

May 07, 2024

Ms. Melanie Humphrey
Michigan Department of Environment, Great Lakes, and Energy
Oil, Gas, and Minerals Division
1504 West Washington Street
Marquette, MI, 49855

**RE: Request for Amendment, Non-Ferrous Metallic Mineral Mining Permit MP 01 2010
Eagle Mine LLC Humboldt Mill**

Dear Ms. Humphrey,

Eagle Mine LLC (Eagle) is requesting an amendment to the above-referenced Non-Ferrous Metallic Mineral Mining permit for additional processing of tailings at Eagle's Humboldt Mill. The additional processing will include pyrrhotite flotation, tailings dewatering, and the loading of the dewatering tailings into trucks. The use of the dewatered tailings at Eagle Mine for use as paste backfill will be the subject of a separate amendment request to Eagle Mine's Non-Ferrous Metallic Mineral Mining Permit MP 01 2007.

The Humboldt Mill currently receives nickel and copper ore in trucks from the Eagle Mine in the Coarse Ore Storage Area building. Nickel and copper concentrates are subsequently produced using crushing, grinding, and flotation. The concentrate is dewatered and loaded into rail cars for transportation to customers. The material left over after the removal of the concentrates from the ore is referred to as tailings and is subaqueously disposed of in the Humboldt Tailings Disposal Facility (HTDF).

The Part 632 Rules outline the information required for a mine permit amendment application issued under Part 632. Rule 206(1) states that the amendment application shall include revisions to items affected by the proposed change, which follows.

Eagle proposes to make the following two changes that will allow for further processing of tailings at the Humboldt Mill:

1. **Addition of a pyrrhotite recovery circuit.** The recovered pyrrhotite will be loaded into railcars at the Concentrate Load Out (CLO) building and transported off site or placed in the Humboldt Tailings Disposal Facility (HTDF).
2. **Addition of a tailings dewatering and load-out facility.** The new addition will be adjacent to the existing Coarse Ore Storage Area (COSA) building. Approximately a quarter to a half of the tailings Eagle produces will be dewatered and the remaining tailings will be placed in the HTDF.

All new operations, structures, and equipment associated with the changes noted above will be within the Part 632 permit boundaries of the Humboldt Mill.

The information contained in this application supplements Eagle's mining plan for the Humboldt Mill, which is incorporated by reference in Eagle's Part 632 permit. The other aspects of Eagle's permitted plans for Humboldt Mill, as outlined in Rule 206 (1), that are unchanged are as follows:

- The environmental impact assessment
- The reclamation and environmental protection plan
- The contingency plan
- Federal, state, and local permits and licenses
- The provisions for financial assurance
- Other terms and conditions of the Part 632 permit (unless the Michigan Department of Environment, Great Lakes, and Energy designates them as a result of review and approval of this application for permit amendment)

Proposed Mining Plan Changes

Eagle is proposing a small increase (3%) in ore trucking and mill throughput due to anticipated minor changes at Eagle Mine, bringing Eagle's production to 2,200 metric tons per day (mtpd), which was addressed in a Permit to Install (PTI) application submitted on November 22, 2023. This change in production rate does not impact any aspect of Michigan Rule 425.206 of the administrative rules promulgated pursuant to Part 632 of 1994 Michigan PA 451, as amended (the "Part 632 Rules") permit for the Humboldt Mill.

If the proposed buildings are constructed, the main access road at the Humboldt Mill will be rerouted to the south of the existing Humboldt Mill access road. The access road changes will better facilitate traffic flow to the mill and administrative building and assist with redirecting stormwater to the existing onsite retention pond.

The following provides additional detail regarding the proposed changes in Eagle's Humboldt Mill operations and supplements Eagle's Mining Plan for the Humboldt Mill.

Pyrrhotite Recovery Circuit

Eagle will construct a pyrrhotite flotation and thickening circuit within the existing concentrator building and CLO building. This circuit will remove pyrrhotite from the tailings. Pyrrhotite removal enhances the geotechnical properties of the tails, allowing them to be used to formulate the paste backfill. Recovered pyrrhotite, a mineral that is currently present in Eagle's tailings, may be stored in the CLO building and shipped off site or placed subaqueously in the HTDF.

The pyrrhotite flotation plant is expected to produce 12.5 metric tons per hour (300 mtpd) of pyrrhotite concentrate. The pyrrhotite concentrate will be pumped to a new thickener. Pyrrhotite that is not dewatered will be conveyed to the HTDF via double-walled piping along the existing tailings line corridor. If pyrrhotite is to be dewatered for commercial sale, the thickener underflow will be pumped to a filter feed tank and will be dewatered through a new pressure filter. Filtrate from the pyrrhotite filtration will report back to the pyrrhotite thickener, and the thickener overflow will be pumped to the process water tank for reuse in the plant. The tailings line additions are depicted in Figure 610-CI-010.

There are several proposed chemical reagents that may be added in the pyrrhotite flotation process. Table 1 includes the proposed reagents, purpose of the reagents in the process, estimated usage, solution percentage, and storage quantity. Table 1 also includes chemical abstract services reference number. The pyrrhotite flotation tailings may be adjusted back to a basic range using soda ash which is used in the existing beneficiation operations at Humboldt Mill.

Table 1 Proposed Process Chemicals

Reagents	Process	Purpose	Alternative Name	CAS Number	Estimated Usage Rate (kg/day) (undiluted)	Soln %	Storage Quantity
Sulfuric acid (liquid)	Feed slurry	pH adjustment	N/A	7663-93-9	60,000	93	Metric Tons (bulk)
Hydrated lime (liquid)	Secondary conditioner tank	pH neutralizer	Calcium hydroxide	1305-62-0	17,000	18	Metric Tons(bulk)
Copper (II) sulfate pentahydrate (granular)	Feedbox, flotation circuit	Flotation agent	Copper sulfate	7758-98-7	600	10	Super sacs (2200 lbs)
PAX (granular)	Primary collector in pyrrhotite recovery	Pyrrhotite recovery/collector	Potassium Amyl Xanthate	2720-73-2	400	10	Super sacs (2200 lbs)
MIBC (liquid)	Feedbox, flotation circuit	Flotation agent	Methyl Isobutyl Carbinol	108-11-2	250	100	Totes (1773 lbs)
OPTIMER 83949 Flocculant (granular)	Tailings thickener	Thickener	Polyacrylamide	--	50	0.1	Bags (55 lbs)

The recovered pyrrhotite may be temporarily stockpiled in the CLO building along with the copper and nickel concentrate produced at the site if it will be shipped off site via the existing rail operation. Alternatively, it would leave the flotation circuit as a slurry and conveyed to the HTDF for subaqueous disposal.

Attachment A provides the engineering drawings presenting the preliminary layout of the pyrrhotite recovery circuit equipment.

Tailings Dewatering and Load-Out Facility

Eagle will construct a new tailings dewatering and load-out facility that will operate separately from and in parallel with the existing tailings handling system. This facility will be adjacent to the COSA building and enclosed to prevent precipitation from contacting the tailings and to control fugitive dust. Approximately a quarter to half of the desulfurized tailings will be directed to the new dewatering facility, while the remaining tailings will continue to be subaqueously disposed of in the HTDF.

The new tailings dewatering and load-out facility will include a filter press to dewater the tailings. Eagle will recycle the water removed from the tailings within the process or discharge it directly to the HTDF in a manner consistent with current permit conditions. Dewatered tailings will be loaded into ore trucks that are currently empty when going from the Humboldt Mill site to the Eagle Mine site. Haul trucks will continue to enter the COSA from the west side of the building, dump coarse ore, and exit on the east side. The trucks will then loop into the new facility, be loaded with dewatered tailings, and exit the new building from the west side. The use of the dewatered tailings at Eagle Mine for paste backfill will be the subject of a future permit amendment request for MP 01 2007.

Environmental Considerations

New tailings and/or pyrrhotite transport systems will be designed per Condition E3, constructed per Special Permit Condition E12, and monitored per Special Permit Condition F8. Eagle is not proposing any additional changes to the operation of the HTDF.

The new tailings dewatering and load-out facility will be constructed in an area of known environmental contamination that pre-dates Eagle's ownership and occupancy of the Humboldt Mill property. Eagle's proposed construction activities, including managing environmentally impacted residuals from construction, will be completed compliant with Eagle's "due care" obligations, pursuant to Section 20107a of Part 201 (Environmental Remediation) of 1994 Michigan PA 451, as amended.

Air emissions from the pyrrhotite separation operation at the Humboldt Mill were also addressed in the November 2023 PTI application. The potential emissions include criteria pollutants, HAPs and TACs. These emissions originate primarily from the material handling operations such as conveyor drops and storage pile maintenance using a front-end loader. Potential emissions from the paste backfill operation include criteria pollutants, HAPs, and TACs. These emissions originate primarily from the proposed material transport, handling, and blending operations.

The changes at the Humboldt Mill do not require an amendment to the environmental impact assessment. The changes at the Humboldt Mill will be within the existing permit boundary and will make use of previously disturbed open space, be placed within the concentrator, or utilize the HTDF.

Reclamation of the new facilities, roads, and equipment will follow the approved reclamation plan.

Updated Plans

Attachment A presents the preliminary engineering plans depicting (a) the location of the proposed pyrrhotite recovery operation for your consideration, (b) the size and location of the proposed tailings dewatering and load-out facility, (c) addition of a tailings line and filtrate line to and from the tailings loadout facility; and (d) revised trucking patterns on the site.

Financial assurance planning will be addressed in annual reports, or sooner at your request.

Eagle appreciates your time and consideration of this amendment request. Should you wish to discuss these matters further, or have any questions, please contact me at (906) 458-7107.

Sincerely,

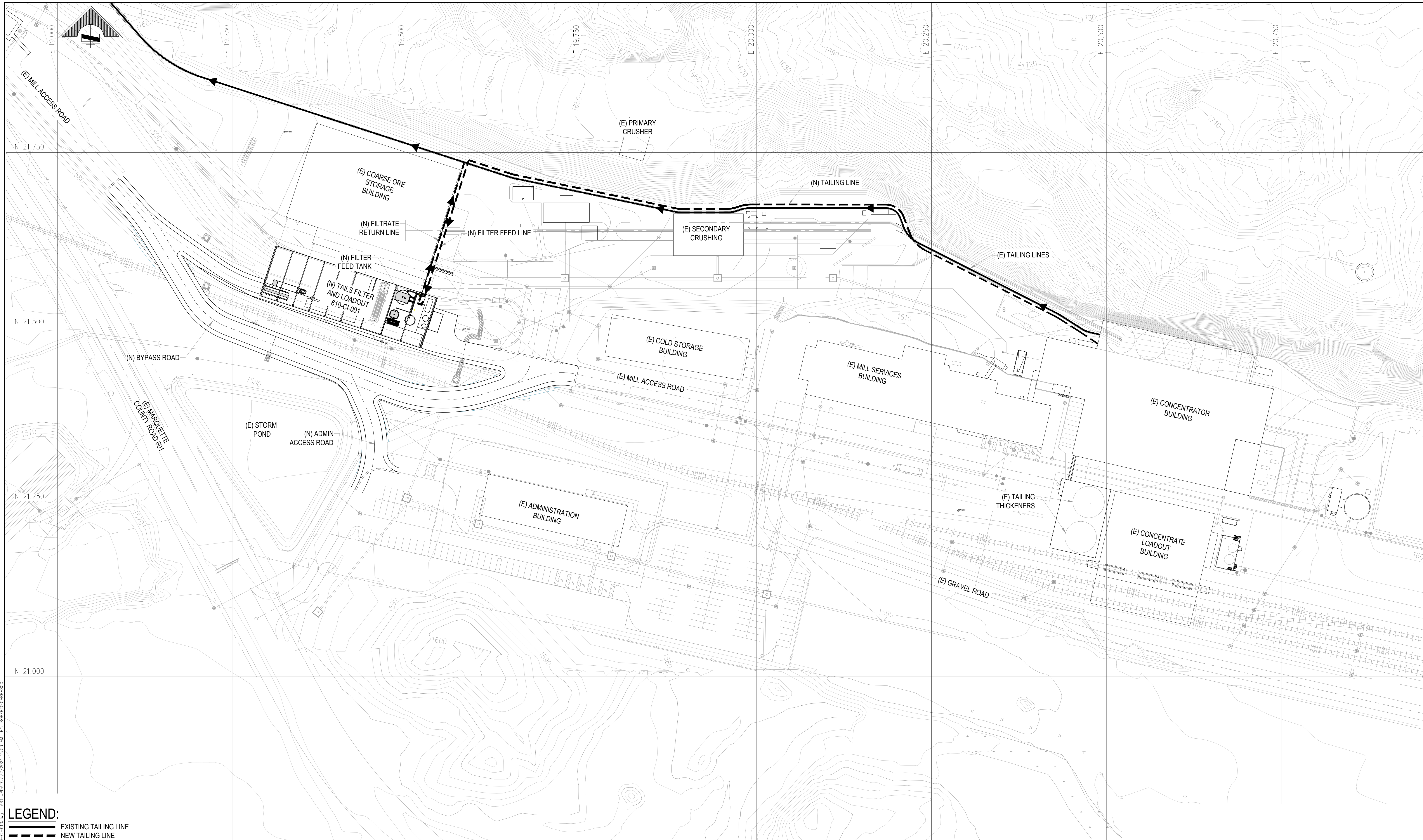
A handwritten signature in black ink, appearing to read "Jennifer Nutini", written in a cursive style.

Jennifer Nutini, PE
Environmental Superintendent

Attachments:

Attachment A Preliminary Engineering Drawings

ATTACHMENT A



LEGEND:
 ——— EXISTING TAILING LINE
 - - - NEW TAILING LINE

NOTES:
 1. COORDINATES ARE TO BE VERIFIED IN THE FIELD TO MATCH SITE AND SURVEY RESULTS.
 2. SURVEY FILE RECEIVED FROM EAGLE MINE ON APRIL 12, 2023. FILE IS UNADJUSTED.
 3. COORDINATE SYSTEM : MINE SITE COORDINATES

PLAN
 SCALE: 1" = 60'

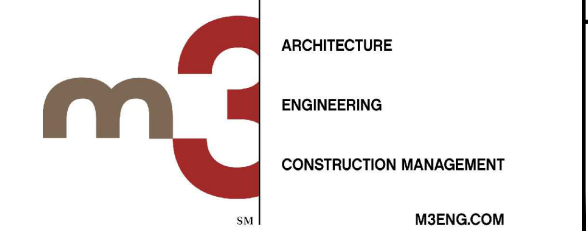


PRELIMINARY
 NOT FOR CONSTRUCTION

Eagle Mine
 a subsidiary of **Jundin Mining**

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610-CI-001	TAILING FILTRATION GRADING PLAN														

BAR SCALE FOR REFERENCE ONLY		DATE
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DRAWN BY	ARM	FEB 24
CHECKED BY	MWO	FEB 24
PROJECT MGR		
CLIENT APPR		

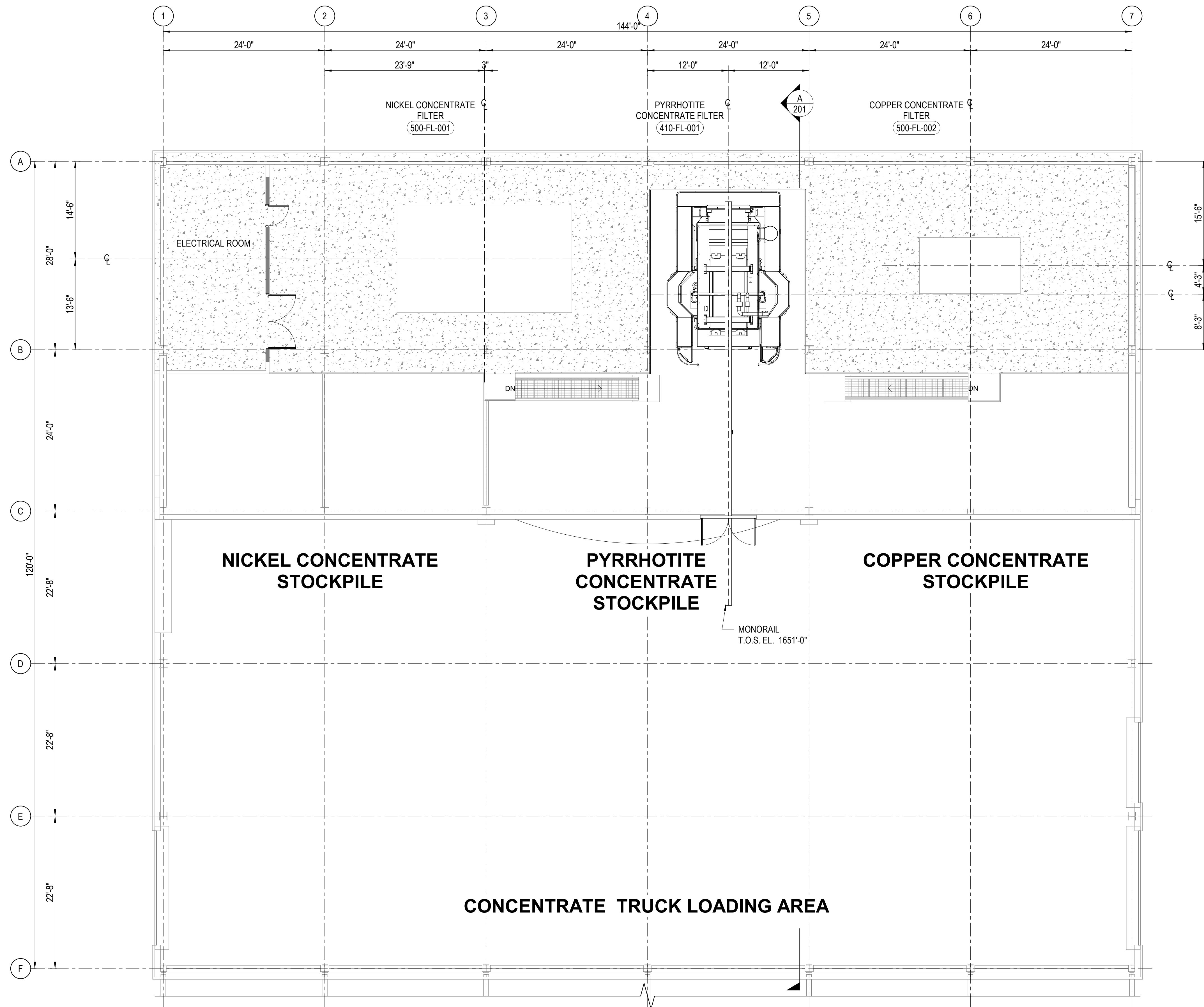
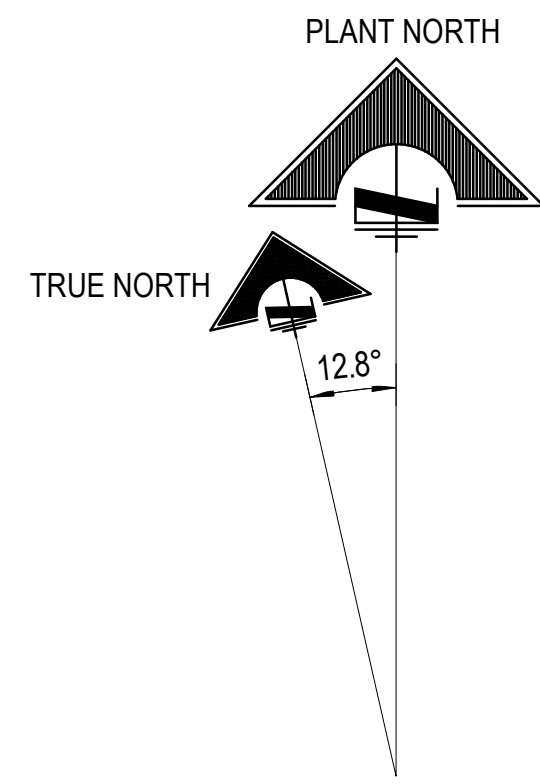


EAGLE PASTE BACKFILL PROJECT

MILL GENERAL SITE CIVIL TAILING LINE ROUTING

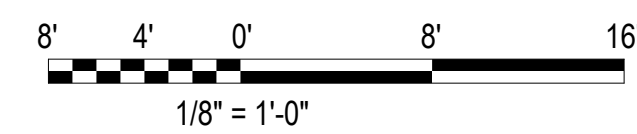
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DWG NO.	610-CI-010
REV NO.	P1
DATE	16 FEB 24

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OVERALL PLAN

SCALE: 1/8" = 1'-0"



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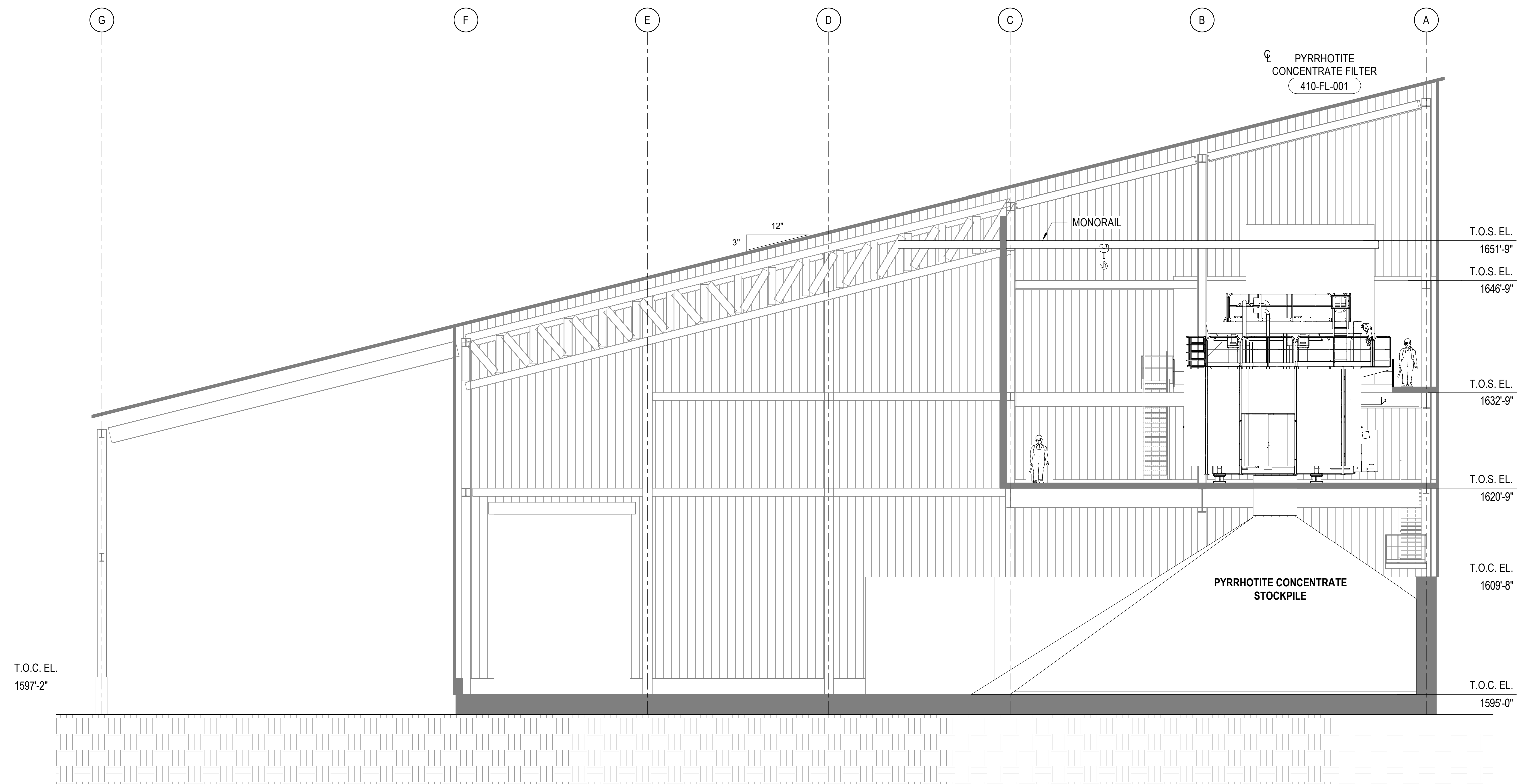
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500-GA-201	SECTION														

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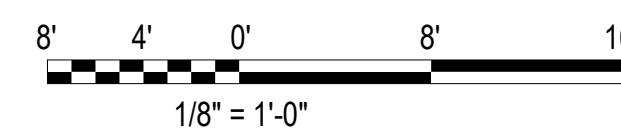
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CONCENTRATE LOADOUT GENERAL ARRANGEMENT OVERALL VIEW CONCENTRATE FILTER PLAN	
PROJECT NO.	M3-PN230121
DWG NO.	500-GA-200
REV. NO.	P2
DATE	23 JUN 23



SECTION

SCALE: 1/8" = 1'-0"

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Eagle Mine
a subsidiary of **lundin mining**

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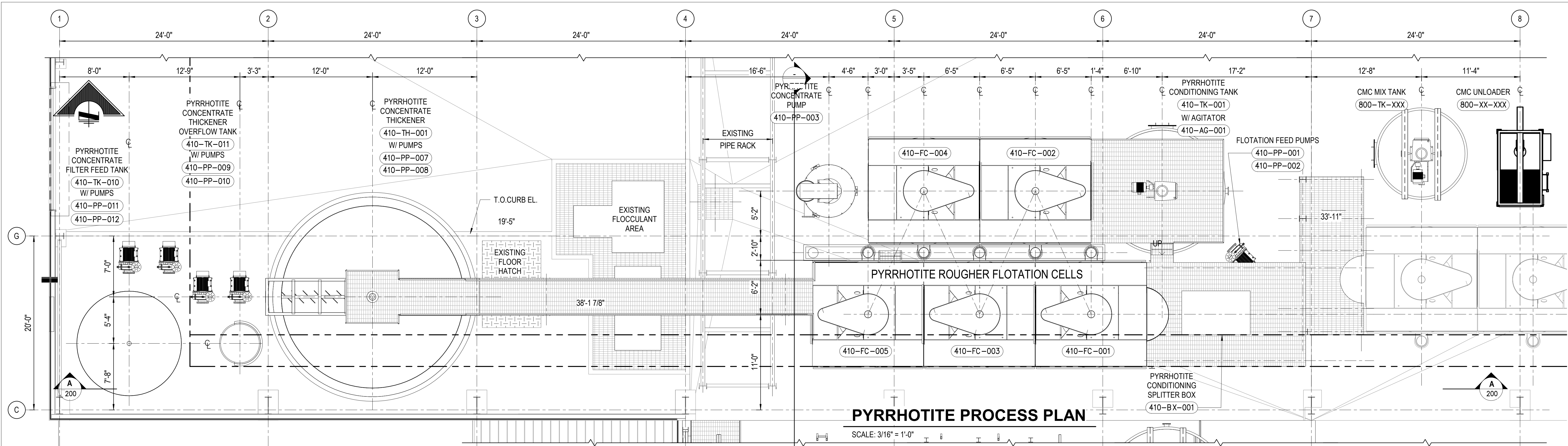
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500-GA-200	OVERALL VIEW																

DO NOT SCALE 11x17 DRAWINGS

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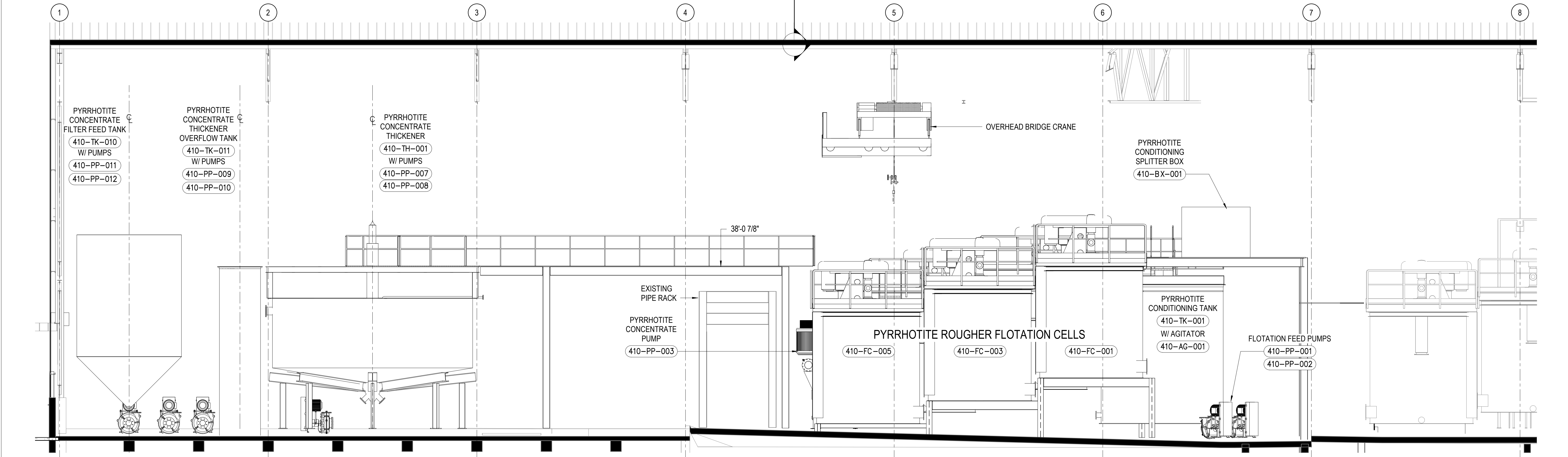


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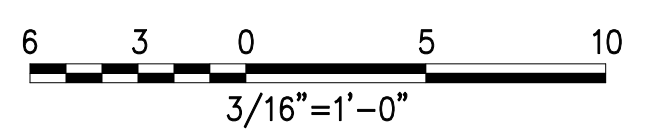
PYRRHOTITE PROCESS PLAN

SCALE: 3/16" = 1'-0"



SECTION

SCALE: 3/16" = 1'-0"



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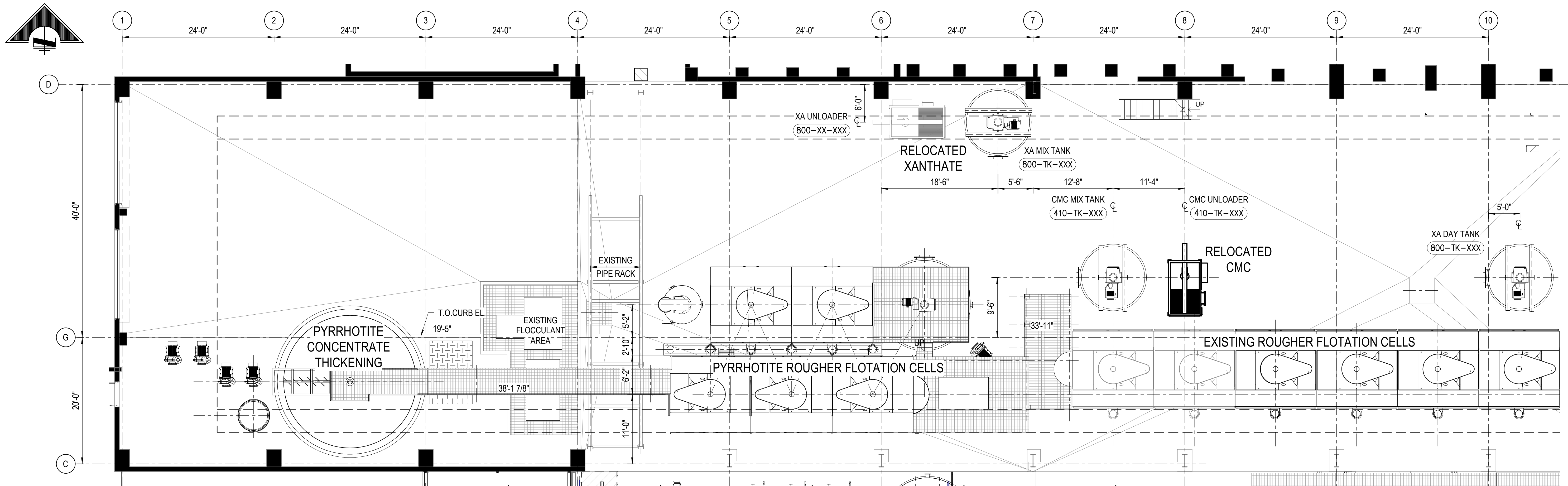
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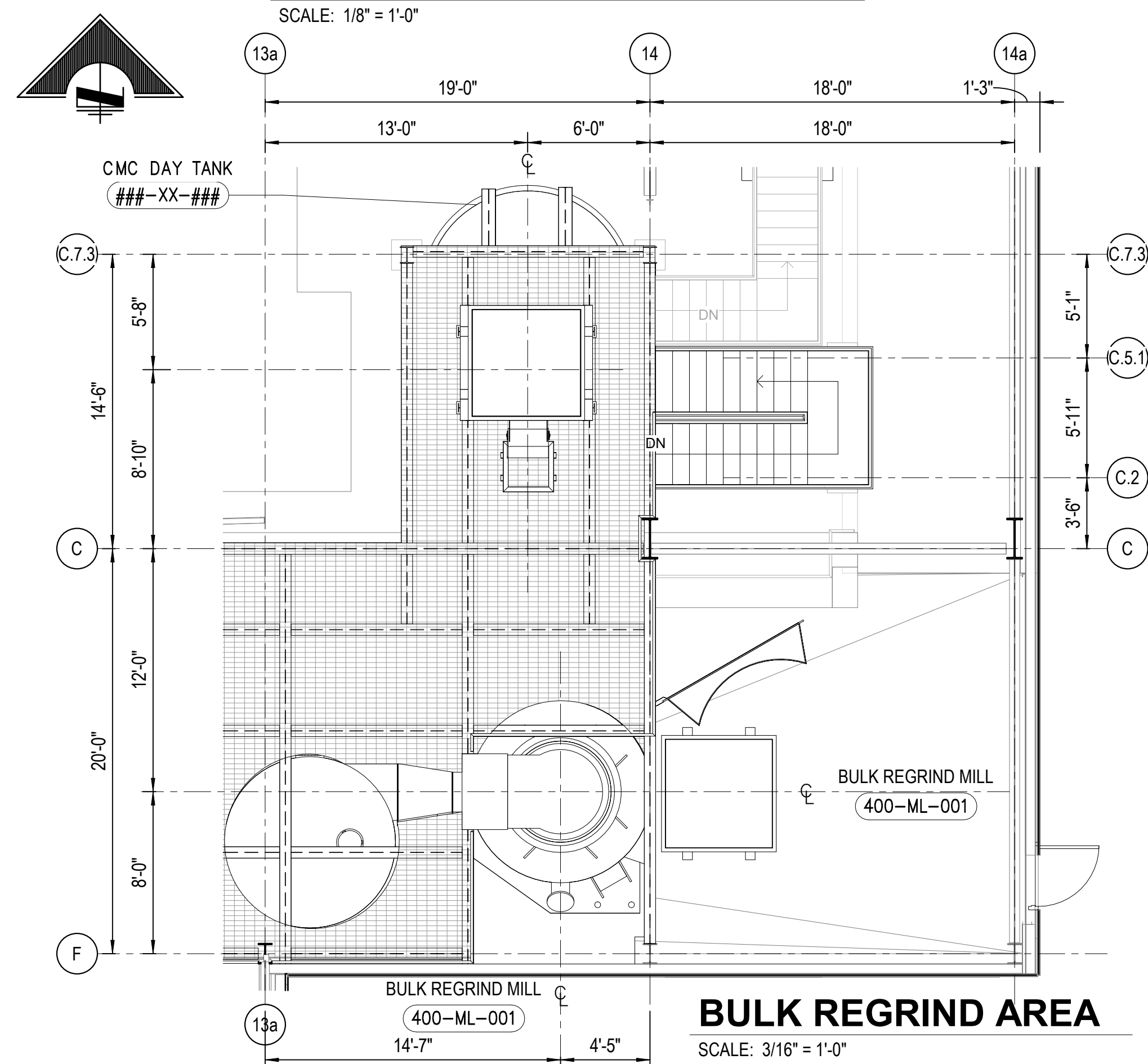
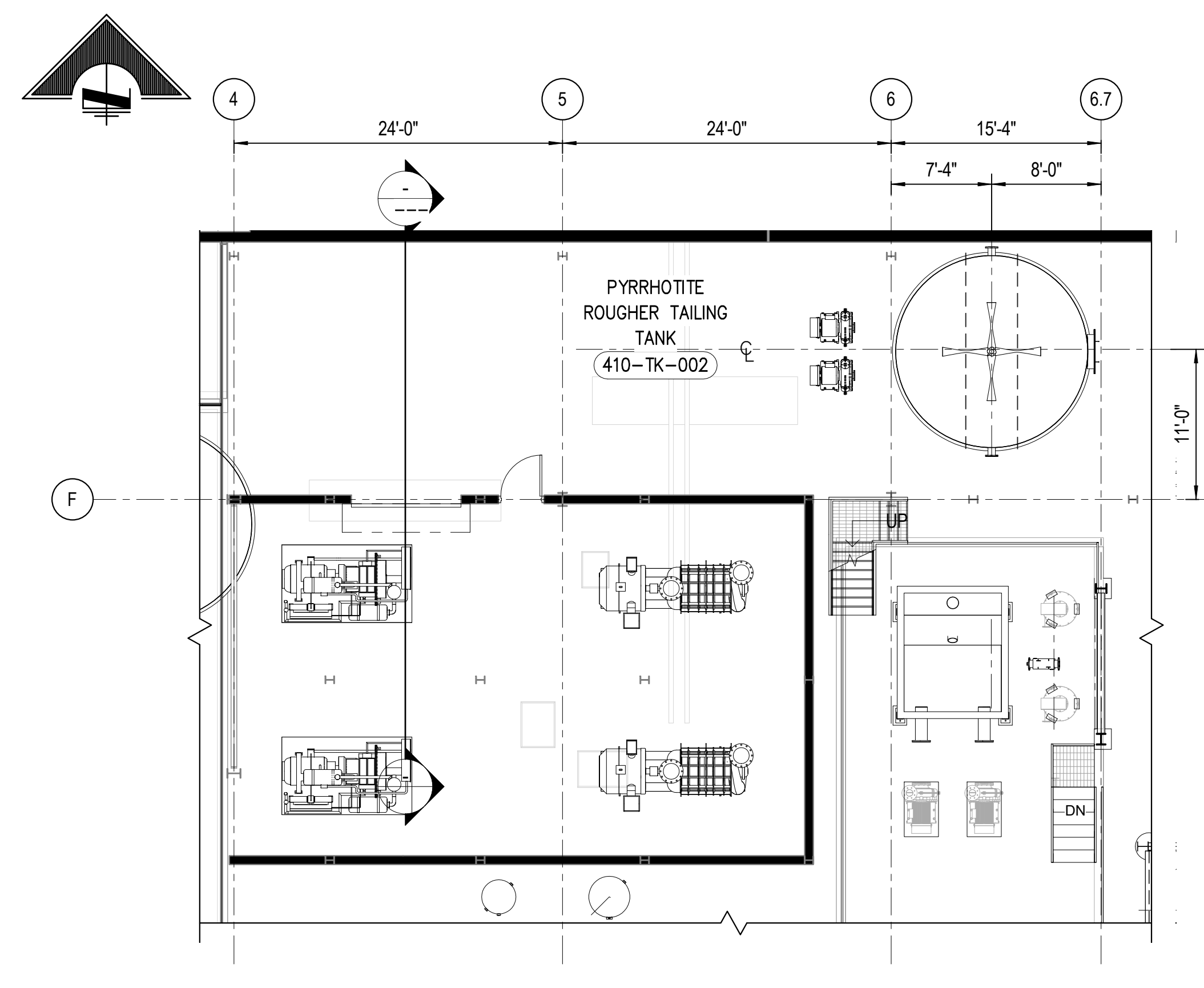
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REV. NO. P1	DATE 23 JUN 23

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REAGENT RELOCATION PLAN

SCALE: 1/8" = 1'-0"



BULK REGRIND AREA

SCALE: 3/16" = 1'-0"



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HUMBOLDT MILL BROWNFIELD STUDY

**REAGENTS
GENERAL ARRANGEMENT
RELOCATION OF REAGENTS
PLANS**

PROJECT NO.	M3-PN230121
DWG NO.	800-GA-201
REV NO.	P1
DATE	23 JUN 23

REFERENCES			REFERENCES			REVISIONS					REVISIONS				
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