMI	Canadian Environmental and Metallurgical, Inc.
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGWP	Certified Ground Water Professional
CHMM	Certified Hazardous Materials Manager
COSA	Coarse ore storage area
CR	County road
CREP	Conservation Reserve Enhancement Program
cy	cubic yards
D.O.	dissolved oxygen
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
ft	feet
ft^2	square feet
ft^3	cubic feet
Foth	Foth Infrastructure & Environment, LLC
gpd	gallons per day
gpd/ft^2	gallons per day per square foot
gpm	gallons per minute
HDPE	high density polyethylene
hp	Horsepower
hr	hour
HSE	Health, Safety and Environment
HTDF	Humboldt Tailings Disposal Facility
IC	Incident Commander
ICS	Incident Command System
ILSA	Inland Lakes and Streams Application
in	inch
KEMC	Kennecott Eagle Minerals Company
kg	kilograms
kV	kilovolt
kW	kilowatt
lbs	pounds
M3	M3 Engineering and Technology Corporation
MCCD	Marquette County Conservation District
MCL	Michigan Compiled Laws
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation

mg/l	milligrams per liter
MPA	Mining Permit Application
MPC	Mineral Processing Corporation
MSc	Master of Science
MSDS	Material Safety Data Sheets
MSHA	Mining Safety and Health Administration
MSL	mean sea level
mV	millivolts
ng/l	nanograms per liter
NPDES	National Pollutant Discharge Elimination System
NREPA	Natural Resources and Environmental Protection Act
NRCS	Natural Resources Conservation Service
NTU	neflometric turbidity units
OSHA	Occupational Health and Safety Act
OSS	on-site septic system
%	percent
PEL	Preliminary effluent limits
P.E.	Professional Engineer
P.G.	Professional Geologist
P.H.	Professional Hydrologist
pH	- Log [H+]
Ph.D.	Doctor of Philosophy
PIPP	Pollution Incident Prevention Plan
PVC	polyvinyl chloride
R	Rule
SESC	Soil Erosion and Sediment Control
SM	standard method
SPCC	Spill Prevention Control and Countermeasures
sq ft	square feet
S.U.	standard units
SWPPP	Stormwater Pollution Prevention Plan
tonnes (t)	metric tonnes (1 tonne = 1.1 ton)
t/d	tons per day
tpd	tonnes per day
ug/l	micrograms per liter
umhos/cm	micromhos per centimeter
WWTP	Wastewater treatment plant
yr	year
yrs	years

Glossary of Terms

The mining related terms below are provided for the convenience of reader to better understand the information in this *Mining Permit Application*.

Term	Definition
Benefication	Process to extract valued mineral from ore.
Bulk Rougher	Initial flotation circuit to extract valued mineral composition.
Cleaner and Scavenger	Final flotation circuit to extract residual valued mineral composition after bulk rougher circuit.
Concentrate	Processed ore having higher concentration of valued metal(s)
Flotation	Benefication process to remove valued mineral composition from ore using mechanical and chemical processes.
Metallurgy	An analysis of ore composition for its valued mineral content.
Tailings	Mineralized waste product upon completion of ore benefication.
Slurry	A composition of process water and solids conveyed through a pipeline.

1. Introduction

Kennecott Eagle Minerals Company (KEMC) is proposing to reuse the existing Humboldt Mill facilities located in Humboldt Township, Marquette County, Michigan for processing ore from the Eagle Mine. This project will entail processing of ore to concentrate and placement of residual tailings in the Humboldt Tailings Disposal Facility (HTDF). The concentrate may be shipped to Canada or to other smelter locations.

1.1 Purpose and Scope

The Humboldt Mill development is a nonferrous metallic mining project. As part of the permitting process for the Humboldt Mill, KEMC has prepared this Mining Permit Application (MPA) in accordance with Part 632 of the Michigan Natural Resources and Environmental Protection Act (NREPA) (Michigan Compiled Laws {MCL} §324.63201 et. seq.) and rules promulgated under R 425.101 et. seq. of the Michigan Administrative Code. This volume (Volume I) of the MPA and associated appendices contains the required permit application forms; the mining, reclamation, environmental protection and contingency plans, and financial assurance information as required in Part 632 and R 425.201(1)(a)(b)(d-h). Volume IA contains Appendices A through G that are referenced in this document. The *Environmental Impact Assessment* (EIA) required under Part 632 and R 425.201(1)(c) is contained in Volume II of this MPA. Appendices for the EIA are contained in Volume IIA through Volume IIJ.

This MPA is based on engineering and other environmental studies as they relate to the design, construction, operation, closure, reclamation, and post-closure care of the Humboldt Mill facilities. Various reports prepared for the Humboldt Mill MPA and EIA are attached to this document to support the design, construction and operations of the facility.

1.2 Project Background Information

Per R 425.201(2)(a) the Humboldt Mill requires a Part 632 mining permit that is separate and distinct from the mining permit for the Eagle Project. This project entails the use of the Humboldt Mill and recommissioning of the HTDF that exists at the site and was used by the Callahan Mining Corporation for the placement of sulfide bearing tailings in the mid to late 1980's.

The mill and associated HTDF will be used for processing nickel and copper ore. Tailings from the mill operation will be placed in the existing HTDF, an anoxic environment to control oxidation of the sulfide tails.

1.2.1 Humboldt Mill Site Background Information

The Humboldt Mill property measuring approximately 349.7 acres is located approximately 24 miles west of Marquette, Michigan as shown on Figure 1-1. The property is located in Sections 2 and 11 in Township 47 North, Range 29 West, Humboldt Township, Marquette County, Michigan. The regional setting surrounding the Humboldt Mill site is shown on Figure 1-2.

The Humboldt Mill facility was originally constructed in 1954 as a joint venture between Cleveland Cliffs Iron Company to concentrate low grade iron ore from the Humboldt Mine. The Humboldt Mine was developed in two stages over its life, beginning in 1954 with underground ore removal, followed by open pit extraction. A total of approximately 12,000,000 cy of rock

was removed from the mine during mining operations. Upon cessation of mining in 1970, the pit was allowed to fill with water. At that time the maximum depth of the Humboldt mine was approximately 350 ft.

The Humboldt Mill facility incorporated crushing, grinding, and flotation process unit operations to concentrate the iron ore at the rate of approximately 10,000 t/d. A grate kiln pellet facility was added in 1960. The mill operated until about 1970. At that time the mine was closed but the mill was converted to a hematite concentrate regrind with upgrading circuits using two ball mills and an elutriation process. The pellet facility continued to operate, processing the hematite concentrate and excess concentrate from the nearby Republic Mine. Operations continued until about 1979 when ore deliveries from Republic ceased.

In the early 1980's, Callahan Mining Corporation developed the Ropes Gold Mine about 10 miles east of the Humboldt Mill site as shown on Figure 1-1. Callahan Mining Corporation purchased parts of the Humboldt Mill facility, with the exception of the pelletizing process. The mill was converted to gold ore processing and started in July, 1985, at the rate of 2,000 t/d. The mill operated until 1989 when the Ropes Mine was closed. During the processing of the Ropes ore, residual process tailings that contained sulfide minerals were placed in the HTDF (the previously mined pit area). Approximately 1.82 million tons of tailings from the Ropes Mine are contained and treated in the HTDF. During this period of time, surface water release from the HTDF was regulated via an NPDES permit (Permit No. MI 0044393). This permit has been inactive since 1997.

Minerals Processing Corporation (MPC) purchased the Humboldt Mill from Callahan Mining Corporation in the mid 1990's to provide custom milling under contract from producers. Since that time MPC has intermittently operated some sections of the mill for custom grind contracts. In 2008, Kennecott Eagle Land, LLC., a Kennecott related company, purchased the approximately 26.7 acre MPC property.

Based on the past site uses, the property retains an environmental legacy. This information is documented in the EIA presented in Volume II of this MPA. Environmental history and current baseline environmental conditions of the Humboldt Mill site are documented in the EIA contained in Volume II of this MPA.

KEMC presently has options to purchase approximately 135.5 acres from O'Dovero and approximately 187.5 acres from Callahan Mining Corporation totaling approximately 349.7 acres for the Humboldt Mill project.

1.3 Mining Permit Application Documents

This MPA is being submitted by KEMC to request a permit for the Humboldt Mill site for processing of nonferrous metallic ore and disposal of tailings. This volume (Volume I and associated Appendices in Volume IA) of the MPA includes the following items required under Part 632 and R 425.201(1)(a)(d-h):

- A completed permit application from the Michigan Department of Environmental Quality (MDEQ) along with a checklist to facilitate MDEQ review (Appendices A-1 and A-2);
- A permit application fee provided under separate cover by KEMC;

- A mining plan, treatment and containment plan, monitoring plan, reclamation plan, environmental protection plan, and contingency plan (Sections 3, 4, 5, 6 and 7);

- The amount of financial assurance that will be provided to satisfy the requirements of R 425.301 (Section 8);

- A listing of other applicable permits and licenses that are being applied for concurrently with this MPA (Section 1.4);

- KEMC's Organization Report (Appendix B); and

- An EIA (Volume II of this application).

This MPA includes the requirements of Part 632 of NREPA and *Nonferrous Metallic Mineral Mining* rules specified in R 425.101 et. seq. of the Michigan Administrative Code. This application is supported by tables and figures and appendices that follow the narrative report. The appendices contain technical reports, calculations and other data that support design elements presented in this application.

1.4 Other Permits and Plans

KEMC is applying for other permits and plans required for operation of the Humboldt Mill which are contained under separate cover in the format required by the respective regulatory agencies. These permit applications and related regulatory documents are as follows:

- A *Michigan Air Use Permit – Permit to Install Application* (Foth, 2008) submitted to the MDEQ for air emissions related to the proposed mill operation.

- A *National Pollutant Discharge Elimination System (NPDES)* permit for discharge of HTDF waters.

- An *Inland Lakes and Stream (ILSA)* permit for placement of tailings in the HTDF.

- *A Part 91 Soil Erosion and Sedimentation Control (SESC)* permit from the Marquette County Conservation District (MCCD) for construction stormwater.

- *Notice of Coverage* for storm water management during construction activities and a *Notice of Intent* for storm water management will be submitted to the MDEQ for the potential release of non-contact storm water runoff.

- A *Type II Non-Transient Non-Community Water Supply* permit from the Marquette County Health Department for water consumption and use by site workers.

- A *Commercial Septic System* permit from the Marquette County Health Department for the treatment and discharge of sanitary wastewater generated by site workers.

- A *Spill Prevention Control and Countermeasures Plan* (SPCC Plan) will be prepared per 40 Code of Federal Regulations (CFR) 112.

- A *Pollution Incident Prevention Plan* (PIPP) will be prepared per R 324.2001 et. seq.

- An MDEQ flammable or combustible liquid storage tank(s) certificates per Michigan Fire Prevention Code (1941 PA 207) and per R 29.5101 through 5516.

- A Humboldt Township Zoning Compliance permit for industrial use of the Humboldt Mill.

During operations, KEMC will file annual reports in compliance with Emergency Planning and Community Right to Know Act (EPCRA).

As a result of the MDEQ's review of the EIA, it is possible that other environmental permits may be identified for the Humboldt Mill. If other permit requirements are identified, KEMC will submit the applications at the appropriate time.

1.5 Document Preparers and Qualifications

This MPA was prepared by Foth Infrastructure & Environment, LLC (Foth) under contract to KEMC. This document incorporates information prepared by other qualified professionals working under contract to KEMC and/or Foth. Table 1-1 provides a listing of the organizations and individuals who have contributed to the preparation of this MPA.

Table 1-1
Document Preparation – List of Contributors

Organization	Individuals	Qualifications
Advanced Ecological Management, LLC 2692 165th Ave Morley, MI 49336	R. Douglas Workman, Ph.D.	Aquatic Scientist
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Table 1-2 *con't*

Organization	Individuals	Qualifications
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King & MacGregor Environmental Inc. 2520 Woodmeadow Dr SE Grand Rapids, MI 49546	Matt MacGregor	Wetland Scientist/Biologist
M3 Engineering & Technology Corp. 2440 W Ruthrauff Rd Ste 170 Tucson, AZ 85705	Jim Norine, P.E.	Professional Engineer
North Jackson Company 1004 Harbor Hills Dr. Marquette, MI 49855	Dan Wiitala, P.G.	Professional Geologist
SGS Lakefield Research Ltd PO Box 4300 185 Concession St Lakefield, Ontario, Canada K0L 2H0	Dan Imeson, MSc	Senior Project Metallurgist
URS Corporation 36 East Seventh St., Ste. 2300 Cincinnati, OH 45202	Christopher Bergman, Ph.D., RPA	Archaeologist
Canadian Environmental and Metallurgical, Inc. 6927 Antrim Ave. Burnaby, BC, Canada V5J 4M5	Rick Vos	Geochemist

(1) Individuals involved with the preparation of reclamation plan.

Prepared by: JOS1
Checked by: SVD1

2. Project Location Information

2.1 Site Location

The Humboldt Mill is located in Sections 2 and 11 Township 47 North, Range 29 West, Humboldt Township, Marquette County, Michigan. The site is approximately 24 miles west of the city of Marquette. The mill site is accessed via entrance off County Road (CR) 601.

2.2 Property Ownership

The 349.7 acre Humboldt Mill site property is presently owned by Kennecott Eagle Land, LLC (26.7 acres), Callahan Mining Corporation and O'Dovero Properties. KEMC has options to purchase the land parcels from Callahan Mining Corporation and O'Dovero properties. Adjacent Properties, within 1,320 ft to the Humboldt Mill property boundary are shown on Figure 2-1 which include:

- O'Dovero properties to the East and Southwest,
- AL & SI property to the North,
- Ogea property to the Northeast,
- Kumpu property to the South,
- J&J Ogea property to the South,
- HS property to the Northwest,
- Humboldt Stone to the Northwest, and
- Christopher and Holly Ray Properties to the West.

The nearest residence to the Humboldt Mill site is the T&T Rosten residence located approximately 1800 ft south of the main mill building as shown on Figure 2-2.

2.3 Land Use and Zoning

The Humboldt Mill site and surrounding properties have been heavily modified by past mining and ore processing operations. These mining related modifications include mine spoil piles, tailing containment structures, mill facilities and other structures as shown on the existing conditions map on Figure 2-2.

Present land use on the Humboldt Mill site can be described as industrial/mining processes. Land uses surrounding the Humboldt Mill site are primarily passive, such as outdoor recreational uses, including snowmobiling in the winter and hunting in the fall. In addition, surrounding properties were also used for industrial/mining processes. Two waste rock piles and two tailings disposal basins, from previous iron ore mining activities, exist on the surrounding properties to the east and west of the facility.

Presently the proposed property is zoned Industrial (I) Residential (R) and Resource Production (RP) as shown on Figure 2-3. The residential zoned area is located at the northeast corner of the HTDF. Due to its pre-existing industrial use, this area is a non-conforming and therefore exempt from residential zoning requirements. Surrounding the KEMC property, zoning is primarily a mix of Residential, Industrial, Resource Production and Timber Production. KEMC will submit a Zoning Compliance Permit Application to Humboldt Township for industrial use of the site.

2.4 Conservation and Historical Preservation Easements

In the fall of 2006, archaeologists from URS Corporation completed a Phase I Archaeological Survey of the Humboldt Mill property and surrounding areas to identify any potential cultural and/or historical features (URS Corporation, 2007). This document is included in the Appendices for the EIA in Volume II of this application. The URS Survey concluded:

> *The site has been extensively disturbed from past mining activities. A low level of prehistoric and historic activity took place within the project area. A remnant of a small structure, possibly related to recreational activity or logging, and a single isolated prehistoric quartz flake were identified. No resources were eligible for inclusion on the National Register of Historic Places.*

There are no known conservation or historic preservation easements within 1,320 ft of the project site.

2.5 Adjacent Properties and Measures Taken to Prevent Damage

Properties adjacent to and within 1,320 ft of the Humboldt Mill site are presented in Section 2.2 and shown on Figure 2-1. The proposed facilities for the Humboldt Mill will include the existing mill buildings, the HTDF, a potable water well, sanitary system, stormwater management structures, a wastewater treatment plant (WWTP) for the HTDF and other facility infrastructure improvements. These facilities will be designed, constructed and operated in such a manner to prevent impacts to the environment or damage to adjacent properties.

Environmental impacts to adjacent properties will not occur due to the design and containment of potential materials of risk including mill reagents, unprocessed ore, processed ore residuals, and fuels. During operations, KEMC will implement the following plans to monitor and control environmental hazards that could impact adjacent properties including:

- A surface water and erosion control plan that will control surface water runoff thereby eliminating stormwater related environmental impacts to adjacent properties. This plan is further discussed in Section 3.2.15.
- As part of the Notice of Intent to be filed for an NPDES permit for stormwater discharges associated with industrial activities, a stormwater pollution prevention plan (SWPPP) will be prepared.
- A treatment and containment plan as presented in Section 4 that will provide for containment of mining related materials at the mill site and within the HTDF.
- A facility groundwater and surface water monitoring plan that will assess groundwater and surface water quality during operations and after closure. This plan is discussed in Section 5.1, 5.2, and 6.5.
- An SPCC to monitor fuel storage areas, as presented in Section 3.2.20.
- A PIPP to prevent and/or control any chemical release, as presented in Section 3.2.20.

3. Mining Plan

This section presents information pursuant to R 425.203, including descriptions of the mill process and ore metallurgy and facility operations as part of the mining plan. In order to convey that the MDEQ rule requirements have been addressed, figures illustrating site features and operational practices are also presented herein. The specific elements of the mining plan are discussed in detail in the following sections.

3.1 Project Development

The Humboldt Mill development will include the operation of the existing mill facilities and new facilities as listed below:

- Facility gate and fence;
- Facility administration/communication systems;
- Truck entrance gatehouse parking;
- A coarse ore storage area (COSA);
- Crushing and conveying system;
- The existing HTDF;
- A water treatment system with a new controlled outlet structure at the HTDF;
- Ore processing systems;
- Site utilities;
- Septic and sanitary systems;
- Potable and non-potable water supply systems;
- Mill reagent storage areas, and
- Surface water management structures,
- Rail spur and building for concentrate load-out;
- Tailings slurry pipeline;
- All buildings and structures within the fenced facility boundary; and
- Cut-off wall on the north side of the HTDF.

Collectively these facilities are referred to as the Humboldt Mill. The overall site development plan for the Humboldt Mill is shown on Figure 3-1.

It is expected that facility development and operation for processing ore will be 9 to 10 yrs (2 yrs for development, seven to eight years for ore processing). The overall project development time line is shown on Figure 3-2. The operating period of the mill, as well as production rates, are based upon the ore mineral composition, production rate and product demand, as discussed in Section 3.2.3.

3.2 Mill Site Development, Construction Schedule, Beneficiation and Operations

This section describes activities associated with site development, construction schedule, and mill operations.

3.2.1 Site Development

The Humboldt Mill site is an existing mill facility used to process metallic ores. Between 1984 and 1989 the existing HTDF was used for disposal of approximately 1.82 million tons of sulfide tailings from the processing of ore from the Ropes Mine.

Redevelopment of the Humboldt Mill site to process ore will require renovating some existing plant equipment and facilities in addition to the installation and construction of new equipment and recommissioning of the existing HTDF. Provided below is a list of planned new and renovated/recomissioned facilities:

- The COSA for storage of 20,000 tonnes of coarse ore (new);
- Secondary crusher building (new);
- The office and maintenance building (renovated)
- The mill building (renovated);
- The sanitary system (new treatment system);
- Access and vehicle parking areas (new bituminous area);
- Potable well and pump house (refurbished existing or new);
- Site rail spur;
- HTDF (recommissioned);
- WWTP plant for treating discharge water from the HTDF (new);
- Concentrate load-out building (new);
- Tailings slurry pipeline(s) (new);
- Surface water control structures including ditches and culverts (new); and
- Cut-off wall on the north side of the HTDF.

The proposed site development plan showing these structures and facilities are shown on Figure 3-1.

3.2.2 Mill Construction Schedule

Site construction and mill renovations will take approximately 24 to 30 months. The expected construction sequence for the Humboldt Mill is as follows:

- Replace/construct the perimeter fence;
- Implement temporary site surface water and erosion control plan(s);
- Prepare the construction staging area and soil stockpile areas;
- Clear, grub and strip and stockpile of topsoil from construction areas;
- Construct infrastructure including rail spur and roads;
- Implement reclamation of disturbed construction areas;
- Renovation of mill equipment;
- Construct the cut-off wall, WWTP and pipelines;
- Construction of new sanitary system;
- Construction of new potable water well;
- Commence monitoring of facility monitoring devices.

Some elements of the construction sequence may be altered based upon final permitted conditions, final construction schedule, and operational requirements.

3.2.3 Mill Production Rates, Operating Life

Ore will be shipped to the Humboldt Mill site via 50 ton covered trucks. Approximately 1,500 tonnes of ore will be delivered to the mill site daily. Initially, ore delivered to the mill site will be unloaded in the COSA having a capacity of 20,000 tonnes. Ore processing rates at the mill site are expected to be 8 hours per 5 days a week through the crushing plant and 24 hours per day 7 days a week, for 365 days per year for grinding and concentrate production. However, based upon market conditions, processing rates will be adjusted to meet demand. Concentrate production is expected to be a nominal 400 tpd. Tailings production is expected to be a nominal 1100 tpd. Further discussions of the mill operations are presented in Section 3.2.5.

The Humboldt Mill site is expected to process ore for seven to eight years. During this time ore processing rates and concentrate/tailings tonnage will fluctuate due to changing ore grade, recovery and market demand.

3.2.4 Beneficiation Process

This section describes the beneficiation process for the ore including a description of ore metallurgy, tailings characteristics, and mill processes.

3.2.4.1 Metallurgy

KEMC has conducted bench scale flotation tests on composite ore samples to characterize mineral recovery. In summary, the flotation tests determined that metal recovery will range from 75% to 97% for copper and 60% to 90% for nickel. Concentrate grade for copper and nickel average 28% and 10%, respectively.

3.2.4.2 Tailings Characteristics

A summary of the tailings test program is provided in Appendix C-1. Geochemistry characteristics of the process tailings were evaluated by Canadian Environmental and Metallurgical, Inc. (CEMI) and Geochimica, Inc. Geotechnical characteristics of the process tailings were evaluated by Miller Engineers and Scientists. The results of the geochemical and geotechnical tests are summarized in reports found in Appendices C-2 and C-3.

3.2.4.2.1 Geochemical Test Methods and Test Results

The geochemical testing includes industry standard mineralogical tests and static testing programs to assess the potential acid generating characteristics of the tailings. Based on these test results, the appropriate method for long term storage of the tails is sub-aqueous deposition in the deep anoxic environment of the HTDF.

3.2.4.2.2 Geotechnical Test Methods and Test Results

Geotechnical testing was conducted with representative tailings samples to determine material grain size distribution. A total of five grain size distribution tests and two specific gravity tests were performed on tailing samples based upon production years (2010, 2011, 2012 and 2013) and massive or semi-massive composition. Testing was conducted using ASTM D1140 and D854 test procedures for grain size distribution and specific gravity test respectively. The specific gravity test results averaged 3.03 for dry solids. The grain size test results indicated the tailings can be characterized as either sandy silt or silty sand. A copy of the test results are provided in Appendix C-3.

3.2.5 Mill Operations

The Humboldt Mill is expected to process approximately a nominal 1,500 tpd of ore for seven to eight years. The following sections present information of site operations based upon ore composition and production. It can be expected that some variations of the process could occur based upon changing ore grades, recovery and/or market demand.

3.2.5.1 Mill Process Flow Design

The ore process flow design was completed by M3 Engineering and Technology Corporation (M3). The process flow for the ore through the Humboldt Mill is presented on Figures 3-3 through 3-13. Figures 3-14 through 3-19 display general arrangements and other building specifications.

3.2.5.1.1 Primary, Secondary and Tertiary Crushing Operations

Haul trucks will deliver ore to the mill into the enclosed COSA. This building will have a storage capacity of about 20,000 tonnes of ore. Ore will be reclaimed in the ore storage building by a front end loader to the dump hopper feeding the primary crusher. The primary crusher will be a jaw crushing unit. Ore will then be fed by way of a conveyor to the secondary crusher building that houses the secondary and tertiary crushers. Primary crusher fines are routed directly to the mill and oversize routed through the secondary and tertiary crusher units. The secondary and tertiary crushers will be a cone type unit operating in a closed loop arrangement.

Ore will then be deposited on the belt of the new transfer conveyor which will then convey it to the existing refurbished plant feed conveyor. The feed conveyor will deposit the ore into existing four 2,000 tonne fine ore bins. Presently KEMC plans on using only two bins. However, depending upon operation needs, all four bins could be used. The ore storage bins will empty through existing vibrating feeders onto existing refurbished ball mill feed conveyors.

The secondary crushing facility will be equipped with an air compressor to provide high pressure air required for maintenance equipment such as air tools. An overhead crane will be provided in the secondary crushing building for maintenance purposes. A “wet spray” system will be installed in the primary crusher discharge area to suppress dust from the ore feed stream. Dust collection will take place in the secondary crusher building at pick up and conveying points.

3.2.5.1.2 Ore Grinding

The grinding circuit is designed to process a nominal 1,500 tpd of ore based upon 95% availability, 24 hour per day, 7 days per week, 365 days per year basis. The grinding circuit is designed to reduce the crushed ore from 80% passing 10 mm to 80% passing 80 microns.

Fine ore will be made into a slurry by addition of water before entering the grinding process. The grinding operation will consist of two refurbished 900 horsepower (hp) ball mills which will grind ore to a size of 80% passing 80 microns. The slurry will then be fed into discharge sumps where it will be fed to two hydrocyclone clusters, one per ball mill. Slurry will be pumped using horizontal centrifugal slurry pumps to the primary cyclone clusters. Hydrocyclone underflow will report back to the ball mills. Hydrocyclone overflow (final grinding circuit product) will flow by gravity to the bulk flotation circuit.

3.2.5.1.3 Bulk Rougher Flotation Process

Upon grinding, ore is then passed through the bulk rougher flotation circuit. The bulk rougher flotation circuit will consist of a series of rougher flotation cells. The size and number of the flotation cells will vary during the facility operating life. The bulk flotation circuit is shown on Figure 3-5.

Flotation reagents and frother will be added to the rougher process as needed. The bulk rougher concentrate will be pumped to the regrind mill circuit. The regrind mill is an existing 450 hp unit that will be refurbished.

The flotation cells used in the bulk rougher flotation circuit will be new. The flotation area will be serviced by an existing bridge crane and monorail. Sump pumps will be provided throughout the flotation area for collection and containment of process waters. The air supply for individual cells will be controlled by valves and air flow meters located at specific locations.

3.2.5.1.4 Bulk Cleaner and Scavenger Flotation Process

Rough concentrate will pass through a cyclone that will direct fine product to the cleaner scavenger flotation circuit. Coarse product will pass through the regrind mill and then passed back through the cyclone. The bulk cleaner and cleaner scavenger circuit will consist of a series of first cleaner flotation cells and second cleaner flotation cells, and bulk cleaner scavenger cells. The size and number of flotation cells will vary during the facility operation life. The cleaner and scavenger flotation circuit is shown on Figure 3-5. The concentrate from the cleaner scavenger flotation concentrate will be pumped to the copper flotation circuit.

Reagents will be added to the cleaner and scavenger process on an as needed basis. The flotation cells used in the bulk cleaner flotation circuit will be new. The air supply for individual cells will be controlled by valves and air flow meters located at specific locations.

3.2.5.1.5 Copper and Nickel Flotation Process

The copper rougher flotation circuit will consist of a series of new rougher flotation cells. The copper-nickel flotation circuit is shown on Figure 3-6. Tailings from the copper rougher circuit will constitute the nickel concentrate and will flow by gravity to a sump and pump which will convey the nickel concentrate to the nickel concentrate thickener shown on Figure 3-7.

Copper concentrate from the copper rougher circuit will be pumped to the copper cleaner flotation circuit. The copper cleaner flotation circuit will consist of first cleaner flotation cells and second cleaner flotation cells. The first cleaner concentrate will be pumped into the second cleaner flotation cells. The second cleaner concentrate will then be pumped to the copper concentrate thickener, Figure 3-8. Flotation reagents will be added into the copper rougher feed conditioner on an as required basis.

3.2.5.1.6 Concentrate Dewatering, Load-Out and Transport

Concentrate from the bulk and copper cleaner flotation circuits will be pumped to the concentrate dewatering and load-out circuits. The concentrate dewatering circuits will each consist of thickening and pressure filtering.

Concentrate from the cleaner flotation circuits will be pumped to new 30-foot diameter concentrate thickeners. The concentrates will be thickened and pumped to agitated concentrate stock tanks, one for nickel and one for copper. Overflow from the concentrate thickeners will be pumped back to the concentrate thickener. Excess water from the thickeners will be pumped back to system process water.

Concentrate from the stock tanks will be pumped to automatic pressure filters where the moisture content of the concentrate will be reduced. Concentrate will be filtered to a approximately 15% moisture in the filter cake. Filtrate from the concentrate filter will be combined with the thickener feed and gravity flow to the concentrate thickener feed box.

Concentrate filter cake from the pressure filters will discharge directly onto conveyors which transport the concentrate to the new approximately 25,000 sq ft load-out building. Concentrate delivered to the load-out building will be at a moisture content near 15%. Further discussion of concentrate monitoring is provided in Section 5.5. Within the concentrate load-out building individual rail cars will be loaded via loading spout positioned above the cars. On occasion, concentrate may be dropped from the conveyor onto the building floor to be loaded into rail cars by front end loaders. Upon filling each rail car, the product will be secured with either loading hatches or tarps used for open cars. The general arrangement of the concentrate load-out building is shown on Figures 3-18 and 3-19.

Concentrate will be transported to a smelter for further processing. It is expected that every 3 to 5 days 1,200 to 2,500 wet tons of concentrate will be shipped to the smelter based upon rail scheduling.

3.2.5.1.7 Tailings Management

From the flotation circuit, tailings will be dewatered to approximately 60% solids. Tailings slurry will then be pumped at nominal rate of 212 gallons per minute (gpm) via double walled high density polyethylene (HDPE) pipe to the HTDF. Fluctuations in the ore processing rate will affect tailings generation and slurry discharge to the HTDF. At the HTDF tailings will be subaqueously placed at the base of the HTDF. Bottom placement will minimize changes to the HDTF surface water quality thereby lessening treatment requirements for the discharge water from the HTDF. Further discussion regarding the design and operation of the HTDF is provided in Section 4.

3.2.5.1.8 Other Mill Services

An existing metallurgical laboratory is on-site and housed in the office/maintenance building. This laboratory will contain the equipment for sample preparation and metallurgical test work. Personnel will prepare daily flotation cell samples, samples for analysis and process control.

3.2.5.1.9 Process Reagents

Table 3-1 lists the process chemicals and expected storage and usage rates for the Humboldt Mill ore.

Table 3-1
Process Chemicals

Reagent	Alternate Name	Chemical Symbol	Usage Rate (kg/day) (undiluted)	Soln %	Storage Quantity
Sodium Sulfite (granular)	N/A	Na_2SO_3	594	10	Super sacs (2200 lbs)
MIBC (liquid)	Methyl Isobutyl Carbinol	$C_6H_{14}O$	127	100	Totes (1773 lbs)
SIPX (granular)	Sodium Isopropyl Xanthate	$C_4H_7NaOS_2$	225	10	Drums (243 lbs)
Hydrated Lime (granular)	Calcium hydroxide	$Ca(OH)_2$	4,950	15	Tonnes (bulk)
Soda Ash (granular)	Sodium carbonate	Na_2CO_3	4,950	15	Tonnes (bulk)
Magnafloc 155 (granular)	Polyacrylamide	--	4.5	0.1	Bags (551 lbs)

Adapted from M3 Prepared by: JOS1
Note: The use of soda ash and/or lime will be dependent upon ore type. Checked by: MJP1

The process chemicals and demand may change based upon operations and ore benefication requirements and ore variations in mineralogy and metallurgy. Figure 3-17 shows reagent storage area locations.

3.2.6 Employment Schedule

KEMC expects to employ approximately 50 employees during the mill operating life. During the operating life of the Humboldt Mill employment may change due to ore production requirements and processing schedule.

3.2.7 Site Access, Parking, Roads and Equipment Storage

Access to the Humboldt Mill site is via CR 601 as shown on Figure 3-1. The main access will be gated for security control. A chain link security fence will be installed around the main facility operating area shown on Figure 3-1. Employee and visitor parking will be permitted only in the designated parking areas as shown on Figure 3-1. Haul trucks leaving the facility will exit at an exit-only location on to CR 601 as shown on Figure 3-1.

Equipment storage areas will be provided in the mill building and the outside lay down area as shown on Figure 3-1. The main site access road, parking and lay down areas will be bituminous paved.

3.2.8 Buildings and Structures

The Humboldt Mill will include the following list of buildings and structures:

Office and Maintenance Building
The office and maintenance building is an existing 30,000 sq ft building. This building will be rehabilitated as follows:

- Repair existing roof with a rubberized coating.
- Repaint interior and exterior walls.
- Replace plumbing and lighting fixtures.
- Replace flooring.
- Replace siding where needed.

This office and maintenance building currently houses a 10-bay maintenance shop, an office area, a worker dry room, a boiler room, an assay laboratory, and warehouse space. The current state of the maintenance shop doors is in disrepair. Two doors will be replaced for maintenance bays servicing site equipment. The remaining doors will be sided over and this area will serve as storage space. The boiler room will be blocked off and will not be reused. Space heating will be achieved by either propane units or electric resistance heat.

Gate House
A new gate house for the facility will be constructed at the facility entrance as shown on Figure 3-1.

Mill Building
The mill building is an existing 44,000 sq ft building. This building will be rehabilitated as follows:

- Repair existing roof with a rubberized coating.
- Repaint exterior walls.
- Replace siding where needed.
- Upgrade electrical and heating systems.
- Install new process equipment including bins, flotation cells, conveyors, etc.

The building has existing propane fired air handling units. A partial wall will be added inside the mill building to isolate some of the non-essential areas of the building to reduce heating costs.

COSA
KEMC will construct a new 22,500 sq ft COSA at the location shown on Figure 3-1. This building has the capacity to store 20,000 tonnes of coarse ore. Trucks will back up to a roll-up door(s) on the west side of the building. These doors will be routinely closed to provide enclosure to the activities within, minimizing both fugitive dust and precipitation contact with ore. The trucks will unload onto the COSA floor then pull forward to be washed, if needed, to remove particles left on wheels and under carriage. Wash water will be routed to the tailings wastewater discharge line to the HTDF. The COSA floor will be constructed of reinforced concrete. The COSA also houses the primary crusher, a 1,500 tpd jaw crusher unit, on the east end of the building.

Secondary Crushing Building
A new 12,000 sq ft metal framed secondary crushing building will house the secondary and tertiary crushing units. This building will have a baghouse installed for dust collection.

Transfer Station
On the foundation of a former secondary crusher building (Figure 2-2), an enclosure will house a transfer point between the secondary crusher transfer conveyor and the mill feed conveyor. The transfer station location is shown on Figure 3-1; a general arrangement appears on Figure 3-16.

The enclosure offers a covered location for a transfer point between two long conveyors. A water spray bar will be provided for added dust suppression.

Concentrate Load-Out Building
KEMC will construct a new 25,000 sq ft concentrate load-out building at the location shown on Figure 3-1. The rail spur will pass through the building to allow rail car loading to be conducted in a covered, secured location. This building will be connected via conveyors to the main mill building. Separate conveying lines will be provided for nickel and copper concentrates. Rail cars will be loaded either by loading spout or front-end loader. Although concentrate will be moist, dust pick-ups will be installed to collect dust generated by material handling. Excess concentrates will be brushed off from the rail cars as needed prior to exiting the building.

WWTP
A new building will be constructed near the mill building for the WWTP as shown on Figure 3-1. This building will house equipment to treat waters for release from the HTDF during operations and through facility closure. The WWTP will be equipped with influent and effluent systems. Water treatment plans are defined in the NPDES permit application submitted to the MDEQ.

3.2.9 Areas of Storage and Transfer of Chemicals

Chemical reagents used for ore processing will only be stored in secure contained locations within the main mill plant as shown in Figure 3-17. This area has been designed for spill prevention and containment measures. A listing of chemicals which would be stored in bulk is provided in Table 3-1.

Transportation of chemicals to the Humboldt Mill will be performed only by certified chemical transporters meeting Michigan Department of Transportation (MDOT) requirements. Some chemicals may be brought to the site by railcar. All chemicals being transported will include proper shipment papers and will be inventoried upon delivery to the site. The chemicals will then be stored in secured locations within the main mill plant or directly off-loaded from bulk carriers to silos.

3.2.10 Transport Vehicle Wash

Water hoses will be provided in the COSA and in the concentrate load-out building to clean transport vehicles (trucks and rail cars) of accumulated particulate prior to leaving the facility, if necessary.

3.2.11 Facility Potable Water

KEMC plans on refurbishing the existing Humboldt Mill potable water well for future facility operations. This refurbished system will include a new well, pump(s), pressure tanks and piping. It is anticipated that the potable water system will have a capacity of approximately 50 gpm to meet the expected mill operating demand. Figure 3-20 shows the facility water piping plan. KEMC will apply for a Type II Non-Transient Non-Community Water Supply Permit from Marquette County Health Department for the use of the existing well.

3.2.12 Facility Process Water Balance

A facility water balance analysis was performed to assess water requirements for the facility operations. The facility water balance includes the demand for mill process water, wastewater from various site operations and water treatment capacity required for discharge from the HTDF. The facility water balance analysis is provided in the report in Appendix D, which evaluated the integrated water balance for the HTDF and mill, assessed water quality issues associated with the placement of the tails in the HTDF and evaluated water treatment needs and contingencies.

In summary, the mill operations will require approximately 155 gpm of water. The water source for the mill operations will include 19 gpm from the coarse ore in the COSA and 116 gpm pumped from the HTDF and 20 gpm from the domestic water supply. Process water leaving the mill will total approximately 155 gpm of which 13 gpm will be associated with the moisture in concentrate and the balance, 142 gpm, will be tailings slurry water transported to the HTDF. Water released from the HTDF will be treated via WWTP at an average rate of 362 gpm, assuming a continuous WWTP annual operating period. The expected maximum expected design basis treatment demand for water released from the HTDF will be approximately 511 gpm. For contingency purposes, the WWTP will be designed for a treatment capacity of approximately 570 gpm. Design analysis of the HTDF water balance is provided in Section 4.1.1.1. It should be noted that the water balance analysis presented herein is based upon current engineering plans for mill operating conditions. As mill engineering operations are refined, the facility water balance will be refined.

3.2.13 Provisions to Prevent the Release of Contaminated Substances

The Humboldt Mill site will include containment structures to prevent the release of contaminated substances. These include secure storage areas for mill processing chemicals and the HTDF. The mill will implement an SPCC Plan and a PIPP to prevent and/or control any chemical release on the property. These plans are discussed in more detail in Section 3.2.20.

3.2.14 Excavation, Stockpiling and Earthwork for Balance of Materials

Earthwork balance is based upon the design of the site facilities. The following Table 3-2 provides an estimated earthwork balance based upon the proposed site development.

Table 3-2
Earthwork Balance

Structure	Cut (cy)	Fill (cy)	Balance (cy)
Roads/Parking	<700	--	700
Drainage Structures	<100	--	100
Utilities	<100	--	100
Total			900

Prepared by: JOS1
Checked by: MJP1

It is expected that site development work will produce a small quantity of excess soil, approximately 900 cy. This material will be stockpiled for future site reclamation at the location shown on Figure 3-1.

3.2.15 Surface Water Management and Control Structures

The Humboldt Mill site has been designed to control storm water runoff from the mill area. The storm water system for the project site is shown on Figure 3-1. Surrounding the mill operations area, stormwater control features will include a series of drainage ditches and culverts collecting stormwater surrounding the plant areas. This water will be conveyed south of the main facilities as shown on Figure 3-1. All water collected surrounding the operations area will not contact potential reactive materials or other chemicals and therefore will not require treatment prior to discharge. As such this water is termed as non-contact water. The surface water design basis calculations are provided in Appendix E.

3.2.15.1 Soil Erosion and Sedimentation Control Plan

Rule (R) 425.203 (c)(xxii) requires that an SESC plan meeting the requirements of Part 91 of NREPA be incorporated into the MPA as presented herein. This section describes the SESC plan components for the Humboldt Mill to effectively reduce soil erosion and sedimentation during construction that may impact the surrounding properties. The goal of the SESC plan is to incorporate methods into the design and operation such that soil erosion due to surface activities will be mitigated.

The site erosion control features will be implemented during initial site development. Permanent soil erosion control measures will be established as soon as possible after construction has been completed, to augment or replace the temporary measures installed during construction. The SESC plan requirements address the following:

- Construction phase erosion control plans showing areas and extent of disturbance (Figure 3-21);
- Details of the Best Management Practices (BMP) (Figure 3-22).
- Operation phase erosion control plans (Figure 3-23)

3.2.15.1.1 Description of Temporary Soil Erosion and Sedimentation Controls

The temporary site surface water and erosion controls to be implemented during construction are shown on Figure 3-21. The following is a list of the earthwork and other grading activities that are part of the construction phase. Each activity is followed by a description of the BMPs that will be implemented to minimize soil erosion and site runoff. Methods specified in the MDOT, 2003 Standard Specification for Construction (MDOT, 2003), were employed to demonstrate compliance to Part 91 requirements. A KEMC site person will be certified as construction and industrial storm water operators to provide inspections and coordinate repairs and maintenance during construction.

Land Clearing - Land clearing is the removal of woody and herbaceous plant material and consists of two components: clearing, which is the cutting and removal of trees, and grubbing, which is the removal of stumps and roots. The majority of the area of the Humboldt Mill site has been previously disturbed due to past mining or mill operations. As such only minimal land clearing will be needed.

Surface Water Diversion - Diversion of surface water run-on controls will be provided as shown on Figure 3-21 during construction. This will include a series of drainage ditches to route surface water run-on around the site facilities to the west and southwest. Culverts will be positioned as needed to allow water to flow below roadways or other surfaced areas.

Topsoil Stripping and Stockpiling – Because the site has been disturbed by past operations, very little topsoil remains in the area of the project development. Topsoil that is excavated from the site will be temporarily stockpiled for future use in an area shown on Figure 3-1. Erosion control devices such as silt fencing will be installed around the stockpiles. Stockpiles that remain for longer than three months will be seeded.

Erosion Control
Prior to earthwork activities, silt fence will be constructed downgradient of the disturbed areas as shown on Figure 3-21. In addition, straw bale check dams will be placed in areas of higher water velocity. Silt fence will also be constructed around the soil stockpiles. Stockpiles that will exist for longer than 3 months will be seeded. Seeding will be a mixture typically used on sandy soil for roadside restoration projects as specified in the MDOT, 2003 Standard Specifications for Construction (MDOT, 2003). Seed mixtures will include temporary species such as oats or perennial rye grass that germinate quickly and act as a nurse crop until the perennial species germinate and develop. Erosion control devices are shown on Figure 3-22.

Site Excavation and Grading – The proposed site development will require minimal site grading, primarily associated with surface water controls. Any excess soil will be stockpiled for future site needs. As presented in Section 3.2.14 site development will have an excess of approximately 900 cy, requiring a small stockpile area as shown on Figure 3-1.

3.2.15.1.2 Description of Permanent Soil Erosion and Sedimentation Controls

The permanent SESC structures for the mill site will include drainage ditches and culverts to route surface water runoff around the facility operating area to the south/southwest as shown on Figure 3-23. This water will not contact mill process materials that could result in water quality changes. Waters that come in contact with reactive materials or chemicals will be retained by the facility and used for process water or be routed to the HTDF. Planned operation and maintenance activities for the facility storm water and erosion control structures are listed in the table provided on Figure 3-23. This includes maintenance and repair of the storm water conveyance system and erosion control features to ensure non-contact water quality is retained during the course of the project. As part of the NPDES permit for stormwater discharges associated with industrial activity, a SWPPP will be prepared and implemented. KEMC will designate one of the technical staff to be a certified storm water operator to complete the regular inspections and coordinate repairs or maintenance during construction and operations.

3.2.16 Sanitary System

KEMC plans on constructing a new on-site septic system (OSS) for facility sanitary needs. The design basis for the OSS assumes 60 employees with a sanitary demand of 35 gpd per employee, (Michigan Criteria for subsurface sewage disposal) requiring an OSS treatment capacity of approximately 2,100 gpd. Discharge from the OSS will filter through the native site soils. For the design flow of 2,100 gpd at a dosing rate of 0.50 gpd/ft^2 (Michigan Criteria for subsurface sewage disposal) requires an absorption field of 4,200 ft^2. KEMC will prepare a separate

commercial septic system permit application for the sanitary system to submit to Marquette County.

3.2.17 Security and Access Control

Security and access control will be maintained at all times at the Humboldt Mill site. Surrounding the facility will be a chain link fence marked with no trespassing signs. Vehicles will access the facility via the main facility entrance off CR 601. Vehicles entering or leaving the facility must pass through the main gate with the exception of ore trucks, which will exit the facility through a secure gate north of the main gate (Figure 3-1). An attendant will be present at the gate house to control facility entry during facility operating hours. A secure access gate located south of the main gate will be provided for rail cars.

3.2.18 Aesthetics and Landscaping

The Humboldt Mill site is naturally obscured by the existing trees and the rock outcrop along the north side of the property. Furthermore, the site is remote, with the closest private residence approximately 1,800 ft south of the Humboldt Mill building. KEMC may selectively plant trees to further enhance the visual buffer around the mill facilities from CR 601. Near the entrance road, landscaping will blend with the natural flora to develop a balanced natural appearance.

3.2.19 Spill Prevention Control and Countermeasures and Pollution Incident Prevention Plans

Because KEMC is planning to store more than 1,320 gallons of petroleum products, an SPCC Plan will be prepared for the fuel storage area that will incorporate the provisions set forth in 40 CFR 112. The SPCC Plan will be prepared prior to the commencement of operations at the facility. The SPCC Plan will be reviewed and certified by a Professional Engineer, maintained at the facility and reviewed and revised as required by federal, state, and local regulations. Pursuant to the SPCC Plan and regulatory requirements, tanks and secondary containment will be designed to contain a potential spill. Storage tanks and containment areas will also be installed such that prevention measures for all fuel handling and storage are incorporated into the design, including techniques that will be used to contain potential spills during loading and off-loading of vehicles.

In addition to the federal SPCC requirements, all aboveground storage tanks containing flammable or combustible materials must be in compliance with the Michigan Fire Prevention Code statute at 1941 PA 207. The statute applies not only to tanks that store liquid petroleum products, but also to storage of compressed gases including propane. Design plans for affected storage tanks will be submitted to the MDEQ Waste and Hazardous Materials Division for approval.

In addition to the above requirements, the facility will also comply with R 324.2001 through R 324.2009. These rules require preparation of a PIPP Plan to address potential spillage of fuel, salt and other “polluting materials” listed under R 324.2009. While a portion of these rules contain requirements that are similar to the federal SPCC rules, the regulations contain requirements to cover salt and any listed “polluting material” that is above indicated Threshold Reporting Quantities. The listed materials include numerous metal compounds, including copper and nickel. The rules state that if these materials are in solid form, they shall be stored such that they are “enclosed, covered, contained or otherwise protected to prevent run-on and runoff”.

Design provisions for all storage facilities at the site contain adequate measures to meet this requirement.

To ensure that an overall cohesive SPCC plan is prepared for the site, it is anticipated that the PIPP will incorporate all requirements of the SPCC Plan as well as requirements for other regulated chemicals at the site. The PIPP will be prepared prior to commencement of operations at the site. Once the written PIPP is prepared, notice will be provided to the state and other emergency agencies that the PIPP is available. The PIPP will then be provided upon request. In accordance with state regulations, the PIPP will be reviewed and updated as needed every 3 yrs.

3.2.20 Mill Site Mobile Equipment

Listed below is expected mobile site equipment.

- Front end loaders for the COSA, and concentrate load-out building;
- Pick-up trucks;
- Maintenance vehicles;
- Fork lifts;
- Bobcats;
- Genie lifts;
- Haul trucks.

Other mobile equipment may be needed on a limited basis to support operations.

3.2.21 Electrical Demand

The Humboldt Mill site is currently served by a 34 kV overhead electric utility feeder. A step-down transformer and switch gear are in place to distribute 2.4 kV power to the mill. No changes for this system are required for plant upgrades. KEMC will also install a 100 kW generator for emergency stations if the main power is disrupted.

3.2.22 Heating

Heating will be provided in the main mill building using electric base board heaters or propane heaters.

3.2.23 Communications

Communications at the mill site will be provided by either a duplex microwave radio or fiber optic system to allow inter-site communications.

3.2.24 Rail Spur

KEMC plans on redeveloping three miles of rail line to the existing LS&I rail line operated by Canadian National Rail. The KEMC rail spur will use the existing rail bed of the abandoned Humboldt Mill rail spur as shown on Figure 1-2. KEMC is currently awaiting approval for right-of-way easement grant from the MDNR for the rail spur access.

One hundred ton rail cars will be loaded within the concentrate load-out building via loading spout or occasionally by front-end loader. It is expected that four to five rail cars will be loaded each day. Every three to five days approximately 12 to 25 loaded rail cars will be shipped to a

smelter in Canada via Canadian National Rail line. Presently KEMC plans on operating the rail spur to the LS&I line for delivery of the concentrate rail cars to Canadian National.

3.2.25 Tailings Disposal

Ore processing tailings will be disposed of in the HTDF. During the seven to eight year operating life of the facility, it is expected that approximately 2.5 million tonnes (dry weight) of tailings will be generated and disposed of in the HTDF. Tailings will be slurried to the HTDF at a nominal rate of 212 gpm (solids and water). Water release from the HTDF will be treated via WWTP then discharged at the northern discharge outlet. The release of water from the WWTP will be regulated by an NPDES permit submitted to the MDEQ under separate cover. Further discussion of the design and operations of the HTDF is provided in Section 4.

4. Treatment and Containment Plan

The treatment and containment plan presented herein presents the design, construction and operations of storage and disposal facilities for materials that have been identified as reactive pursuant to R 425.203 (c)(v). This treatment and containment plan addresses the temporary storage of ore in the COSA prior to processing, disposal of process tailings via the HTDF, and temporary storage of the ore concentrate prior to shipping.

4.1 Tailings Disposal Facility

Over the seven to eight year operating period for processing ore, it is expected that approximately 2.5 million tonnes (dry weight) of tailings will be generated. KEMC plans on disposing of tailings in the existing 67-acre HTDF. The expected daily nominal loading of tailings to the HTDF during operation is estimated approximately 1,100 tonnes (dry weight). As discussed previously in Section 1.2 the Humboldt mine became a tailings disposal facility in 1984 when the mill processed ore from the Ropes Mine and MDEQ permitted us of the pit as a tailings disposal facility. As such, it is a pre-existing disposal facility and its future use as such will be regulated under Part 632. By definition under Part 632 the HTDF is a "*tailings basin…on which is deposited by hydraulic or other means, the material that is separated from the metallic product in the benefication or treatment of minerals…*". Furthermore as defined under R 425.102(k), the HTDF is a "*disposal facility … where tailings are intentionally placed into or on the land… which the tailings will remain after closure*".

4.1.1 Design Considerations

KEMC has conducted a detailed analysis of the existing HTDF including water balance estimates and chemical characterization of the existing water quality as well as potential water quality changes as a result of tailings loading. A summary of these analyses are presented in the following sections. Appendix D contains the *Hydrologic and Geochemical Mass Balance Modeling Report* which presents in detail issues associated with the water quality in the HTDF. To account for operational variation, the HTDF analysis in Appendix D is based on a tailings loading rate of approximately 1,160 tpd.

4.1.1.1 System Water Balance

The design of the HTDF required an evaluation of the system water balance. The water balance is an assessment of the various water inputs and releases from the HTDF. Inputs to the pit include surface water runoff from the watershed area, direct precipitation minus evapotranspiration and groundwater influx. Groundwater influx to the HTDF occurs via the shallow alluvial soils present on the south side. Release of water from the HTDF occurs through the surficial alluvial soils at its north side. The net average annual water input to the HTDF is estimated at approximately 246 gpm. At equilibrium, average release from HTDF is 246 gpm. On average, peak discharge from the HTDF will occur during the month of April.

During mill operations, discharge of tailings to the HTDF via slurry is expected to be 212 gpm of slurry (water and solids). The slurry will contain tailings at approximately 60% solids. Expected annual solids loading to the HTDF will be approximately 123,000 to 371,000 tonnes (dry weight). Total quantity of tailings that will be disposed of in the HTDF is approximately 2.5 million tonnes. As a result of the tailings loading, approximately 13,500 ft^3 of water per day will be displaced from the HTDF during operations. Over the seven to eight year operating

period, approximately 6,500,000 to 7,400,000 cy of water will be released from the HTDF. This includes water displaced from tailings placement and water released from natural precipitation events. This water will be treated, as necessary, via WWTP prior to release.

4.1.1.2 Water Quality Characterization

The existing HTDF water has been extensively characterized over the past 20 plus years by the previous owners. In addition, KEMC conducted further thermal and chemical characterization of the HTDF water.

Based upon measured temperature and water quality, the HTDF has two distinct compartmentalized characteristics, a thermocline (temperature stratification) and a chemocline (chemical stratification). This assessment was based upon monitoring water quality at seven locations within the HTDF and review of historical data. In summary, the current conditions of the water quality in the HTDF are characterized as low water temperature and anoxic at depth. With the exception of iron, metal concentrations increase with depth. It is believed the decrease in iron concentration at depth is a result of oxidation due to dissolved oxygen in the water and metals precipitation. Other metal concentrations increased at depth due to the presence of existing tailings at the bottom of the HTDF.

Initial modeling of the effect on water quality of tailings loading to the HTDF was conducted by developing a fully mixed stirred reactor model of the facility. This model captured the natural water inputs and the metal loading due to the tailing effluent slurry. Based on measured metal concentrations in the tailings slurry, the model predicted metal concentrations in the HTDF water which then were used to evaluate WWTP process design. The model predicts that existing HTDF water dilutes the tailings effluent metal concentrations, during operation prior to treatment at a WWTP. The metal concentrations resulting from full mixing of the HTDF are the maximum concentrations possible in the epilimnion of the HTDF. Although the fully mixed condition is not expected to develop in the HTDF, the WWTP is designed to treat the metal concentrations calculated by the fully mixed model.

In order to better assess water quality changes in the HTDF during tailings loading, a five compartment water balance model was developed for the HTDF. The five compartment model was developed based upon the thermocline and chemocline stratigraphy that characterizes the existing water column conditions which better characterizes the HTDF during operations then the simpler fully mixed model presented above. Input and outputs to the separate compartments included the tailings at the deepest compartment, return water to the mill in mid-compartment levels, and surface water input from the watershed in the upper most compartment.

The multi-compartment model was run for three major constituents of concern: nickel, copper, and mercury. The results of the model over operating years 3 and 7 are presented in Table 4-1.

Table 4-1
Multi-Compartment Modeling Results

Compartment and Depth Range		Nickel (ug/l)		Copper (ug/l)		Mercury (ng/l)	
		3 yrs	7 yrs	3 yrs	7 yrs	3 yrs	7 yrs
1	0-6 ft	6.2	3.2	1.4	1.7	0.2	0.2
2	6-24 ft	14.2	7.3	3.0	3.9	0.4	0.4
3	24-96 ft	40.4	16.8	11.1	11.3	1.1	0.9
4	96-144 ft	80.5	28.1	54.4	29.1	4.0	2.1
5	144-192 ft	215	113	228	138	16.4	9.8

Water Quality Standards[(1)]: Ni: 111 ug/l
Cu: 26 ug/l
Hg: 1.3 ng/l

Prepared by: GRE
Checked by: JBM

[(1)]Wetland Discharge PEL's

Results of the multi-compartment model indicate, as expected, an increase in metal concentrations during the operating years for the lower compartments. The surface compartment retains surface water standards during the entire operating period for all major metal constituents. Although the multi-compartment suggests that the HTDF water quality at the surface will meet discharge standards through operations, KEMC will construct a WWTP for treatment of HTDF water, as needed, so that water quality standards will be met.

In addition to the geochemical modeling described above, KEMC conducted a detailed hydrogeologic investigation of the HTDF to assess the vertical stability of the chemocline and thermocline as well as the hydraulic integrity of the existing tailings basin. The results from this investigation are provided in Appendix I of the EIA. The plans for installation of the cut-off wall and wastewater treatment plant along with the results from the geochemical modeling (Appendix D in Volume IA) and hydrogeologic investigation (Appendix I of the EIA) demonstrate that the plans for tailings placement in the HTDF will reasonably minimize actual and potential adverse impacts on groundwater and surface water.

4.1.2 HTDF Design

The design of the HTDF for ore process tailings will provide protection to the public health and welfare, as well as protecting the environment from the release of elevated chemicals of concern. The design of the HTDF is based upon established best practices for sulfide tailings management as described in Section 4.2 of the EIA contained in Volume II of this MPA.

Sub-aqueous disposal of tailings is a common practice used by the mining industry for sulfide tailings and is considered best practice – when applicable. The potential oxidation of sulfide tailings occurs under aerobic conditions during wetting and drying cycles. To eliminate the potential for the sulfides in the tailings to oxidize, the tailings generated from the milling process will be placed in the anoxic environment that exists in the HTDF.

4.1.2.1 Tailings Disposal Plan

Tailings will be generated at a nominal rate of 1,100 tpd (dry solids). Over the seven to eight year period of processing ore, approximately 2.5 million tonnes of tailings solids will be

disposed of in the HTDF. The tailings will be maintained in a saturated state from processing at the mill through final placement in the HTDF.

Tailings will be placed at the bottom of the HTDF via 4-in diameter pipeline. As discussed in Section 4.1.1.2, waters at depth in the HTDF are anoxic. Placing the tailings at the base of the HTDF will minimize potential oxidation of the tailings thereby minimizing long term impacts on the quality of water discharging from the HTDF.

Tailings will be placed in three separate phase areas beginning in the North (Phase 1) progressing to the south (Phase 2, Phase 3). The HTDF phase development plan is shown on Figure 4-1. The tailings slurry will be subaqueously placed at the bottom in a controlled manner to allow solids accumulation in layers across the floor. This will be accomplished with the use of a floating barge(s) positioned across the HTDF. The barges will be repositioned as necessary to reduce tailings deposition mounding on the HTDF bottom. The total estimated volume available in the three areas to elevation 1,475 ft MSL is approximately 5,000,000 cy. Assuming the tailings consolidate to conservative 72% solids, estimated required tailings disposal volume is about 2,400,000 cy. Leveling of the tailings after placement will occur over a period of time, due to consolidation and gravity. The surface elevation of the tailings will be near elevation 1,420 ft MSL, and with the current surface water elevation at 1,538 ft MSL this leaves approximately 118 ft of water over the tailings.

Loading the HTDF with tailings will displace water. It is estimated that approximately 1,300,000 cy to 1,500,000 cy of water will be displaced from the HTDF as a result of tailings placement (solids only) over the life of the project. Displaced water and runoff minus reclaimed water, will be treated through a WWTP plant at a nominal rate of approximately 362 gpm.

Water from the HTDF exits via surface and subsurface drainage into alluvial soils at the north end of the HTDF. In order to prevent HTDF water from mixing with groundwater present in the alluvial soil (primarily a mixture of sands and gravels), KEMC will construct a low permeability cut-off wall at the location shown on Figures 3-1 and 4-1. The cut-off wall will extend approximately 1,800 linear ft and will be keyed to the bedrock outcrop near elevation 1,543 ft MSL. Based upon past geophysics surveys conducted in this area the soils extend to a depth averaging approximately 40 to 50 ft (Traverse Engineers Services, 1984). The cut-off wall will be extended to bedrock along this alignment. A site map showing the bedrock elevations surrounding the HTDF is shown on Figure 4-2. Cross-sections through the HTDF are shown on Figures 4-3 and 4-4. Additional geological information is provided in the EIA.

KEMC is considering different cut-off wall construction techniques including cut/fill methods and vibratory beam injection methods. Both of these methods have been successfully used in similar type conditions. As shown on Figure 4-1, some grading will be needed at the north perimeter of the HTDF to establish a surface elevation for the cut-off wall at or above elevation 1,543 MSL. By meeting that elevation, the HTDF exceeds the capacity required for a 24 hr, 100 yr storm event. A 24 hr, 100 yr storm event would require 1.2 ft of added storage capacity for the HTDF. For example, assuming a water elevation of 1,538.5 ft MSL, a 24 hr, 100 yr storm event would result in a peak water level of 1,539.7 ft MSL, less than the containment elevation of 1,543 ft MSL.

4.1.2.2 Tailings Transport System

Tailings will be conveyed to the HTDF as a slurry within a double cased HDPE pipe system at 212 gpm (water and solids). The tailings slurry will be approximately 60% solids. The proposed location of the slurry pipe is shown on Figures 3-1 and 4-1. The slurry pipeline will be a 4-in diameter HDPE carrier pipe encased within an 8-in diameter HDPE containment pipe. A leak detection manhole will be positioned at the pipe invert as shown on Figures 3-1 and 4-1. The manhole will have sensors to monitor any accumulated liquid as a result of a breach from the inner carrier pipe. Details of the slurry pipeline system are shown on Figure 4-5.

Pursuant to R 425.203(c)(xix)(F) the tailings transport system will have provisions for containment of slurry from an unlikely breach of the system as well as standby pumps and emergency power provisions. The tailings transport contingency plans are discussed in Section 7.1.1.3.

4.1.2.3 Water Treatment and Discharge

Displaced and excess water from the HTDF will be treated via the WWTP. The water treatment facility will use treatment technologies such as metal hydroxide precipitation, ion exchange and adsorption processes to remove constituents to concentrations required by the facility's proposed NPDES permit.

During the operating period, the WWTP will have a maximum capacity to treat approximately 570 gpm of water. Treated water from the WWTP will be discharged to Wetland EE at the north side of HTDF as shown on Figure 3-1. Water from the HTDF currently discharges to this wetland. The treated water will be regulated under an NPDES permit which KEMC is applying for. The water balance analysis for the HTDF is provided in Appendix D.

4.2 Coarse Ore Storage Area

As described in Section 3.2.8, the COSA will be constructed to contain mined ore awaiting processing. The COSA building will measure approximately 22,500 sq ft having a storage capacity of approximately 20,000 tonnes of ore. This building will be constructed of steel framing with steel siding. Roll-up doors will be installed on the west end of the building for ore truck unloading. The floor of the COSA will be constructed of reinforced concrete. The COSA design features will provide adequate containment for the mined ore and will prevent exposure to the environment.

4.3 Concentrate Load-Out Building

As presented in Section 3.2.8, ore concentrate will be loaded into rail cars within the 25,000 sq ft concentrate load-out building. Because this activity will occur within an enclosed building, release of concentrate to the environment will not occur. Furthermore, concentrate will be maintained at a moisture level of at least 15% to control oxidation reactions. Drop doors installed on either end of the building will be closed during rail car fill operations to prevent particulate release to the environment. In addition, the rail lines will be constructed with an impermeable substrate of either concrete or bituminous materials. KEMC will routinely clean the load-out area and rail line of spilled concentrate. Periodic cleaning reduces the risk of uncontrolled release of concentrate to the environment. The floor of the concentrate load-out

building will be constructed with reinforced. Given these design and operation provisions, concentrate will be fully contained within the load-out building.

5. Inspections and Operations Monitoring Plan

The operations monitoring plan described in this section is designed to meet the requirements of R 425.203 and R 425.406. The monitoring plan includes the following elements:

- Monitoring the quality of groundwater surrounding the Humboldt Mill site and the HTDF,
- Monitoring the quality of surface water surrounding the Humboldt Mill site and the HTDF,
- Monitoring of HTDF geochemical conditions, and
- Miscellaneous operational monitoring activities for environmental protection.

Monitoring of surface water discharge from the HTDF will be regulated separately under an NPDES permit. This permit application will be submitted separately to the MDEQ. Post-closure monitoring is described in the reclamation plan in Section 6.

5.1 Groundwater Quality Monitoring

Groundwater quality monitoring will be conducted for the Humboldt Mill. A total of six wells identified as leachate and compliance monitoring wells for the HTDF are shown on Figure 5-1. The following Table 5-1 lists the HTDF monitoring wells, locations, sampling frequency and purpose.

Table 5-1
HTDF Groundwater Monitoring Wells

Well No.	Monitoring Location	Frequency	Status	Purpose
PW-2	Upgradient	Quarterly	Existing	Background
KMW-5	Upgradient	Quarterly	Existing	Background
MW-701	Downgradient	Quarterly	Proposed	Leachate
MW-702	Downgradient	Quarterly	Proposed	Leachate
MW-703	Downgradient	Quarterly	Proposed	Compliance
MW-704	Downgradient	Quarterly	Proposed	Compliance

Prepared by: MJP1
Checked by: JOS1

Table 5-2 summarizes the parameter list parameter sampling frequency, and analytical methods for the groundwater monitoring program.

Table 5-2
Groundwater Quality Monitoring Program
Parameter List and Sampling Frequency

Parameter	Frequency	Analytical Method	Target Detection Limit	Units
Field				
Groundwater Elevation	Quarterly	Field	NA	ft msl
Temperature	Quarterly	Field	NA	^{o}C
D.O.	Quarterly	EPA-360.1	NA	mg/l
Specific Conductance	Quarterly	Field	NA	umhos/cm
Oxidation-Reduction Potential	Quarterly	Field	NA	mV
pH	Quarterly	EPA-9040C	NA	S.U.
Turbidity	Quarterly	Field	NA	NTU
Metals				
Aluminum	Annually	EPA-200.7/6020	50	ug/l
Antimony	Annually	EPA-200.8/6020	2.0	ug/l
Arsenic	Quarterly	EPA-200.8/6020	5.0	ug/l
Barium	Annually	EPA-200.8/6020	100	ug/l
Beryllium	Annually	EPA-200.8/6020	1.0	ug/l
Boron	Annually	EPA-200.8/6020	300	ug/l
Cadmium	Annually	EPA-200.8/6020	1.0	ug/l
Chromium	Annually	EPA-200.8/6020	10	ug/l
Copper	Quarterly	EPA-200.8/6020	4.0	ug/l
Cobalt	Annually	EPA-200.8/6010B	20	ug/l
Iron	Quarterly	EPA-200.7/6020	200	ug/l
Lead	Quarterly	EPA-200.8/6020	3.0	ug/l
Lithium	Annually	EPA-200.7/6020	10	ug/l
Manganese	Quarterly	EPA-200.8/6020	50	ug/l
Mercury (low level)	Quarterly	EPA-1631E	1	ng/l
Molybdenum	Annually	EPA-200.8/6020	50	ug/l
Nickel	Quarterly	EPA-200.8/6020	20	ug/l
Selenium	Annually	EPA-200.8/6020	5.0	ug/l
Silver	Annually	EPA-200.8/6020	0.2	ug/l
Thallium	Annually	EPA-200.8/6020	2	ug/l
Vanadium	Annually	EPA-200.8/6020	4	ug/l
Zinc	Quarterly	EPA-200.8/6020	10	ug/l
Anions				
Alkalinity, Bicarbonate	Quarterly	310.1/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	Quarterly	310.1/SM 2320 B	2.0	mg/l
Chloride	Quarterly	EPA-325.2/300.1	10	mg/l
Fluoride	Quarterly	EPA-300.1	1.0	mg/l
Nitrate	Quarterly	EPA-353.2/300.1	100	ug/l
Nitrite	Quarterly	EPA-353.2 /300.1	100	ug/l
Nitrogen, Ammonia	Quarterly	350.1/4500 NH36	25	ug/l
Sulfate	Quarterly	EPA-300.1	1	ug/l
Sulfide	Quarterly	376.1	0.2	mg/l

Table 5-2 *(con't)*

Parameter	Frequency	Analytical Method	Target Detection Limit	Units
Cations				
Calcium	Quarterly	EPA-200.7/6010B	4.0	mg/l
Sodium	Quarterly	USEPA-6010B	1.0	mg/l
Magnesium	Quarterly	EPA-200.7/6010B	1.0	mg/l
Potassium	Quarterly	EPA-200.7/6010B	0.50	mg/l
Others				
Hardness (calculated) as $CaCO_3$	Quarterly	SM 2340B	NA	mg/l

NA – Not Applicable

Prepared by: SVF
Checked by: JSL

5.2 Hydrologic Monitoring

As part of the operations environmental monitoring plan, KEMC will implement a hydrologic monitoring program of surrounding surface water systems. The hydrologic monitoring will be implemented per the requirements of R 425.203(g) and R 425.406. A total of seven surface water monitoring points will be used by KEMC to assess surface water quality surrounding the mill site. The location of the monitoring points are shown on Figure 5-2.

The quarterly surface water monitoring events will take place during the summer baseflow, fall rain, winter baseflow and spring snowmelt and runoff. These monitoring stations will be monitored on a quarterly basis for the parameters listed in Table 5-3.

Table 5-3
Surface Water Quality Monitoring Program
Parameter List and Sampling Frequency

Parameter	Frequency	Analytical Method	Method Reporting Limit	Units
Field				
Temperature	Quarterly	Field	NA	°C
D.O.	Quarterly	Field	NA	mg/l
Specific Conductance	Quarterly	Field	NA	umhos/cm
pH	Quarterly	Field	NA	S.U.
Turbidity	Quarterly	Field	NA	NTU
Flow	Quarterly	Field	NA	cfs
Metals				
Aluminum	Annually	EPA-200.7/6020	50	ug/l
Antimony	Annually	EPA-200.8/6020	2.0	ug/l
Arsenic	Quarterly	EPA-200.8/6020	1.0	ug/l
Barium	Annually	EPA-200.8/6020	10	ug/l
Beryllium	Annually	EPA-200.8/6020	1.0	ug/l
Boron	Annually	EPA-200.8/6020	50	ug/l
Cadmium	Annually	EPA-200.8/6020	0.40	ug/l
Chromium	Annually	EPA-200.8/6020	1.0	ug/l
Cobalt	Annually	EPA-200.8/6010B	10	ug/l
Copper	Quarterly	EPA-200.8/6020	2.0	ug/l
Iron	Quarterly	EPA-200.7/6020	40	ug/l
Lead	Quarterly	EPA-200.8/6020	1.0	ug/l
Lithium	Annually	EPA-200.7/6020	10	ug/l
Manganese	Quarterly	EPA-200.8/6020	10	ug/l
Mercury	Quarterly	EPA-1631E	0.25	ng/l
Molybdenum	Annually	EPA-200.8/6020	10	ug/l
Nickel	Quarterly	EPA-200.8/6020	1.2	ug/l
Selenium	Annually	EPA-200.8/6020	4.0	ug/l
Silver	Annually	EPA-200.8/6020	0.4	ug/l
Thallium	Annually	EPA-200.8/6020	1.2	ug/l
Vanadium	Annually	EPA-200.8/6020	1.2	ug/l
Zinc	Quarterly	EPA-200.8/6020	10	ug/l
Anions				
Alkalinity, Bicarbonate	Quarterly	310.1/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	Quarterly	310.1/SM 2320 B	2.0	mg/l
Chloride	Quarterly	325.2/4500-CLE	1.0	mg/l
Fluoride	Quarterly	SM 4500 F-C	0.10	mg/l
Nitrate	Quarterly	353.2/4500 NO3F	0.05	mg/l
Nitrite	Quarterly	EPA-353.2 or 354.1/4500 NO2B	0.05	mg/l
Nitrogen, Ammonia	Quarterly	350.1/4500 NH36	0.50	mg/l
Sulfate	Quarterly	EPA-375.4/4038	1.0	mg/l
Sulfide	Quarterly	376.1/4500 S2-F	5.0	mg/l

Table 5-3 *con't*

Parameter	Frequency	Analytical Method	Method Reporting Limit	Units
Cations				
Calcium	Quarterly	EPA-200.7/6010B	0.50	mg/l
Potassium	Quarterly	EPA-200.7/6010B	0.50	mg/l
Magnesium	Quarterly	EPA-200.7/6010B	0.50	mg/l
Sodium	Quarterly	EPA-200.7/6010B	0.50	mg/l
General Chemistry				
Hardness (calculated) as $CaCO_3$	Quarterly	EPA-6010/6020	0.002	mg/l
Total Dissolved Solids	Quarterly	EPA-160.1/SM 2540 C	50	mg/l
Total Suspended Solids	Quarterly	EPA 160.2/SM 2540 D	1.0	mg/l

NA – Not Applicable

Prepared by: SVF
Checked by: JSL

5.3 Plan to Monitor Geochemical Characterization During Operations

KEMC will monitor the geochemical characteristics of the tailings during operations as listed in Table 5-4. The purpose of this monitoring will be to assess tailings and HTDF chemical characteristics that may require alterations to the WWTP such that water discharge standards can be maintained through operations.

Table 5-4
Tailings Geochemical Monitoring

Media	Test Requirement	Frequency
Tailings Solids	Density and specific gravity	Quarterly
Tailings Carriage Water	Table 5-5[(1)]	Quarterly[(1)]
HTDF	Table 5-5 Bathymetry	Quarterly Annually

[(1)] Continuous temperature measured at thickener under-flow and near tailings discharged to HTDF

Prepared by: JOS
Checked by: JBM

Water quality monitoring for the HTDF will be performed at two locations shown on Figure 5-2. Sampling the water column will be completed at five different depths as determined based on chemocline and thermocline gradients. Based upon the test results, KEMC will review the HTDF WWTP system processes and modify as necessary to maintain compliance with water quality standards. Bathymetry will be conducted annually to assess filled volume as compared to design capacity.

Table 5-5
Tailings Geochemical
Test Parameters

Parameter	Analytical Method	Method Reporting Limit	Units
Field			
Temperature	Field	NA	^{o}C
D.O.	Field	NA	mg/l
Specific Conductance	Field	NA	umhos/cm
pH	Field	NA	S.U.
Flow (Mill Effluent)	Field	NA	cfs
Metals			
Aluminum	EPA-6020/6010	50	ug/l
Antimony	EPA-6020/6010	2.0	ug/l
Arsenic	EPA-6020/6010	1.0	ug/l
Barium	EPA-6020/6010	10	ug/l
Beryllium	EPA-6020/6010	1.0	ug/l
Boron	EPA-6020/6010	50	ug/l
Cadmium	EPA-6020/6010	0.40	ug/l
Chromium	EPA-6020/6010	1.0	ug/l
Cobalt	EPA-200.8/6010B	10	ug/l
Copper	EPA-6020/6010	2.0	ug/l
Iron	EPA-6020/6010	40	ug/l
Iron (ferrous)	HACH 8146	40	ug/l
Iron (ferric)	CALCULATED	40	ug/l
Lead	EPA-6020/6010	1.0	ug/l
Lithium	EPA-6020/6010	10	ug/l
Manganese	EPA-6020/6010	10	ug/l
Mercury	EPA-1631E	0.25	ng/l
Molybdenum	EPA-6020/6010	10	ug/l
Nickel	EPA-6020/6010	1.2	ug/l
Selenium	EPA-6020/6010	4.0	ug/l
Silver	EPA-6020/6010	0.4	ug/l
Strontium	EPA-6020/6010	1.0	ug/l
Thallium	EPA-6020/6010	1.2	ug/l
Vanadium	EPA-6020/6010	1.2	ug/l
Zinc	EPA-6020/6010	10	ug/l
Anions			
Alkalinity, Bicarbonate	310.1/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	310.1/SM 2320 B	2.0	mg/l
Chloride	325.2/4500-CLE	1.0	mg/l
Fluoride	SM 4500 F-C	0.10	mg/l
Nitrogen, Nitrate	353.2/4500 NO3F	0.05	mg/l
Nitrogen, Nitrite	EPA-353.2 or 354.1/4500 NO2B	0.05	mg/l
Nitrogen, Ammonia	350.1/4500 NH36	0.50	mg/l
Sulfate	EPA-375.4/4038	1.0	mg/l
Sulfide	376.1/4500 S2-F	5.0	mg/l

Table 5-5 *con't*

Parameter	Analytical Method	Method Reporting Limit	Units
Cations			
Calcium	EPA-200.7/6010B	0.50	mg/l
Potassium	EPA-200.7/6010B	0.50	mg/l
Magnesium	EPA-200.7/6010B	0.50	mg/l
Sodium	EPA-200.7/6010B	0.50	mg/l
General Chemistry			
Alkalinity, Total	310.1/SM 2320 B	2.0	mg/l
Carbon, Dissolved Organic	415.1/5310 D/9060	1.0	mg/l
Carbon, Total Organic	415.1/5310 D/9060	1.0	mg/l
COD	410.4/SM 5220 D	2.0	mg/l
Hardness (calculated) as CaCO3	EPA-6010/6020	0.002	mg/l
Total Dissolved Solids	EPA-160.1/SM 2540 C	50	mg/l
Total Suspended Solids	EPA 160.2/SM 2540 D	1.0	mg/l
Turbidity	EPA 180.1	NA	NTU

NA – Not Applicable

Prepared by: JBM
Checked by: GRE

5.4 Groundwater and Surface Water Sampling Procedures

Water samples will be collected in accordance with KEMC's project Quality Assurance Project Plan and Standard Operating Procedures (North Jackson, 2004a and 2004b).

During operations, groundwater and surface water quality data will be statistically assessed for distributional changes as a result of site activities. Statistical methods will include testing for trends in water chemistry and comparing constituent concentration levels to those observed in background or upgradient locations. Appropriate parametric or nonparametric statistical methods will be selected in consideration of the observed data characteristics, namely, the distributional form of the data and the degree of left censuring (amount of data below detection).

In addition, sources of variation in the data unrelated to site activities, such as seasonality, will be statistically estimated and controlled. Relevant documents containing guidance for selecting appropriate statistical tests are:

- MDEQ, 2002. *Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria.*
- Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, New York.
- USEPA, 2000. *Practical Methods for Data Analysis–EPA QA/G-9*, EPA/600/R-96/084.
- USEPA, 1992. *Statistical Analysis for Groundwater Monitoring Data at RCRA Facilities – Addendum to Interim Final Guidance*, PB89-151047.

KEMC will provide to MDEQ annual summary reports of monitoring data and analyses completed. All related monitoring data will be maintained by KEMC in a database available for MDEQ review.

5.5 Concentrate Monitoring

Concentrate monitoring for oxidation reactions will be conducted in the concentrate load-out building. Monitoring will be conducted daily by a qualified KEMC employee using a thermal imagining scanner. KEMC will have staff trained to identify potential reactive conditions. This device will detect thermally elevated zones in the concentrate pile. Areas of the concentrate piles exhibiting higher temperatures will be sprayed with water to raise the moisture content of the concentrate and reduce the potential to oxidize.

5.6 Miscellaneous Inspection and Monitoring Activities

During operations other miscellaneous environmentally related monitoring activities will be implemented by KEMC. These activities are summarized in Table 5-6.

5.7 Minimization and Mitigation of Impacts

R 425.203(k) requires that an applicant for a mining permit prepare and submit plans to prevent, minimize and mitigate adverse impacts of the proposed mining operation on flora, fish, wildlife habitat and biodiversity. KEMC's planning team, described in Section 1 of this document, has thoroughly studied the environment in the vicinity of the proposed Humboldt Mill site. In so doing, the site development plans described herein were designed to prevent and minimize adverse impacts on the surrounding environment.

Facility construction will not disturb any known listed species. New facilities are located in areas that have previously been disturbed by past mine and milling operations, therefore disturbance to natural areas will be minimized. KEMC proposed mitigation measures are incorporated into this mining plan.

Table 5-6
Miscellaneous Operational Environmental Monitoring Inspection and Maintenance Activities

Equipment or Area	Description	Preventive Maintenance/Inspection	Corrective Maintenance Procedures	Equipment Requirements	Material Needs	Inspection Frequency
1. Stormwater Management and Erosion Control Structure	Ditches, Culverts, Spillways, etc.	1. Clean sediment from ditches. 2 Clean culverts of debris.	1. Replace rusted or damaged culverts. 2. Repair eroded areas and install erosion control measures to remedy erosion.	Backhoe, truck, shovels	Fill soil, erosion control materials (e.g., riprap, erosion mat).	Minimum Monthly
2. Access Roads and Interior Roads		1. Minimize mud tracking, clean as needed.	1. Repair ruts, pot holes, etc. 2. Inspect for ruts or road damage.	Truck, shovels	Road gravel, Bituminous patch	Minimum Monthly
3. Soil Stockpiles	Topsoil and other soil stockpiles	1. Maintain silt fences. 2. Maintain other erosion control devices. 3. Inspect for erosion and soil displacement.	1. Replace or repair silt fence as needed. 2. Repair eroded areas including regrading and revegetation. 3. Clean ditches where silt and/or sand has accumulated.	Shovel, backhoe	Silt fencing	Minimum Monthly
4. Environmental Monitoring Devices	Groundwater Monitoring Wells	1. Install locking caps with seals.	1. Repair/replace broken caps, surface seals and locks	Shovel	Protector pipes, concrete lock/key set, PVC pipe	Quarterly
5. Security Devices	Means to Control Entry (fencing/gates) Exterior Lighting	1. Replace damaged fence/gates. 2. Replace burnt out bulbs.	1. Repair or replace worn or rusty fences. 2. Repair rusty or broken locks, etc.	Miscellaneous	Fence/gate parts and locks	Quarterly
6. HTDF Containment Dike		1. Inspect dike for erosion/displacement 2. Assess dike seeps	1. Repair eroded areas including revegetated and grading 2. Provide additional fill material of displacement has occurred.	Backhoe	Fill material	Quarterly and after major precipitation events
7. Slurry Pipeline		1. Inspect pipeline and manholes	1. Repair damage or pipeline breach. 2. Seal manhole cracks or joints. 3. Remove solids accumulation in manhole.	Lift Truck, extrusion welding equipment	Pipe patch epoxy seal coat, HDPE pipe, patch small holes with extrusion patch or cut and replace larger damaged areas	Once per shift

Prepared by: JOS1
Checked by: MJP1

6. Reclamation Plan

This section presents the Humboldt Mill Reclamation Plan pursuant to R 425.204 and R 425.407. The goal of the reclamation plan is to retain a site condition that is consistent with the industrial setting prior to KEMC operations. Reclamation of the property will consist of decommissioning plant equipment and establishing a property end use that is consistent with local development plans. Included with the Reclamation Plan are procedures and expected time lines for closure. Post-closure monitoring is discussed in Section 6.5 The reclamation plan will consist of the following elements:

- Decommissioning of plant equipment.
- Removal of remaining chemicals/reagents on the property.
- Demolition and/or removal of unwanted structures/buildings.
- Revegetation of disturbed areas with natural vegetation.
- Removal of HTDF control structures including piping and the WWTP. Note that the subsurface cut-off wall will remain in place after reclamation.
- Post-closure monitoring of surface water and groundwater for 20 yrs after site closure.

As defined under Part 632, reclamation for the Humboldt Mill site will include reconditioning or rehabilitation of areas for useful purposes and protection of natural resources. It is expected that the Humboldt Mill buildings and structures will be reutilized as part of an economic development program for the local community.

6.1 Reclamation Sequencing and Timing

Reclamation activities related to the proposed development will commence during initial construction activities at the site and will continue through facility closure into the post-closure period. Reclamation sequencing has been established based upon three different site development events as presented in Table 6-1.

Table 6-1
Reclamation Sequence

Sequence	Event	Facility Development Year
1	Site Construction	3
2	Closure[(1)]	11, 12, 16[2]
3	Post-Closure	16 to 36

[(1)] Facility closure when Eagle Mine ore processing is complete.
[(2)] WWTP decommissiong

Prepared by: JOS1
Checked by: MJP1

Sequence 1 will occur concurrently with or directly after site construction, and will include reclaiming areas disturbed during site construction. Closure Reclamation, Sequence 2, will occur in year 11 extending into year 12 when ore processing is complete and in approximate year 16 with removal of the HTDF WWTP. Note that although the WWTP will be decommissioned in year 16, it will be used for contingency purposes if water quality in the HTDF exceeds surface water discharge standards after mill closure. During Sequence 2, upon cessation of all mill operations, the plant equipment will be decommissioned and the property surrounding the mill

facilities will be restored by KEMC. Finally, in year 16 when the HTDF water quality has stabilized (see Appendix D), the WWTP will be decommissioned and removed from the site. Post-Closure Reclamation Sequence 3 will occur for a period of 20 yrs. Table 6-2 lists significant activities associated with each reclamation sequence.

Table 6-2
Reclamation Activities

Sequence	Event	Time Period	Reclamation Activity
1	Site Construction Reclamation	Year 3	- Reclaim surrounding areas - Access Road: seed disturbed areas between shoulder and Right-of-way - Seed soil stockpiles
2	Closure Reclamation	Years 11, 12 and 16	- Seed and mulch disturbed areas - Decommissioning of plant equipment and buildings - Regrade disturbed areas - Remove WWTP and inlet/outlet control structures (year 16)
3	Post-Closure Reclamation	Years 16-36	- Monitor groundwater and surface water for 20 years. - Conduct semi-annual inspections of the facility.

Prepared by: JOS1
Checked by: MJP1

6.2 Final Land Use

The final land use of the reclaimed areas at the Humboldt Mill site will remain as restricted industrial use consistent with pre-KEMC acquisition of the facility. This end use is consistent with Humboldt Township zoning of the property and end planning goals. KEMC plans to discuss with the Township and County any end use interest the communities may have with the property or structures. The proposed property reclamation plan at the cessation of processing ore is illustrated in Figure 6-1.

6.3 Site Construction Reclamation

During site construction, reclamation will be performed concurrently for disturbed areas surrounding the facilities that are under construction. Reclamation of these areas will include proper grading for site drainage and applying seed and mulch on disturbed areas following the procedures outlined under Section 3.2.15.1. Storm water management facilities including grading, ditches and temporary detention basins that will be constructed at the start of construction. Silt fences and other erosion control devices will be installed as necessary.

6.4 Closure Reclamation

Closure reclamation will begin in year 11 and be completed in year 12. Facilities that require closure reclamation are discussed in the following sections. The WWTP will be decommissioned and removed from the site in year 16.

6.4.1 Roads and Access

Reclamation of facility roads is expected to begin in year 11. With the exception of the main site access roads, internal site roads will be graded to provide a natural pre-development condition. A minimum number of roads will be maintained to allow access to post-closure monitoring devices. Roads to be reclaimed will be graded consistently with surrounding ground slopes, topsoiled and revegetated. Any gravel surface material will be stockpiled appropriately or removed from the site. The bituminous paved areas will remain for possible continued site operations by others.

6.4.2 Buildings and Structures

It is expected that the majority of the facility buildings including the office/maintenance building, COSA, mill building, concentrate load-out, and gate house will remain for potential sale or use by other operators. Reclamation of these structures will include decommissioning the mill, removal and/or storage of all chemicals and reagents, removal of salvageable equipment, and moth-balling permanent equipment such as crushers, mills, flotation cells and other equipment. A minimal electrical service will be maintained for security for the remaining buildings.

The WWTP will be decommissioned in year 16 and removed from the site including inlet and outlet control structures. KEMC will remove all salvageable equipment from the building. The building structure will then be demolished and debris removed for disposal at a licensed landfill.

6.4.3 Site Utilities

The majority of the site utilities are associated with mill operations. These utilities will be maintained at a minimal level for future operations or other property uses similar to site conditions prior to this permit application.

6.4.4 Earth Grading and Topsoil Placement

Final site grading and topsoil placement will begin in year 11 for the mill and in year 16 surrounding the WWTP location. Regrading will be conducted in such a manner that positive surface water drainage is maintained. Topsoil will be applied, seeded and mulched. Vegetation procedures are presented in the Natural Resources Conservation Service (NRCS) Native Grass Planting Guide presented in Appendix F.

6.4.5 Revegetation

Revegetation, consisting of sowing native grasses across disturbed areas, will begin in year 3. Seeding will be performed using either broadcast, hydro-seeding and/or drill-seeding. Seeding rates will be established based upon final selection of ground cover. Where practical, native grass planting will follow the procedures outlined in the NRCS, Native Grass Planting Conservation Reserve Enhancement Program, CREP-CP2. This document provides seed lists and application rates of native grasses based upon land use. Prior to vegetation, topsoil will be analyzed for proper nutrients including pH, nitrogen and organic content. Fertilizer will be applied at an appropriate rate based on topsoil nutrient testing.

6.4.6 Surface Water and Erosion Control

Erosion control procedures will be implemented continuously through the life of the facility and into post-closure. Erosion control methods outlined in Section 3.2.15.1 are also applicable during reclamation. During reclamation, erosion control practices will include:

- Applying mulch to all ground cover areas,
- Installing silt fence,
- Installing erosion control fabric on slopes steeper than 8%,
- Installing straw bale check dams or rock filled gabions in drainage ditches,
- Using sized riprap in ditches to reduce water velocity.

During reclamation, temporary sediment control basins may be constructed to contain surface water runoff. These structures will be placed during final site grading to better control surface water runoff during site reclamation activities. After completion of site grading, the temporary basins will be filled in and restored to the surrounding topography.

6.4.7 HTDF

At approximately year 16, the small containment berm north of the HTDF will be removed from the site and this area regraded to pre-existing topographic conditions as shown on Figure 6-1. Note that the subsurface containment wall will remain in place.

6.5 Post-Closure Monitoring

Post-closure monitoring will consist of monitoring surface water and groundwater for a period of 20 yrs, beginning in year 16 through year 36.

6.5.1 Post-Reclamation Groundwater Monitoring Plan

Figure 6-2 shows the location of groundwater monitoring points during the post-closure period. Table 6-3 lists groundwater sampling parameters and frequency.

Table 6-3
Post-Reclamation Groundwater Quality Monitoring Program
Parameter List and Sampling Frequency

Parameter	Frequency	Analytical Method	Target Detection Limit	Units
Field				
Groundwater Elevation	Quarterly(1)	Field	NA	ft msl
Temperature	Quarterly(1)	Field	NA	°C
D.O.	Quarterly(1)	EPA-360.1	NA	mg/l
Specific Conductance	Quarterly(1)	Field	NA	umhos/cm
Oxidation-Reduction Potential	Quarterly(1)	Field	NA	mV
pH	Quarterly(1)	EPA-9040C	NA	S.U.
Turbidity	Quarterly(1)	Field	NA	NTU
Metals				
Aluminum	Annually	EPA-200.7/6020	50	ug/l
Antimony	Annually	EPA-200.8/6020	2.0	ug/l
Arsenic	Quarterly(1)	EPA-200.8/6020	5.0	ug/l
Barium	Annually	EPA-200.8/6020	100	ug/l
Beryllium	Annually	EPA-200.8/6020	1.0	ug/l
Boron	Annually	EPA-200.8/6020	300	ug/l
Cadmium	Annually	EPA-200.8/6020	1.0	ug/l
Chromium	Annually	EPA-200.8/6020	10	ug/l
Copper	Quarterly(1)	EPA-200.8/6020	4.0	ug/l
Cobalt	Annually	EPA-200.8/6010B	20	ug/l
Iron	Quarterly(1)	EPA-200.7/6020	200	ug/l
Lead	Quarterly(1)	EPA-200.8/6020	3.0	ug/l
Lithium	Annually	EPA-200.7/6020	10	ug/l
Manganese	Quarterly(1)	EPA-200.8/6020	50	ug/l
Molybdenum	Annually	EPA-200.8/6020	50	ug/l
Nickel	Quarterly(1)	EPA-200.8/6020	20	ug/l
Selenium	Annually	EPA-200.8/6020	5.0	ug/l
Silver	Annually	EPA-200.8/6020	0.2	ug/l
Zinc	Quarterly(1)	EPA-200.8/6020	10	ug/l
Mercury (low level)	Quarterly(1)	EPA-1631E	1	ng/l
Thallium	Annually	EPA-200.8/6020	2	ug/L
Vanadium	Annually	EPA-200.8/6020	4	ug/L
Anions				
Alkalinity, Bicarbonate	Quarterly(1)	310.1/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	Quarterly(1)	310.1/SM 2320 B	2.0	mg/l
Chloride	Quarterly(1)	EPA-325.2/300.1	10	mg/l
Fluoride	Quarterly(1)	EPA-300.1	1.0	mg/l
Nitrate	Quarterly(1)	EPA-353.2/300.1	100	ug/l
Nitrite	Quarterly(1)	EPA-353.2 /300.1	100	ug/l
Nitrogen, Ammonia	Quarterly(1)	350.1/4500 NH36	25	ug/l
Sulfate	Quarterly(1)	EPA-300.1	1	ug/l
Sulfide	Quarterly(1)	376.1	0.2	mg/l

Table 6-3 *con't*

Parameter	Frequency	Analytical Method	Target Detection Limit	Units
Cations				
Calcium	Quarterly[(1)]	EPA-200.7/6010B	4.0	mg/l
Sodium	Quarterly[(1)]	USEPA-6010B	1.0	mg/l
Magnesium	Quarterly[(1)]	EPA-200.7/6010B	1.0	mg/l
Potassium	Quarterly[(1)]	EPA-200.7/6010B	0.50	mg/l
Others				
Hardness (calculated) as $CaCo_3$	Quarterly	SM 2340B	NA	mg/l

[(1)] Quarterly for the first 5 yrs, annual thereafter
NA – Not Applicable

Prepared by: SVF
Checked by: JSL

6.5.2 Post-Reclamation Surface Water Quality Monitoring Plan

Figure 6-3 shows the location of surface water monitoring locations. These monitoring stations will be sampled for 20 yrs (years 16 through 36) in accordance with Table 6-4.

6.5.3 Sampling Protocols

The sampling procedures and statistical methods used in the operational monitoring plan will continue to be used during the post-closure monitoring period.

Table 6-4
Post-Reclamation Surface Water Quality Monitoring Program
Parameter List and Sampling Frequency

Parameter	Frequency	Analytical Method	Method Reporting Limit	Units
Field				
Temperature	Quarterly[(1)]	Field	NA	°C
D.O.	Quarterly[(1)]	Field	NA	mg/l
Specific Conductance	Quarterly[(1)]	Field	NA	umhos/cm
pH	Quarterly[(1)]	Field	NA	S.U.
Turbidity	Quarterly[(1)]	Field	NA	NTU
Flow	Quarterly[(1)]	Field	NA	cfs
Metals				
Aluminum	Annually	EPA-200.7/6020	50	ug/l
Antimony	Annually	EPA-200.8/6020	2.0	ug/l
Arsenic	Quarterly[(1)]	EPA-200.8/6020	1.0	ug/l
Barium	Annually	EPA-200.8/6020	10	ug/l
Beryllium	Annually	EPA-200.8/6020	1.0	ug/l
Boron	Annually	EPA-200.8/6020	50	ug/l
Cadmium	Annually	EPA-200.8/6020	0.40	ug/l
Chromium	Annually	EPA-200.8/6020	1.0	ug/l
Cobalt	Annually	EPA-200.8/6010B	10	ug/l
Copper	Quarterly[(1)]	EPA-200.8/6020	2.0	ug/l
Iron	Quarterly[(1)]	EPA-200.7/6020	40	ug/l
Lead	Quarterly[(1)]	EPA-200.8/6020	1.0	ug/l
Lithium	Annually	EPA-200.7/6020	10	ug/l
Manganese	Quarterly[(1)]	EPA-200.8/6020	10	ug/l
Mercury	Quarterly[(1)]	EPA-1631E	0.25	ng/l
Molybdenum	Annually	EPA-200.8/6020	10	ug/l
Nickel	Quarterly	EPA-200.8/6020	1.2	ug/l
Selenium	Annually	EPA-200.8/6020	4.0	ug/l
Silver	Annually	EPA-200.8/6020	0.4	ug/l
Thallium	Annually	EPA-200.8/6020	1.2	ug/l
Vanadium	Annually	EPA-200.8/6020	1.2	ug/l
Zinc	Quarterly[(1)]	EPA-200.8/6020	10	ug/l
Anions				
Alkalinity, Bicarbonate	Quarterly[(1)]	310.1/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	Quarterly[(1)]	310.1/SM 2320 B	2.0	mg/l
Chloride	Quarterly[(1)]	325.2/4500-CLE	1.0	mg/l
Fluoride	Quarterly[(1)]	SM 4500 F-C	0.10	mg/l
Nitrate	Quarterly[(1)]	353.2/4500 NO3F	0.05	mg/l
Nitrite	Quarterly[(1)]	EPA-353.2 or 354.1/4500 NO2B	0.05	mg/l
Nitrogen, Ammonia	Quarterly[(1)]	350.1/4500 NH36	0.50	mg/l
Sulfate	Quarterly[(1)]	EPA-375.4/4038	1.0	mg/l
Sulfide	Quarterly[(1)]	376.1/4500 S2-F	5.0	mg/l

Table 6-4 *con't*

Parameter	Frequency	Analytical Method	Method Reporting Limit	Units
Cations				
Calcium	Quarterly[(1)]	EPA-200.7/6010B	0.50	mg/l
Potassium	Quarterly[(1)]	EPA-200.7/6010B	0.50	mg/l
Magnesium	Quarterly[(1)]	EPA-200.7/6010B	0.50	mg/l
Sodium	Quarterly[(1)]	EPA-200.7/6010B	0.50	mg/l
General Chemistry				
Hardness (calculated) as $CaCO_3$	Quarterly[(1)]	EPA-6010/6020	0.002	mg/l
Total Dissolved Solids	Quarterly[(1)]	EPA-160.1/SM 2540 C	50	mg/l
Total Suspended Solids	Quarterly[(1)]	EPA 160.2/SM 2540 D	1.0	mg/l

[(1)] Quarterly for the first 5 yrs, annual thereafter
NA – Not Applicable

Prepared by: SVD1
Checked by: JSL

6.6 Reclamation Costs

Total estimated reclamation cost for the Humboldt Mill Site is $1,766,500. Included with this cost is $685,000 for post-closure monitoring. Reclamation line item costs are provided in Table 6-5. The summary reclamation cost is presented in Table 6-6.

The unit costs are based upon "Means Building Construction Cost Data" or engineering judgment from experience, assuming a third party would perform the work. The unit costs include labor, materials, and overhead and profit and are based upon 2008 prices.

Table 6-5
Reclamation and Monitoring Cost Estimate

	Item	Unit	Cost/Unit	Extension
	Year 3 (Site Construction)			
1.	Regrading	22 acres	$1,000/acre	$ 22,000
2.	Install erosion control devices (silt fence)	4,500 linear ft	$2.00/linear ft	$ 9,000
3.	Seed/mulch	22 acres	$2,500/acre	$ 55,000
4.	Plantings (trees/shrubs)	60	$100/planting	$ 6,000
			Annual Cost	**$ 92,000**
	Year 11 Closure			
1.	Decommissioning of mill equip./buildings	Lump Sum	$100,000	$100,000
2.	HTDF dike removal	Lump Sum	$30,000	$ 30,000
3.	Regrading of disturbed areas	4 acres	$1,000/acre	$ 10,000
4.	Seed/mulch disturbed areas	4 acres	$2,500/acre	$ 10,000
			Annual Cost	**$150,000**
	Year 12 Closure			
1.	Regrading of remaining disturbed areas	2 acres	$1,000/acre	$ 2,000
2.	Seed/mulch disturbed areas	2 acres	$2,500/acre	$ 5,000
3.	Install erosion control devices (silt fencing)	1,000 linear ft	$2.00/linear ft	$ 2,000
			Annual Cost	**$ 9,000**
	Year 16 Closure			
1.	WWTP removal	Lump Sum	$100,000	$100,000
2.	Seed/mulch disturbed areas	1 acre	$2,500/acre	$ 2,500
			Annual Cost	**$102,500**

Table 6-5 *con't*

Item	Unit	Cost/Unit	Extension
20 Years (Post-Closure)			
1. Grading	2 acres	$1,000/acre	$ 2,000
2. Install Silt Fence	200 linear ft	$2.00/linear ft	$ 400
3. Seed/Mulch	2 acres	$2,500/acre	$ 5,000
4. Inspections	semi-annual	$2,000/inspection	$ 4,000
5. Fence repair	100 linear ft	$50/linear ft	$ 5,000
6. Electrical demand	Lump Sum	$20,000	$ 20,000
		Annual Cost	**$ 36,400**
Post-Closure Monitoring	**Unit**	**Cost/Unit**	**Extension**
1. Groundwater Monitoring (5 monitoring wells)			
• Quarterly sampling, years 12-16	$1,000 / sampling event	$1,000 x 5 x 4 times/yr x 5[(1)] yrs	$ 100,000
• Semi-Annual sampling, years 16-36		$1,000 x 5 x 1 times/yr x 20 yrs	$ 100,000
• Labor	50 hrs/yr	50 hrs/yr x $75/hr x 20 yrs	$ 75,000
2. Surface Water Monitoring (8 sampling locations)			
• Quarterly sampling, years 12-16	$1,000 / sampling event	$1,000 x 8 x 4 times/yr x 5 yrs	$ 160,000
• Semi-Annual, years 16-36		$1,000 x 8 x 1 times/yr x 20 yrs	$160,000
• Labor	60 hrs/yr	60 hrs/yr x $75/hr x 20 yrs	$ 90,000
		Total Monitoring Costs	**$685,000**

[(1)] First 5 years, years 12-16

Costing References: - CRS Means – Building Construction Cost Data, 2004
- Relevant Engineering Experience
- Analytical laboratory costs provided by a 3rd party contractor

Prepared by: MJP1
Checked by: JOS1

Table 6-6
Summary of Reclamation and Monitoring Costs

Year	Cost
3	$ 92,000
11	$ 150,000
12	$ 9,000
16	$ 102,500
20 years x 36,400	$ 728,000
Subtotal	$1,081,500
Post-Closure Monitoring	$ 685,000
Total Reclamation & Monitoring Cost	**$1,766,500**

Prepared by: MJP1
Checked by: JOS1

7. Contingency Plan

This section of the MPA presents the contingency plan pursuant to MDEQ Part 632 in R 425.205. Included is a qualitative assessment of the risk to public health and safety and environment (HSE) associated with potential accidents or failures involving activities with the Humboldt Mill. The focus of the contingency plan is on possible HSE risks and contingency measures. Possible HSE risks to on-site workers will be addressed by KEMC through HSE procedures in accordance Mining Safety and Health Administration (MSHA) requirements.

The Humboldt Mill involves processing ore, as well as storing and treating by-products of that process. KEMC's milling, storage, and treatment facilities have been designed and will be constructed and operated to protect the environment through the use of proven technologies and engineering practices. The environmental protection features are discussed in Sections 3 through 6.

7.1 Contingency Items

This contingency plan addresses the items listed below in accordance with R 425.205 (1)(a)(i) - (xii).

- Release or threat of release of toxic or acid-forming materials,
- Storage, transportation and handling of chemicals and reagents,
- Fuel storage and distribution,
- Fires and combustible materials,
- Air emissions,
- Spills of hazardous substances,
- Other natural risks defined in the EIA,
- Power disruption, and
- Leaks from containment systems from stockpiles or storage facilities.

For each contingency item, a description of the risk is provided, followed by a qualitative assessment of the risk(s) to the environment or public health and safety. The response measures to be taken in the event of an accident or failure are also described.

7.1.1 Containment of Reactive Materials

Potentially reactive materials generated as a result of processing operations are ore concentrate and tailings. As discussed in Section 3.2.4.2, processed ore has the potential to leach metal constituents when exposed to air and water. As described in the following sub-sections, the handling and management of potential reactive waste materials have been carefully considered in the design of the Humboldt Mill so as to prevent the formation and uncontrolled release of ARD.

7.1.1.1 COSA and Concentrate Load-Out Areas

Potential environmental risk associated with the COSA and concentrate load-out areas are release of contact water to the environment via cracks in the floor areas or collection sumps. The COSA and concentrate load-out areas will have concrete floors sloping to floor drains that will collect contact water. This water will then be either used as facility process water or be discharged to the tailings discharge line.

Contingency planning for these facilities will include timely repair of cracks in the floors and walls that could allow release of contact water. An impermeable surface inspection plan for these facilities is provided in Appendix G. This plan describes procedures for routine impermeable surface inspections, preventative and remedial actions as well as documentation procedures.

7.1.1.2 Humboldt Tailings Disposal Facility

Because tailings will be sub-aqueous in an anoxic environment, generation of ARD will not occur. Potential contaminant release from the HTDF could be waters having elevated metal concentrations that impact surface water or groundwater quality. As discussed in Section 4, surface water discharge from the HTDF will be treated through a WWTP prior to release during operations and for 5 yrs after closure of mill operations. In year 16 it is expected water quality in the HTDF will meet surface water quality standards and no further treatment will be required. As such, it can be expected that with these controls, surface water quality will not be impacted. In addition, the installation of the cut-off wall in the alluvial soils along the north perimeter of the HTDF will prevent release to the groundwater. Therefore, groundwater quality surrounding the HTDF will not be influenced by HTDF operation.

Groundwater seeps from the HTDF will not occur due to the low permeability of the surrounding Precambrian geologic formation. Furthermore, monitoring surrounding groundwater and surface water quality will identify changes to via surrounding water quality indicative of groundwater release from the HTDF. Contingency planning from an unlikely groundwater release from the HTDF will include :

- Identify the nature and extent of the release,
- Implement additional monitoring to ascertain extent of release,
- Develop a remedial action plan to bring facility back into compliance,
- Implement remedial action plan.

Specific details of the remedial action plan would be developed based upon the nature of the release and with agreements with the MDEQ.

KEMC will monitor water quality in the HTDF during operations and post-closure. If metal concentrations change from predicted values that could alter the treatment plan, KEMC will be able to adjust the treatment process at the WWTP or amend the HTDF water with reagents such as:

- Phosphate
- Alum

Specific reagents and application rate(s) would be identified upon determination of elevated metal parameters of concern. Past phosphate seeding of HTDF by previous owners was shown to be effective for nickel concentration reduction. Alum could also be used as a flocculent to enhance metal precipitation thereby improving water quality.

7.1.1.3 Tailings Transport System

Tailings will be transported to the HTDF via slurry contained within a double-cased HDPE pipe conveyance system. The pipe conveyance system will consist of a 4-in diameter carrier pipe within an 8-in outer containment pipe. In addition, leak detection manholes will be positioned along the alignment for monitoring system breaches. In the unlikely event of a leak within the inner carrier pipe, slurry will backflow to detection manholes positioned at the pipe line inverts as shown on Figure 3-1. Within the detection manholes will be moisture sensors or floats that will detect the presence of liquids. If liquid is detected, beacons positioned on the manholes and annunciators located in the slurry pump control room will activate notifying the operations of a potential system breach.

If a breach is identified, the slurry pumps will be shut-down until the source of breach is identified and repaired. The contingency plan for moving tailings to the HTDF facility will then be accomplished via truck with a sealed cargo area or the tailings will be held within the plant thickener vessel until the pipeline is repaired.

7.1.1.4 HTDF Perimeter Dike Failure

An earthen dike will be constructed at the north perimeter of the HTDF as shown on Figures 3-1 and 4-1. The dike will be constructed to elevation 1543 MSL to contain water within the HTDF during peak precipitation events. The HTDF will be inspected quarterly and after major precipitation events to assess structural integrity of the dike. If structural defects are noted such as displacement, cracking and erosional seeps, KEMC will immediately implement stabilization procedures by adding fill to bolster the dike.

7.1.2 Storage, Transportation and Handling of Chemicals

Potential risks associated with chemical use include surface and groundwater quality impacts. Chemicals will be used for ore processing in the flotation circuit as identified in Table 3-1.

Chemicals will be brought to the site by certified chemical haulers, meeting MDOT transportation requirements. Storage of these chemicals will be provided in secure locations within building(s) or outdoor bulk storage silos designed for that application. Transferring chemicals will be conducted by qualified site personnel. Bulk granular products will be conveyed pneumatically to the storage silos. Bulk liquids will unload from tanker trucks on pavement areas to allow for cleaning of any spilled material. Specific procedures will be prepared as part of the facilities PIPP.

Because chemicals will be stored in secure areas, the potential for release into the environment is very remote. If a breach of contaminant vessel does occur, the chemical will be contained within the secondary containment area. The spill or release will be immediately cleaned using appropriate methods specified in the Material Safety Data Sheets (MSDS). MSDS will be maintained on-site for all chemicals.

7.1.3 Fuel Storage and Distribution

Diesel and gasoline may be stored on site in secured containment area(s) for vehicle use and emergency generators. It is expected that approximately 4,000 gallons of petroleum based fuels will be stored on site.

In general, fuel spills and leaks will be minimized by the following measures:

- Training of personnel responsible for hauling fuel in proper procedures and emergency response,
- Regular equipment inspections and documentation of findings,
- Adequate secondary containment around all above ground tanks, and
- Staging of on-site emergency response equipment to quickly respond to unanticipated spills or leaks.

Specific procedures will be prepared as part of the facility's SPCC Plan. As noted in Section 3.2.20, this plan will be incorporated in a complete PIPP for the entire site.

Diesel fuel, gasoline and propane (fuels) will be transported to the Humboldt Mill by tanker truck from local distributors. The probability of an accidental release during transportation will be dependant on the location of the supplier(s) and the frequency of shipment, neither of which have been determined but is regulated by MDOT and is the responsibility of transporter. A fuel release resulting from a vehicular accident during transportation is judged to be a low probability event. Transport of fuel in tanker trucks does not pose an unusual risk to the region since tanker trucks currently travel to the region on a regular basis to deliver fuels to gasoline stations located in the communities surrounding the Humboldt Mill.

Three potential release events associated with the aboveground storage of fuels are a bulk tank failure, mishandling/leaking hoses, and a construction/reclamation phase release.

Bulk Tank Failure - A tank failure could potentially result from unusual thermal, mechanical, or chemical stresses. Chemical stresses are not anticipated as the storage tanks will be constructed of materials compatible with the fuels in accordance with appropriate tank design standards. Mechanical stress is also not anticipated since the tanks will be located within a secondary containment offering protection from vehicles. During construction, tanker fuel trucks designed for fueling will be used. Contingency measures required to mitigate a fuel spill will be developed in the PIPP and SPCC. In addition, tank integrity testing will be performed at regular frequencies to verify that the storage tanks are not leaking.

Mishandling/Leaking Hoses - A release might result from leaking hoses or valves, or from operator mishandling. This type of release is likely to be small in volume. Any small spills will be cleaned up by using on-site spill response equipment such as absorbent materials and/or removing impacted soils as per the PIPP and SPCC.

Construction/Reclamation Phase Release - A fuel spill during the construction or reclamation phases could occur from a mobile storage tank failure or mishandling of fuels. Such a release is considered to be a low probability event given that operators will be trained to manage these types of potential releases. As with mishandling or leaking hoses, these small spills will be cleaned up by using on-site spill response equipment such as absorbent materials and/or removing impacted soils as per the SPCC.

Absorptive materials may be used initially to contain a potential spill. After the initial response, soil impacted with residual fuel would be addressed. Remedial efforts could include, if necessary, the removal of soil to preclude migration of fuel to groundwater or surface water. The project's PIPP/SPCC plan will address fueling operations, fuel spill prevention measures, inspections, training, security, spill reporting, and equipment needs. All responses to a fuel spill, both large and small, will follow the guidelines dictated by the plan. The tanks will be inspected regularly, and records of inspections and any spills will be kept and reported to MDEQ and other agencies as required.

Contingency plans for responding to fuel spills on KEMC property from tanker trucks are required of all mobile transport owners as dictated by MDOT regulation and 49 CFR 130. These response plans require appropriate personnel training and the development of procedures for timely response to spills. The plan must identify who will respond to the spill and describe the response actions to potential releases, including the complete loss of cargo. The plan must list the names and addresses of regulatory contacts to be notified in the event of a release.

7.1.4 Fires and Combustible Materials

Surface fires can be started by a variety of causes including vehicular accidents, accidental ignition of fuels or flammable chemical reagents, and lightening strikes. Smoking will only be allowed in designated areas on the site. Contingency measures include having the required safety equipment, appropriate personnel training and standard operating procedures. Given these measures, uncontrolled or large surface fires are considered a low probability event with negligible risk.

Because the Humboldt Mill is situated in a forested region, forest fires started off-site could potentially impact the mill site. The cleared area in the vicinity of the surface facilities will serve as a fire break to protect surface facilities. Contingency measures discussed below can be implemented in the event of an off-site forest fire.

In order to minimize the risk of a fire on-site, stringent safety standards will be followed during construction and operation of surface facilities. During the construction phase, all construction equipment will be equipped with fire extinguishers. If controlled burning is required to eliminate waste wood following site clearing activities, a permit will be obtained from the MDNR which will specify measures to be taken for the prevention of fires.

During the plant operation phase, standard fire safety measures will be exercised. Fire extinguishers and standby water pipelines with hydrants will be located in high risk areas and personnel will be trained in their use. The location of the fire hydrants are shown on Figure 3-20. The surface rescue team will be trained in fire fighting techniques to respond to fires. On-site fire fighting equipment will include a fire control vehicle and an aboveground water storage tank and distribution system for fire suppression.

Contingency planning for managing materials that oxidize will include training equipment operators on the material characteristics. Because the concentrate will only be present for short periods of time in either the mill building or concentrate load-out building, and given that the concentrate will have a moisture content of at least 15%, the likelihood of an oxidation is very remote. In the unlikely event of oxidation, contingency procedures will include dousing the concentrate with water.

7.1.5 Wastewater Collection and Treatment

The major sources of water from the facility requiring treatment will be planned discharge from the HTDF. HTDF effluent will be treated at the WWTP and discharged per the requirements of an NPDES permit. In the unlikely event of a WWTP shut down from physical or mechanical problems, the HTDF has capacity to store up to approximately 600 days of displaced water from tailings loading and precipitation. If needed, KEMC can increase the capacity of the HTDF by raising the elevation of its north perimeter berm. Raising a berm height by 1 ft will result in approximately 2,900,000 ft^3 of added storage capacity to the HTDF. This will provide adequate contingency to address and resolve WWTP discharge problems.

7.1.6 Air Emissions

The construction, operation and reclamation phases of the project will be performed in a manner to minimize the potential for accidents or failures that could result in off-site air quality impacts. All phases of the project will incorporate a combination of operating and work practices, maintenance practices, emission controls and engineering design to minimize potential accidents or failures. Below is a description of identified areas of risk and associated contingency measures that may be required. As part of a comprehensive environmental control plan, these contingency measures will assist in minimizing air impacts to the surrounding area.

7.1.6.1 Fugitive Emissions During Construction

The Humboldt Mill involves an existing facility. However, certain redevelopment will take place on the property to accommodate proposed KEMC operations. During surface construction, areas subject to cut and fill operations and development of soil stockpiles will be temporarily re-vegetated and/or covered after final grading for soil stabilization and dust control. Temporary re-vegetation will start during the first year and continue through the completion of construction. After final grading of embankment slopes, temporary or permanent vegetation will be planted for soil stabilization and to reduce wind blown dust. While these soil stabilization efforts are expected to be effective, there is a potential that excessive dust could be created by extreme weather conditions. These conditions could include strong wind storms or gusts in the area or excessive rain events. Such events could erode soil and vegetation, creating newly exposed soil that could also be subject to wind dispersion.

To address this risk, KEMC will closely monitor re-vegetated and covered areas during the construction phase. If vegetated or covered areas are disturbed by wind activity or excessive rainfall, protective mats and/or vegetation will be re-established as soon as possible. Temporary covers may also need to be re-anchored to ensure temporary stockpiles are protected.

In addition to the above situation, there may be periods when hot and/or dry conditions could occur during the construction phase. To the extent necessary during these periods, roadways will be kept moist by instituting a watering program over identified traffic areas. It is anticipated this program will minimize excessive dust associated with mobile equipment. In the event fugitive dust is still identified as an issue, the cause of the problem will be determined such that appropriate action can be taken.

7.1.6.2 Air Emissions During Operations

During operation of the mill, potential emissions from the facility will be controlled as detailed in the Humboldt Mill Project *Michigan Air Use Permit – Permit to Install Application* (Foth, 2008)**.** Controls will include use of building enclosures for material handling, installation of dust collection or suppression systems such as baghouses or water sprays to control dust during ore crushing and transfer operations and following prescribed preventive maintenance procedures for the facility. Tailings generated during the milling process will be slurried to the HTDF and therefore will not generate particulate matter. Ore brought from off-site will be transported in covered trucks to minimize dust emissions. Below is a more detailed discussion of potential airborne risks associated with proposed operations at the facility.

To minimize dust emissions from the COSA and concentrate load-out building, these areas will be fully enclosed. Water sprays will be used at the primary crusher and conveyor transfer points located in the conveyor transfer station and mill building as shown on Figure 3-13.

Fabric filter baghouses will be used throughout the facility to minimize emissions of dust. Dust collection will be provided for ore transfer points, vibrating screens and fine ore storage. Baghouse malfunction is a possibility and can include a bag break or offset and excessive dust loading. These potential malfunctions will be addressed in a malfunction prevention and abatement plan prepared prior to facility operations. The plan will include regular inspections and maintenance activities of dust collection and suppression systems. This will be accomplished through monitoring of pressure drop across the bags, monitoring of gas flow, and visual observations of stack emissions to assess opacity per permit conditions. In the event the monitoring program indicates a malfunction, a thorough investigation of the cause will occur. If necessary, ore processing operations will be shut down until the problem is corrected. Fugitive dust sources will be addressed by a Fugitive Dust Control Plan. This plan will outline practice, inspection and documentation and reporting methods used in minimizing roadway, dust, dust from material storage piles and other handling or transfer for points. This can include water sprays, applications of water on roadways and specific material handling practices.

7.1.6.3 Air Emissions During Reclamation

Once milling operations are completed, reclamation will commence in accordance with R 425.204. Similar to activities described above, there is a slight risk that fugitive dust emissions could be released during certain re-vegetation activities and during temporary storage of materials in stockpiles. Similar to controls employed during the construction phase, areas to be reclaimed will be re-vegetated to stabilize soil and reduce dust emissions. If severe wind or an excessive rain event reduces the effectiveness of these protective measures, appropriate action will take place as soon as possible to restore vegetated areas to their previous effectiveness and replace covers as necessary.

To the extent necessary, areas being reclaimed will be kept in a moist state by continuing the watering program. In the event fugitive dust is identified as an issue, corrective action will determine the cause of the problem and appropriate action will occur.

7.1.7 Spills of Hazardous Substances

Chemical reagents will primarily be used for the ore flotation process. Table 3-1 includes a list of reagents planned for use at the site along with the approximate usage rates, method of transportation to the site, and the type of shipping container.

Chemical storage and delivery systems will follow current standards that are designed to prevent and contain spills. All use areas and indoor storage areas will be designed, constructed and/or protected to prevent run-on and runoff to surface or ground waters in accordance with a written PIPP for the site. This will include development of secondary containment areas for liquids. Each secondary containment area will be constructed of materials compatible with and impervious to the liquids being stored. In addition, any truck off-loading area for bulk chemicals will be curbed with a sloped pad, such that spills will be directed and contained within the secondary containment area. Response to a major spill will be outlined in the PIPP and SPCC prepared for the facility prior to the commencement of operations.

Spill containment measures for chemical storage and handling will reduce the risk of a spill from impacting the environment. Due to the low volatility of the chemicals used in the flotation process, fugitive emissions to the atmosphere during a spill incident are likely to be negligible. Off-site exposures are not expected. It is therefore anticipated that management and handling of flotation reagents will not pose a significant risk to human health or the environment.

7.1.8 Other Natural Risks

Earthquakes – The Upper Peninsula of Michigan is in a seismically stable area. The USGS seismic impact zone maps show the maximum horizontal acceleration to be less than 0.1 g in 250 years at 90% probability. Therefore, the mill site is not located in a seismic impact zone and the risk of an earthquake is minimal. Therefore, no earthquake contingency measures are discussed in this section.

Floods - Section 3.2.15 and 6.4.6 discuss the proposed handling of surface water runoff to control erosion during of mill construction, operation, and reclamation phases. High precipitation could lead to the failure of erosion control structures. The impacts of such an event would be localized erosion. Contingency measures to control erosion include sandbag sediment barriers and temporary diversion berms. Long-term or off-site impacts are not expected. Failed erosion control structures would be repaired or rebuilt. Impacts from high precipitation are reversible and off-site impacts are not expected to occur. Given the considerable planning and engineering efforts to manage high precipitation events, the risk posed by high precipitation is considered negligible.

Severe Thunderstorms or Tornadoes – Severe thunderstorms or tornadoes will be addressed in the emergency procedures to be developed for the mill site. Certain buildings will be designated shelters in the event of severe weather. Evacuation procedures will be part of the on-site training of all employees.

Blizzard – The mill site will be designed to accommodate the winter conditions anticipated in the Upper Peninsula of Michigan. KEMC will work with the Humboldt Township and Marquette County on an arrangement for maintenance of the County Roads during winter conditions. If road conditions deteriorate beyond the capability of the county or township maintenance

equipment, KEMC will have provisions to keep workers housed on-site for extended periods, as needed.

7.1.9 Power Disruption

Electrical power for the project will be provided by the Upper Peninsula Power Company. The facility is presently served by a 34 kV overhead electric utility feeder. In the unlikely event that power is disrupted a 100 kW generator will be on-site to power essential facilities needs including the tailings slurry pump and concentrate and tailings thickeners.

7.2 Emergency Procedures

This section includes the emergency notification procedures and contacts for the Humboldt Mill site. In accordance with R 425.205(2), a copy of this contingency plan will be provided to each emergency management coordinator having jurisdiction over the affected area at the time the application is submitted to the MDEQ.

Emergency Notification Procedures – An emergency will be defined as any unusual event or circumstance that endangers life, health, property or the environment. KEMC has adopted an Incident Command System (ICS) structure to respond to such emergencies. The ICS structure allows key individuals to take immediate responsibility and control of the situation and ensures appropriate public authorities, safety agencies and the general public are notified, depending on the nature of the emergency. A brief description of the ICS structure is as follows:

- Incident Commander (IC): The General Manager at the facility will be designated the IC and will be responsible to ensure that emergency response actions are carried out in an appropriate and timely manner. The IC will ensure that appropriate resources are available, secure the area, and release resources in an orderly manner. The IC will also ensure appropriate notification is made to all required regulatory agencies and necessary emergency response agencies.

- Safety Officer: The facility safety officer and staff are responsible for ongoing review of ICS structures and will monitor activities in response to any emergencies. During an emergency, the safety officer will manage special situations that expose responders to hazards, coordinate emergency response personnel, fire response, and ensure relevant emergency equipment is available for emergency service. This individual will also work with the IC to ensure appropriate personnel are made available to respond to the situation.

- Environmental Officer: The facility environmental manager will be responsible for managing any environmental aspects of an emergency situation. This individual will coordinate with the IC to ensure environmental impact is minimized, determine the type of response that is needed and act as a liaison between environmental agencies and mine site personnel.

- Public Relations Officer: The facility human relations manager will be responsible for managing all contacts with the public and will coordinate with the IC and the safety and environmental officers to provide appropriate information to the general public. This individual will meet all arriving outside response agencies and pass on instructions from the IC. This individual will immediately notify families of employees injured or affected.

Evacuation Procedures – While the immediate surrounding area is sparsely populated, if it is necessary to evacuate the general public, this activity will be handled in conjunction with emergency response agencies. The Public Relations Officer will be responsible for notification, working with other site personnel, including the IC safety and environmental officers.

In the event evacuation of mill personnel is required, KEMC will have established emergency response procedures. All evacuation procedures will be developed in compliance with MSHA regulations.

Emergency Equipment – Emergency equipment will include but will not be limited to the following:

- ABC Rechargeable fire extinguishers,
- Mill communication system,
- Radios,
- First aid kits, stretchers, backboards, and appropriate medical supplies,
- Spill Kits (hydrocarbon and chemical),
- Water truck and fire hoses,
- HAZMAT response equipment.

Fire extinguishers will be located at appropriate locations throughout the facility, in accordance with MSHA requirements. Key facility personnel will be equipped with radios for general communications and emergencies. Other emergency response equipment will be located at appropriate and convenient locations for easy access for response personnel. The location of this equipment will be further delineated in final site plans for the facility.

Emergency Telephone Numbers – Emergency telephone numbers are included for site and emergency response agencies, as required by R 425.205(1)(c). They are as follows:

- Operator and Emergency Management Coordinator: Jon Cherry – (906) 486-1257

- Local Ambulance Services: 911

- Hospitals: Marquette General Hospital – (906) 225-3560
  Bell Hospital – (906) 485-2200

- Local Fire Departments: Humboldt Township - 911
  Marquette Township – 911

- Local Police: Marquette County Central Dispatch – 911
  Marquette County Sheriff Department – (906) 225-8435
  Michigan State Police – (906) 475-9922 (direct line)

- MDEQ Gwinn Office – (906) 346-8300

- Pollution Emergency Alerting System (in Michigan) - 1-800-292-4706

- Federal Agencies: EPA Region 5 Environmental Hotline – 1-800-621-8431
  EPA National Response Center – 1-800-424-8802
  MSHA North Central District – (218) 720-5448

- MDNR Marquette Field Office – (906) 228-6561

- Humboldt Township Supervisor, Marvin W. Ruspakka: (906) 339-2239

7.3 Testing of Contingency Plan

During the course of each year, the facility will test the effectiveness of the Contingency Plan. Conducting an effective test will be comprised of two components. The first component will include participation in adequate training programs on emergency response procedures for those individuals involved in responding to emergencies. These individuals will include the IC, Safety Officer, Environmental Officer, Public Relations Officer and other individuals designated to respond to fires and participate in emergency activities. Individuals will receive appropriate information with respect to their specific roles, including procedures and use of certain emergency response equipment.

The second component of an effective Contingency Plan will be to conduct mock field tests. At least one mock field test will be performed each year. The Safety Officer will work with the Environmental Officer and the IC to first define the situation that will be tested. The types of test situations could include responding to a release of controlled substance, responding to a fire or responding to a natural disaster such as a tornado. A list of objectives will be developed for planning and evaluating each identified test situation. A date and time will then be established to carry out the test. Local emergency response officials may be involved, depending on the type of situation selected.

Once the test is completed, members of the ICS team and other KEMC officials will evaluate the effectiveness of the response and make recommendations to improve the system. These recommendations will then be incorporated into a revision of the facility Contingency Plan.

8. Financial Assurance

KEMC will provide financial assurance pursuant to R 425.301. This section presents the financial assurance including site reclamation and post-closure monitoring costs, MDEQ administrative costs, and operating and environmental contingency costs. The financial assurance cost elements are summarized in the following Table 8-1.

Table 8-1
Financial Assurance Costs

♦ Reclamation/Monitoring	$1,766,500
♦ MDEQ Administrative Oversight (25% of Reclamation and Monitoring Costs)	$ 441,625
Subtotal	$2,208,125
♦ Environmental Contingency Cost (20% of Reclamation/Monitoring and MDEQ Oversight Costs)	$ 441,625
♦ Operating Contingency Cost[(1)]	$2,000,000
Total Financial Assurance Cost	**$4,649,750**

(1) Including cost to operate HDTF WWTP for 5 yrs @ $400,000/yr

Prepared by: MJP1
Checked by: JOS1

The total estimated financial assurance cost for the Humboldt Mill is $4,649,750. KEMC will file a financial assurance instrument with the MDEQ upon issuance of project permits, and agreement with MDEQ on the financial assurance costs.

8.1 Reclamation and Post-Closure Monitoring Costs

A detailed description and cost for reclamation and post-closure monitoring are described in Section 6. The total reclamation and monitoring costs for the Eagle Project are $1,766,500. Reclamation and post-closure monitoring costs are detailed in Table 6-5 and Table 6-6.

8.2 Administrative Costs

MDEQ administrative costs will include those activities necessary to implement remediation, reclamation and post-closure monitoring including:

- Contract negotiations with contractors,
- Staff administration,
- Legal expenses,
- Construction management and oversight.

The estimated MDEQ administrative cost is $441,625.

8.3 Environmental Contingency Costs

Environmental contingency costs are those costs associated with unlikely remediation to air, surface water and groundwater. The estimated total environmental contingency cost is $441,625.

Note that because of the facility environmental controls and monitoring that will be conducted, potential environmental impacts are extremely remote.

8.4 Operating Contingency Costs

Operating contingency costs include those costs necessary to continue operation of the facility environmental controls such as the WWTP for a five year period until reclamation can begin. The estimated operating contingency cost is $2,000,000.

8.5 Financial Assurance Instrument

KEMC will establish financial assurance in the form of an irrevocable letter of credit meeting the requirement of R 425.302.

8.6 Standards for Release of Financial Assurance

KEMC proposes the following standards for release of financial assurance at the completion of reclamation. KEMC may request partial release of the financial assurance for those portions of the site that are reclaimed and have met the release criteria. Listed below are the standards for release for that portion of the financial assurance that addresses site reclamation:

- Removal of chemicals or reagents from site buildings,
- HTDF water quality meeting permitted standards after removal of the WWTP,
- Removal of HTDF WWTP, and
- The site reclamation in general conformance with Humboldt Township planning goals.

9. References

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Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, New York.

Michigan Department of Environmental Quality. 2002. *Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria.*

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North Jackson Company. September 2004a. *Eagle Project – Hydrologic Assessments Standard Operating Procedures Manual*

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Traverse Engineering Services. 1984, *Humboldt Pit Hydrogeological Report, Callahan Mining Corporation*, November 1984.

United States Environmental Protection Agency. 1992. *Statistical Analysis for Groundwater Monitoring Data at RCRA Facilities – Addendum to Interim Final Guidance*, PB89-151047.

United States Environmental Protection Agency. 2000. *Practical Methods for Data Analysis– EPA QA/G-9*, EPA/600/R-96/084.

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Figures



Lake Superior

Lanse Twp
Baraga
Michigamme Twp
Silver Lake Basin
Champion Twp
Powell Twp
Ishpeming Twp
Marquette Twp
Peshekee River
Wolf Lake
Log Lake
Dead River Storage Basin
Deer Lake
Kipple Creek
Middle Branch of Escanaba River
Second River
Ely Twp
Negaunee Twp
US 41
Marquette
Marquette
Lake Michigamme
Van Riper State Park
Deer Lake
Ropes Mine Site
~24 Miles
Humboldt Mill Project Location
Champion Mine Site
Teal Lake
Fish Lake
Humboldt Tailings Disposal Facility
Horseshoe Lake
Perch Lake
Heron Rookery Pond
Lowmoor Lake
US 41
Ishpeming
Negaunee
Goose Lake
Republic Township
US 95
CR 601
Lake Lory
Sands Twp
Goose Lake
Greenwood Reservoir
Tilden Mine Site
Empire Mine Site
Granite Lake
Chocolay Twp
Tilden Twp
Tailings Pond
Richmond Twp
Tailings Pond
Tower Lake
Humboldt Twp
Middle Branch of Escanaba River
Schweitzer Basin
Black River
Tailings Pond
Tailings Pond
West Branch
West Branch Twp
Skandia Twp

NOTES

1. Horizontal datum based on NAD 83/94. Horizontal coordinates based on UTM Zone 16.
2. All base information downloaded from Michigan Center of Geographic Information (http://www.michigan.gov/cgi).
3. Site Location - Project Site within Sections 2 and 11, T47N, R29W, Humboldt Township, Marquette County, Michigan.

LEGEND

- Counties
- Municipalities
- Minor Civil Divisions
- Lakes and Rivers
- KEMC Project Location
- Highways
- Major Roads
- Minor Roads
- Railroads

N

Foth Infrastructure & Environment, LLC

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Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY: JOS1			DATE: AUG. '08
APPROVED BY: SVD1			DATE: AUG. '08
APPROVED BY:			DATE:

Kennecott Eagle Minerals

FIGURE 1-1

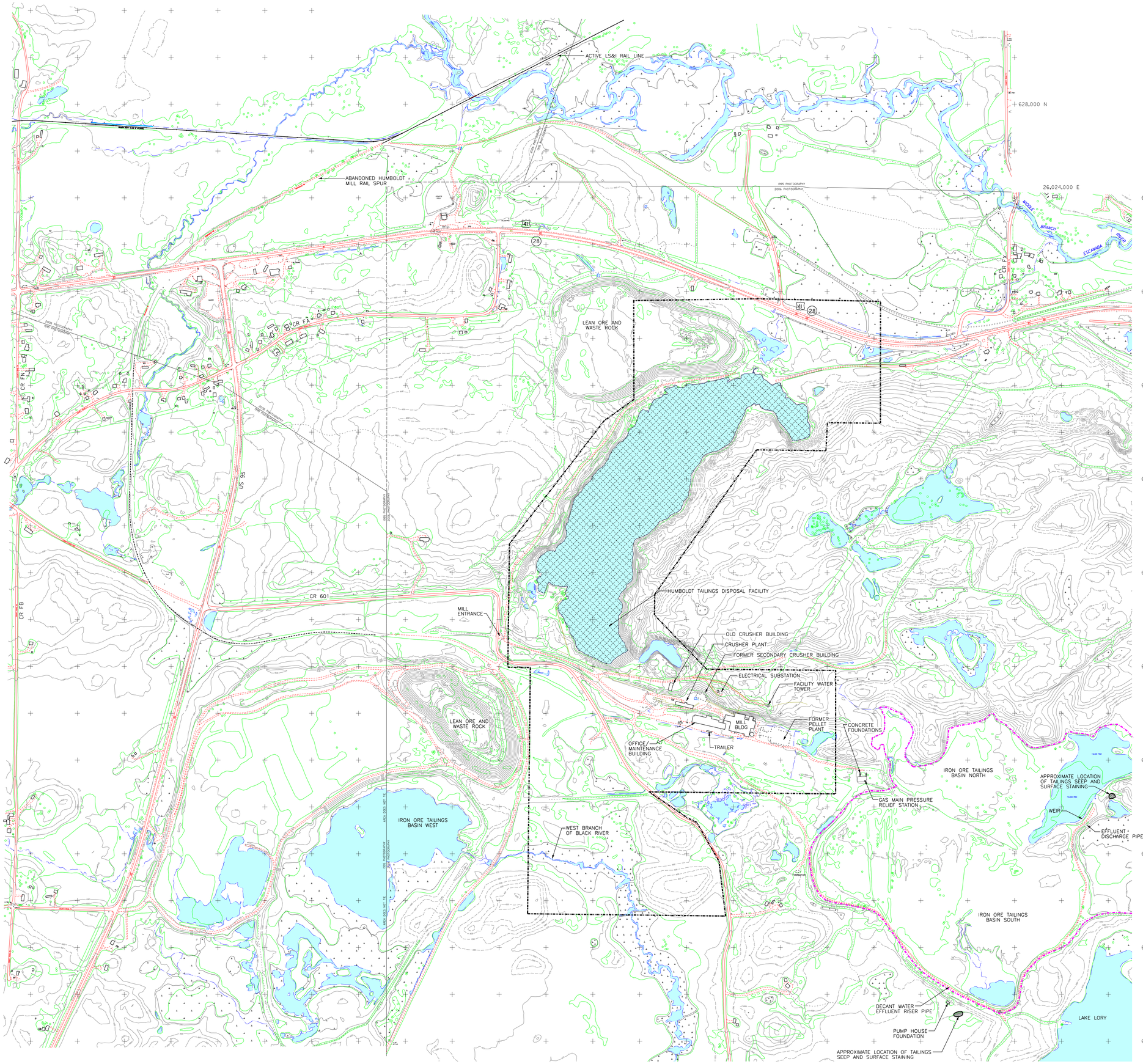
HUMBOLDT MILL PROJECT
PROJECT LOCATION

Scale: 0 1.5 3 Miles

Date: AUGUST, 2008

Prepared by: DAT

Project No: 06W003



LEGEND

- EXISTING ELEV. CONTOUR IN FEET
- PAVED ROAD
- UNPAVED ROAD
- TRAIL
- TREE
- TREE LINE
- FENCE
- SURFACE WATER
- SWAMP/WETLAND
- STREAM/LAKE
- BUILDING
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- APPROXIMATE LIMITS OF PRE-EXISTING IRON ORE TAILINGS DISPOSAL FACILITY
- KEMC PROJECT LOCATION
- ACTIVE LS&I RAIL LINE

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006, UNLESS OTHERWISE NOTED.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. SITE LOCATION: PROJECT SITE WITHIN SECTIONS 2 AND 11, T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 10 FOOT.

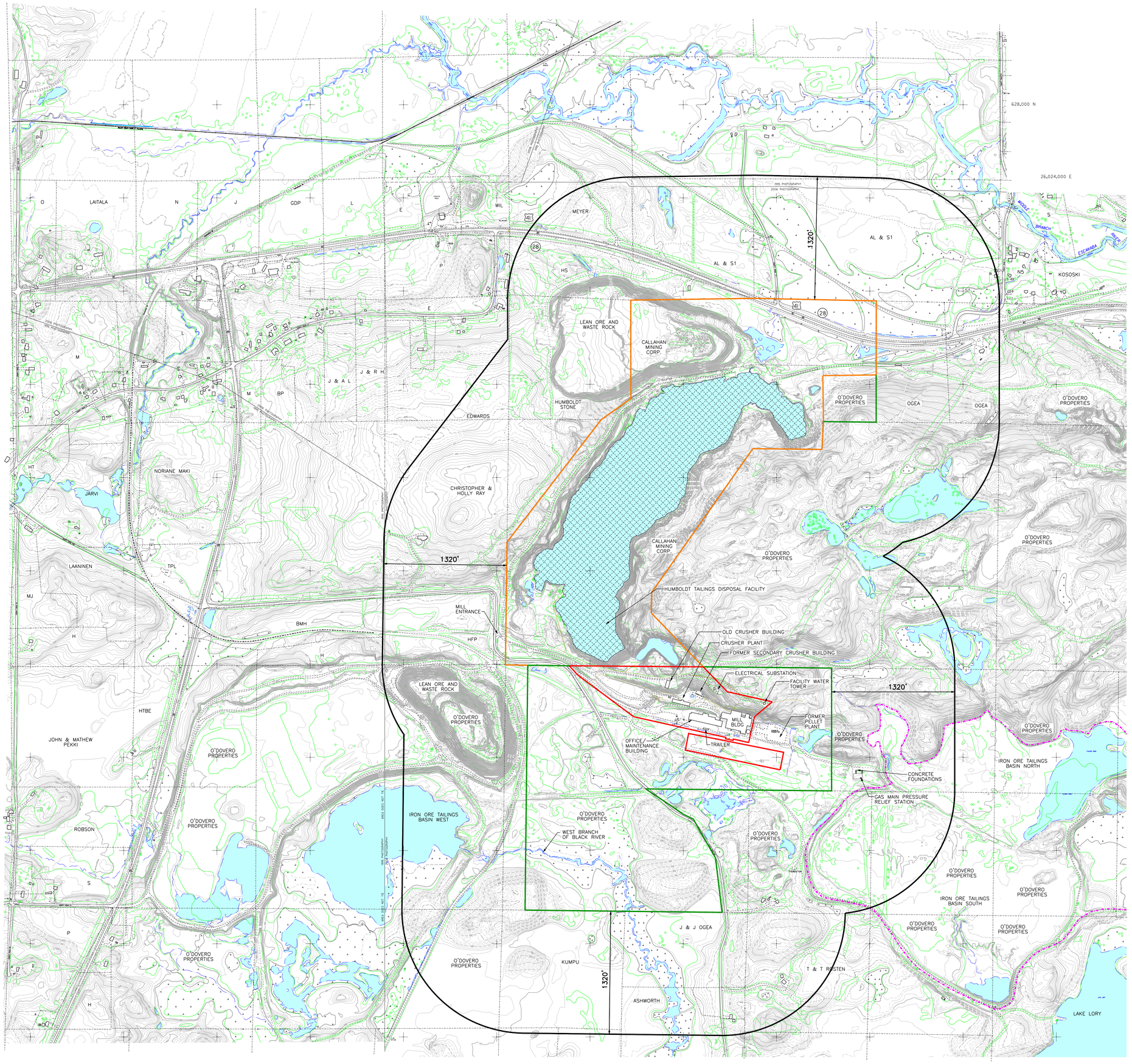
Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:	JOS1		DATE: DEC. '07
APPROVED BY:	SVD1		DATE: DEC. '07
APPROVED BY:			DATE:

Kennecott Eagle Minerals

FIGURE 1-2
HUMBOLDT MILL PROJECT
REGIONAL SETTING

Scale: 0 200 400
Date: DECEMBER, 2007
Prepared By: JOW
Project No. 06W003

L:\06w003\MPA\TIA\mpa_tia_regional_exist_condition_3d
12/11/2007 jow



N

LEGEND

- EXISTING ELEV. CONTOUR IN FEET
- PAVED ROAD
- UNPAVED ROAD
- TRAIL
- TREE
- TREE LINE
- FENCE
- SURFACE WATER
- SWAMP/WETLAND
- STREAM/LAKE
- BUILDING
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- APPROXIMATE LIMITS OF PRE-EXISTING IRON ORE TAILINGS DISPOSAL FACILITY
- PROPERTY BOUNDARY
- CALLAHAN PROPERTY OWNERSHIP (KEMC PURCHASE OPTION)
- KENNECOTT EAGLE LAND, LLC PRPERTY OWNERSHIP
- O'DOVERO PROPERTY OWNERSHIP (KEMC PURCHASE OPTION)
- EXISTING RAIL LINE

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006, UNLESS OTHERWISE NOTED.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. SITE LOCATION: PROJECT SITE WITHIN SECTIONS 2 AND 11, T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 10 FOOT.
5. KEMC PURCHASE OPTIONS ARE ASSIGNABLE AND MAY BE ASSIGNED TO KENNECOTT RELATED ENTITY.

Foth Infrastructure & Environment, LLC				Kennecott Eagle Minerals
REVISED	DATE	BY	DESCRIPTION	FIGURE 2-1
				HUMBOLDT MILL PROJECT
				PROPERTY OWNERSHIP
CHECKED BY:	JOS!		DATE: AUG. '08	
APPROVED BY:	SVD!		DATE: AUG. '08	Scale: 0 200' 400' Date: AUGUST, 2008
APPROVED BY:			DATE:	Prepared By: JOW Project No. 06W003

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12/12/2008 bjw1

26,017,000 E | 26,018,000 E | 26,019,000 E | 26,020,000 E | 26,021,000 E | 26,022,000 E | 26,023,000 E | 26,024,000 E

627,000 N | 625,000 N | 624,000 N | 623,000 N | 622,000 N | 621,000 N | 620,000 N | 619,000 N | 618,000 N

N

0 300' 600'

LEAN ORE AND WASTE ROCK

SURFACE WATER ELEVATION = 1537.88 (JUNE 5, 2007)

HUMBOLDT TAILINGS DISPOSAL FACILITY

MILL ENTRANCE

OLD CRUSHER BUILDING

CRUSHER PLANT

FORMER SECONDARY CRUSHER BUILDING

ELECTRICAL SUBSTATION

FACILITY WATER TOWER

MILL BLDG

FORMER PELLET PLANT

TRAILER

OFFICE/ MAINTENANCE BUILDING

STORMWATER OUTFALL

SEPTIC SYSTEM

CONCRETE FOUNDATIONS

GAS MAIN PRESSURE RELIEF STATION

IRON ORE TAILINGS BASIN NORTH

APPROXIMATE LOCATION OF TAILINGS SEEP AND SURFACE STAINING

WEIR

EFFLUENT DISCHARGE PIPE

IRON ORE TAILINGS BASIN WEST

WEST BRANCH OF BLACK RIVER

PRIVATE RESIDENCE

IRON ORE TAILINGS BASIN SOUTH

DECANT WATER EFFLUENT RISER PIPE

PUMP HOUSE FOUNDATION

APPROXIMATE LOCATION OF TAILINGS SEEP AND SURFACE STAINING

LAKE LORY

MIDDLE BRANCH ESCANABA RIVER

LEGEND

- EXISTING ELEV. CONTOUR IN FEET
- PAVED ROAD
- UNPAVED ROAD
- TRAIL
- TREE
- TREE LINE
- FENCE
- SURFACE WATER
- SWAMP/WETLAND
- STREAM/LAKE
- BUILDING
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- APPROXIMATE LIMITS OF PRE-EXISTING IRON ORE TAILINGS DISPOSAL FACILITY
- KEMC PROJECT LOCATION

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. SITE LOCATION: PROJECT SITE WITHIN SECTIONS 2 AND 11, T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 10 FOOT.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: DEC. '07
APPROVED BY:	SVD1	DATE: DEC. '07
APPROVED BY:		DATE:

Kennecott Eagle Minerals

FIGURE 2-2

HUMBOLDT MILL PROJECT EXISTING CONDITIONS

Scale:	AS SHOWN	Date:	DECEMBER, 2007
Prepared By:	JOW	Project No.	06W003

L:\06w003\MPA\TIA\mpa-tia-existing site.3d
12/11/2007 jow

26,017,000 E | 26,018,000 E | 26,019,000 E | 26,020,000 E | 26,021,000 E | 26,022,000 E | 26,023,000 E | 26,024,000 E

627,000 N | 626,000 N | 625,000 N | 624,000 N | 623,000 N | 622,000 N | 621,000 N | 620,000 N | 619,000 N | 618,000 N

N

41 28

MIDDLE BRANCH ESCANABA RIVER

1 2 3 10 11 12 13 14 15

LEAN ORE AND WASTE ROCK

MILL ENTRANCE

OLD CRUSHER BUILDING

CRUSHER PLANT

FORMER SECONDARY CRUSHER BUILDING

FACILITY WATER TOWER

MILL BLDG

OFFICE / MAINTENANCE BUILDING

FOUNDATION

TAILINGS POND

LAKE LORY

LEGEND

- EXISTING ELEV. CONTOUR IN FEET
- PAVED ROAD
- UNPAVED ROAD
- TRAIL
- TREE
- TREE LINE
- FENCE
- SURFACE WATER
- SWAMP/WETLAND
- STREAM/LAKE
- BUILDING
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- KEMC PROJECT LOCATION
- SECTION LINES
- TOWN DEVELOPMENT ZONING DISTRICT
- RESOURCE PRODUCTION (RP-10) ZONING DISTRICT
- RESOURCE PRODUCTION (RP-20) ZONING DISTRICT
- INDUSTRIAL (I) ZONING DISTRICT
- RESIDENTIAL (R) ZONING DISTRICT
- TIMBER PRODUCTION (TP-40) ZONING DISTRICT

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. SITE LOCATION: PROJECT SITE WITHIN SECTIONS 2 AND 11, T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 10 FOOT.
5. ZONING DISTRICT INFORMATION FROM HUMBOLDT TOWNSHIP, ECI OF ISHPEMING, MI., MAY 12, 2003.

0 300' 600'

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: DEC. '07
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APPROVED BY:		DATE:

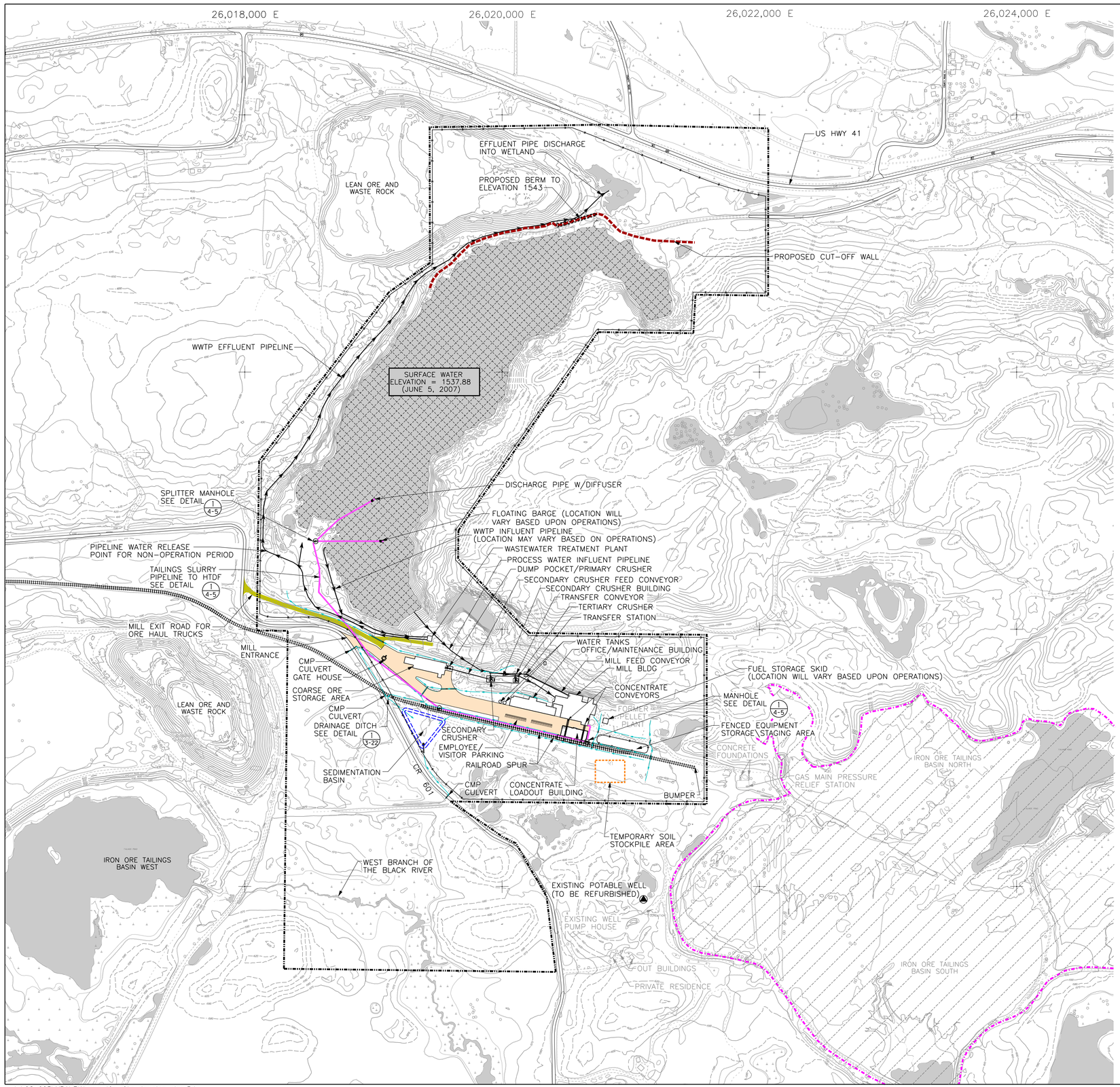
Kennecott Eagle Minerals

FIGURE 2-3

HUMBOLDT MILL PROJECT
HUMBOLDT TOWNSHIP ZONING DISTRICTS

Scale: AS SHOWN	Date: DECEMBER, 2007
Prepared By: JOW	Project No. 06W003

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LEGEND

- EXISTING ELEV. CONTOUR IN FEET
- TREE
- TREE LINE
- BUILDING
- TRAIL
- PAVED ROAD
- UNPAVED ROAD
- STREAM/LAKE
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- PRE-EXISTING IRON ORE TAILINGS DISPOSAL FACILITY
- KEMC PROJECT LOCATION
- GRAVEL SURFACE
- RAILROAD SPUR
- SURFACE WATER FLOW DIRECTION
- BITUMINOUS PAVED AREA
- CMP CULVERT
- FENCE
- TAILINGS SLURRY PIPELINE TO HTDF
- BERMED AREA TO ELEVATION 1543
- WWTP EFFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)
- WWTP INFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)
- PROCESS WATER INFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)
- PROPOSED CUT-OFF WALL

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. KEMC PROJECT LOCATION WITHIN SECTIONS 2 AND 11 T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 10 FOOT.

Foth Infrastructure & Environment, LLC				
REVISED	DATE	BY	DESCRIPTION	
CHECKED BY:	JOS1		DATE: SEPT. '08	
APPROVED BY:	SVD1		DATE: SEPT. '08	
APPROVED BY:			DATE:	

Kennecott Eagle Minerals

FIGURE 3-1

HUMBOLDT MILL PROJECT
SITE DEVELOPMENT PLAN

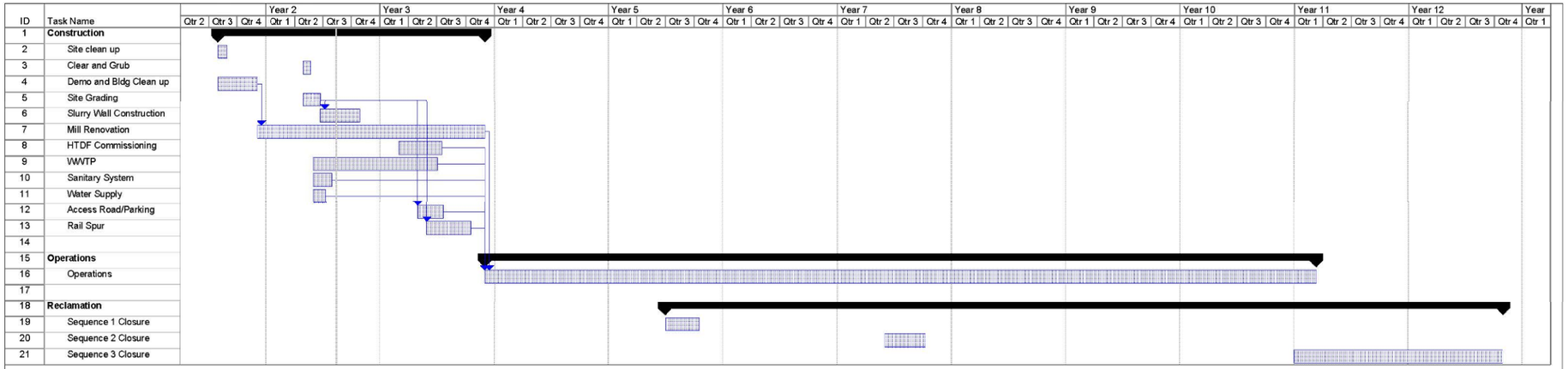
Scale: 0 200' 400'

Date: SEPTEMBER, 2008

Prepared By: JOW

Project No. 06W003

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Foth Infrastructure & Environment, LLC

Foth Infrastructure & Environment, LLC			
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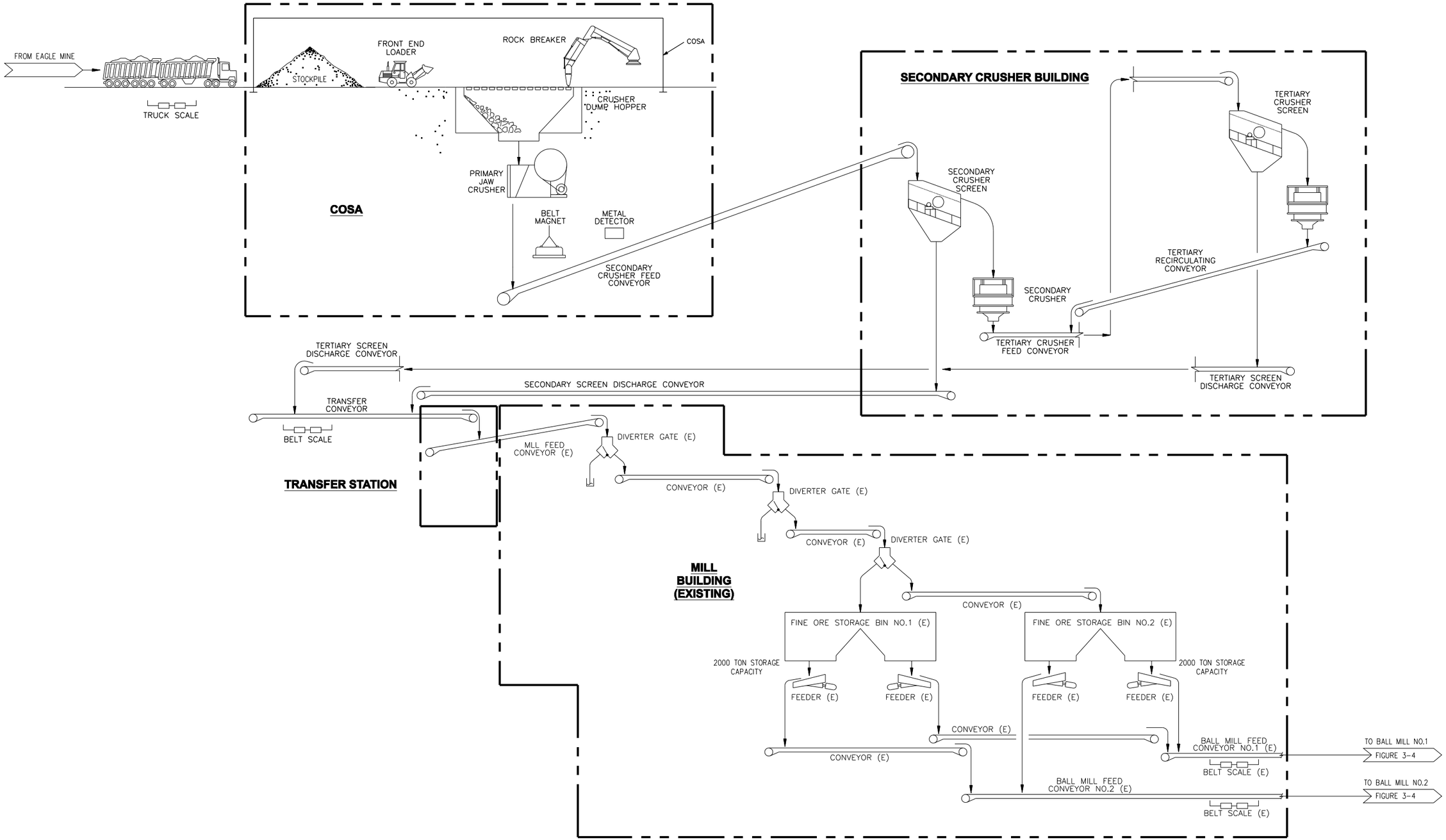
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APPROVED BY:	SVD1	DATE: AUG. '08	
APPROVED BY:		DATE:	

Kennecott
Eagle Minerals

FIGURE 3-2
HUMBOLDT MILL PROJECT
PROJECT TIMELINE

Scale:	NOT TO SCALE	Date: AUGUST, 2008	
Prepared by:	DAT	Project No:	06W003

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NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. CRUSHING PLANT TO PROCESS A NOMINAL 2,200 TONNES PER DAY OF ORE.
3. (E) - DESIGNATES EXISTING EQUIPMENT

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY: JOS1		DATE: AUG. '08	
APPROVED BY: SVD1		DATE: AUG. '08	
APPROVED BY:		DATE:	

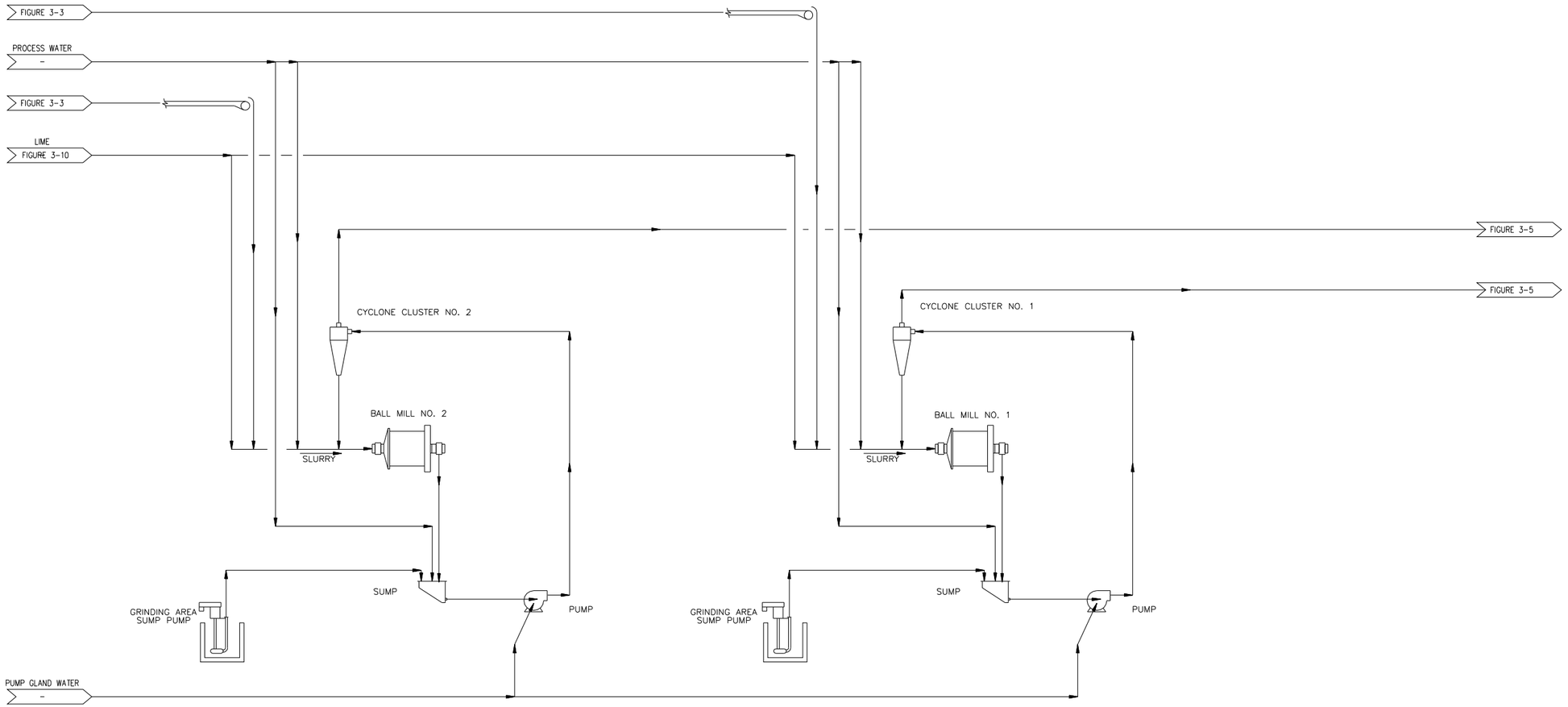
Kennecott Eagle Minerals

FIGURE 3-3

HUMBOLDT MILL PROJECT
CRUSHING PLAN PROCESS FLOW

Scale: NOT TO SCALE	Date: AUGUST, 2008
Prepared By: BLK	Project No. 06W003

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9/19/2008 jow



NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. GRINDING PLANT IS DESIGNED FOR A NOMINAL CAPACITY OF 1,500 TONNES PER DAY.

Foth Infrastructure & Environment, LLC				
REVISED	DATE	BY	DESCRIPTION	
CHECKED BY:	JOS1		DATE: NOV. '07	
APPROVED BY:	SVD1		DATE: NOV. '07	
APPROVED BY:			DATE:	

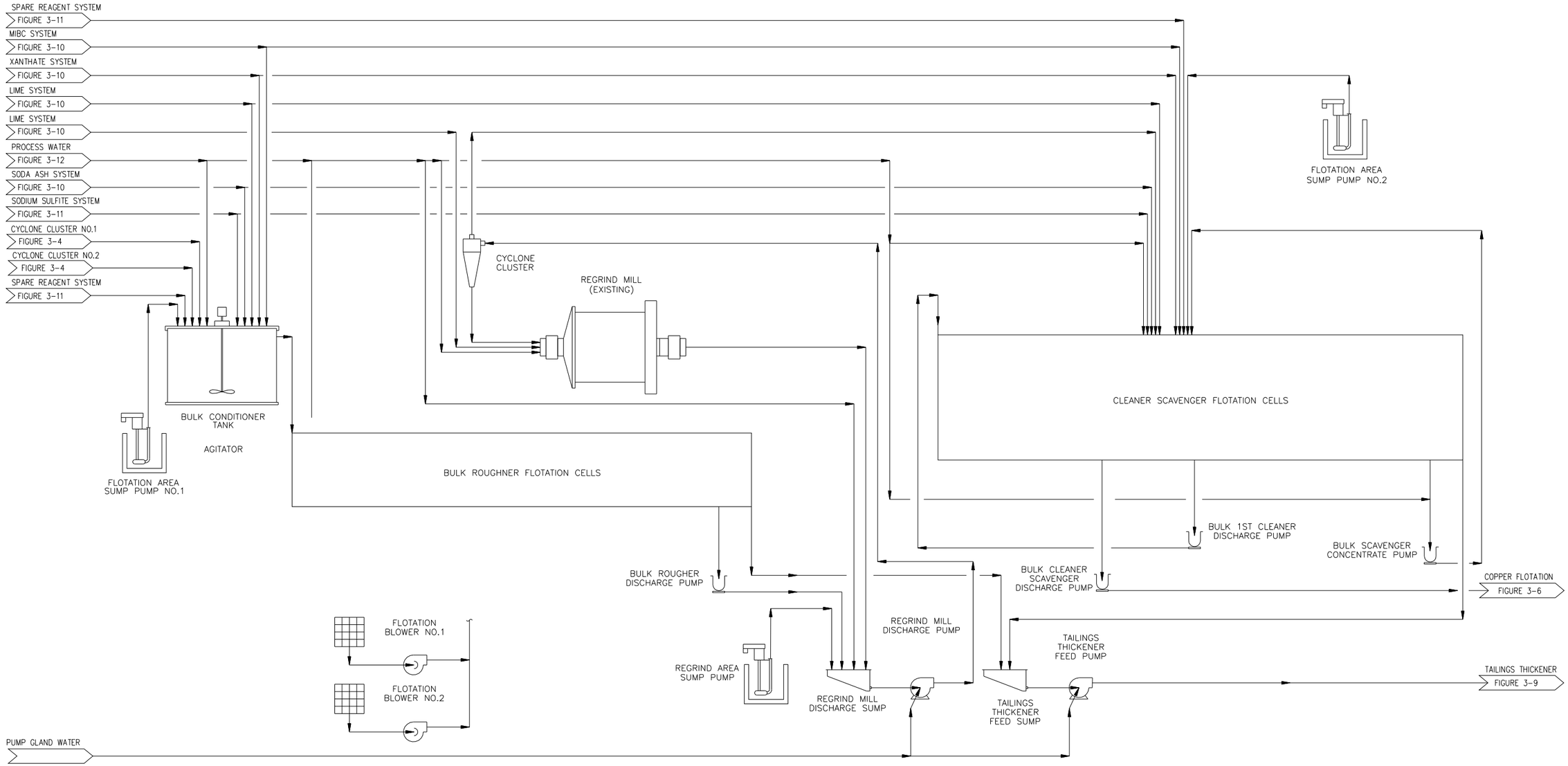
Kennecott Eagle Minerals

FIGURE 3-4

HUMBOLDT MILL PROJECT
GRINDING CIRCUIT PROCESS FLOW

Scale: NOT TO SCALE	Date: NOVEMBER, 2007
Prepared By: BLK	Project No. 06W003

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12/11/2007 jow



NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. FLOTATION PLANT TO PROCESS A NOMINAL 1,500 TONNES PER DAY OF ORE.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: NOV. '07
APPROVED BY:	SVD1	DATE: NOV. '07
APPROVED BY:		DATE:

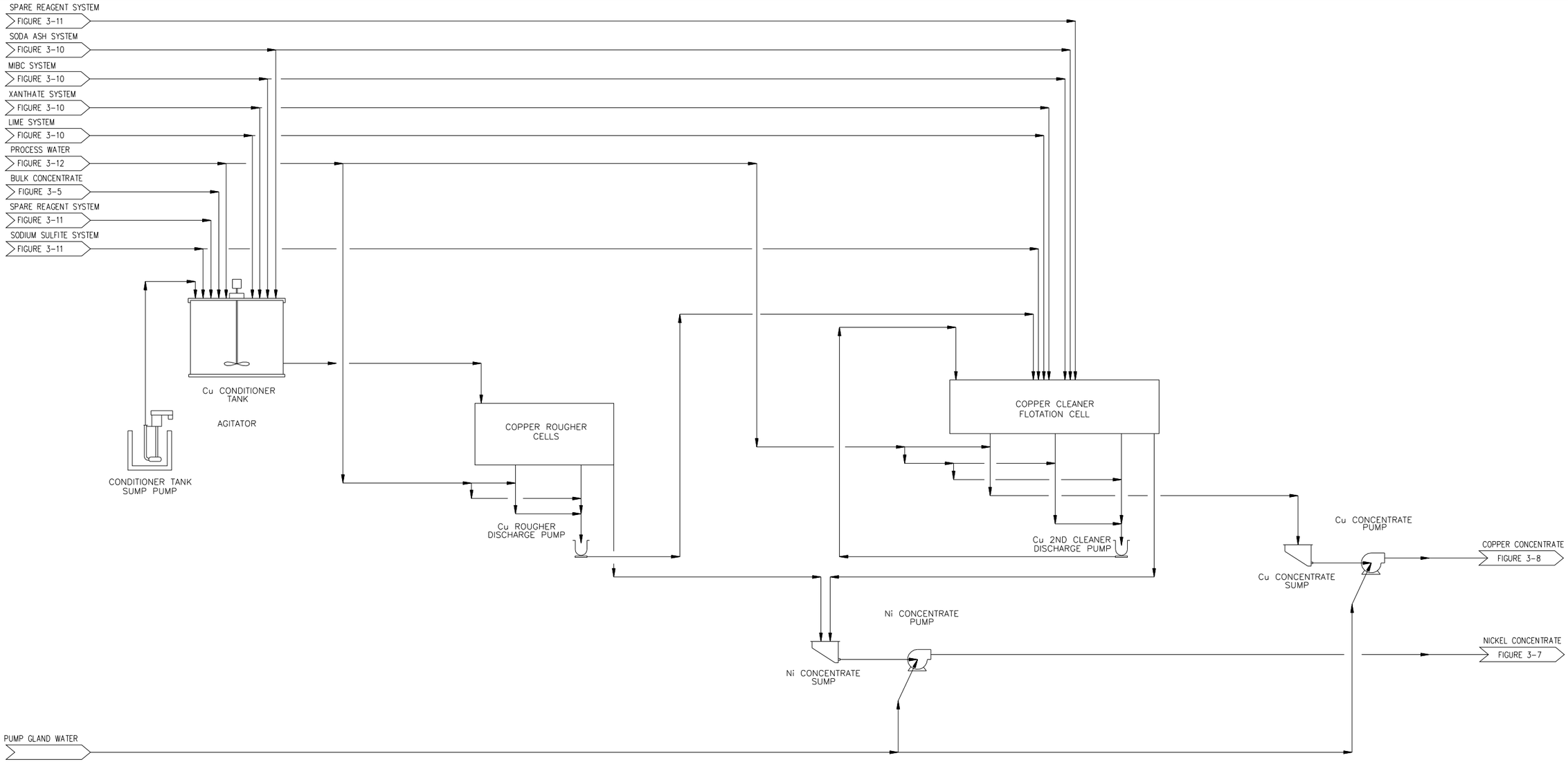
Kennecott Eagle Minerals

FIGURE 3-5

HUMBOLDT MILL PROJECT
BULK FLOTATION PROCESS FLOW

Scale: NOT TO SCALE	Date: NOVEMBER, 2007
Prepared By: BLK	Project No. 06W003

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12/11/2007 jow



NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. FLOTATION PLANT TO PROCESS A NOMINAL 1,500 TONNES PER DAY OF ORE.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOSI	DATE: NOV. '07
APPROVED BY:	SVDI	DATE: NOV. '07
APPROVED BY:		DATE:

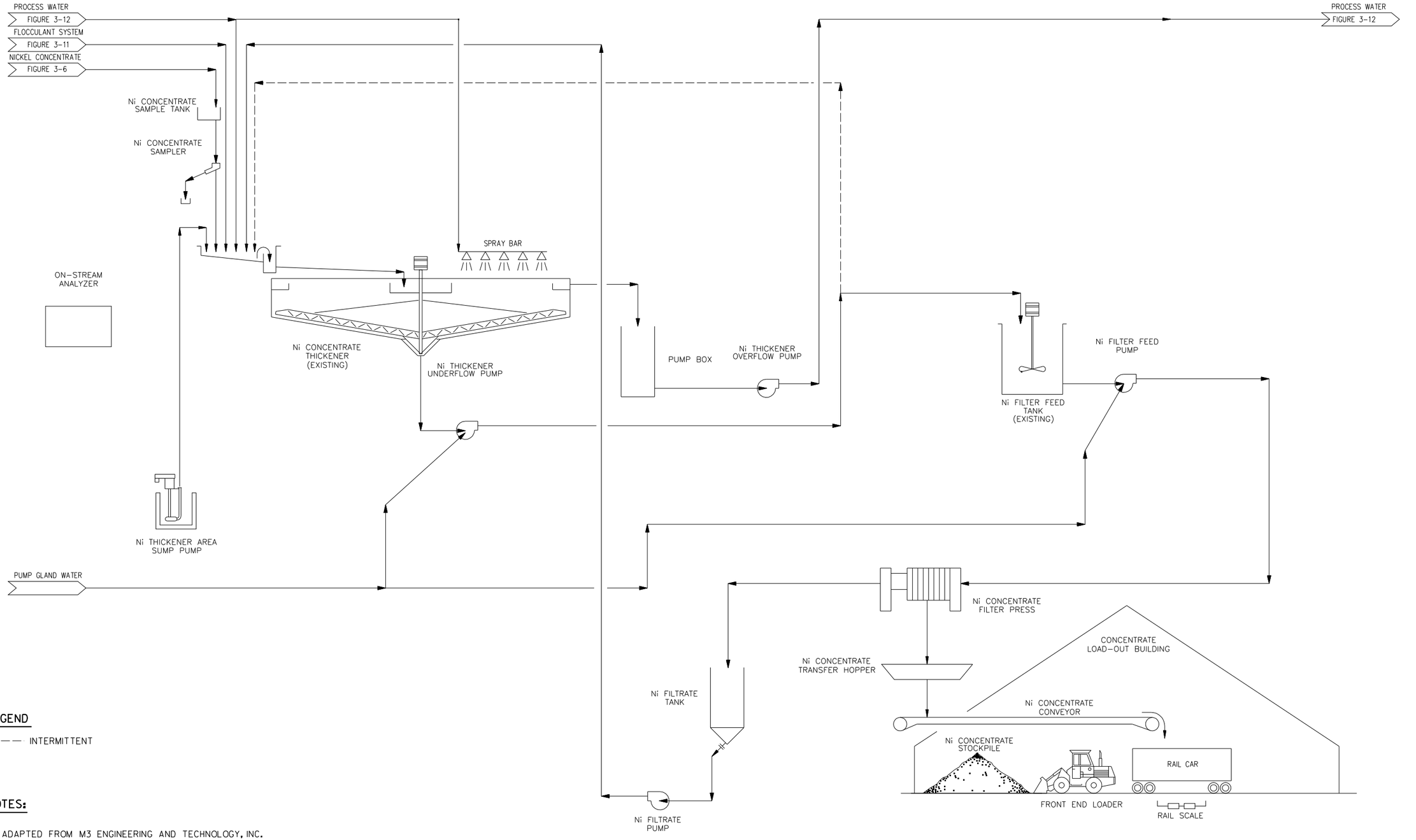
Kennecott Eagle Minerals

FIGURE 3-6

HUMBOLDT MILL PROJECT
COPPER-NICKEL FLOTATION
PROCESS FLOW

Scale: NOT TO SCALE	Date: NOVEMBER, 2007
Prepared By: BLK	Project No. 06W003

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12/11/2007 jow



LEGEND

——— INTERMITTENT

NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. PLANT TO PROCESS A NOMINAL 1,500 TONNES PER DAY OF ORE.

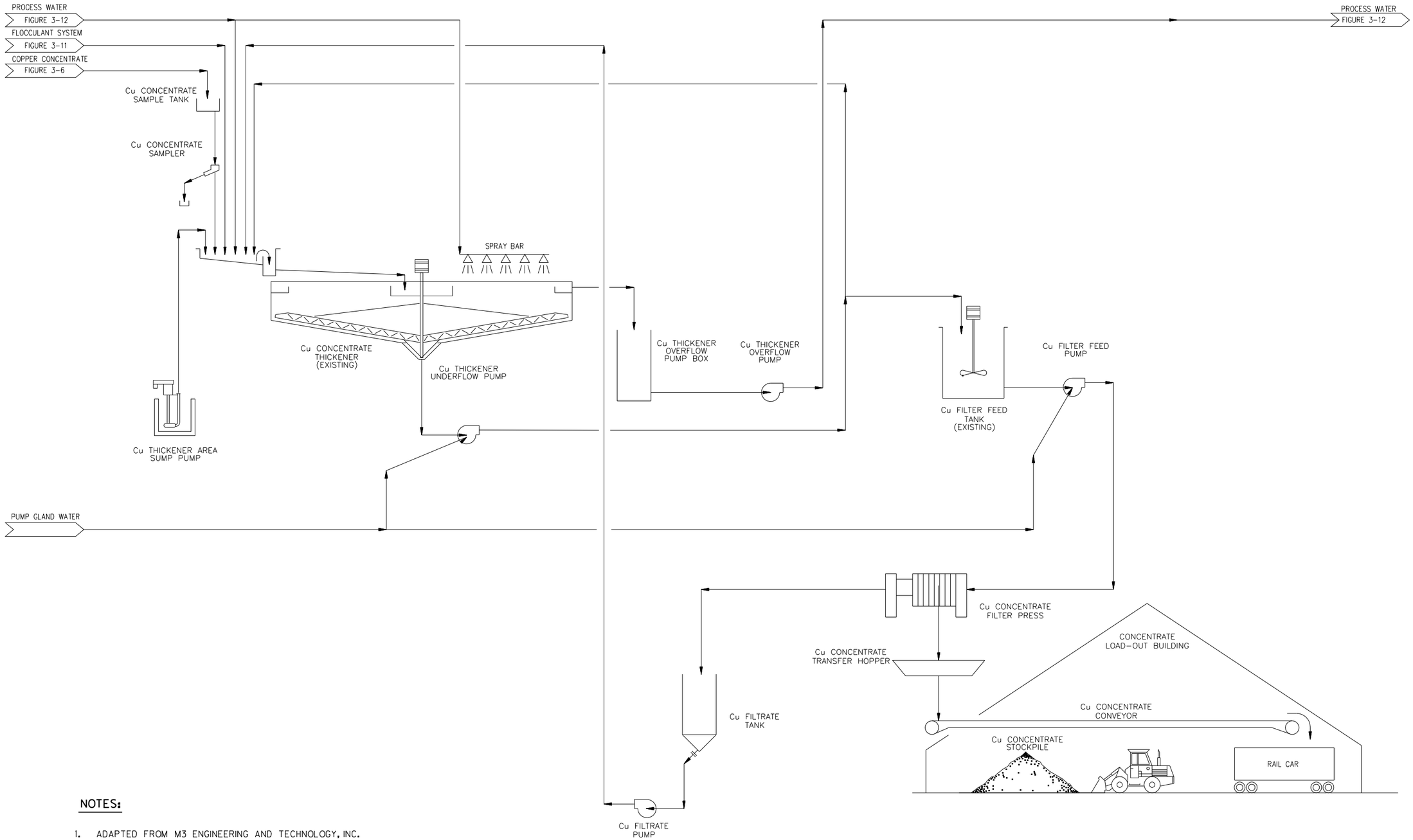
Foth Infrastructure & Environment, LLC				
REVISED	DATE	BY	DESCRIPTION	
CHECKED BY:	JOS1		DATE: AUG. '08	
APPROVED BY:	SVD1		DATE: AUG. '08	
APPROVED BY:			DATE:	

Kennecott Eagle Minerals

FIGURE 3-7
HUMBOLDT MILL PROJECT
NICKEL CONCENTRATE DEWATERING PROCESS FLOW

Scale: NOT TO SCALE	Date: AUGUST, 2008
Prepared By: BLK	Project No. 06W003

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8/29/2008 bjwl



NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. PLANT TO PROCESS A NOMINAL 1,500 TONNES PER DAY OF ORE.

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

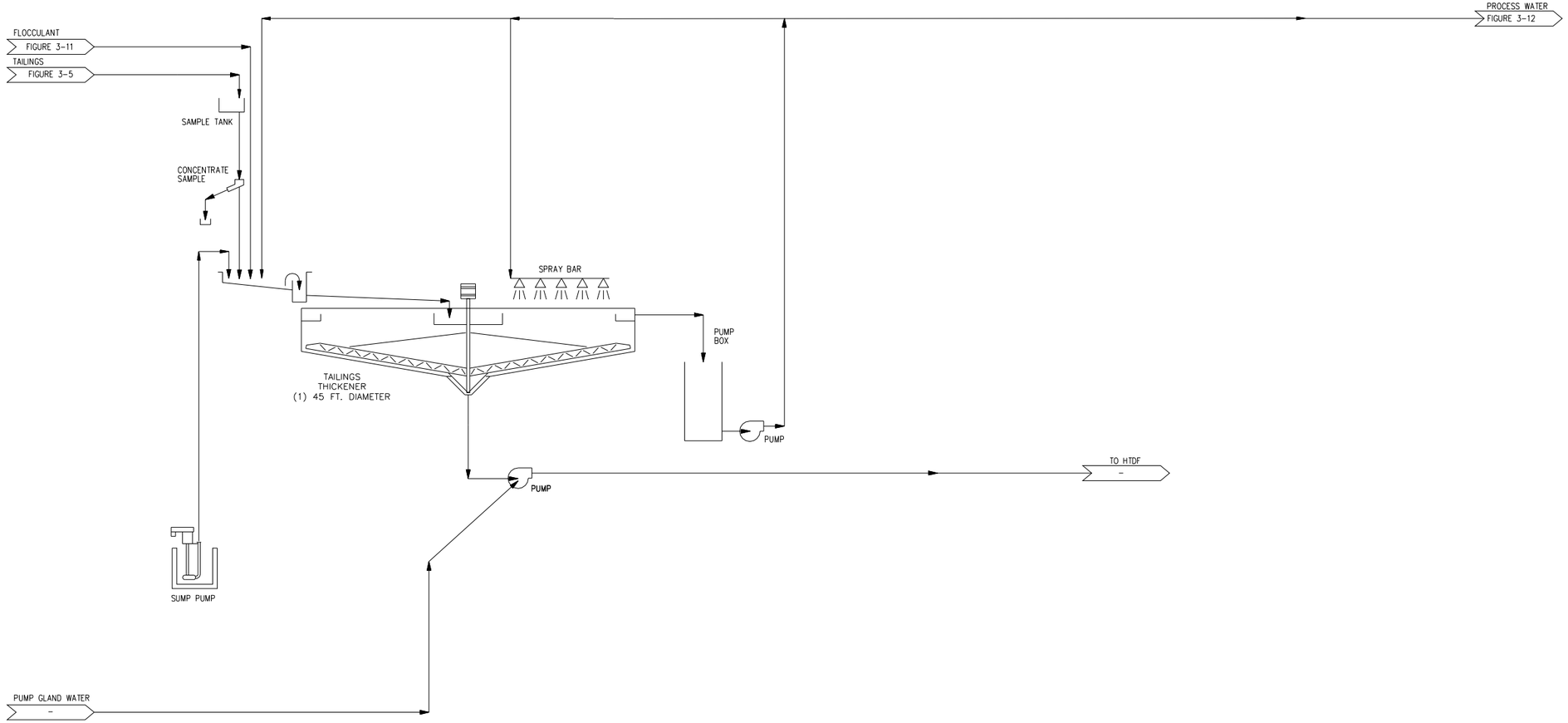
CHECKED BY:	JOS1	DATE: AUG. '08
APPROVED BY:	SVD1	DATE: AUG. '08
APPROVED BY:		DATE:

Kennecott Eagle Minerals

FIGURE 3-8
HUMBOLDT MILL PROJECT
COPPER CONCENTRATE DEWATERING PROCESS FLOW

Scale: NOT TO SCALE	Date: AUGUST, 2008
Prepared By: BLK	Project No. 06W003

I:\06w003\MPA\TIA\mpa-tia-Cu-conc-dewater.dgn
12/12/2008 jow



NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. PLANT TO PROCESS 1,500 TONNES PER DAY OF ORE.

Foth Infrastructure & Environment, LLC				
REVISED	DATE	BY	DESCRIPTION	
CHECKED BY:	JOS1			DATE: NOV. '07
APPROVED BY:	SVD1			DATE: NOV. '07
APPROVED BY:				DATE:

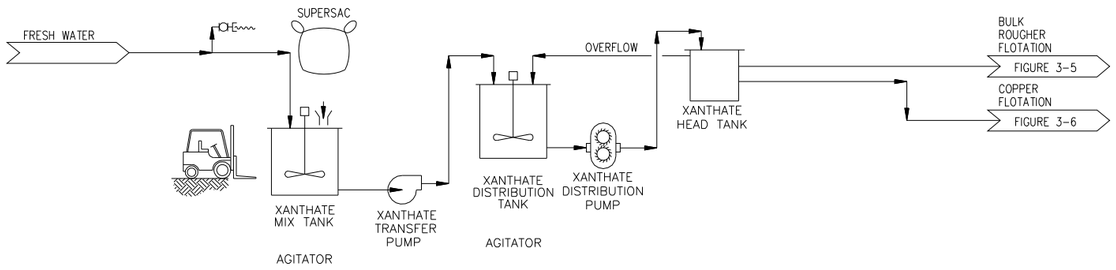
Kennecott Eagle Minerals

FIGURE 3-9

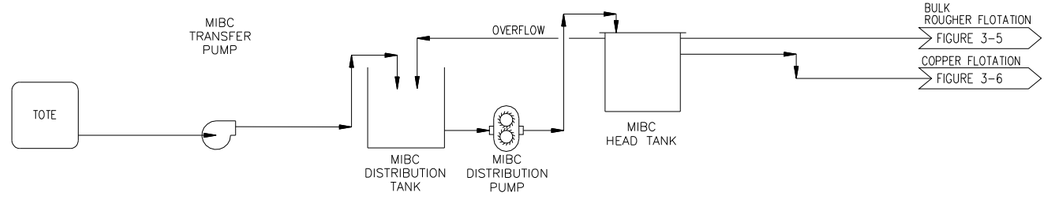
HUMBOLDT MILL PROJECT
TAILINGS DEWATERING PROCESS FLOW

Scale: NOT TO SCALE	Date: NOVEMBER, 2007
Prepared By: BLK	Project No. 06W003

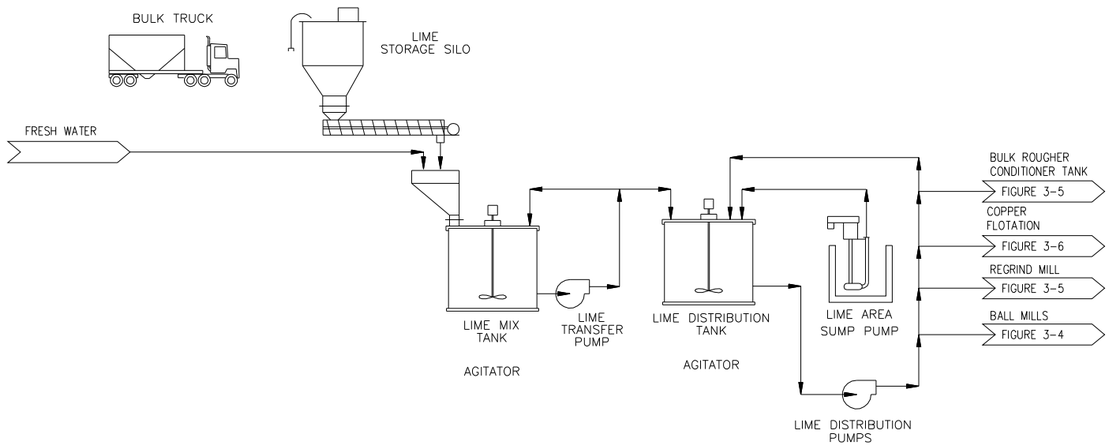
L:\06w003\MPA\TIA\mpa-tia-tailings-dewater-process.dgn
12/11/2007 jow



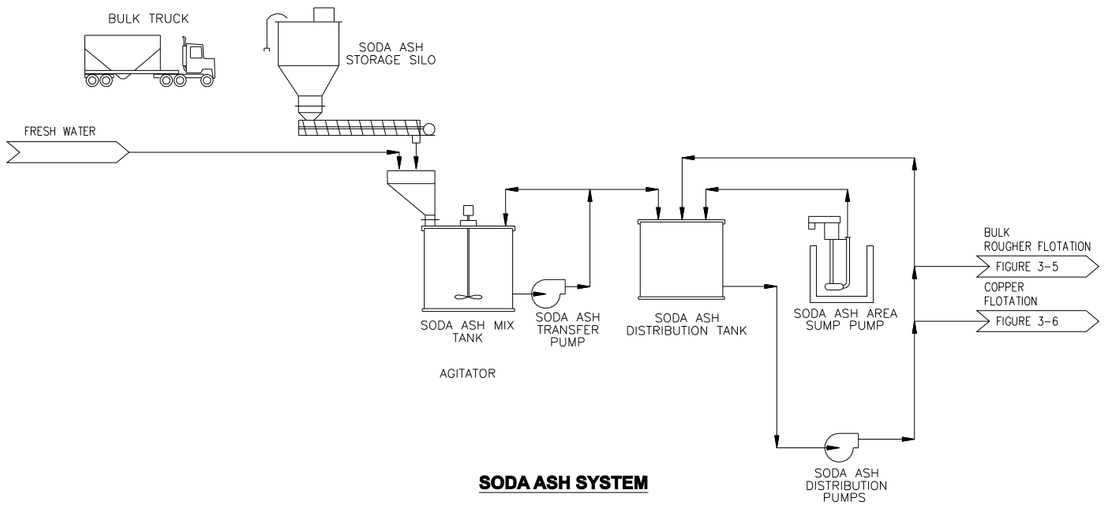
XANTHATE (SIPX) SYSTEM



MIBC (FROTHER) SYSTEM



LIME SYSTEM



SODA ASH SYSTEM

NOTE:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.

Foth Infrastructure & Environment, LLC				
REVISED	DATE	BY	DESCRIPTION	
CHECKED BY:		JOS1		DATE: NOV. '07
APPROVED BY:		SVD1		DATE: NOV. '07
APPROVED BY:				DATE:

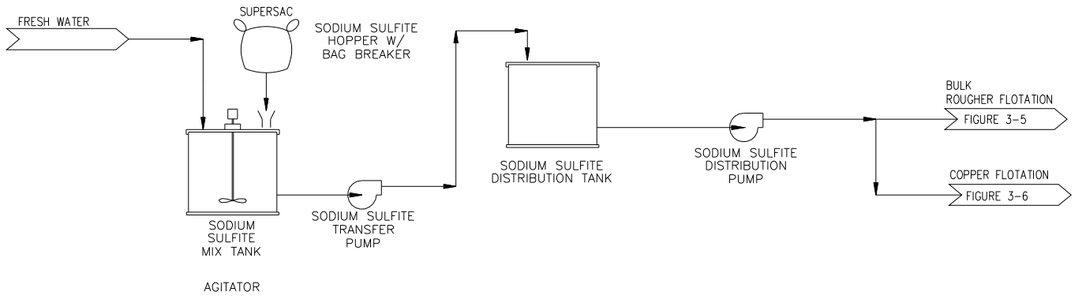
Kennecott Eagle Minerals

FIGURE 3-10

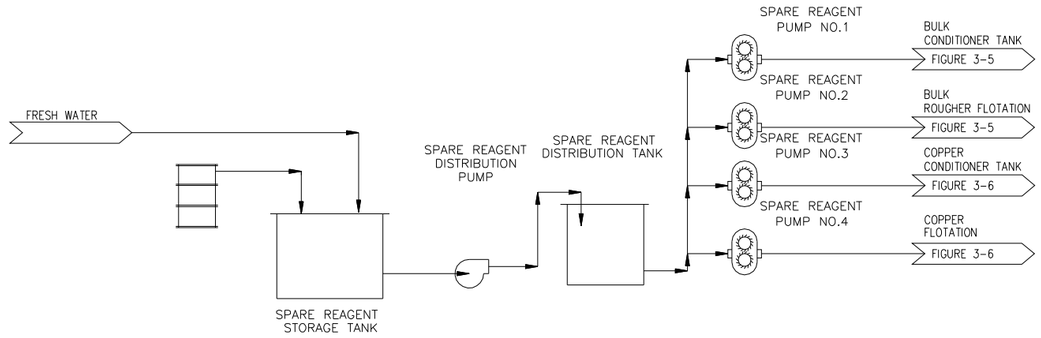
HUMBOLDT MILL PROJECT REAGENT PROCESS FLOW

Scale: NOT TO SCALE	Date: NOVEMBER, 2007
Prepared By: BLK	Project No. 06W003

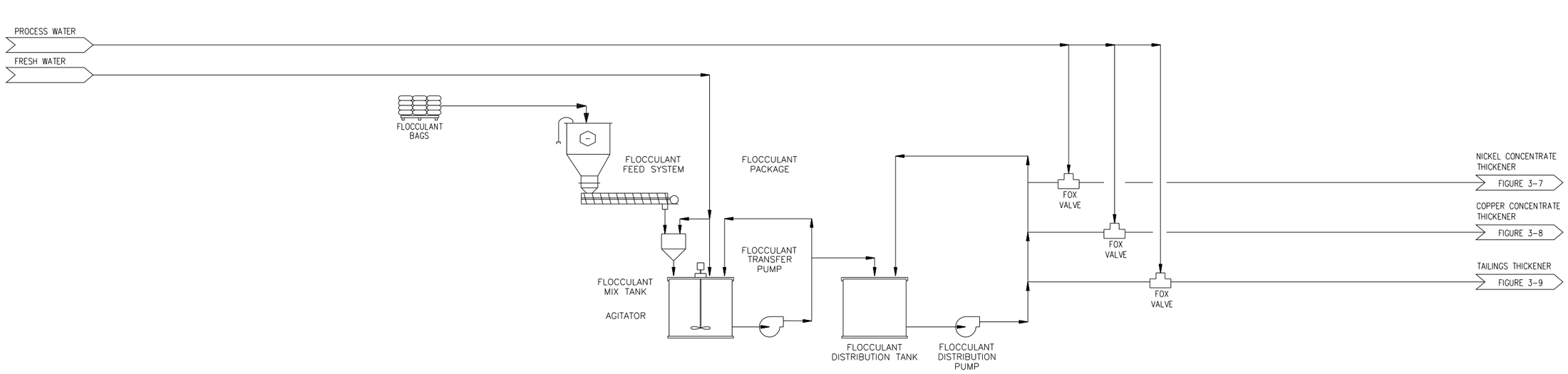
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12/11/2007 jow



SODIUM SULFITE SYSTEM



SPARE REAGENT SYSTEM



FLOCCULANT SYSTEM

NOTE:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.

Foth Infrastructure & Environment, LLC				
REVISED	DATE	BY	DESCRIPTION	
CHECKED BY:	JOS1			DATE: NOV. '07
APPROVED BY:	SVD1			DATE: NOV. '07
APPROVED BY:				DATE:

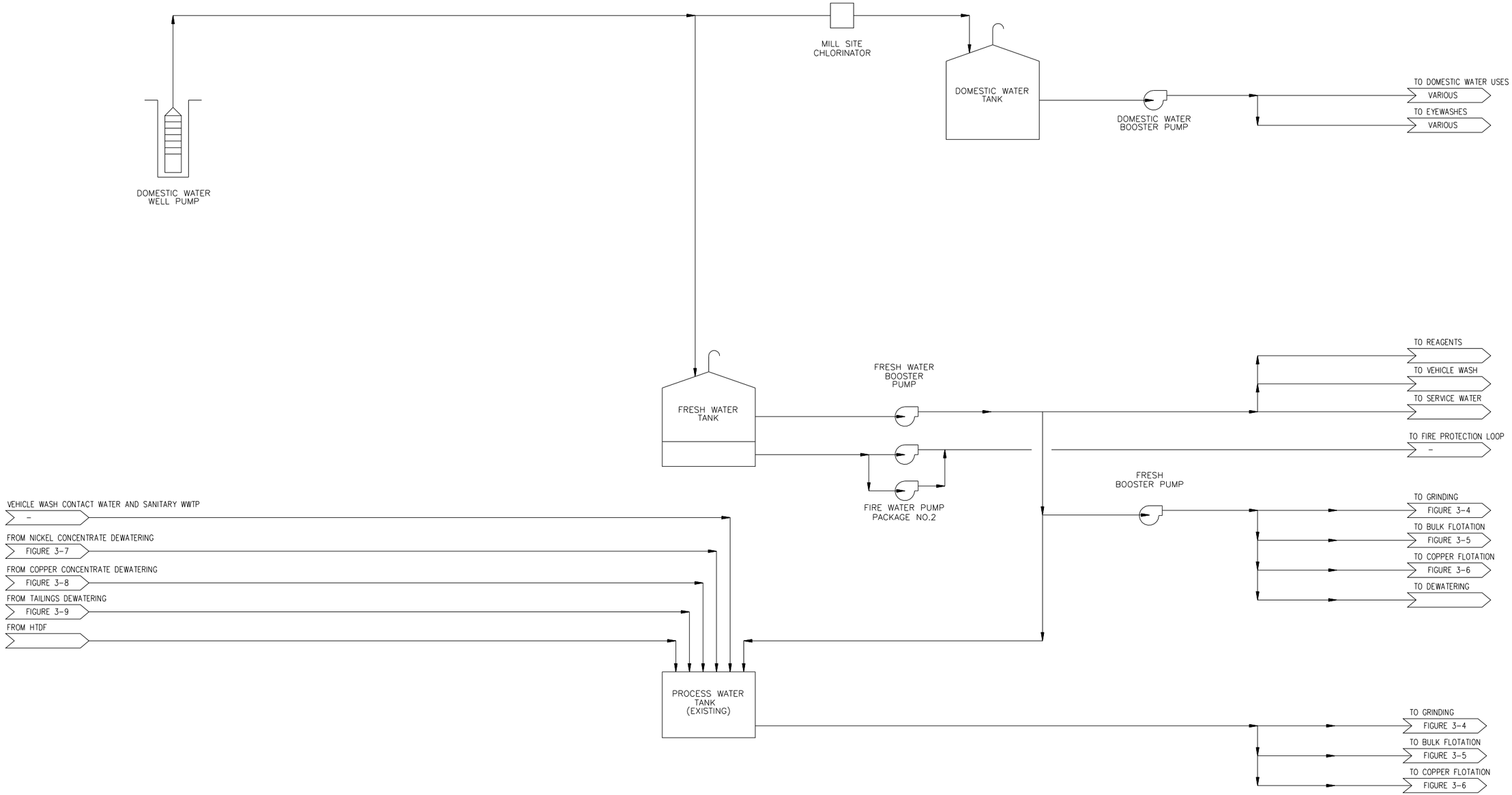
Kennecott Eagle Minerals

FIGURE 3-11

HUMBOLDT MILL PROJECT
REAGENT PROCESS FLOW

Scale: NOT TO SCALE	Date: NOVEMBER, 2007
Prepared By: BLK	Project No. 06W003

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12/11/2007 jow



NOTE:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE:	NOV. '07
APPROVED BY:	SVD1	DATE:	NOV. '07
APPROVED BY:		DATE:	

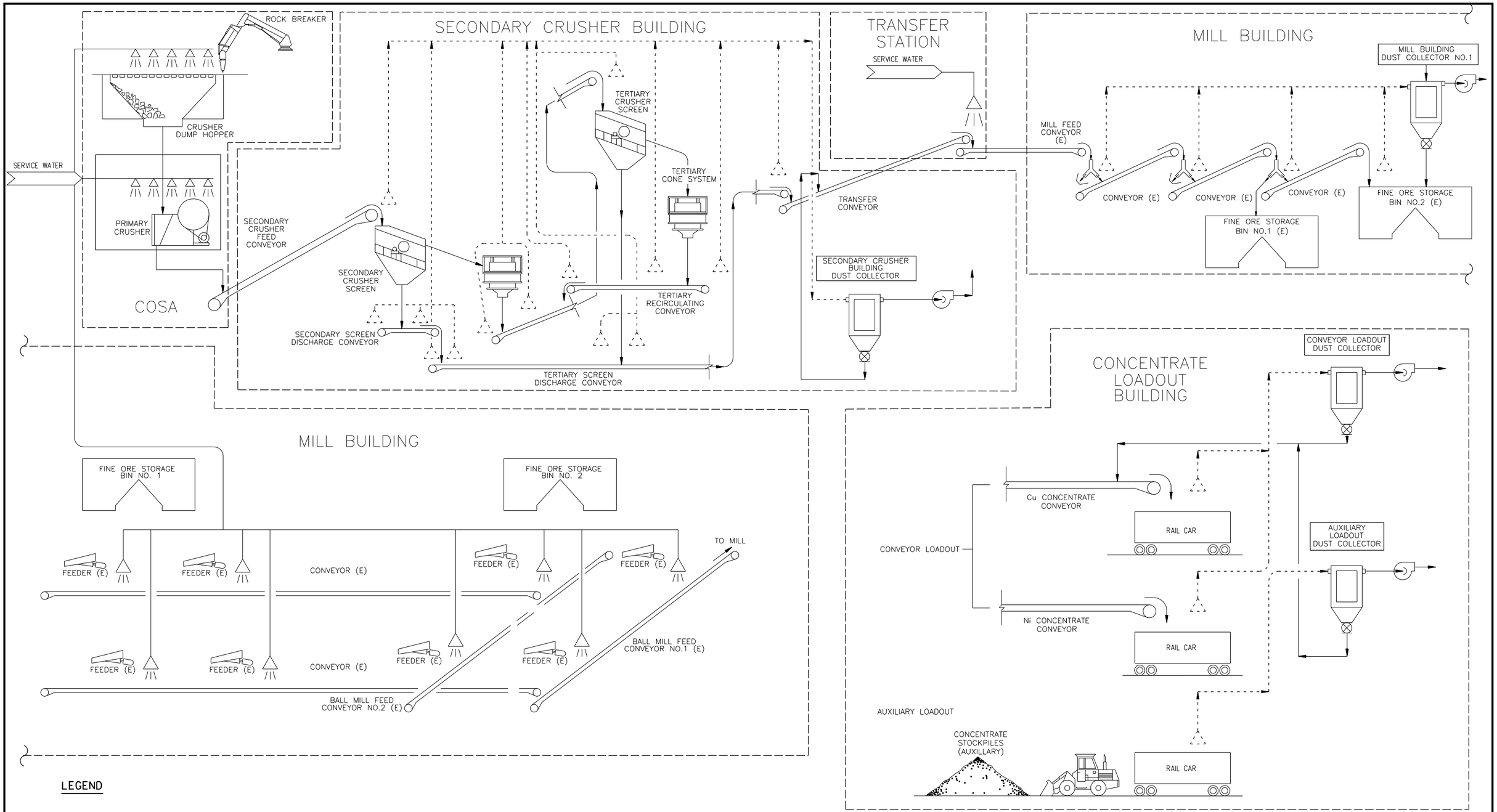
Kennecott Eagle Minerals

FIGURE 3-12

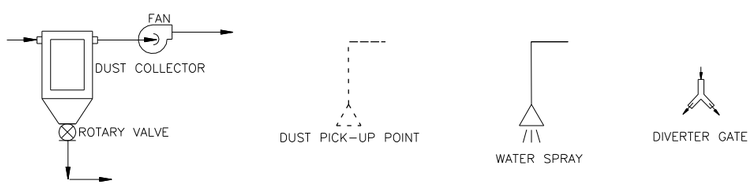
HUMBOLDT MILL PROJECT WATER PROCESS FLOW

Scale: NOT TO SCALE	Date: NOVEMBER, 2007
Prepared By: BLK	Project No. 06W003

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12/11/2007 jow



LEGEND



NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. (E) - DESIGNATES EXISTING EQUIPMENT.

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY: AKM			DATE: AUG. '08
APPROVED BY: SVD1			DATE: AUG. '08
APPROVED BY:			DATE:

Kennecott Eagle Minerals

FIGURE 3-13

HUMBOLDT MILL PROJECT
DUST COLLECTION PROCESS FLOW

Scale: NOT TO SCALE	Date: AUGUST, 2008
Prepared By: BLK	Project No. 06W003

I:\06w003\MPA\08_revision\08_rev_mpa_dust collect-process-flow.dgn
12/12/2008 jow



NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. CRUSHING PLANT IS DESIGNED FOR A NOMINAL CAPACITY OF 2,220 TONNES PER DAY OF ORE.
3. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
4. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
5. KEMC PROJECT LOCATION WITHIN SECTIONS 2 AND 11 T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
6. CONTOUR INTERVAL SHOWN IS 2 FOOT.
7. SEE FIGURE 3-1 FOR BUILDING LOCATION

LEGEND

BITUMINOUS PAVED AREA

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOSI	DATE: AUG. '08
APPROVED BY:	SVDI	DATE: AUG. '08
APPROVED BY:		DATE:

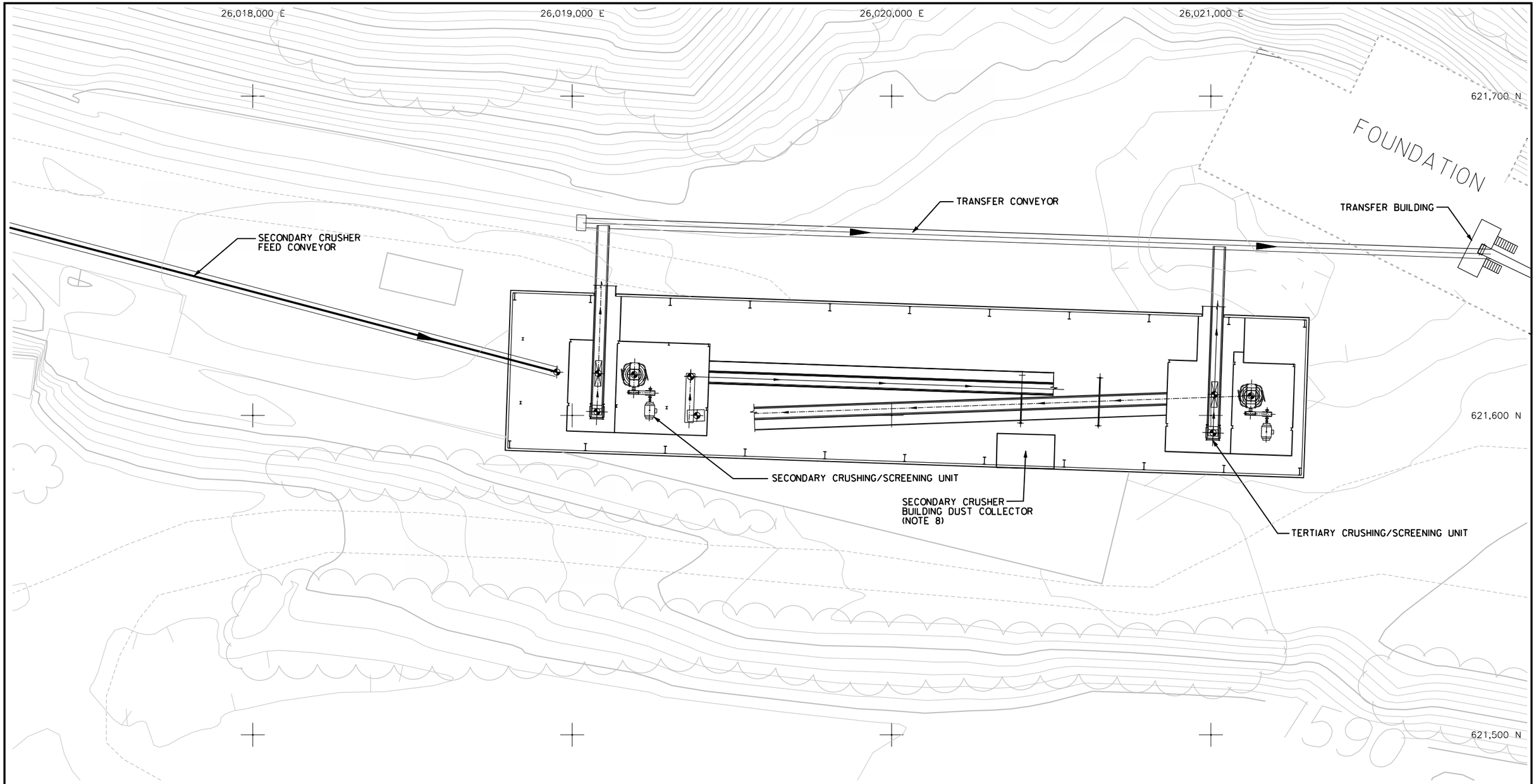
Kennecott Eagle Minerals

FIGURE 3-14

HUMBOLDT MILL PROJECT
COSA GENERAL ARRANGEMENT

Scale: 0 15' 30'
Date: AUGUST, 2008
Prepared By: BLK
Project No. 06W003

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12/12/2008 jow



N

NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. CRUSHING PLANT IS DESIGNED FOR A NOMINAL CAPACITY OF 2,200 TONNES PER DAY OF ORE.
3. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
4. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
5. KEMC PROJECT LOCATION WITHIN SECTIONS 2 AND 11 T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
6. CONTOUR INTERVAL SHOWN IS 2 FOOT.
7. SEE FIGURE 3-1 FOR BUILDING LOCATION.
8. LOCATION MAY CHANGE.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: AUG. '08
APPROVED BY:	SVD1	DATE: AUG. '08
APPROVED BY:		DATE:

Kennecott Eagle Minerals

FIGURE 3-15
HUMBOLDT MILL PROJECT
SECONDARY CRUSHER BUILDING
GENERAL ARRANGEMENT

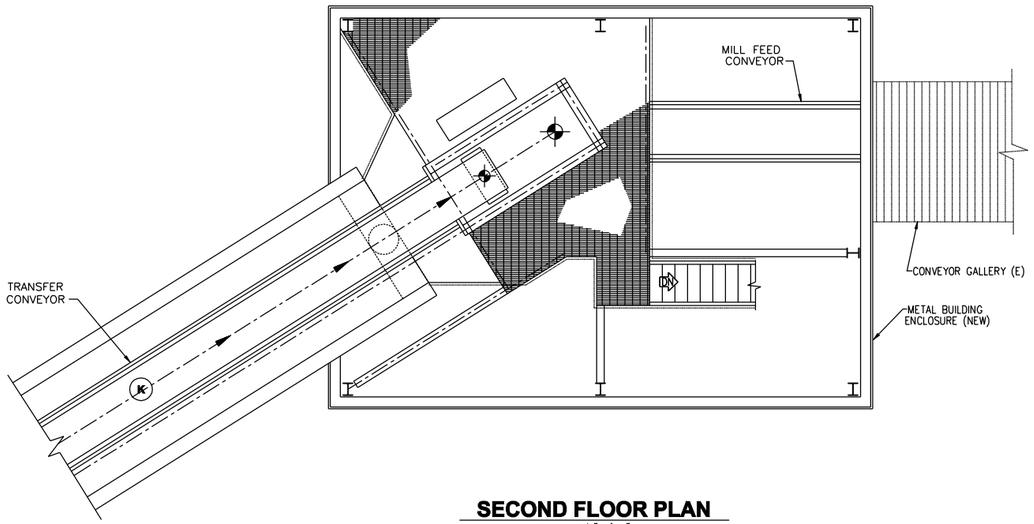
Scale: 0 15' 30'

Date: AUGUST, 2008

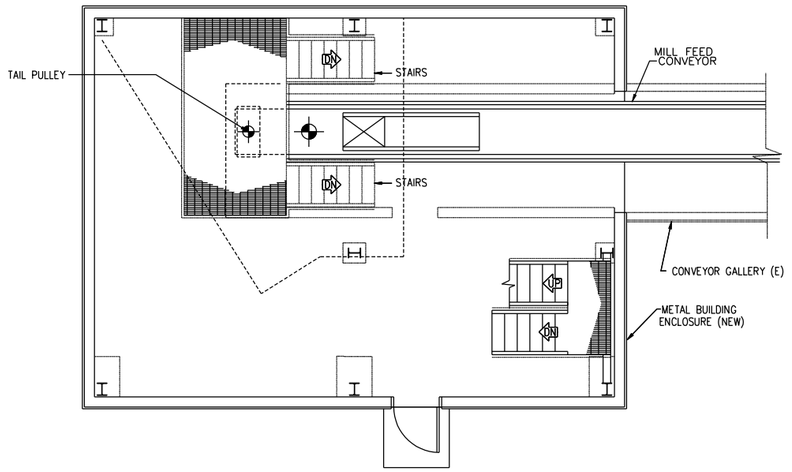
Prepared By: JOW

Project No. 06W003

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12/12/2008 jow



SECOND FLOOR PLAN
SCALE: 1/4"=1'-0"



GROUND FLOOR PLAN
SCALE: 1/4"=1'-0"

NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. SEE FIGURE 3-1 FOR BUILDING LOCATION

Foth Infrastructure & Environment, LLC				
REVISED	DATE	BY	DESCRIPTION	
CHECKED BY:	JOS1		DATE: AUG. '08	
APPROVED BY:	SVD1		DATE: AUG. '08	
APPROVED BY:			DATE:	

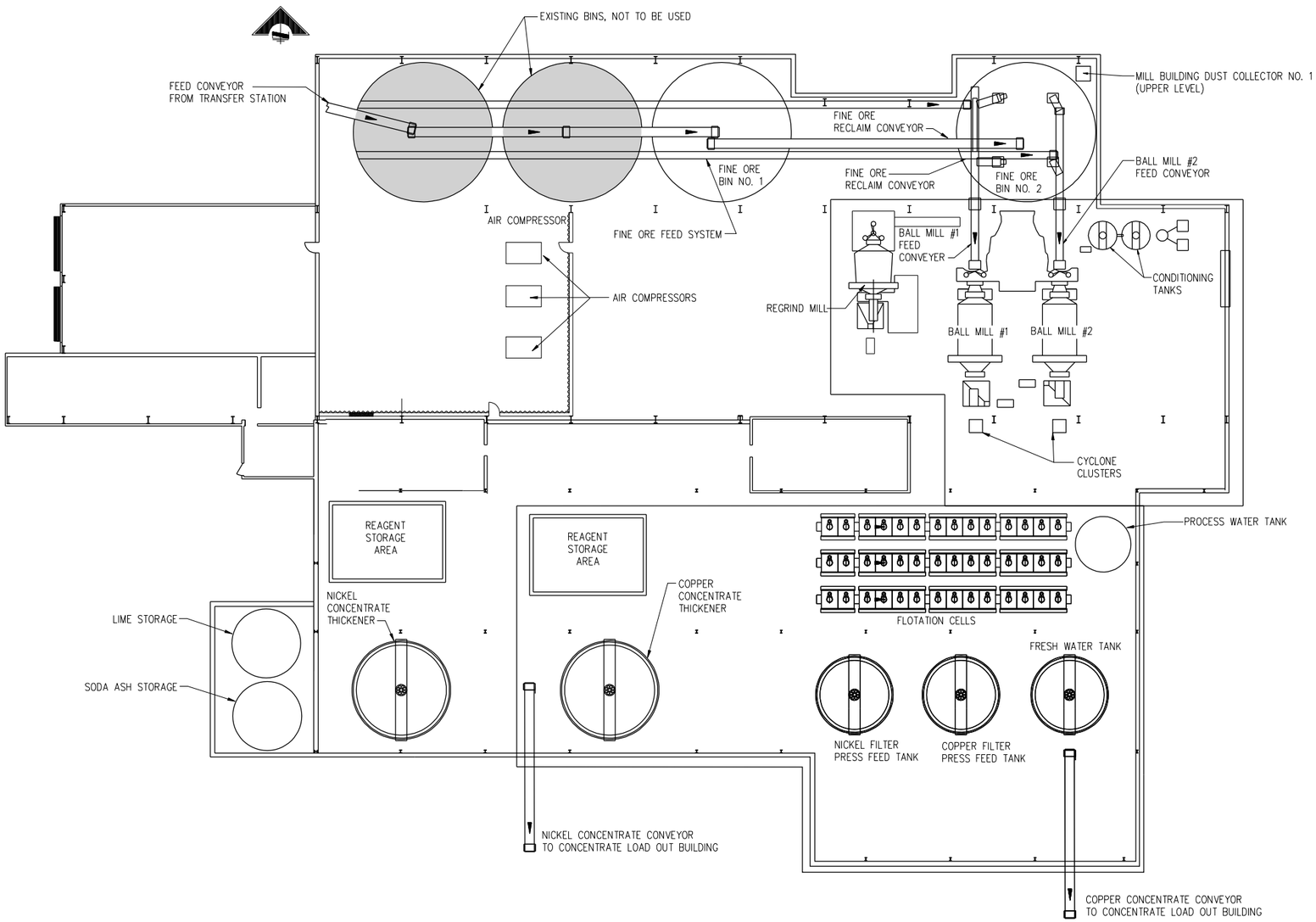
Kennecott Eagle Minerals

FIGURE 3-16

HUMBOLDT MILL PROJECT
TRANSFER STATION

Scale: NOT TO SCALE	Date: AUGUST, 2008
Prepared By: BLK	Project No. 06W003

I:\06w003\MPA\TIA\mpa-tia-transfer station.dgn
12/12/2008 jow



NOTE:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. SEE FIGURE 3-1 FOR BUILDING LOCATION
3. EQUIPMENT LOCATIONS ARE SUBJECT TO CHANGE.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: AUG. '08	
APPROVED BY:	SVD1	DATE: AUG. '08	
APPROVED BY:		DATE:	

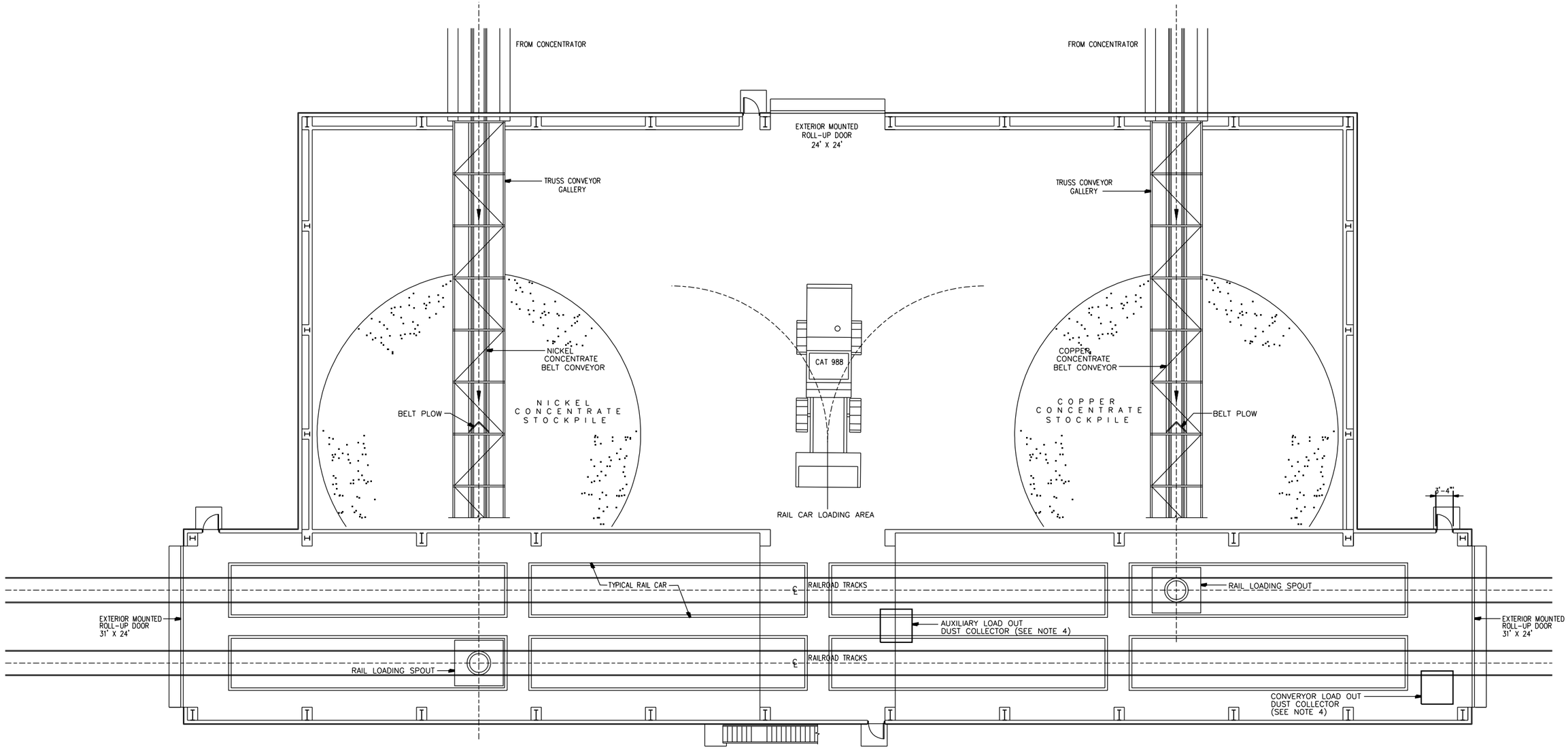
Kennecott Eagle Minerals

FIGURE 3-17

HUMBOLDT MILL PROJECT
MILL BUILDING GENERAL PLANT EQUIPMENT

Scale: NOT TO SCALE	Date: AUGUST, 2008
Prepared By: BLK	Project No. 06W003

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12/12/2008 jow



GRADE LEVEL PLAN

NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. FLOTATION PLANT TO PROCESS A NOMINAL 1,500 TONNES PER DAY OF ORE.
3. SEE FIGURE 3-1 FOR BUILDING LOCATION
4. LOCATION MAY CHANGE.

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY: JOS1			DATE: AUG. '08
APPROVED BY: SVD1			DATE: AUG. '08
APPROVED BY:			DATE:

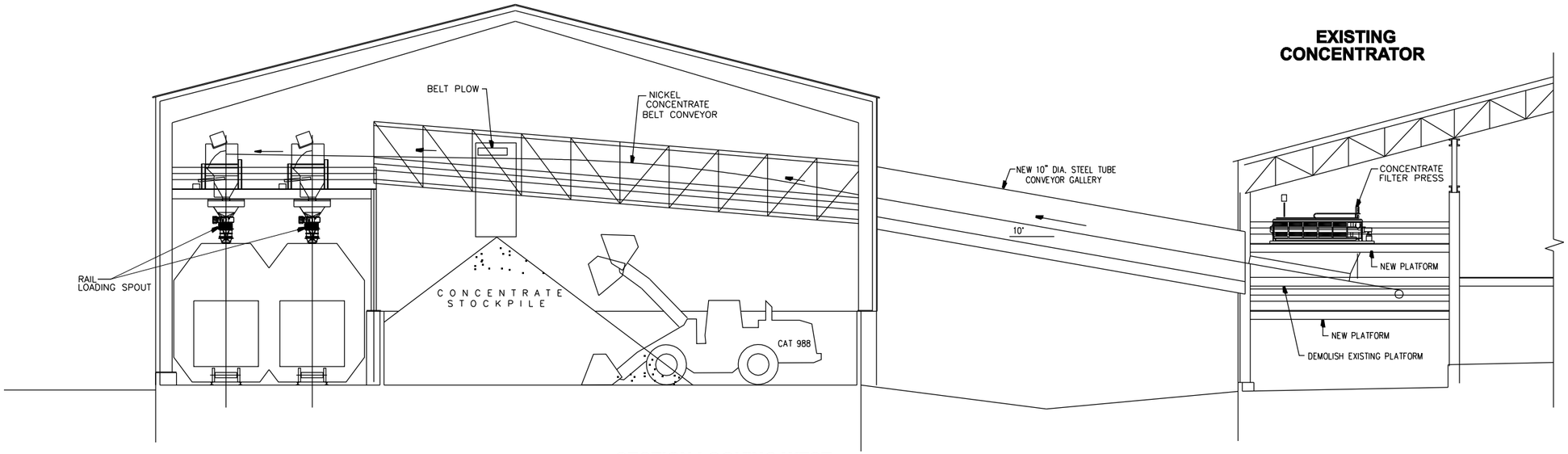
Kennecott
Eagle Minerals

FIGURE 3-18
HUMBOLDT MILL PROJECT
CONCENTRATE LOADOUT BUILDING
GENERAL ARRANGEMENT

Scale:	NOT TO SCALE	Date:	AUGUST, 2008
Prepared By:	JOW	Project No.	06W003

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12/12/2008 jow

NEW CONCENTRATE LOADOUT BUILDING



SECTION LOOKING WEST

NOTES:

1. ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. FLOTATION PLANT TO PROCESS A NOMINAL 1,500 TONNES PER DAY OF ORE.
3. SEE FIGURE 3-1 FOR BUILDING LOCATION.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: AUG. '08	
APPROVED BY:	SVD1	DATE: AUG. '08	
APPROVED BY:		DATE:	

Kennecott Eagle Minerals

FIGURE 3-19

HUMBOLDT MILL PROJECT
CONCENTRATE LOADOUT BUILDING SECTION

Scale:	NOT TO SCALE	Date:	AUGUST, 2008
Prepared By:	JOW	Project No.	06W003

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12/12/2008 jow

26,018,500 E | 26,019,000 E | 26,019,500 E | 26,020,000 E | 26,020,500 E | 26,021,000 E

622,000 N

621,500 N

621,000 N

WWTP EFFLUENT PIPELINE

DOUBLE CASED TAILINGS SLURRY PIPE SEE DETAIL 1/4-5

WWTP INFLUENT PIPELINE (LOCATION MAY VARY BASED UPON OPERATIONS)

HUMBOLDT TAILINGS DISPOSAL FACILITY

WASTEWATER TREATMENT PLANT

2" DIA. POTABLE WATER

8" DIA. FIRE WATER

PROCESS WATER INFLUENT PIPELINE

GATE HOUSE

COARSE ORE STORAGE AREA

SECONDARY CRUSHER BUILDING

REFURBISHED ELECTRICAL BUILDING

ELECTRICAL SUBSTATION

TRANSFER STATION

8" DIA. FIRE WATER

2" DIA. FRESH WATER

2" DIA. POTABLE WATER

MILL FEED CONVEYOR

10" DIA. FIRE WATER

FRESH WATER TANK

OFFICE/MAINTENANCE BUILDING

MILL BLDG

POTABLE WATER TANK

FUEL STORAGE SKID

CONCENTRATE LOADOUT BUILDING

MANHOLE SEE DETAIL 1/4-5

FRESH WATER FROM WELL

MANHOLE SEE DETAIL 1/4-5

RAILROAD SPUR (NEW)

COUNTY ROAD 601

N

LEGEND

- EXISTING ELEV. CONTOUR IN FEET (1570)
- SPOT ELEVATION (X1705.3)
- TREE
- TREE LINE
- BUILDING
- TRAIL
- PAVED ROAD
- UNPAVED ROAD
- STREAM/LAKE
- SURFACE WATER
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- FIRE HYDRANT
- BITUMINOUS PAVED AREA
- GRAVEL SURFACE
- RAILROAD SPUR
- DOUBLE CASED TAILINGS SLURRY PIPE
- MANHOLE (MH)
- FENCE

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. KEMC PROPERTY BOUNDARY WITHIN SECTIONS 2 & 11 T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. WATER PIPING PLAN ADAPTED FROM M3 ENGINEERING & TECHNOLOGY CORP.
5. LOCATIONS OF WATER DISTRIBUTION PIPING MAY CHANGE BASED UPON FINAL SITE DESIGN OR OPERATIONAL REQUIREMENTS.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: AUG. '08	
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APPROVED BY:		DATE:	

Kennecott Eagle Minerals

FIGURE 3-20

HUMBOLDT MILL PROJECT WATER PIPING PLAN

Scale: 0 100' 200'

Date: AUGUST, 2008

Prepared By: BLK

Project No. 06W003

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12/12/2008 jow

26,018,000 E
26,019,000 E
26,020,000 E
26,021,000 E
26,022,000 E
26,023,000 E
625,000 N
624,000 N
623,000 N
622,000 N
621,000 N

EFFLUENT PIPE DISCHARGE INTO WETLAND
PROPOSED BERM TO ELEVATION 1543
PROPOSED CUT–OFF WALL
WWTP EFFLUENT PIPELINE
PIPELINE WATER RELEASE POINT FOR NON–OPERATION PERIOD
WWTP INFLUENT PIPELINE
WASTEWATER TREATMENT PLANT
PROCESS WATER INFLUENT PIPELINE
DUMP POCKET/PRIMARY CRUSHER
SECONDARY CRUSHER FEED CONVEYOR
SECONDARY CRUSHER
SECONDARY CRUSHER BUILDING
TRANSFER CONVEYOR
TERTIARY CRUSHER
MILL ENTRANCE
MILL EXIT ROAD FOR ORE HAUL TRUCKS
REFURBISHED ELECTRICAL BUILDING
ELECTRICAL SUBSTATION
TAILINGS THICKENER TANK
FACILITY WATER TOWER
COARSE ORE STORAGE AREA
TRANSFER STATION
MILL FEED CONVEYOR
CMP CULVERT
GATE HOUSE
WATER TANKS
FUEL STORAGE SKID
FENCED EQUIPMENT STORAGE\STAGING AREA
OFFICE/MAINT. BUILDING
MILL BLDG
CMP CULVERT
CR 601
FORMER PELLET PLANT
DRAINAGE DITCH SEE DETAIL 1 3-22
CONCRETE FOUNDATIONS
SEDIMENTATION BASIN
RAILROAD SPUR
EMPLOYEE/ VISITOR PARKING
STORMWATER OUTFALL
SEPTIC SYSTEM
CONCENTRATE LOADOUT BUILDING
CMP CULVERT
GAS MAIN PRESSURE RELIEF STATION
TEMPORARY SOIL STOCKPILE AREA

N

LEGEND

- EXISTING ELEV. CONTOUR IN FEET
- SPOT ELEVATION
- TREE
- TREE LINE
- BUILDING
- TRAIL
- PAVED ROAD
- UNPAVED ROAD
- STREAM/LAKE
- SURFACE WATER
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- KEMC PROJECT LOCATION
- CMP CULVERT
- SURFACE WATER FLOW DIRECTION
- BITUMINOUS PAVED AREA
- FENCE
- GRAVEL SURFACE
- RAILROAD SPUR
- PROPOSED CUT–OFF WALL
- STRAW BALE CHECK DAM
- EROSION CONTROL FENCING
- AREA CLEARED (GRUBBED AND STRIPPED OF TOPSOIL)
- WASTEWATER TREATMENT PLANT
- DISCHARGE WATER PIPE
- BERMED AREA TO ELEVATION 1543
- WWTP EFFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)
- WWTP INFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)
- PROCESS WATER INFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO–METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. KEMC PROJECT LOCATION WITHIN SECTIONS 2 AND 11 T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 2 FOOT.

0 250′ 500′

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

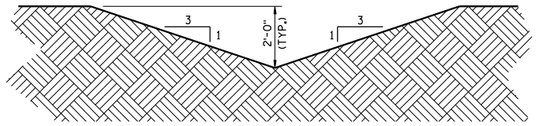
CHECKED BY:	JOS1	DATE: AUG. '08
APPROVED BY:	SVD1	DATE: AUG. '08
APPROVED BY:		DATE:

Kennecott Eagle Minerals

FIGURE 3-21
HUMBOLDT MILL PROJECT
SITE SURFACE WATER AND EROSION CONTROL PLANS CONSTRUCTION PHASE

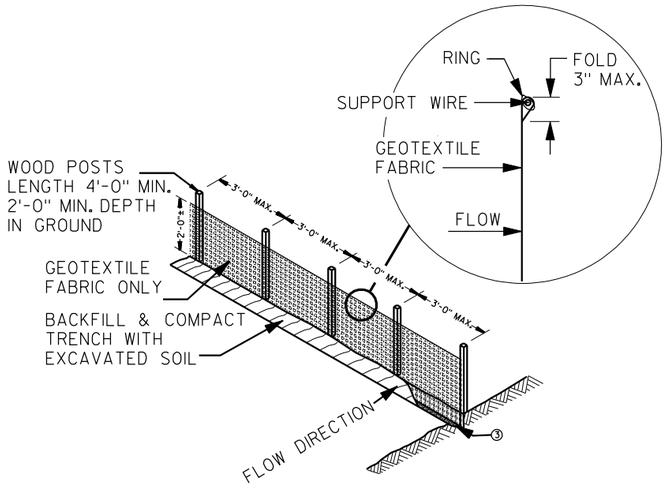
Scale: AS SHOWN	Date: AUGUST, 2008
Prepared By: JOW	Project No. 06W003

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12/12/2008 bjw1

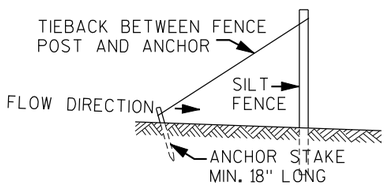


1 / 3-22 FACILITY OPERATIONS DRAINAGE DITCH DETAIL (TYPICAL)

NOT TO SCALE

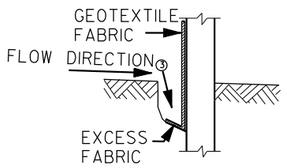


ATTACH THE FABRIC TO THE POSTS WITH WIRE STAPLES OR WOODEN LATH AND NAILS



GEOTEXTILE FENCE TIE BACK

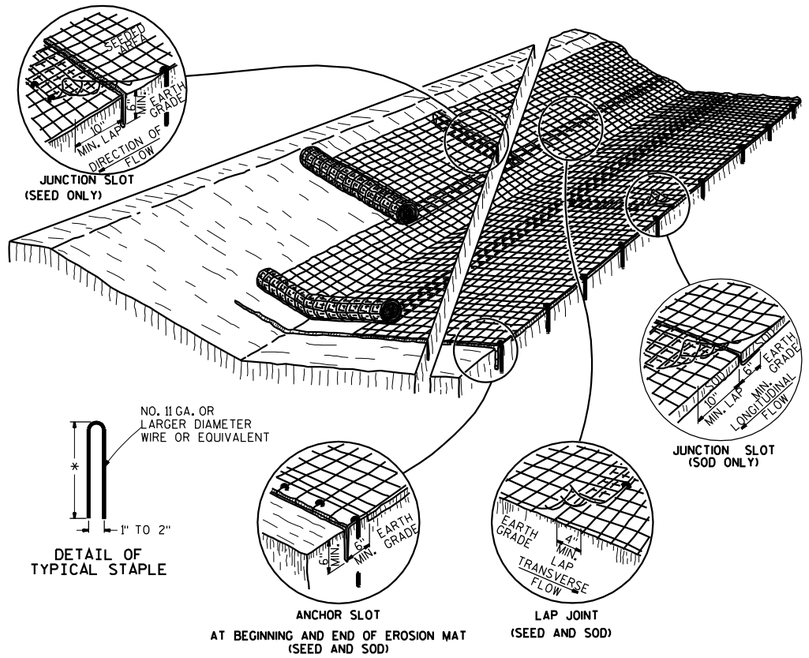
(WHEN REQUIRED BY THE ENGINEER)



TRENCH DETAIL

GEOTEXTILE FABRIC DETAIL

NOT TO SCALE



* 6" MIN. FOR FIRM SOILS
12" MIN. FOR LOOSE SOILS
8" MIN. WHERE BOTH SOD AND MATS ARE USED

EROSION MAT DETAIL

NOT TO SCALE

EROSION MAT OVER SOD

a. ONLY JUTE FABRIC WILL BE PERMITTED OVER SOD.

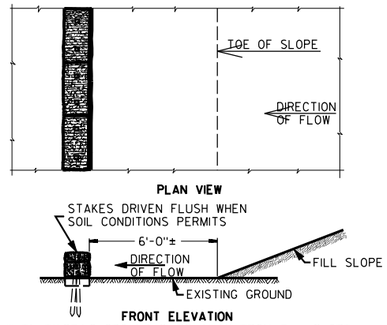
b. WOOD STAKES FOR SOD MAY BE OMITTED IF THE EXISTING SLOPE AND SOIL CONDITIONS SO WARRANT.

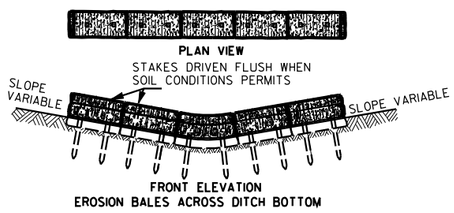
c. THE WIDTH OF THE EROSION MAT SHALL EQUAL THE SOD WIDTH.

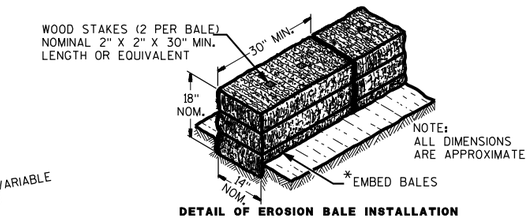
d. SOD STRIPS MAY BE PLACED EITHER LONGITUDINALLY OR TRANSVERSELY TO THE FLOW LINE OF THE DITCH.

EROSION MAT OVER SEEDING

JUNCTION OR ANCHOR SLOTS SHALL BE AT MINIMUM INTERVALS OF 100 FEET ON GRADES UP TO AND INCLUDING 3 PERCENT, AND 50 FEET ON GRADES EXCEEDING 3 PERCENT.







EROSION BALE DETAIL

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY: JOS1			DATE: DEC. '07
APPROVED BY: SVD1			DATE: DEC. '07
APPROVED BY:			DATE:

Kennecott Eagle Minerals

FIGURE 3-22

HUMBOLDT MILL PROJECT
SURFACE WATER/EROSION CONTROL DETAILS

Scale: NOT TO SCALE	Date: DECEMBER, 2007
Prepared By: JOW	Project No. 06W003

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12/11/2007 jow

26,018,000 E
26,019,000 E
26,020,000 E
26,021,000 E
26,022,000 E
26,023,000 E
625,000 N
624,000 N
623,000 N
622,000 N
621,000 N

EFFLUENT PIPE DISCHARGE INTO WETLAND
PROPOSED BERM TO ELEVATION 1543
PROPOSED CUT-OFF WALL
WWTP EFFLUENT PIPELINE
PIPELINE WATER RELEASE POINT FOR NON-OPERATION PERIOD
WWTP INFLUENT PIPELINE
WASTEWATER TREATMENT PLANT
PROCESS WATER INFLUENT PIPELINE
DUMP POCKET/PRIMARY CRUSHER
SECONDARY CRUSHER FEED CONVEYOR
SECONDARY CRUSHER
SECONDARY CRUSHER BUILDING
TRANSFER CONVEYOR
TERTIARY CRUSHER
MILL ENTRANCE
MILL EXIT ROAD FOR ORE HAUL TRUCKS
REFURBISHED ELECTRICAL BUILDING
ELECTRICAL SUBSTATION
TAILINGS THICKENER TANK
FACILITY WATER TOWER
COARSE ORE STORAGE AREA
TRANSFER STATION
MILL FEED CONVEYOR
CMP CULVERT
GATE HOUSE
WATER TANKS
FUEL STORAGE SKID
FENCED EQUIPMENT STORAGE\STAGING AREA
OFFICE/MAINT. BUILDING
MILL BLDG
CMP CULVERT
CR 601
DRAINAGE DITCH SEE DETAIL 3-22
FORMER PELLET PLANT
CONCRETE FOUNDATIONS
SEDIMENTATION BASIN
EMPLOYEE/ VISITOR PARKING
STORMWATER OUTFALL SEPTIC SYSTEM
CONCENTRATE LOADOUT BUILDING
CMP CULVERT
RAILROAD SPUR
GAS MAIN PRESSURE RELIEF STATION
TEMPORARY SOIL STOCKPILE AREA

LEGEND

- EXISTING ELEV. CONTOUR IN FEET (1570)
- SPOT ELEVATION (1705.3)
- TREE
- TREE LINE
- BUILDING
- TRAIL
- PAVED ROAD
- UNPAVED ROAD
- STREAM/LAKE
- SURFACE WATER
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- KEMC PROJECT LOCATION
- CMP CULVERT
- SURFACE WATER FLOW DIRECTION
- BITUMINOUS PAVED AREA
- FENCE
- GRAVEL SURFACE
- RAILROAD SPUR
- PROPOSED CUT-OFF WALL
- WASTEWATER TREATMENT PLANT
- DISCHARGE WATER PIPE
- BERMED AREA TO ELEVATION 1543
- SEEDED AREAS
- WWTP EFFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)
- WWTP INFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)
- PROCESS WATER INFLUENT PIPELINE (LOCATION WILL VARY BASED UPON OPERATIONS)

N

0 250' 500'

OPERATION AND MAINTENANCE- SOIL EROSION CONTROL		
STRUCTURE	FREQUENCY	MAINTENANCE
DITCHES/CULVERTS	MONTHLY	SEDIMENT REMOVED
SILT FENCING ①	MONTHLY	REPAIR (AS NEEDED)
GRAVEL ROADS	MONTHLY	GRAVEL REPLACEMENT (AS NEEDED)
SEDIMENTATION	MONTHLY	SEDIMENT REMOVAL (AS NEEDED)

NOTE: ① ONLY TO BE USED ON A TEMPORARY BASIS.

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. KEMC PROJECT LOCATION WITHIN SECTIONS 2 AND 11 T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 2 FOOT.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: AUG. '08
APPROVED BY:	SVD1	DATE: AUG. '08
APPROVED BY:		DATE:

Kennecott Eagle Minerals

FIGURE 3-23
HUMBOLDT MILL PROJECT
SITE SURFACE WATER AND EROSION CONTROL PLANS OPERATIONS PHASE

Scale:	AS SHOWN	Date:	AUGUST, 2008
Prepared By:	JOW	Project No.	06W003

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12/15/2008 bjw1

26,018,000 E
26,019,000 E
26,020,000 E
26,021,000 E
26,022,000 E
625,000 N
624,000 N
623,000 N
622,000 N

EFFLUENT PIPE DISCHARGE INTO WETLAND
PROPOSED CUT-OFF WALL
PHASE 1
PHASE 2
PHASE 3
WWTP EFFLUENT PIPELINE
SPLITTER MANHOLE (TYP.) SEE DETAIL 1/4-5
PIPELINE WATER RELEASE POINT FOR NON-OPERATION PERIOD
4" DIA. INSIDE 8" CASED HDPE TAILINGS SLURRY PIPE
FLOATING BARGE (LOCATION WILL VARY BASED UPON OPERATIONS) SEE DETAIL 2/4-5
PIPELINE WATER RELEASE FOR SHUTDOWN PERIOD
WWTP INFLUENT PIPELINE
WASTEWATER TREATMENT PLANT
PROCESS WATER INFLUENT PIPELINE
DUMP POCKET/PRIMARY CRUSHER
SECONDARY CRUSHER FEED CONVEYOR
SECONDARY CRUSHER
SECONDARY CRUSHER BUILDING
TRANSFER CONVEYOR
TERTIARY CRUSHER
TRANSFER STATION
REFURBISHED ELECTRICAL BUILDING
ELECTRICAL SUBSTATION
CR 601
MILL ENTRANCE
MILL EXIT ROAD FOR ORE HAUL TRUCKS
RAILROAD SPUR
GATE HOUSE
DRAINAGE DITCH
MANHOLE (TYP.) SEE DETAIL 1/4-5
COARSE ORE STORAGE AREA
OFFICE/MAINT. BUILDING
MILL BLDG
FACILITY WATER TOWER

LEGEND

- EXISTING ELEV. CONTOUR IN FEET
- SPOT ELEVATION
- TREE
- TREE LINE
- BUILDING
- TRAIL
- PAVED ROAD
- UNPAVED ROAD
- STREAM/LAKE
- SURFACE WATER
- KEMC PROJECT LOCATION
- HTDF BATHYMETRIC CONTOUR
- APPROXIMATE AREA FOR HTDF PHASE 1 FILLING SEQUENCE TO ELEVATION 1420
- APPROXIMATE AREA FOR HTDF PHASE 2 FILLING SEQUENCE TO ELEVATION 1420
- APPROXIMATE AREA FOR HTDF PHASE 3 FILLING SEQUENCE TO ELEVATION 1420
- MANHOLE LOCATION
- DOUBLE ENCASED TAILINGS SLURRY PIPE
- FENCE
- CUT-OFF WALL
- BITUMINOUS PAVED AREA
- GRAVEL SURFACE
- BERMED AREA TO ELEVATION 1543

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. KEMC PROJECT LOCATION WITHIN SECTIONS 2 AND 11 T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. TOPOGRAPHIC CONTOUR INTERVAL SHOWN IS 2 FOOT.
5. BATHYMETRIC CONTOURS ARE FROM FOTH SURVEY DATED MAY 3 & 4, 2007. CONTOURS SHOWN ARE 5 FOOT INTERVAL.
6. ALIGNMENT OF SLURRY PIPELINE MAY CHANGE BASED UPON OPERATIONAL REQUIREMENTS.
7. LOCATION AND NUMBER OF DETECTION AND SPLITTER MANHOLES MAY CHANGE BASED ON FINAL DESIGN.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: AUG. '08	
APPROVED BY:	SVD1	DATE: AUG. '08	
APPROVED BY:		DATE:	

Kennecott Eagle Minerals

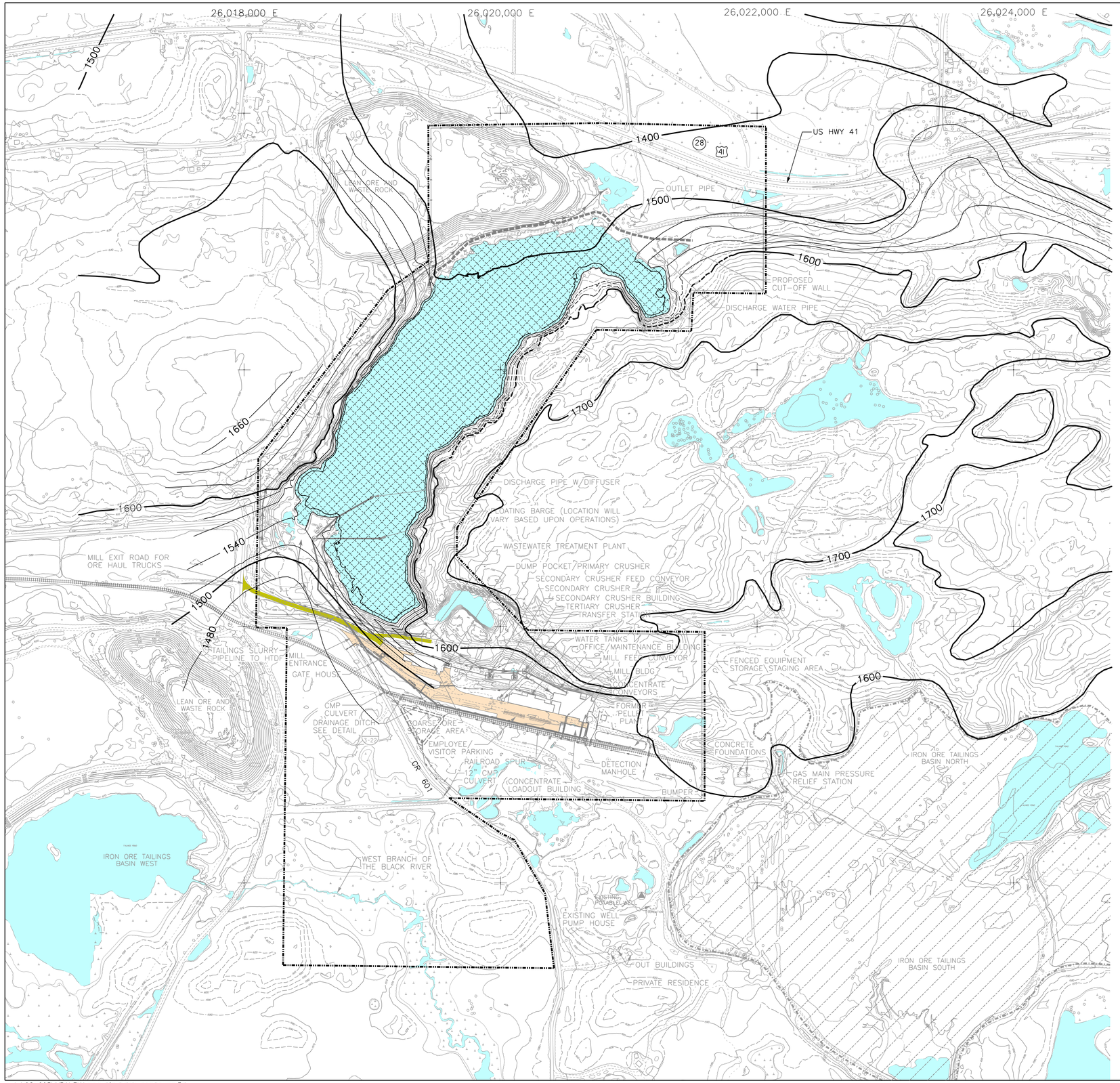
FIGURE 4-1

HUMBOLDT MILL PROJECT HTDF OPERATING PLAN

Scale: 0 200' 400' | Date: AUGUST, 2008

Prepared By: JOW | Project No. 06W003

L:\06w003\MPA\TIA\mpa-tia-Humb-phases.3d
12/12/2008 bjw1



NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. KEMC PROJECT LOCATION WITHIN SECTIONS 2 AND 11 T47N, R29W, TOWN OF HUMBOLDT, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 10 FOOT.
5. BEDROCK CONTOURS MODIFIED AFTER SUPINA (1984).

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: AUG. '08
APPROVED BY:	SVD1	DATE: AUG. '08
APPROVED BY:		DATE:

Kennecott Eagle Minerals

FIGURE 4-2

HUMBOLDT MILL PROJECT
BEDROCK CONTOUR ELEVATIONS

Scale: 0 200' 400'
Date: AUGUST, 2008
Prepared By: JOW
Project No. 06W003

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12/12/2008 bjw1

SECTION A – A′

SOUTH — NORTH

EXISTING GRADE

PERIMETER DIKE TO ELEV.=1543 MSL

WATER ELEV.=1537.88 JUNE 5, 2007

SLURRY WALL

BEDROCK ELEVATION

BATHYMETRIC SURVEY

TOP OF CAP AT ELEV.=1420.5 MSL

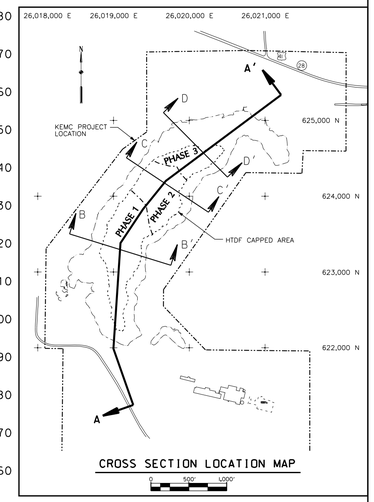
TOP OF EAGLE TAILINGS AT ELEV.=1420.0 MSL

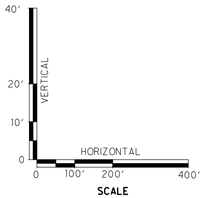
PHASE 3

PHASE 2

PHASE 1

ROPES MINE TAILINGS





NOTES:

1. BATHYMETRY SURVEY CONDUCTED BY FOTH IE ON MAY 1, 2007.
2. TOP ELEVATION OF EAGLE TAILINGS MAY VARY BASED UPON MOUNDING DURING PLACEMENT. TOP ELEVATION WILL NOT EXCEED 1475 MSL.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: NOV. '07
APPROVED BY:	SVD1	DATE: NOV. '07
APPROVED BY:		DATE:

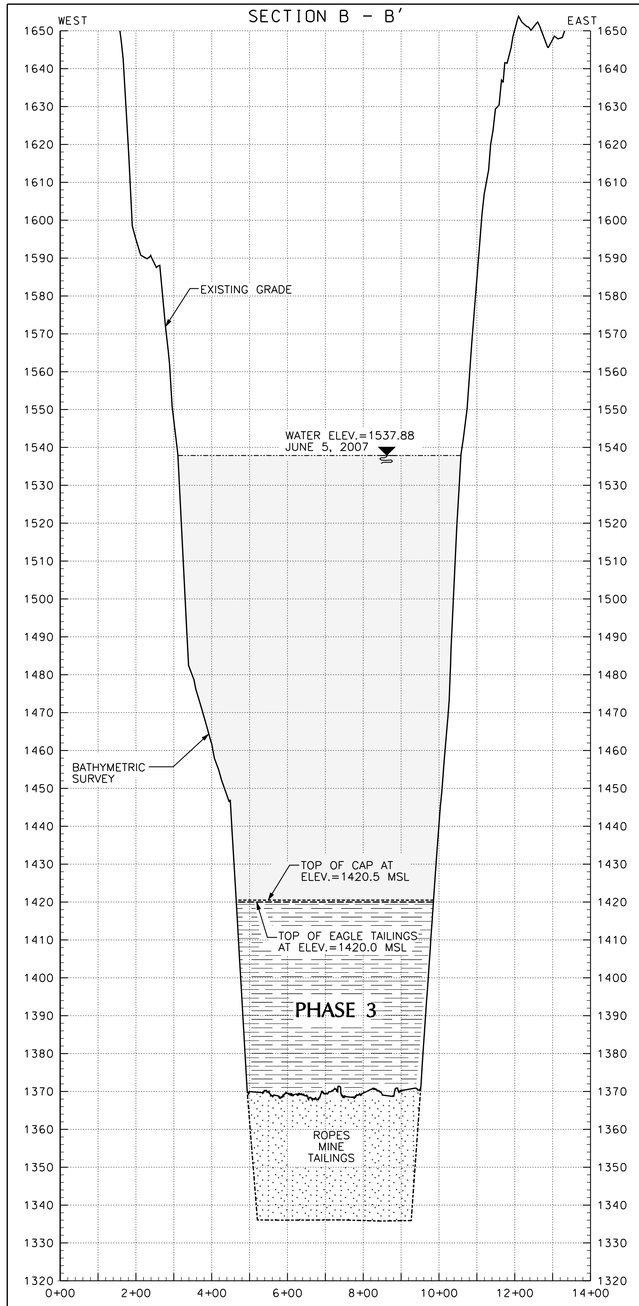
Kennecott Eagle Minerals

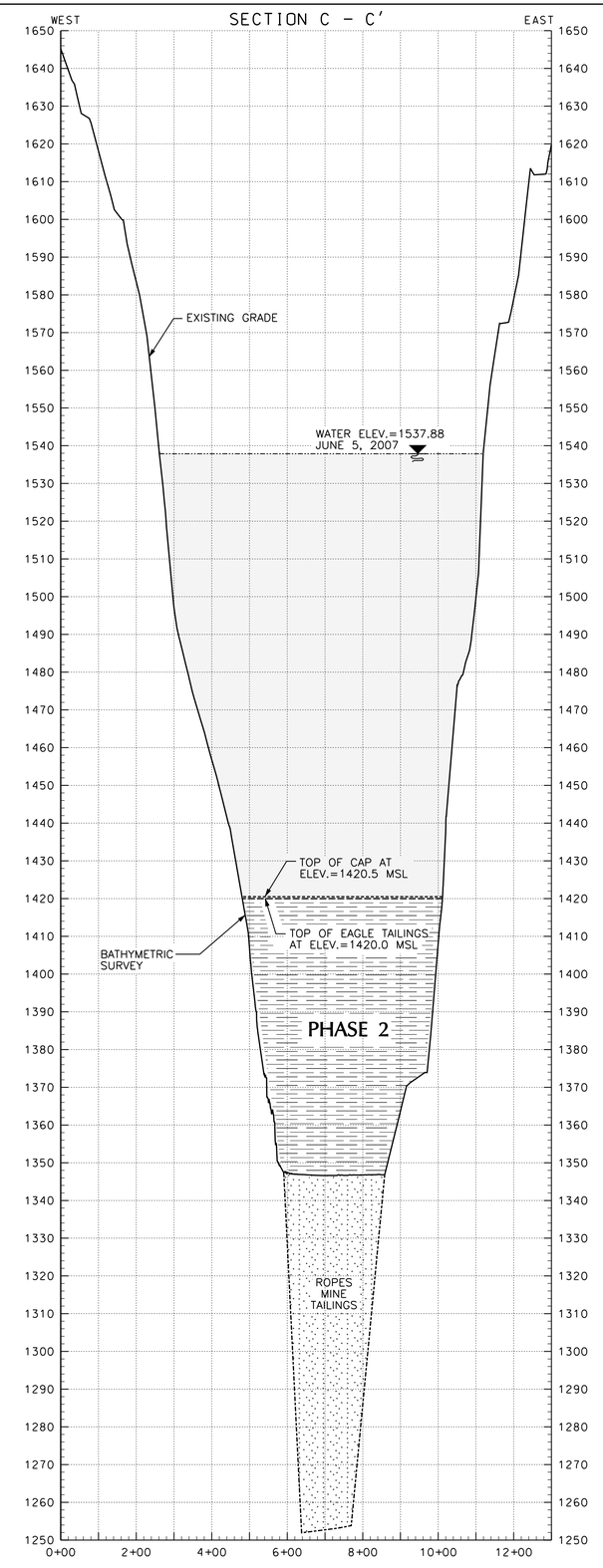
FIGURE 4-3

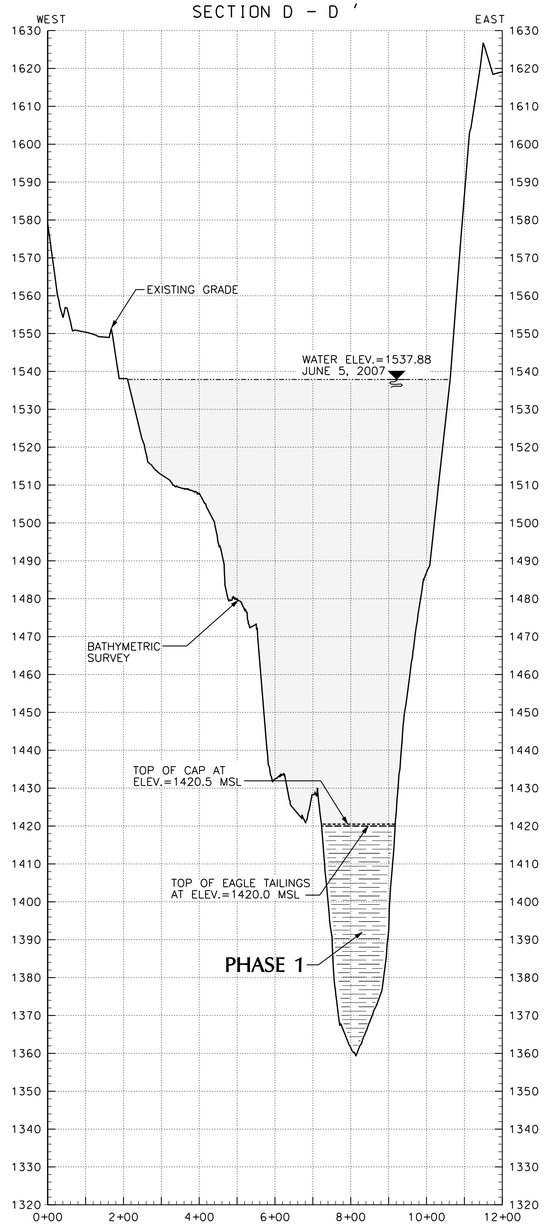
HUMBOLDT MILL PROJECT
CROSS SECTION A-A′

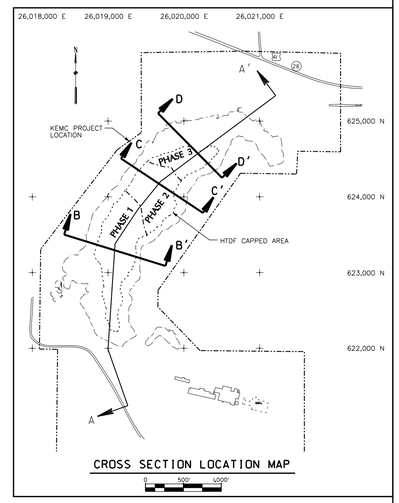
Scale:	AS SHOWN	Date:	NOVEMBER, 2007
Prepared By:	JOW	Project No.	06W003

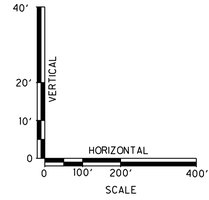
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12/11/2007 jow









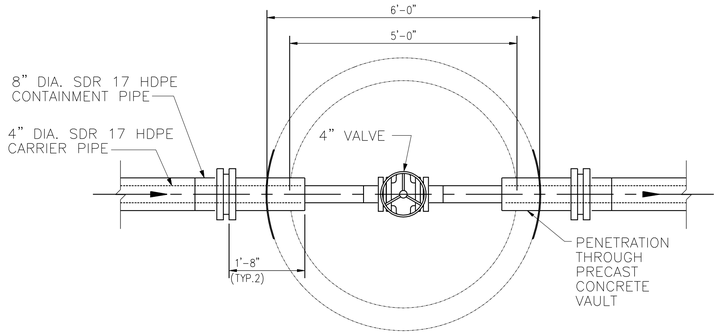


NOTES:

1. BATHYMETRY SURVEY CONDUCTED BY FOTH IE ON MAY 1, 2007.
2. TOP ELEVATION OF EAGLE TAILINGS MAY VARY BASED UPON MOUNDING DURING PLACEMENT. TOP ELEVATION WILL NOT EXCEED 1475 MSL.

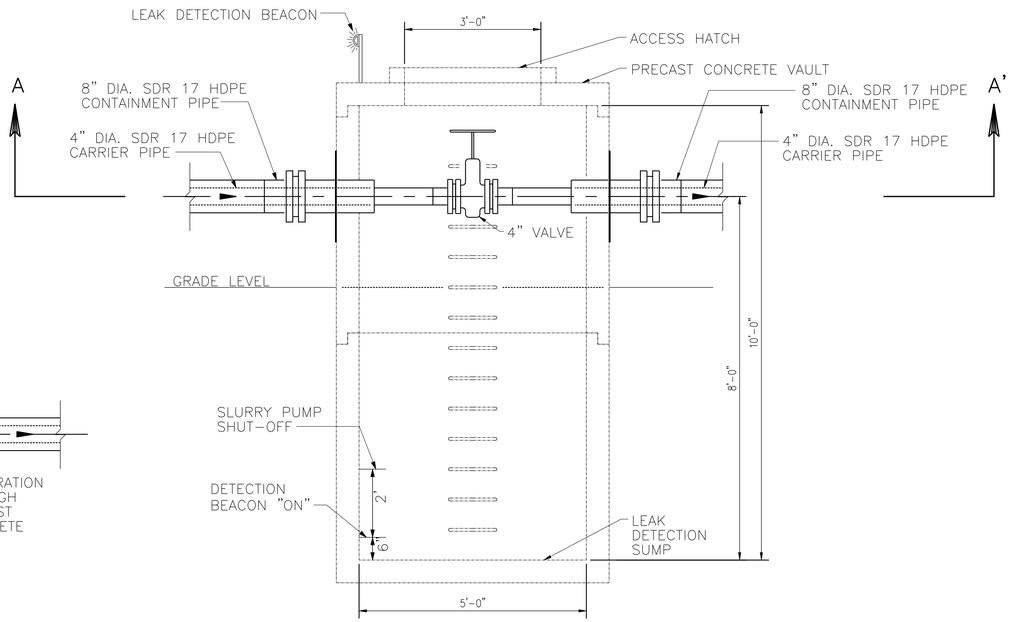
Foth Infrastructure & Environment, LLC				Kennecott Eagle Minerals	
REVISED	DATE	BY	DESCRIPTION	FIGURE 4-4 HUMBOLDT MILL PROJECT CROSS SECTIONS B-B', C-C' AND D-D'	
CHECKED BY:	JOS1	DATE: NOV. '07		Scale: AS SHOWN	Date: NOVEMBER, 2007
APPROVED BY:	SVD1	DATE: NOV. '07		Prepared By: JOW	Project No. 06W003
APPROVED BY:		DATE:			

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12/11/2007 jow



SECTION A – A'

NOT TO SCALE

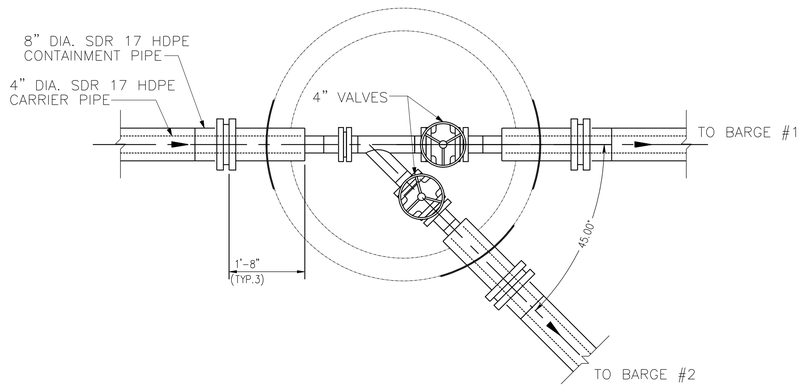


1 / 4-5 LEAK DETECTION/SPLITTER MANHOLE DETAIL

NOT TO SCALE

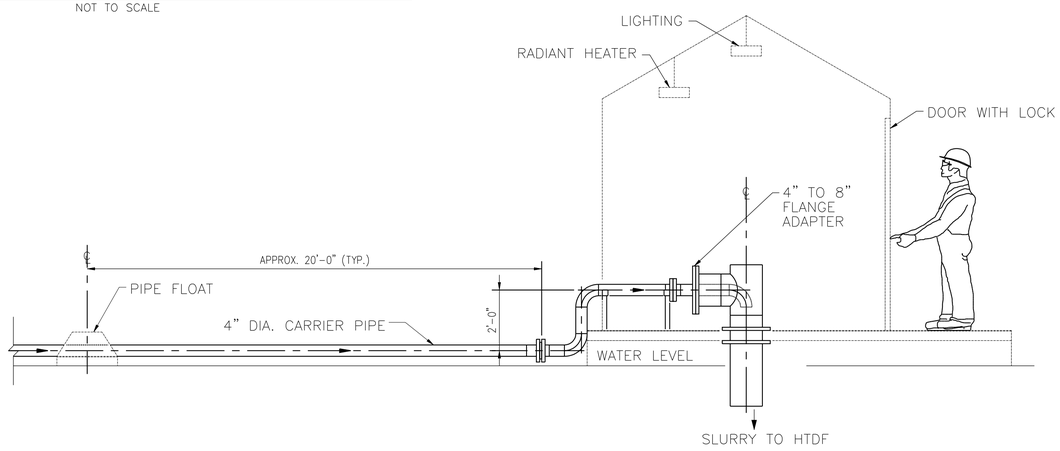
NOTES:

1. DETAILS ADAPTED FROM M3 ENGINEERING AND TECHNOLOGY, INC.
2. DIMENSIONS SHOWN ARE CONCEPTUAL AND MAY CHANGE BASED UPON FINAL DESIGN AND CONSTRUCTION.



SPLITTER MANHOLE SECTION A – A'

NOT TO SCALE



2 / 4-5 BARGE SECTION

NOT TO SCALE

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:	JOS1	DATE: NOV. '07	
APPROVED BY:	SVD1	DATE: NOV. '07	
APPROVED BY:		DATE:	

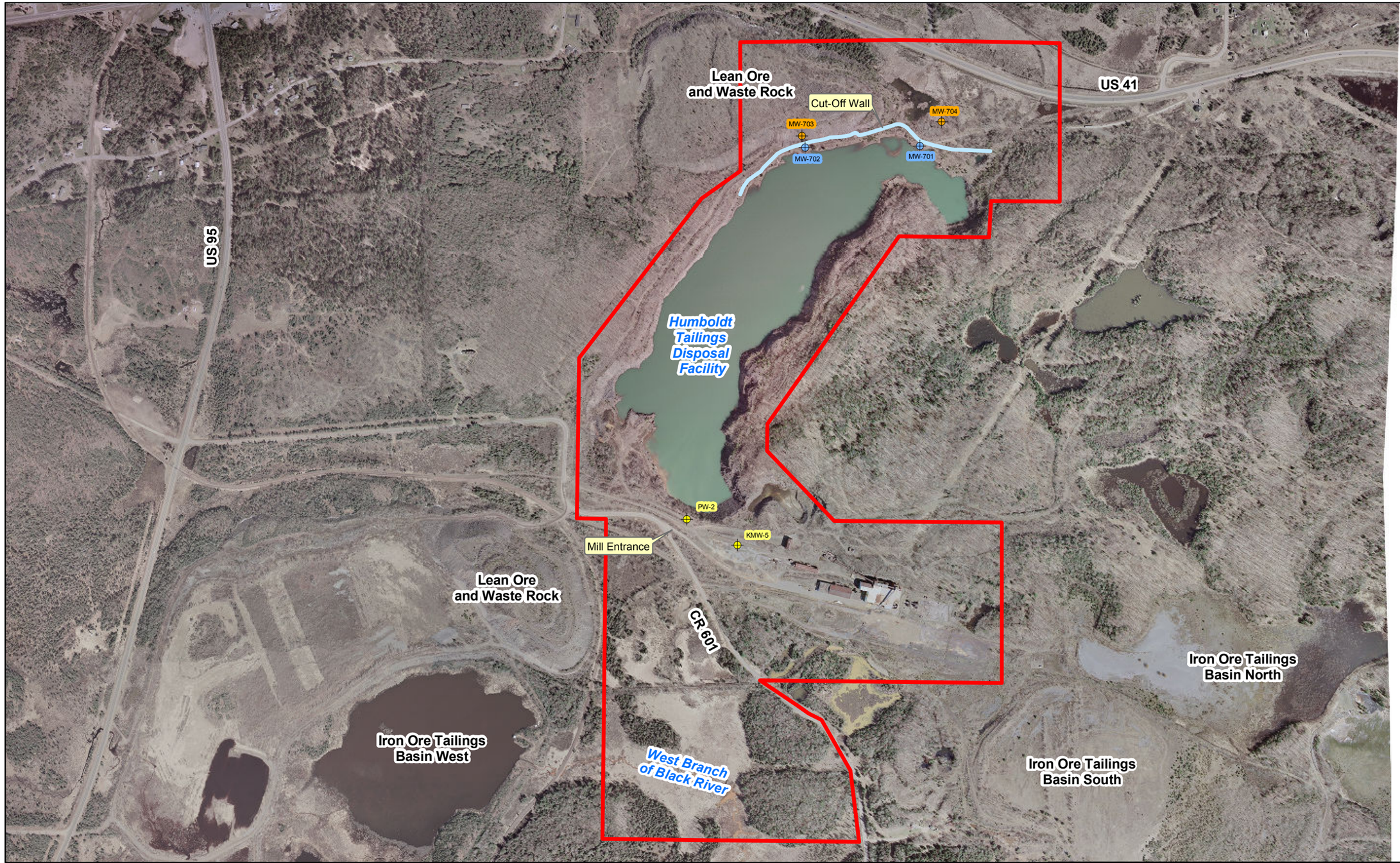
Kennecott Eagle Minerals

FIGURE 4-5

HUMBOLDT MILL PROJECT
SLURRY PIPELINE DESIGN FEATURES

Scale: NOT TO SCALE	Date: NOVEMBER, 2007
Prepared By: JOW	Project No. 06W003

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12/11/2007 jow



NOTES

1. Orthophotography supplied by Aero-Metric Engineering, Sheboygan, Wisconsin. Date of photography: April 27, 2006.
2. Horizontal datum based on NAD 83/96. Horizontal coordinates based on Michigan State Plane North.
3. Humboldt Mill Project located within Sections 2 and 11, T47N, R29W, Humboldt Township, Marquette County, Michigan.

LEGEND

- PW-2 — Existing Background Monitoring Wells upgradient of HTDF
- MW-701 — Proposed HTDF Leachate Monitoring Wells per R425.406(5)(a)
- MW-703 — Proposed HTDF Compliance Monitoring Wells per R425.406(5)(b)
- Downgradient Containment Wall/Compliance Boundary
- KEMC Project Location

N

Foth
Foth Infrastructure & Environment, LLC

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JSL	DATE: AUG. '08	
APPROVED BY:	SVD1	DATE: AUG. '08	
APPROVED BY:		DATE:	

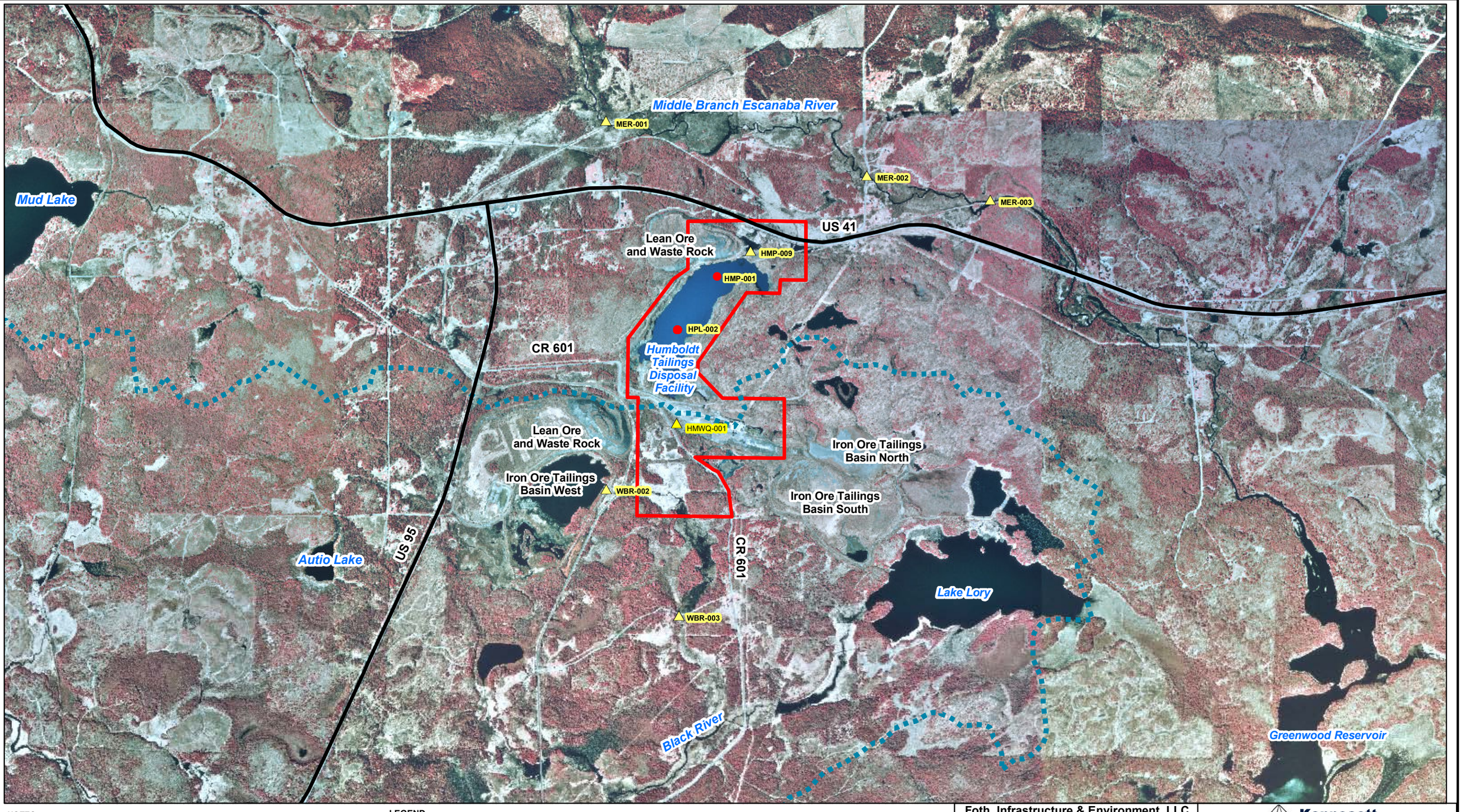
Kennecott
Eagle Minerals

FIGURE 5-1
HUMBOLDT MILL PROJECT
GROUNDWATER MONITORING WELL LOCATIONS

Scale: 0 400 800 Feet | Date: AUGUST, 2008

Prepared by: DAT | Project No: 06W003

M:\06w003\mxd\MPA\TIA\kmc_humboldt_GWLocations_SPN_11x17.mxd November 20, 2008



NOTES

1. 1998 Series USGS Digital Orthophoto Quadrangles supplied by Michigan Center of Geographic Information.
2. Horizontal datum based on NAD 83/96.
   Horizontal coordinates based on Michigan State Plane North.
3. Humboldt Mill Project located within Sections 2 and 11, T47N, R29W, Humboldt Township, Marquette County, Michigan.

LEGEND

- HMWQ-001 — Proposed Surface Water Monitoring Station
- HTDF Monitoring Station
- Watershed Divide
- KEMC Project Location

N

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: OCT. '07	
APPROVED BY:	SVD1	DATE: OCT. '07	
APPROVED BY:		DATE:	

Kennecott Eagle Minerals

FIGURE 5-2

HUMBOLDT MILL PROJECT
SURFACE WATER MONITORING PLAN

Scale: 0 1,000 2,000 Feet | Date: October 2007

Prepared by: DAT | Project No: 06W003

M:\06w003\mxd\MPA\TIA\kmc_humboldt_SW_SampleLocations_SPN_11x17.mxd October 23, 2007

26,018,000 E
26,019,000 E
26,020,000 E
26,021,000 E
26,022,000 E
26,023,000 E

625,000 N
624,000 N
623,000 N
622,000 N
621,000 N

1538
1540
1540
1538

PROPOSED CUT-OFF WALL

WASTEWATER TREATMENT PLANT
DUMP POCKET/PRIMARY CRUSHER
OLD CRUSHER BUILDING
SECONDARY CRUSHER FEED CONVEYOR
SECONDARY CRUSHER
SECONDARY CRUSHER BUILDING
TERTIARY CRUSHER
TRANSFER STATION
REFURBISHED ELECTRICAL BUILDING
ELECTRICAL SUBSTATION
FACILITY WATER TOWER
MILL FEED CONVEYOR
WATER TANKS
OFFICE/MAINT. BUILDING
MILL BLDG
FORMER PELLET PLANT
CONCRETE FOUNDATIONS
GAS MAIN PRESSURE RELIEF STATION
GATE HOUSE
MILL ENTRANCE
MILL EXIT ROAD FOR ORE HAUL TRUCKS
COARSE ORE STORAGE AREA
CMP CULVERT
CMP CULVERT
CMP CULVERT
CMP CULVERT
CR 601
SEDIMENTATION BASIN
DRAINAGE DITCH SEE DETAIL 1/1-29
EMPLOYEE/ VISITOR PARKING
CONCENTRATE LOADOUT BUILDING
STORMWATER OUTFALL SEPTIC SYSTEM
RAILROAD SPUR

N

LEGEND

- EXISTING ELEV. CONTOUR IN FEET (1570)
- SPOT ELEVATION (1705.3)
- TREE
- TREE LINE
- BUILDING
- TRAIL
- PAVED ROAD
- UNPAVED ROAD
- STREAM/LAKE
- SURFACE WATER
- HUMBOLDT TAILINGS DISPOSAL FACILITY (HTDF)
- PRE-EXISTING IRON ORE TAILINGS DISPOSAL FACILITY
- KEMC PROJECT LOCATION
- CMP CULVERT
- SURFACE WATER FLOW DIRECTION
- BITUMINOUS PAVED AREA
- FENCE
- GRAVEL SURFACE
- RAILROAD SPUR
- 1540 RESTORATION CONTOUR
- SEEDED AREAS (AS NEEDED)
- CUT-OFF WALL

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA SUPPLIED BY AERO-METRIC ENGINEERING, SHEBOYGAN, WISCONSIN. DATE OF PHOTOGRAPHY: APRIL 27, 2006.
2. CONTOUR INTERVAL BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. HORIZONTAL DATUM BASED ON NAD 83/96. HORIZONTAL COORDINATES BASED ON MICHIGAN STATE PLANE.
3. KEMC PROJECT LOCATION WITHIN SECTIONS 2 AND 11 T47N, R29W, HUMBOLDT TOWNSHIP, MARQUETTE COUNTY, MICHIGAN.
4. CONTOUR INTERVAL SHOWN IS 2 FOOT.

0 250' 500'

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: AUG. '08
APPROVED BY:	SVD1	DATE: AUG. '08
APPROVED BY:		DATE:

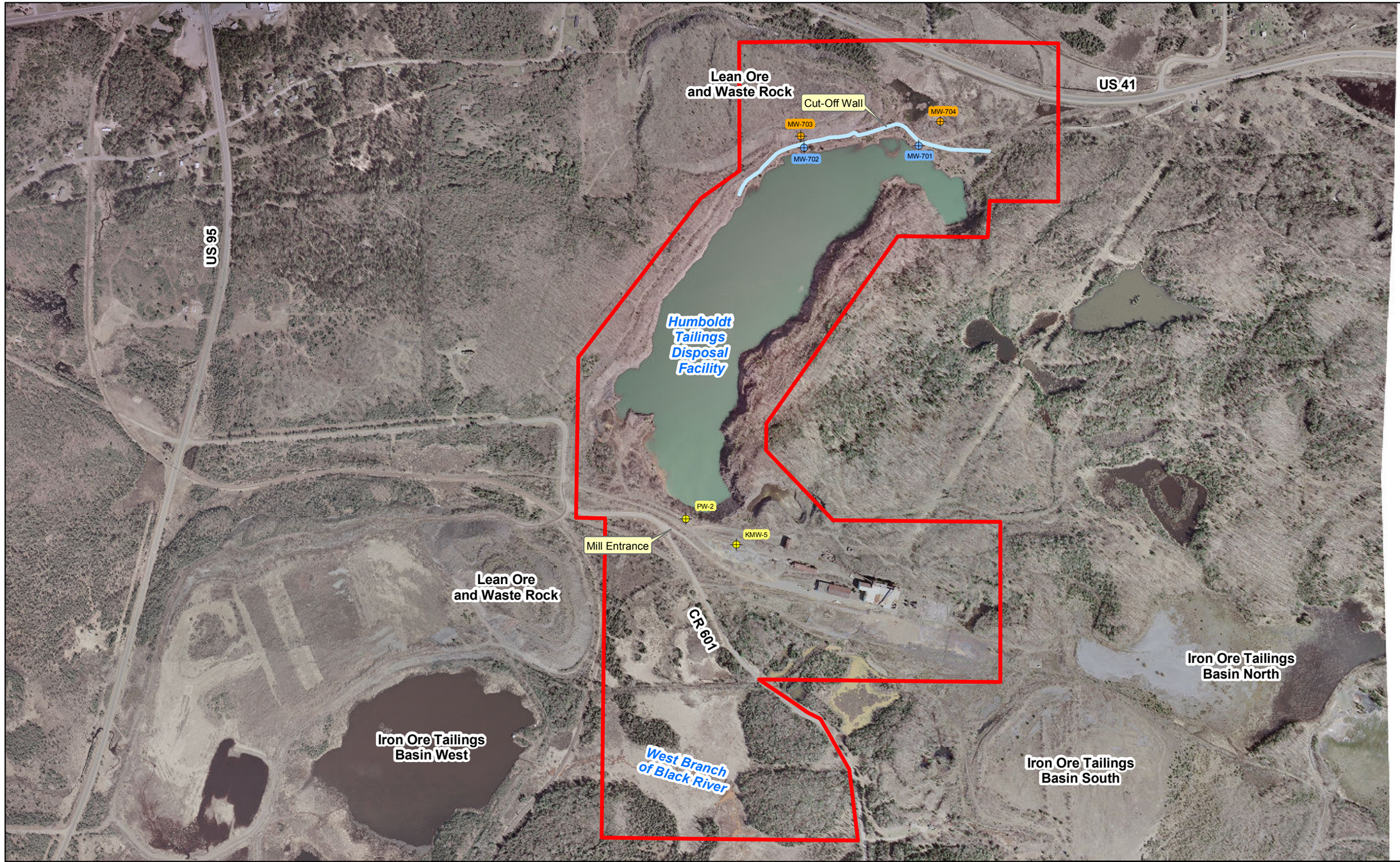
Kennecott Eagle Minerals

FIGURE 6-1

HUMBOLDT MILL PROJECT FINAL SITE DEVELOPMENT PLAN

Scale:	AS SHOWN	Date:	AUGUST, 2008
Prepared By:	JOW	Project No.	06W003

L:\06w003\MPA\TIA\mpa-tia-final-site-dev-plan.3d
12/12/2008 bjw1



NOTES

1. Orthophotography supplied by Aero-Metric Engineering, Sheboygan, Wisconsin. Date of photography: April 27, 2006.
2. Horizontal datum based on NAD 83/96. Horizontal coordinates based on Michigan State Plane North.
3. Humboldt Mill Project located within Sections 2 and 11, T47N, R29W, Humboldt Township, Marquette County, Michigan.

LEGEND

- PW-2 — Existing Background Monitoring Wells upgradient of HTDF
- MW-701 — Proposed HTDF Leachate Monitoring Wells per R425.406(5)(a)
- MW-703 — Proposed HTDF Compliance Monitoring Wells per R425.406(5)(b)
- Downgradient Containment Wall/Compliance Boundary
- KEMC Project Location

N

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

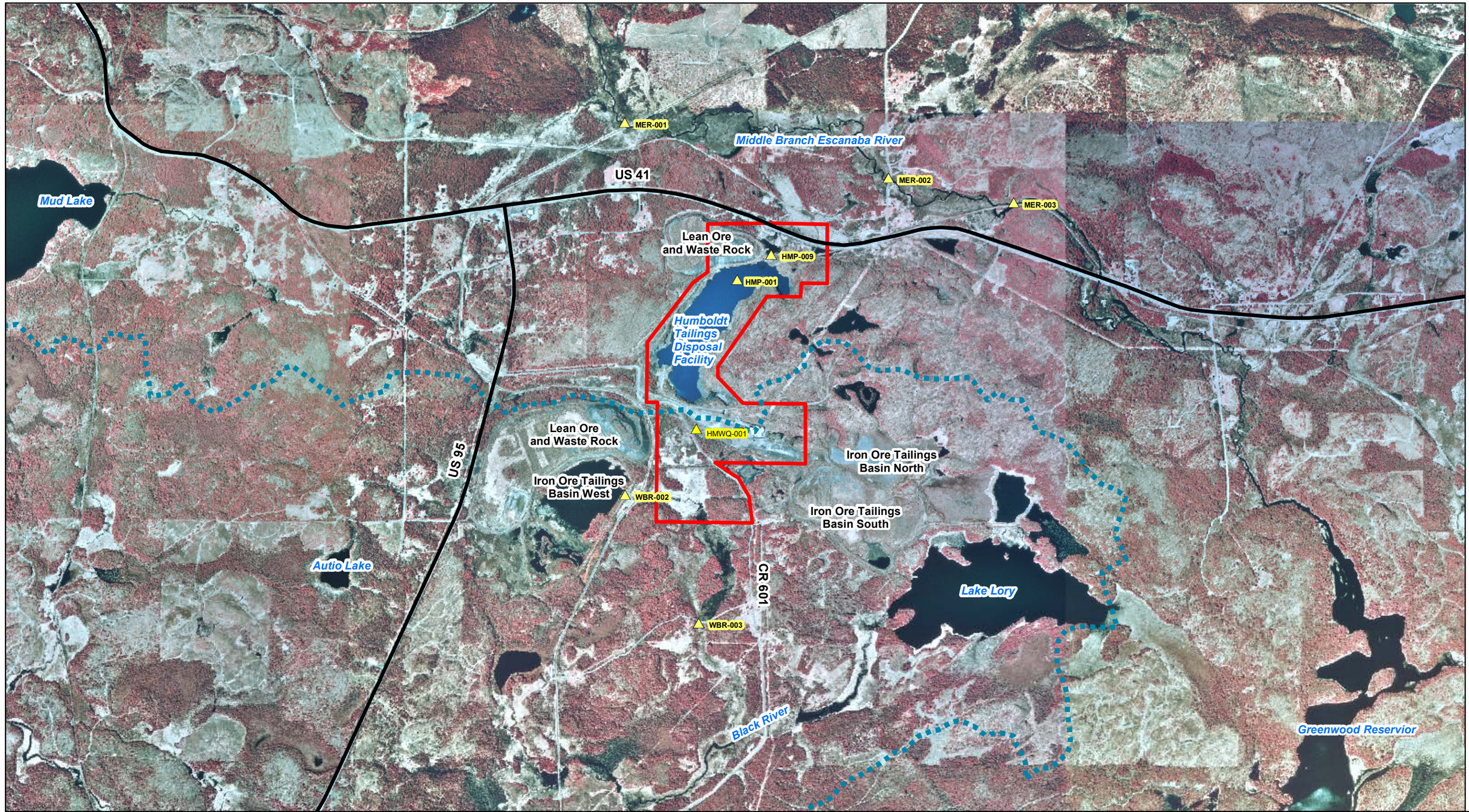
CHECKED BY:	JSL	DATE: AUG. '08	
APPROVED BY:	SVD1	DATE: AUG. '08	
APPROVED BY:		DATE:	

Kennecott Eagle Minerals

FIGURE 6-2
HUMBOLDT MILL PROJECT
POST CLOSURE GROUNDWATER
MONITORING WELL LOCATIONS

Scale: 0 400 800 Feet		Date: AUGUST, 2008	
Prepared by: DAT		Project No: 06W003	

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NOTES

1. 1998 Series USGS Digital Orthophoto Quadrangles supplied by Michigan Center of Geographic Information.
2. Horizontal datum based on NAD 83/96. Horizontal coordinates based on Michigan State Plane North.
3. Humboldt Mill Project located within Sections 2 and 11, T47N, R29W, Humboldt Township, Marquette County, Michigan.

LEGEND

HMWQ-001 — Proposed Surface Water Monitoring Station

Watershed Divide

KEMC Project Location

N

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	JOS1	DATE: OCT. '07
APPROVED BY:	SVD1	DATE: OCT. '07
APPROVED BY:		DATE:

Kennecott Eagle Minerals

FIGURE 6-3
HUMBOLDT MILL PROJECT
POST CLOSURE SURFACE
WATER MONITORING PLAN

Scale: 0 1,000 2,000 Feet | Date: October 2007

Prepared by: DAT | Project No: 06W003

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