WOLVERINE PROJECT

MILL OPERATING PLAN

VERSION 2010-02

QML-0006

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1 Introduction

This Mill Operating Plan describes the infrastructure and processes, and associated support services, for milling at Yukon Zinc Corporation's (YZC) Wolverine Mine.

The Wolverine Project is an underground mining project that will produce copper, lead and zinc concentrates. It is located in the south-eastern Yukon near the headwaters of the Wolverine Lake watershed within the Kaska Nation traditional territory. Site access is via air or a 26 km long all season access road that connects with the Robert Campbell Highway at km 190.

This Plan has been prepared to satisfy requirements in *Quartz Mining License QML-0006* (QML), specifically, Section 13.2. This Plan replaces Section 3.4.1 and 3.4.2 of General Site Plan V2008-04, which briefly summarized the mill operation simplified process. Table 1-1 summarizes the QML documentation requirements for the Plan, and the corresponding report sections where the information is provided herein.

Table 1-1: QML Information Requirements and Corresponding Report Sections

QML Section	Requirement	Report Section(s) Where Addressed
13.2 a)	A description of production rates and mineral product to be produced, including mill recoveries and a flow sheet for the mill.	3, 4
13.2 b)	A summary of the milling methods to be employed, including equipment used and reagents to be stored and consumed.	2, 3
13.2 c)	Final drawings and designs of the mill structure and process equipment.	2, 3, 5, 7, Appendices A & B
13.2 d)	Plans for the use and disposal of water used in mill operations.	2.4, 3
13.2 e)	Plans of storage areas for ore, concentrate and *dense media separation float material* any waste materials, including details of drainage control and water collection proposed for those storage areas. [*note: DMS not currently part of milling process*]	2.2, 2.3
13.2 f)	A summary of mill operating practices particularly with regard to management and control of all wastes and hazardous substances.	3, 5, 7
13.2 g)	A description of concentrate storage, handling and transportation.	5
13.2 h)	Plans for the paste backfill plant.	3.6
13.2 i)	Plans for the power plant.	6
13.2 j)	Methods of fuel storage and handling.	7

The major infrastructure at the Wolverine Project and at the industrial complex is depicted in Figure 1-1 and Figure 1-2, respectively. For additional information on the site infrastructure not detailed herein, refer to the *Wolverine Project General Site Plan V2008-04*. For closure details for the site infrastructure, refer to the *Wolverine Project Reclamation and Closure Plan V2010-03*.

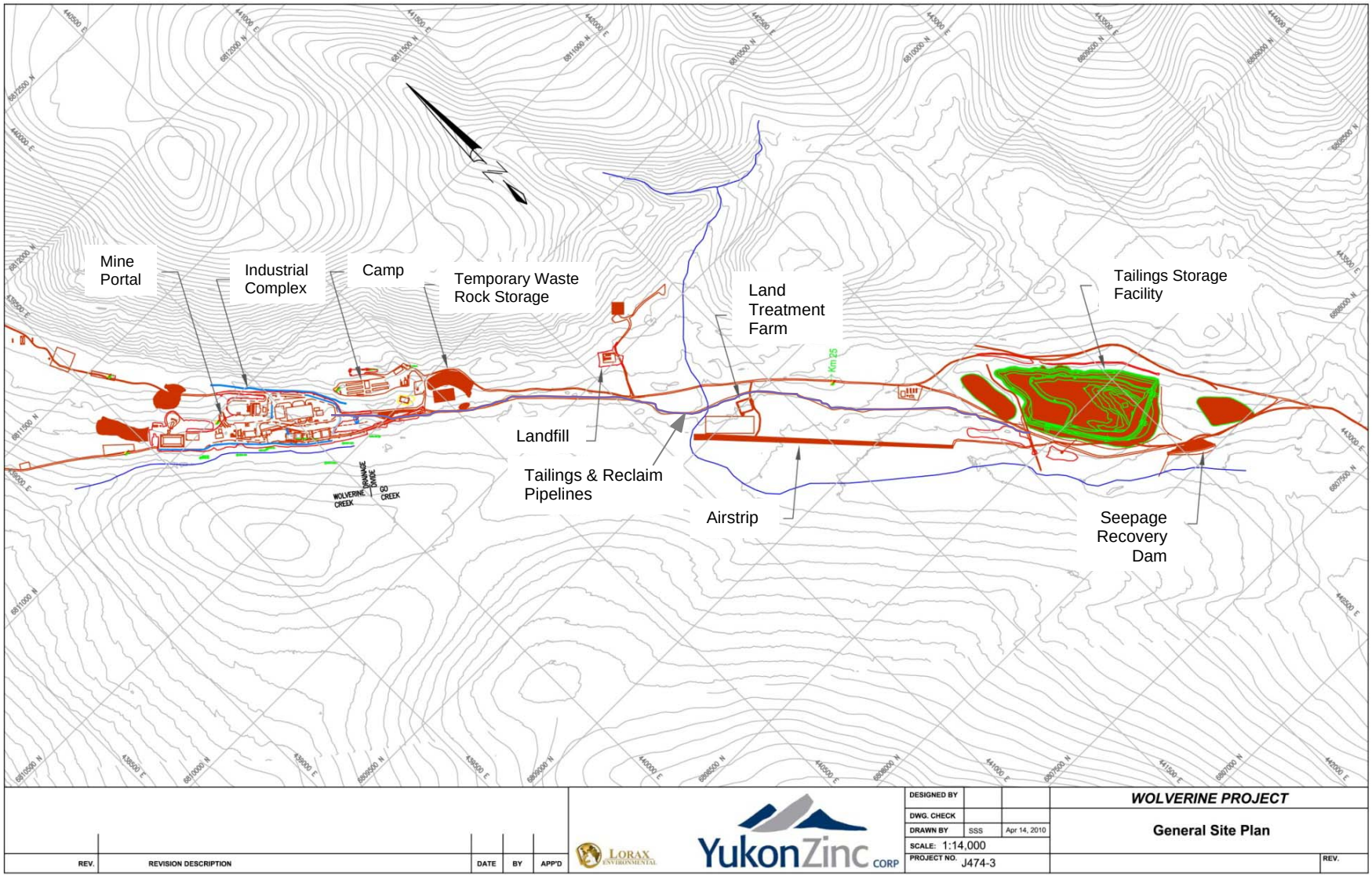


Figure 1-1: General Site Layout - Wolverine Project

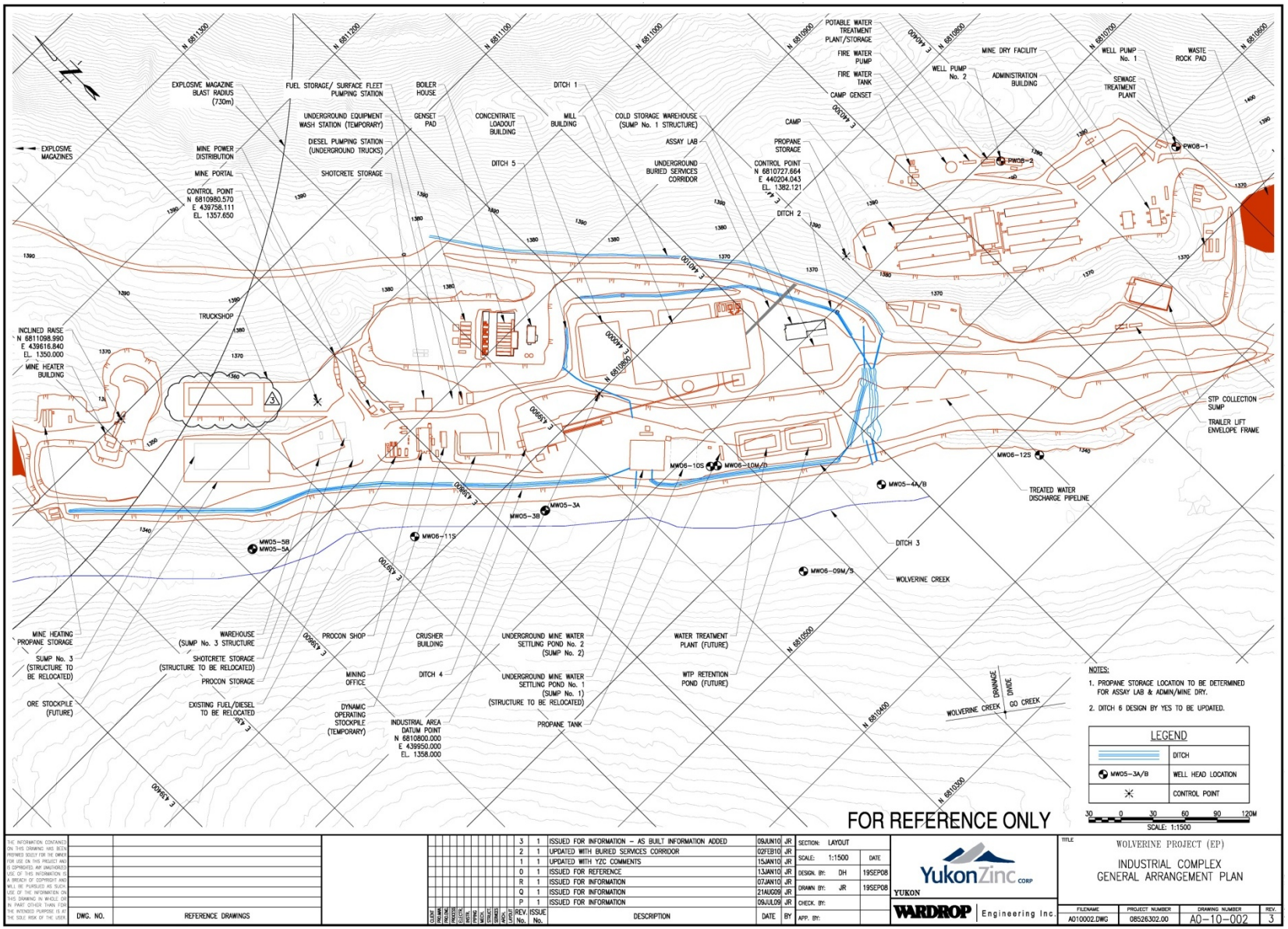


Figure 1-2: General Site Layout - Industrial Complex

2 Mill and Associated Infrastructure

This section summarizes the ore processing facilities and associated infrastructure, including ore and waste storage facilities, and drainage control and water collection. The mill water balance, including the plans for use and disposal of water used in the milling operations, is also provided.

2.1 Mill Facilities

The mill facilities are located adjacent to the mine portal and include a crusher, mill and concentrate load-out buildings (Figure 1-2). The detailed general arrangement plant for the crusher, mill and concentrate load-out buildings within the process plant area is shown in Figure 2-1. Details of the internal workings of the three buildings, including process equipment and operating descriptions are provided in Section 3.

The crusher building is where primary and secondary crushing is conducted and it contains:

- Rock breaker;
- Jaw crusher;
- Cone crusher;
- Vibrating grizzly;
- Conveyors; and
- Associated platforms, belts, chutes, exhaust fans and screens.

The mill building is where grinding, pre-flotation, flotation, re-grinding and paste backfill preparation occurs, and the building contains:

- Rod mill;
- Ball mill;
- Particle size analyzers;
- Lime slaking and mixing;
- Flotation cells (for lead, copper and zinc flotation);
- Conditioning tanks;
- Reagent mixing tanks;
- Water tanks;
- Thickeners;
- Air compressors;
- Glycol distribution system;
- Paste mixers; and
- Associated piping, pumps and access (i.e., ladders, walkways, etc.) and administrative/employee support requirements (i.e., offices, lunch rooms, dry facilities).

The concentrate load-out building is where concentrate is stored prior to transportation off-site, and the building contains cement barriers to segregate the three types of concentrate (zinc, copper and lead), as well as a scale to weigh loaded haul trucks.

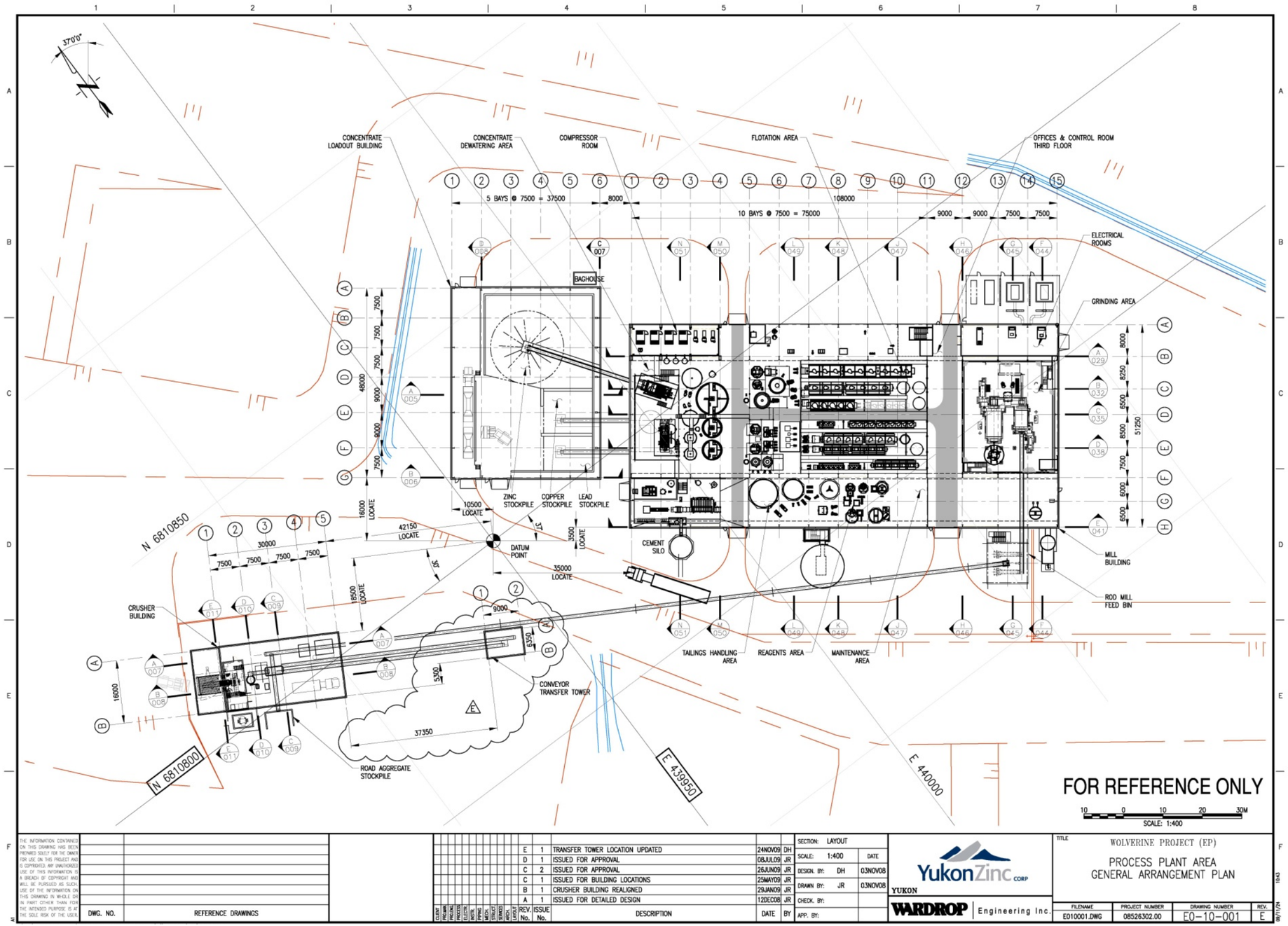


Figure 2-1: Process Plant Area General Arrangement Plan

2.2 Ore and Waste Rock Storage Facilities

Temporary storage was required for the ore and waste produced during the test mining program and pre-production development program, and will be required for mined rock prior to milling. The main locations of ore and waste rock storage at the Wolverine Project are at the temporary waste rock and ore storage facility, located east of the camp (Figure 1-1), the dynamic operating stockpile, located at the west side of the crusher building (Figure 1-2), and the temporary dynamic ore stockpile at the west end of the industrial complex area.

The temporary waste rock and ore storage facility was constructed in 2005 and extended in fall 2007 to accommodate test mine and pre-production development rock generated in 2005 and 2009 – mid 2010, respectively (Picture 2-1). The pad was lined with an HDPE liner and clay prior to the deposition of ore and waste. The ore and some waste material contained on the pad will be used to commission the mill during start-up in summer 2010, and the remaining waste material will be transported underground and used as fill in the first two years of operations.

Water collected within the storage pad drains towards a sump at the south end. Water is pumped from this sump as required and trucked to the tailings facility. Clean runoff emanating from the hillside up slope of the storage pad is directed via ditches around the pad to minimize contamination.



Picture 2-1: Temporary Waste Rock and Ore Storage Facility (April 24, 2010)

The dynamic operating stockpile is a lined area used to temporarily store the ore as it is brought up from the underground mine preceding throughput through the crusher. This area will be used for life of mine. The temporary dynamic stockpile was developed during pre-production development to meet minimum design through-put in the mill for the early production phase. Runoff from the dynamic stockpiles, and from the entire industrial complex, is via collection ditches 2, 3 and 4 (Figure 1-2). These are lined ditches that ultimately discharge into the underground mine water settling pond no. 2 located east of the crusher building. Diversion ditch 1 diverts clean surface runoff upslope of the industrial complex, and into the headwaters of Wolverine Creek (Figure 1-2).

2.3 Tailings Facility

The milling process produces tailings that will either be utilized in the underground mine as paste backfill, or deposited in the tailings facility. The tailings have high sulphide content and have the potential to become acid generating if allowed to oxidize. Therefore, tailings will be stored in a saturated containment system (tailings facility). The design of the tailings facility was based on field and laboratory investigations of the foundation conditions at the facility location, and considerations of geochemical characteristics of the tailings and supernatant water. The design incorporated the availability of local dam borrow materials, storage capacity requirements, site water balance, dam failure consequence rating, and earthquake and flood potential. Further as-constructed details of the starter dam and supporting infrastructure are available in the *Wolverine Project Tailings Storage Facility 2009 Civil Works Construction Summary Report* (May 2010).

The tailings facility includes an L-shaped dam, a tailings pond, a seepage recovery dam and pond, two upland diversion ditches, and a spillway (Figure 2-2). The impoundment covers an area approximately 600 m long and 300 m wide. The dam is 19.5 m and 23.5 m high at project start up and after Year 2 of mining operations, respectively. The tailings dam is a compacted homogeneous earthfill dam with an impervious geosynthetic liner. The liner covers the base of the tailings impoundment and the upstream face of the dam up to the dam crest.

The impoundment is designed to safely route the 1:10,000 year return period flood through a spillway located in the west flank of the dam. The tailings facility will also store the 1:200 year return-period flood event, without the release of water. The design earthquake is a 1:10,000 return period, with a peak ground acceleration of 0.22 g. The minimum geotechnical factors of safety during operations are 1.5 for static stability and 1.1 for pseudo-static stability. The negligibly low seepage rate provides a safety margin against the potential for long-term degradation of portions of the liner. A seepage collection pond constructed downstream of the main dam allows for the return of potentially contaminated seepage water.

The catchment area for the tailings facility is reduced with the construction of two main diversion ditches: Ditches A and B, which are shown in Figure 2-2. The ditches consist of open channel excavations with corrugated steel pipe culverts in areas where the gradients are steeper than 2%. The ditch side slopes are typically 2H:1V. Ditch A intercepts runoff from the catchment northwest of the tailings impoundment and conveys the runoff to Go Creek. Ditch B intercepts runoff directly uphill (northeast) of the tailings basin and directs the flow, via a culvert, to Go Creek downstream of the seepage collection pond. Both ditches discharge first to a stilling basin to reduce discharge velocity into the creek.

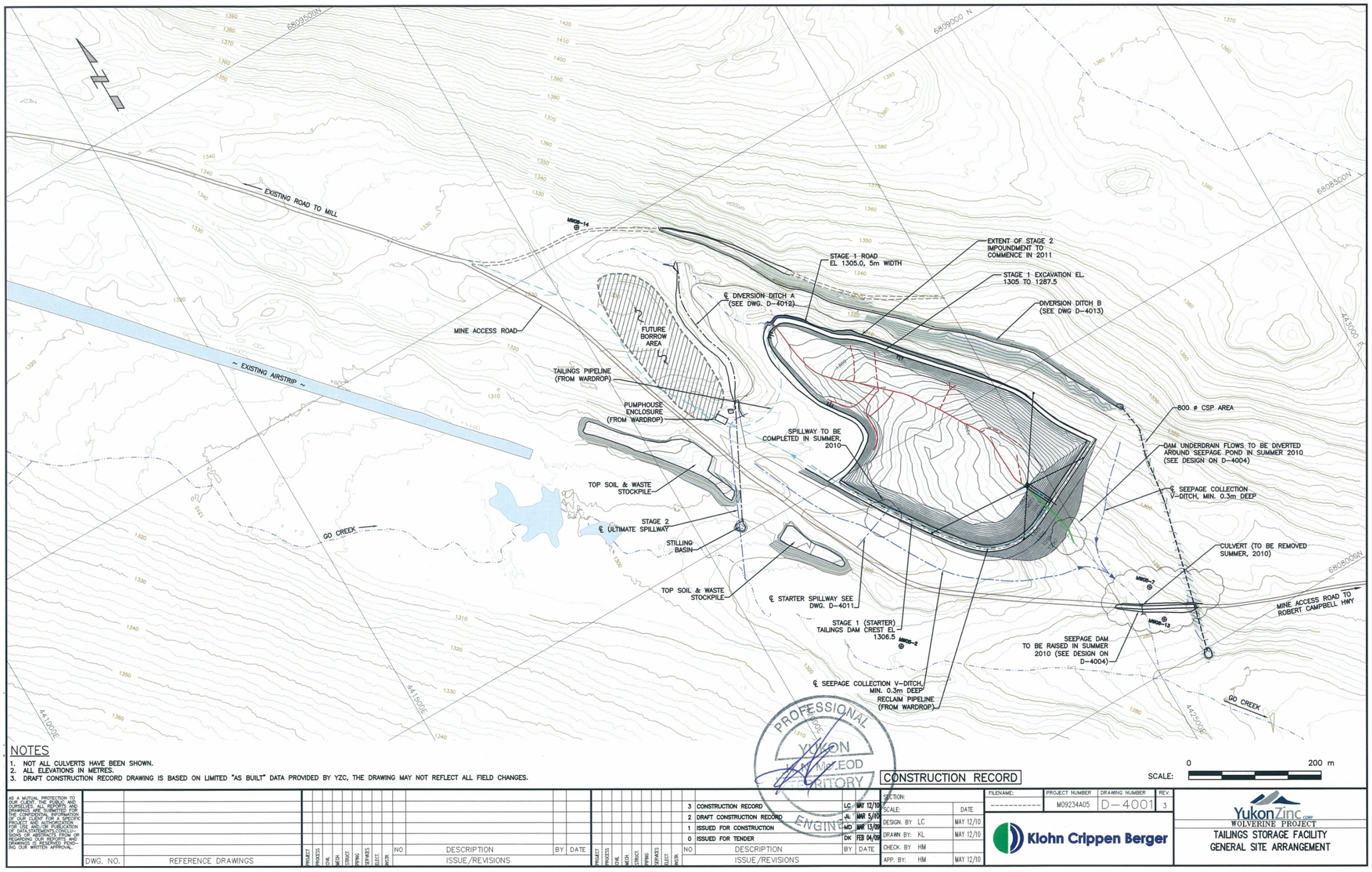


Figure 2-2: Tailings Storage Facility – Starter Dam As-Constructed Drawing

2.4 Water Use and Disposal

The process plant facilities use water reclaimed from the tailings impoundment for most of the water requirements. Surface wells supply freshwater for requirements where reclaim water is not suitable (e.g., potable water, reagent mixing). A positive water balance exists at the site and excess water will be treated at a water treatment plant that will be located adjacent to the process plant. Treated water will be directed to a retention pond to confirm suitability for discharge prior to release to Go Creek downstream of the airstrip (facilities and pipeline not yet designed). Section 2.4.1 describes process water management and reclaim systems, the operational water balance is provided in Section 2.4.2, and Section 2.4.3 outlines effluent disposal.

2.4.1 Process Water Management System

The process water management system has been designed to minimize the amount of effluent discharged into the environment by maximizing re-use of process water and underground mine water discharge. The initial water reserve will be obtained from mine dewatering and surface run-off collected in the tailings facility over the October 2009 – May 2010 period.

The tailings facility is a central water reservoir, allowing the collection of all process water, sewage treatment plant effluent, surface runoff, precipitation, and underground water.

The tailings pipeline is used to convey tailings from the mill via the tailings pumpbox to the tailings storage facility. The reclaim pipeline conveys reclaimed process water from the tailings storage facility for use in the mill. The routing of the tailings and reclaim pipelines are shown on Figure 1-1, as a purple line labelled “tailings and reclaim pipelines”. The tailings pipeline drains via gravity (along the mill access road) to the tailings storage facility, so that if there is a spill, the line will drain primarily in the direction of the tailings storage facility.

The reclaim and tailings pipelines are double walled, with the interior pipe being 8” HDPE, and the outer pipe 12” DR26 HDPE. The pipes are insulated with 2.5” of polyurethane insulation and contain two channels for heat trace, should it be required. Leak detection tees are placed approximately 460 m apart.

Water is pumped from the tailings storage facility via a barged float system which has two transfer pumps, one operational and one standby. A de-icing re-circulating pump keeps the water around the pump barge from freezing. The system is anchored in position by anchor cables. Reclaimed water is transferred to the shore by a floating hose. The reclaim water pipe line, which conveys water along the top of the dam to the pump house is an 8” pipe, with 3” of insulation and heat tracing. The reclaim water drain line, which allows for excess water pumped from the pump system to the reclaim pump house to drain back to the tailings storage facility, is double walled (10” inner and 14” outer pipes with 2” of insulation and heat tracing).

During operations, reclaimed water is pumped from the tailings pond reclaim water pump barge to the reclaim water tank in the mill building for distribution to the points of usage (e.g., gland service water (high and low), mill distribution and vacuum seal water). A reclaim water treatment plant will be installed to treat a portion of the reclaim water before it enters the mill circuit. The existing underground mine water settling pond no. 2 will also supply water to the reclaim water tank, the crusher building and to the underground mine for drilling.

Some process water generated in the individual flotation circuits as the concentrate-thickener overflow solution will also be re-used in the respective flotation circuits. Overflow from the

three concentrate thickeners cannot be directly recycled because different reagents are used in each circuit and contamination would reduce process efficiency. This water will be discharged to the tailings facility and later reclaimed as required.

2.4.2 Site Water Balance

Modelling was carried out to evaluate the requirements for water collection, management, treatment, and discharge under a range of operating scenarios. Inputs to the tailings impoundment include process plant tailings, precipitation, runoff, mine dewatering, and sewage treatment effluent. Outputs from the tailings facility include process plant reclaim, discharge of treated water to Go Creek, evaporation, and pore water contained in the tailings.

An overall site water balance was generated for average operating conditions using estimates of average hourly flows (m^3/h) between the different facilities in the site water management system (Figure 2-4).

Much of the water in the site water balance is continuously recycled between the process plant and the tailings facility (96%). Freshwater for reagent mixing and potable use will be sourced from groundwater wells in the Go Creek watershed.

2.4.3 Effluent Disposal

The tailings impoundment will be operated as a closed system with surplus water treated prior to release. Water treatment and discharge will occur during the six month, ice-free window of May to October. For the purposes of developing and designing a water treatment strategy, a tailings supernatant treatment rate of approximately 30 m^3/h (9 L/s) has been assumed. The initial design of the water treatment plant has been carried out by Lorax Environmental Services Ltd. (Lorax). Pilot plant studies will commence in late summer 2010 once the process plant generats 'typical' supernatant. Based on the storage capacity of the tailings impoundment, water treatment plant operation is not required until after 2012.

The expected chemistry of Wolverine tailings supernatant contains a wide range of parameters requiring treatment prior to discharge including total CN, Al, As, Cd, Cu, Pb, Se and Zn. Thiosalts are also present in tailings supernatant and would be expected to oxidize within the impoundment and generate acidity. Based on the bench scale tests conducted on samples obtained from metallurgical lock-cycle testing, treatment of these waters requires a two-stage process. Test work has focused on using high density sludge (HDS) with iron salt addition and a polishing stage utilizing biological reduction. Bioreactor test work was conducted by Inotec at the University of Utah, and the work was supervised by Lorax.

The bioreactor will be the primary method of water treatment at the Wolverine Project, with a possible pre-treatment step using HDS, and a possible post-treatment step for treatment of biological oxygen demand using either a trickling filter or actively aerated system.

A preliminary design schematic of the system of bioreactors used for the biological reduction of selenium is shown in Figure 2-3. The ultimate design of the bioreactor system, the required nutrient amendments and optimal flow will be determined through the field-scale pilot study in which operating characteristics are optimized.

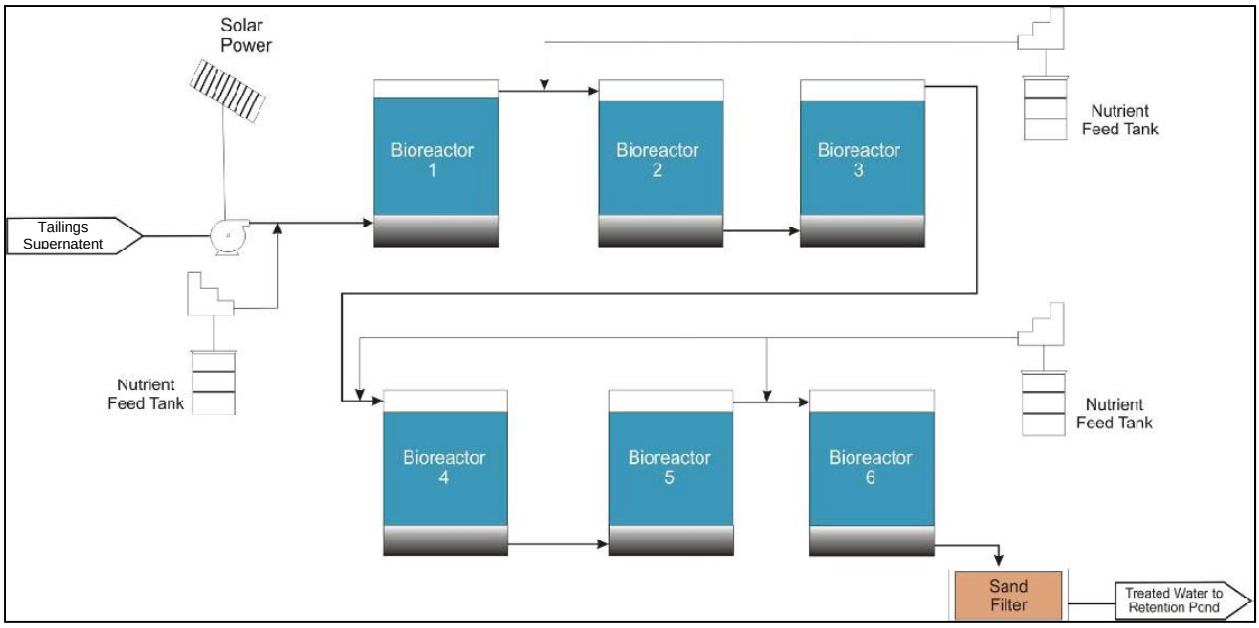


Figure 2-3: Schematic Design of the Bioreactor Water Treatment System

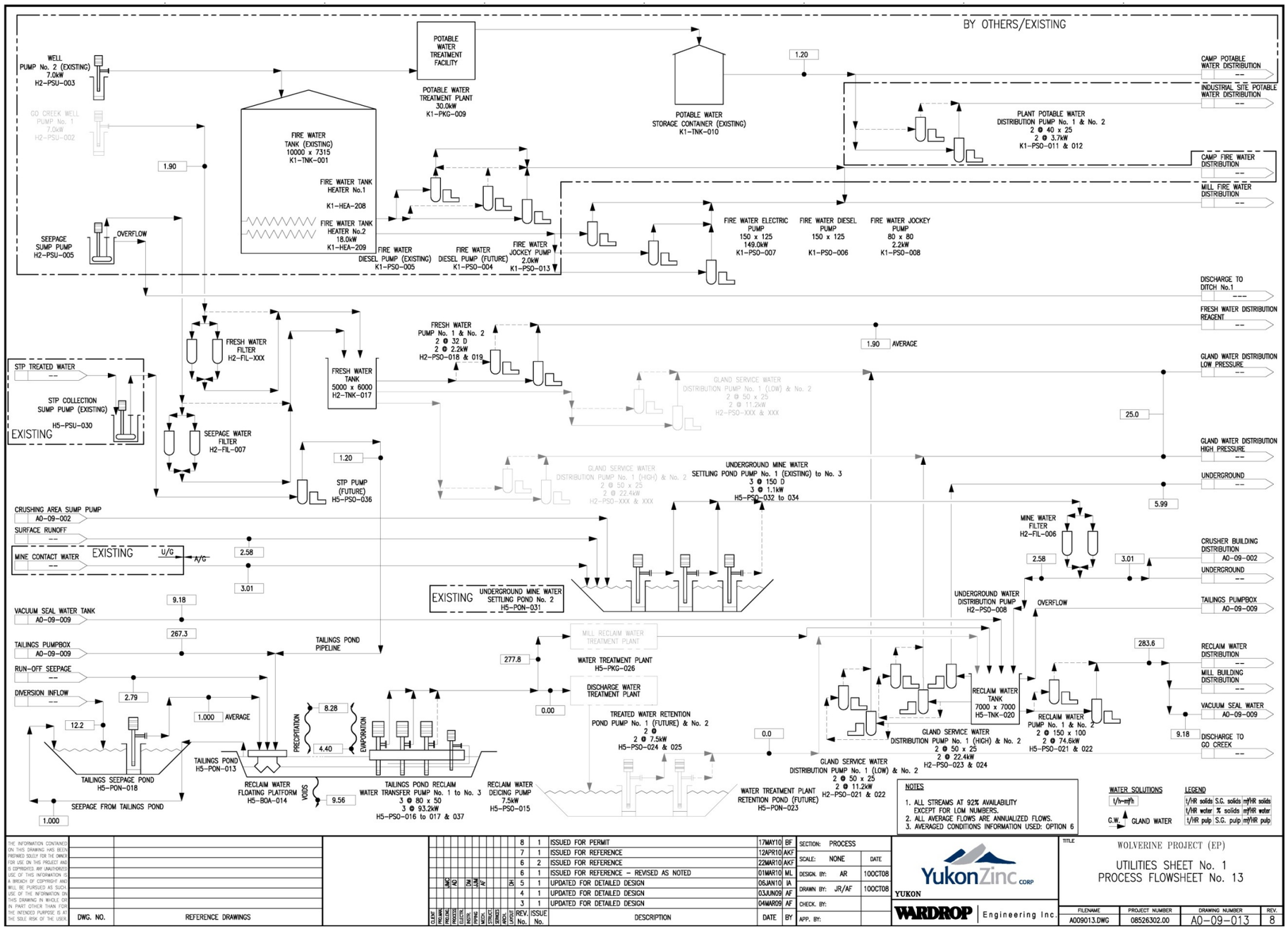


Figure 2-4: Wolverine Project Site Water Balance – Average Conditions

3 Milling Methods

The process descriptions provided below are based on an annual design mill feed treatment rate of 620,500 tonnes or 1,700 t/d. During Year 1 operations commencing in summer 2010, the initial average daily milling rate will be 1400 t/d, with production increasing to 1700 t/d by December 2010. The unit processes selected have been based on metallurgical test work conducted at Process Research Associates (PRA) laboratories located in Vancouver, BC, and detailed engineering completed by Wardrop Engineering Inc.

The simplified process of crushing and screening, grinding and classification, pre-flotation, flotation, regrinding, thickening and filtration is summarized in Figure 3-1.

The metallurgical processing procedures have been designed to produce saleable high grade copper, lead, and zinc concentrates. The concentrates also contain associated precious metal content of gold and silver. The unit processes selected for the recovery of the metals involve conventional size reduction and mineral beneficiation methods.

The unit operations for the processing include:

- run-of-mine (ROM) ore feed hopper;
- primary crushing and screening;
- secondary crushing and screening;
- two stage rod and ball mill grinding;
- classification;
- pre-flotation, rougher and cleaning stages;
- copper rougher flotation, regrinding and cleaner flotation stages;
- copper concentrate thickening, filtration and dispatch;
- lead rougher flotation, regrinding and cleaner flotation stages;
- lead concentrate thickening, filtration and dispatch;
- zinc rougher flotation, regrinding and cleaner flotation stages;
- zinc concentrate thickening, filtration, and dispatch;
- tailings filtration and disposal by paste backfill underground or to the tailings facility;
- water reclamation from tailings pond; and
- fresh water circuit.

The crusher plant availability is 40% (80% on a 12 hour operating basis), and the grinding and flotation circuit operating time is 92%. The projected plant availability will allow sufficient downtime for equipment maintenance. Descriptions for each of the above processes are provided below and detailed process flow sheets are included herein.

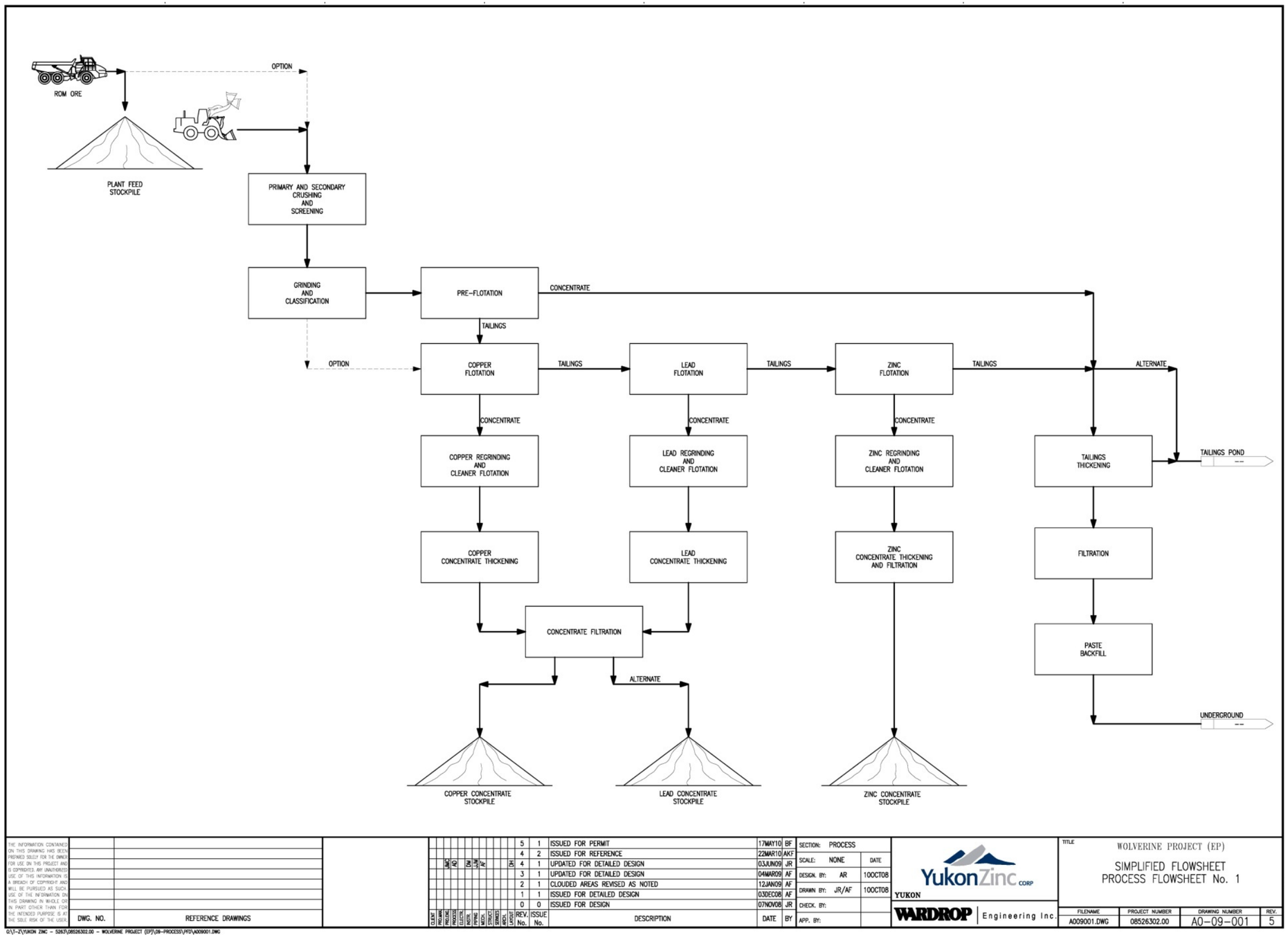


Figure 3-1: Simplified Process Flowsheet

3.1 Primary Crushing

Primary crushing is done on a dry basis. The primary crushing plant will have the following equipment, as shown in Figure 3-2:

- dust collection system;
- stationary grizzly;
- rock breaker;
- vibrating grizzly feeder;
- jaw crusher;
- conveyor belts;
- conveyor belt magnet for tramp metals; and
- overhead crane.

Underground haulage trucks with around 30 tonne capacity will haul ROM ore from the mine to the plant feed stockpile. From the stockpile, a front-end loader will deliver the ore and dump it directly into a stationary grizzly. Undersize material will discharge into a feed hopper/surge bin. The crusher is equipped with a rock breaker to break up any rocks larger than 450 mm and pass it through the stationary grizzly. The feed hopper/surge bin has a nominal live capacity of 60 t and a volume of 26 m^3 to provide a steady feed of ore to the crusher.

The surge bin is equipped with a vibrating grizzly feeder. This grizzly feeder has 40 mm slots to allow undersize material to report to the conveyor that feeds the vibrating sizing screen, and bypasses the primary crusher. The oversize material feeds to the primary stage of crushing, which is a CT jaw crusher. The jaw crusher has a maximum feed opening of 510 mm and will crush to a rock size P_{80} of 75 mm, with the largest size of crushed rock being about 100 mm. The jaw crusher closed size setting is 70 mm, and the average crushing rate is 177 t/h. The undersize material from the vibrating grizzly feeder and jaw crusher discharge are conveyed into the sizing screen feed conveyor no. 1.

3.2 Secondary Crushing

Secondary crushing will also be done on a dry basis. The main items of equipment in the secondary crushing circuit are the following, as shown in Figure 3-2:

- conveyor belts;
- cone crusher;
- vibrating sizing screen;
- metal detector;
- belt magnet;
- rod mill feed bin belt scale; and
- vibrating feeder.

The TC51-1300 cone crusher will produce a product size of less than 19 mm material. The crushed ore is discharged onto the sizing screen feed conveyor no. 1. The vibrating sizing screen has 30 mm square apertures and the bottom-deck has 19 mm square apertures. The screen oversize materials is discharged into a cone crusher feed bin with 50 t live capacity, then onto a vibrating feeder that feeds the cone crusher at an average rate of 132.8 t/h. The screen undersize is discharged onto the conveyor feeding the rod mill feed bin. This bin has a live capacity of 1,700 tonnes and feeds the rod mill in the grinding circuit.

A dust collection system removes the dust generated by the crushers. The dust collected is discharged onto the conveyor feeding the rod mill feed bin for subsequent processing.

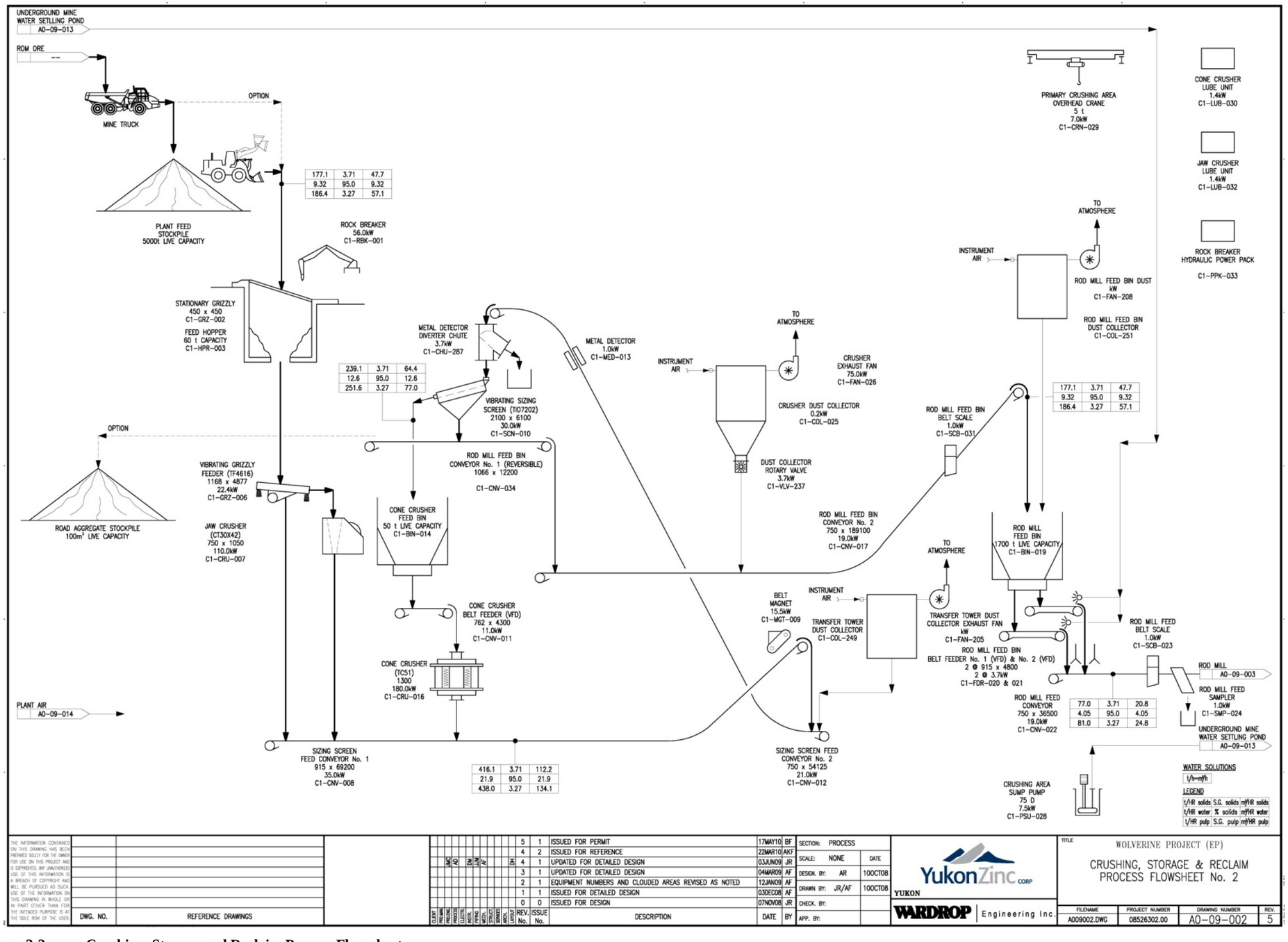


Figure 3-2: Crushing, Storage and Reclaim Process Flow sheet

3.3 Grinding Circuit

The grinding circuit reduces the crushed ore to the size required for the flotation process and is a wet process. The grinding process is a 2-stage operation with the rod mill in open circuit and the ball mill in closed circuit with classifying cyclones. The grinding circuit has the following equipment, as shown in Figure 3-2 and Figure 3-3:

- conveyor belt feeders;
- conveyor belts;
- conveyor belt weigh scale;
- rod mill;
- ball mill;
- mill discharge pumpbox;
- cyclone feed slurry pumps;
- cyclone classifiers;
- mass flow meter;
- rod mill feed belt scale; and
- sampler system.

Ore is drawn out of the bin under controlled feed rate conditions using two belt feeders. These feeders discharge the material onto a conveyor belt feeding the rod mill. A belt scale controls the feed to the rod mill. Water is added to the rod mill feed material to assist the grinding process. The rod mill discharge flows into the mill discharge pumpbox, and the slurry is then pumped to a cyclone cluster for classification. The cyclone cluster has four gMax15-20 cyclones, three cyclones are operational and one is a standby unit. The cyclone underflow is returned to the ball mill as feed material at a pulp density of 70%. Dilution water will be added to the grinding circuit as required from the reclaim water tank. The discharge from the ball mill also flows into the mill discharge pumpbox. The cyclone overflow discharges into the pre-flotation circuit or to the copper flotation-conditioning tank prior to the flotation process.

Lime may be added to the rod mill for the adjustment of the pH of the slurry. In addition, sodium metabisulphite (SMBS), a conditioning reagent for the flotation process, will be added to the mill discharge pumpbox.

Grinding media will be added to the mills in order to maintain power draw for grinding efficiency. Steel rods will be added periodically to the rod mill with a rod charger and steel balls will be added to the ball mill periodically using a ball charging kibble.

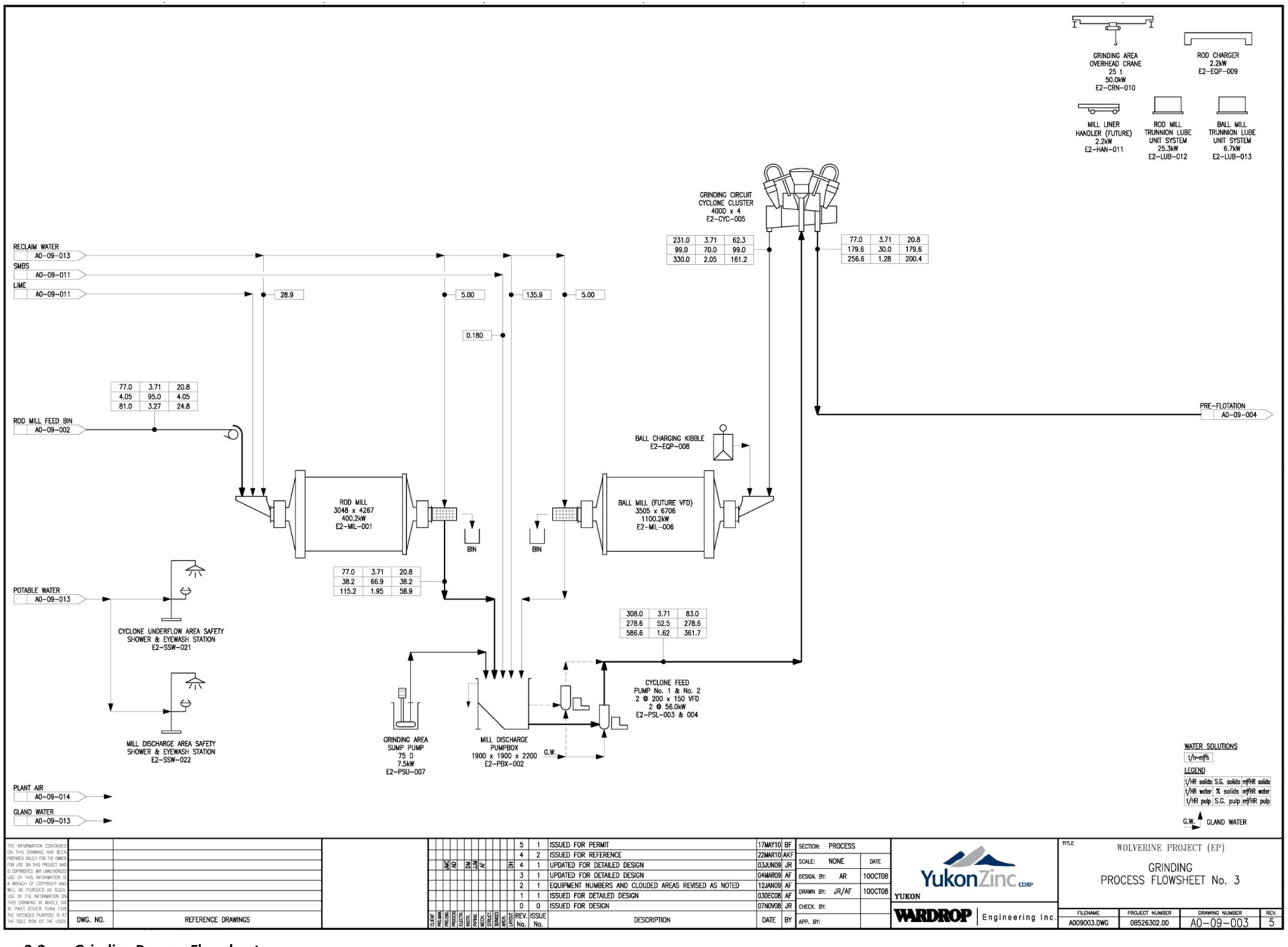


Figure 3-3: Grinding Process Flowsheet

3.4 Flotation Circuit

The milled ore progresses through a pre-flotation process (Figure 3-4) and three stages of sequential flotation to recover copper, lead, the zinc minerals into high-grade metal concentrates (Figure 3-5, Figure 3-6, and Figure 3-7, respectively). Conventional flotation circuits are utilized that have the following major equipment:

- conditioning tank;
- flotation reagent addition facilities;
- sampling system;
- rougher-scavenger flotation cells;
- regrind mill and classifier;
- cleaner flotation cells;
- pump boxes; and
- slurry and solution pumps.

The pre-flotation circuit consists of five 6.0 m^3 rougher cells and two 1.4 m^3 cleaner cells to float non-sulphide minerals from sulphide minerals. Methyl-isobutyl-carbinol (MIBC) reagent is used as a frother. The rougher concentrate is cleaned into a bank of two cleaner cells and pre-flotation cleaner concentrate is pumped into the tailings pumpbox. The rougher and cleaner pre-flotation tailings are pumped into the copper conditioning tank.

The feed to the copper flotation circuit is the pre-flotation tailings or the cyclone overflow from the grinding circuit if pre-flotation circuit is by-passed. The slurry is conditioned in the copper conditioning tank at design feed rate of 76.3 t/h. The copper conditioning tank is equipped with an agitator and has been sized for a retention time or conditioning period of 5 minutes. Lime is added for slurry pH adjustment, if required. The collector reagent TNC312, a proprietary mixture of dialkyl thionocarbamate and MIBC frother, and supplementary amounts of MIBC are added to the conditioning tank. The conditioned slurry overflows into the copper rougher-scavenger flotation bank of cells. Reagents TNC312, MIBC and SMBS-sodium metabisulfate are also added at the feed-end of the copper rougher cell.

The copper rougher-scavenger bank consists of seven 6 m^3 cells to provide 7.5 minutes of flotation time. Air is introduced into the air header and distributed and controlled in each cell to facilitate the flotation process. Copper minerals are selectively floated into a rougher concentrate away from the other minerals and the waste present in the ore slurry.

The copper rougher-scavenger concentrates are pumped via a copper rougher concentrate pump into the copper 1st cleaner column feed tank, which is discharged by gravity into the copper 1st cleaner column cell. The copper scavenger concentrate stream can also be pumped into the copper regrind cyclone feed pumpbox. Concentrate from the copper 1st cleaner column is discharged into the copper 1st column stand pipe and is pumped to the 2nd cleaner column cell. The concentrate from the copper 2nd cleaner column cell is the final copper concentrate with a copper grade ranging from 20-24% Cu. The copper concentrate is pumped to the copper concentrate thickener.

The copper flotation rougher-scavenger tailings are discharged to the copper tailings pumpbox and are pumped to the lead conditioning tank as feed to the lead flotation circuit. The cleaner tails from

the copper 1st cleaner column cell are pumped into the copper regrind cyclone feed pumpbox and then pumped to the copper regrind cyclone.

The classification is done with gMax10-20 cyclones. Two units are installed with one cyclone being a stand-by unit. The coarser cyclone underflow is gravity fed into the copper Stirred Media Detroiter (SMD) 185 at a design feed rates of 2.3 t/h. The SMD is a fluidized media vertical mill, i.e., the stirrer speed is high enough to distribute the media throughout the slurry regardless of media density, forcing mineral particle and media contact. Ceramic beads are used as the the SMD grinding media. Both the SMD product and cyclone overflow streams are discharged into the copper regrind mill discharge pumpbox and pumped to the five banks of 1.4 m^3 copper 1st cleaner scavenger flotation cells. The concentrates from the copper 1st cleaner scavenger cells are pumped to the copper 1st cleaner column feed pumpbox as another feed stream to the copper 1st cleaner column. The tailings from copper 1st scavenger cells are recycled to the feed end of the copper rougher flotation cells and have the option of feeding the copper scavenger flotation cells or the lead conditioning tank.

The collector reagents used in the copper cleaner flotation circuit are Aero 3477, an isobutyl dithiophosphate, and sodium isopropyl xanthate (SIPX). Lime, as a pH regulator, and SMBS and zinc sulphate, as depressant conditioning reagents, are added at the required dosage rates, with MIBC frother as required. Provision has also been made for the use of copper circuit dilution water from the copper concentrate thickener overflow to be re-used in the copper flotation circuit.

Six samplers are installed to automatically sample the copper flotation rougher and cleaner circuit streams for metallurgical accounting purposes. An on-line XRF analysis and a particle size analyzer are used for process control purposes.

The lead-flotation circuit consists of one-conditioning tank with a residence time of 5 minutes, three rougher flotation cells and four scavenger flotation cells each with a volume of 10.0 m^3 to provide flotation time of 12.5 minutes. Both lead rougher-scavenger concentrates are pumped to the lead regrind pumpbox and are then pumped to regrind cyclones. The classification is done with gMax6-10 cyclones. Two cyclone units are installed with one cyclone being a stand-by unit.

The regrind cyclone underflow is fed directly to the SMD 185 regrind mill to reduce the particle size to a P_{80} of 20 µm. Both regrind cyclone overflow and SMD regrind mill product are discharged into the lead regrind mill pumpbox and pumped to the lead cleaner flotation circuit at a designed feed rate of 10 t/h. The lead 1st scavenger flotation tailings report to the lead tailings pumpbox which feeds the zinc circuit.

The 1st cleaner flotation stage has six 2.8 m^3 volume cells, while the 1st cleaner scavenger flotation stage has four 2.8 m^3 volume cells. The 2nd cleaner stage has three 1.4 m^3 volume flotation cells. For the lead circuit, the concentrate from the 2nd cleaner stage is the final concentrate product and it is pumped to the lead concentrate thickener. The tailings from the 2nd cleaner stage are recycled to the preceding stage. The 1st cleaner scavenger tailings are recycled to lead rougher or scavenger feed and have the option to be combined with the lead rougher tailings.

The reagents added to the lead conditioning tank are lime, for pH control, SMBS, sodium cyanide, and zinc sulphate as zinc depressant reagents, and the lead collector reagents are Aero 3477 and SIPX. MIBC frother is added as required. Provision is also made for the staged addition of some of the reagents.

Although sodium cyanide is added to the lead circuit as a depressant reagent for the zinc minerals, this is absorbed onto particle surfaces as the zinc cyanide complex.

The lead tailings stream is sampled automatically and constitutes the feed material to the zinc flotation circuit. Water recycling from the lead-concentrate thickener overflow will be re-used where applicable.

The zinc flotation circuit is similar to the copper flotation circuit, but has different numbers and volumes of flotation cells in the various flotation stages. There are three stages of slurry conditioning to provide longer condition time and for reagent stage addition, four zinc rougher and three zinc scavenger flotation cells, each with a volume of 16 m^3.

The 1st cleaner flotation tailings are fed to a cluster of four cyclones, three operating and one stand-by. The regrind cyclone underflow (~10 t/h) directly feeds the SMD-355 regrind mill. The product size from SMD-355 regrind mill is a P_{80} of 20 µm and is combined with regrind cyclone overflow in the regrind mill pumpbox and fed to the five 8.5 m^3 1st cleaner scavenger cells. The concentrates from the 1st cleaner scavenger are recycled to the preceding stage while the tailings are discharged into the zinc tailings pumpbox. The 1st cleaner concentrates as well as the 3rd cleaner column tails are the feed streams of the 2nd cleaner column cell. The 3rd cleaner column concentrate is the final zinc concentrate product. This is pumped to the zinc concentrate thickener. Water from the zinc-concentrate thickener overflow is re-used in the zinc flotation circuit when applicable.

The reagents added to the zinc conditioning tanks are lime for pH adjustment, Aero 3477 and SIPX as the collector reagents, copper sulphate as the depressant reagent and MIBC as the frother reagent.

The zinc tailings stream is sampled automatically and constitutes the final tailings leaving the processing plant. The zinc tailings are pumped to the tailings facility via the tailings pumpbox. Samplers are installed to automatically sample the zinc flotation feed and tailings streams for metallurgical accounting purposes. Similarly, sampling of some of the cleaner stages and the regrind circuit streams will also be carried out for process control purposes.

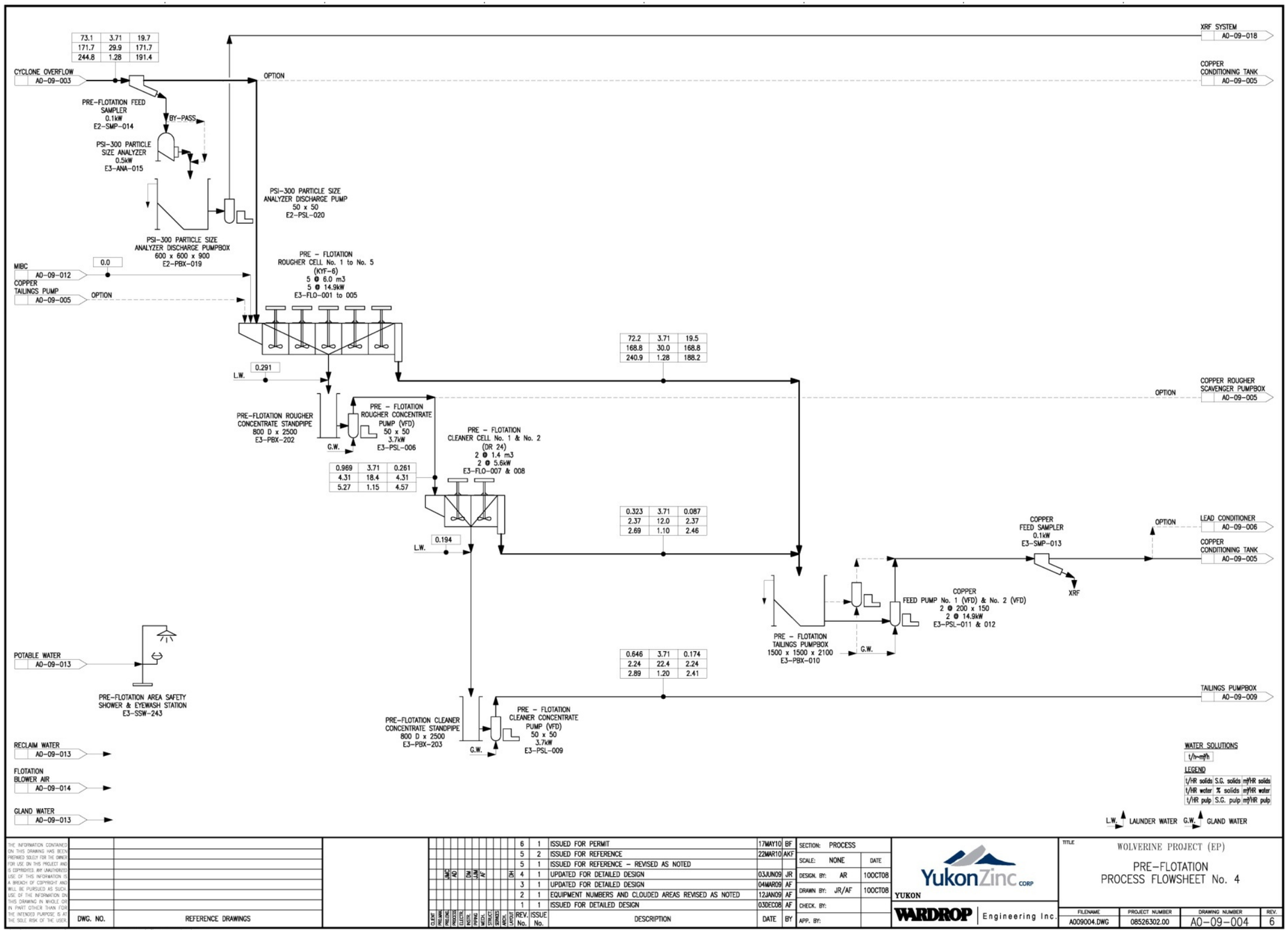


Figure 3-4: Pre-flotation Process Flowsheet

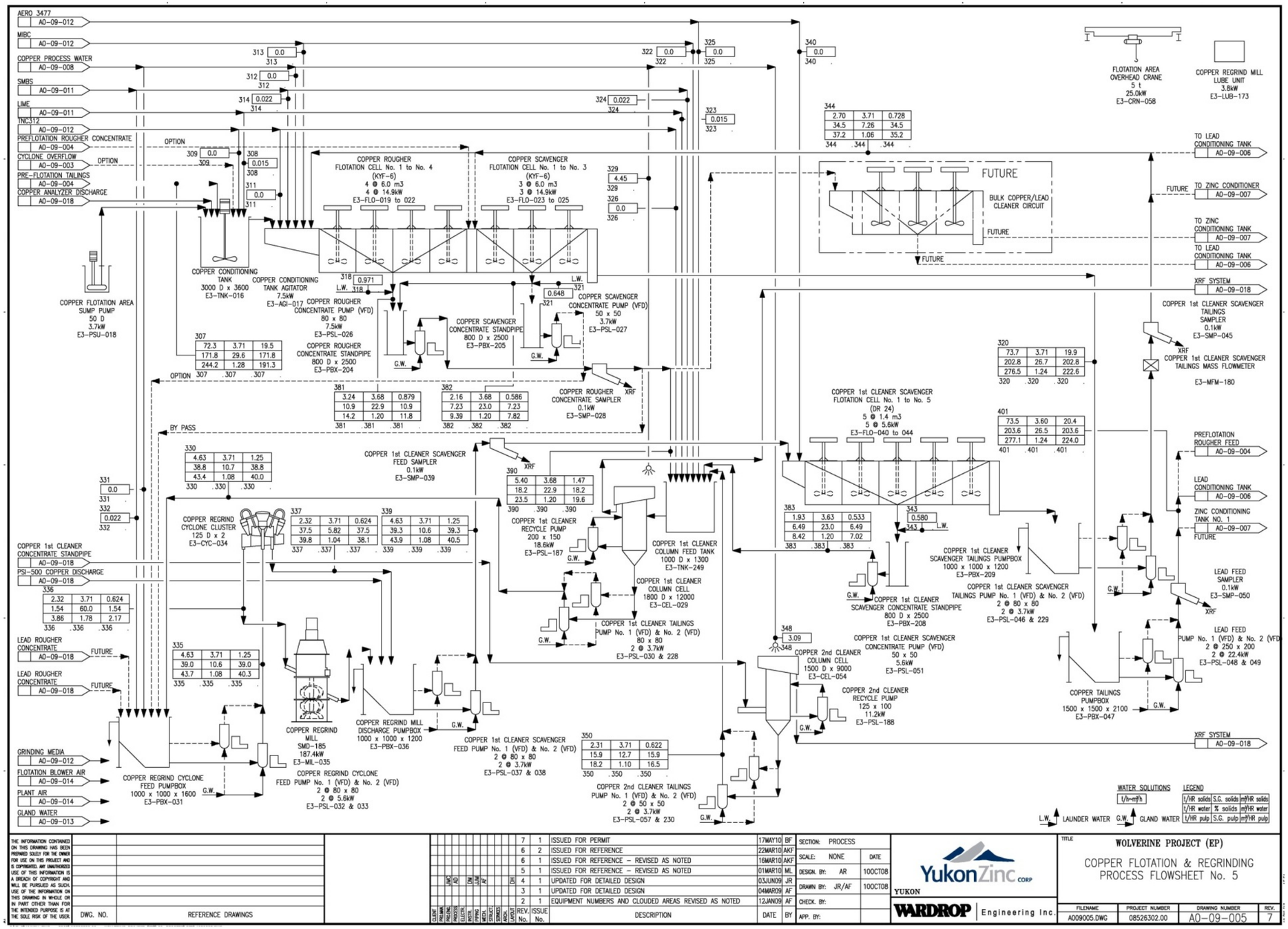


Figure 3-5: Copper Flotation & Regrinding Process Flow sheet

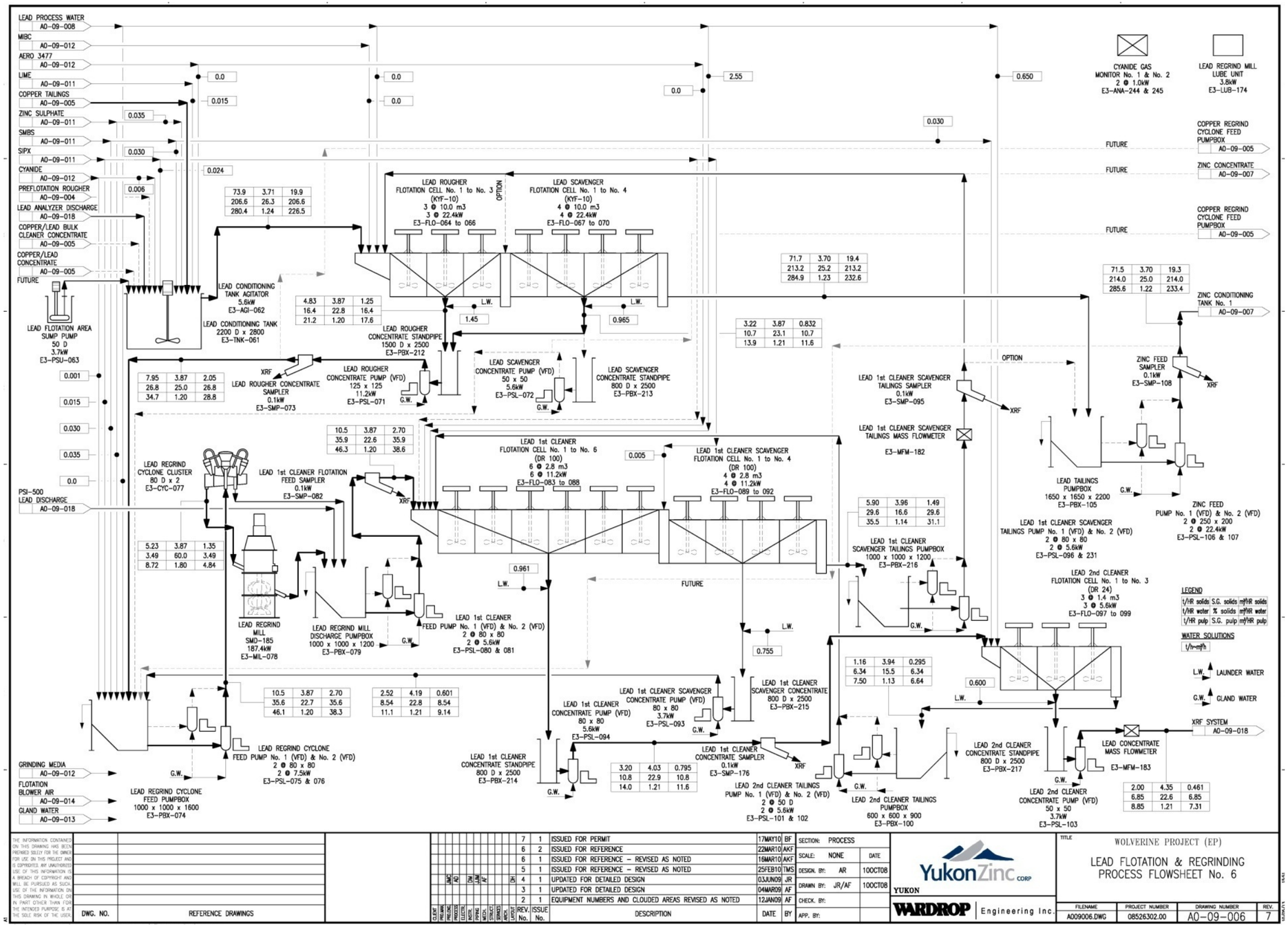


Figure 3-6: Lead Flotation & Regrinding Process Flow sheet

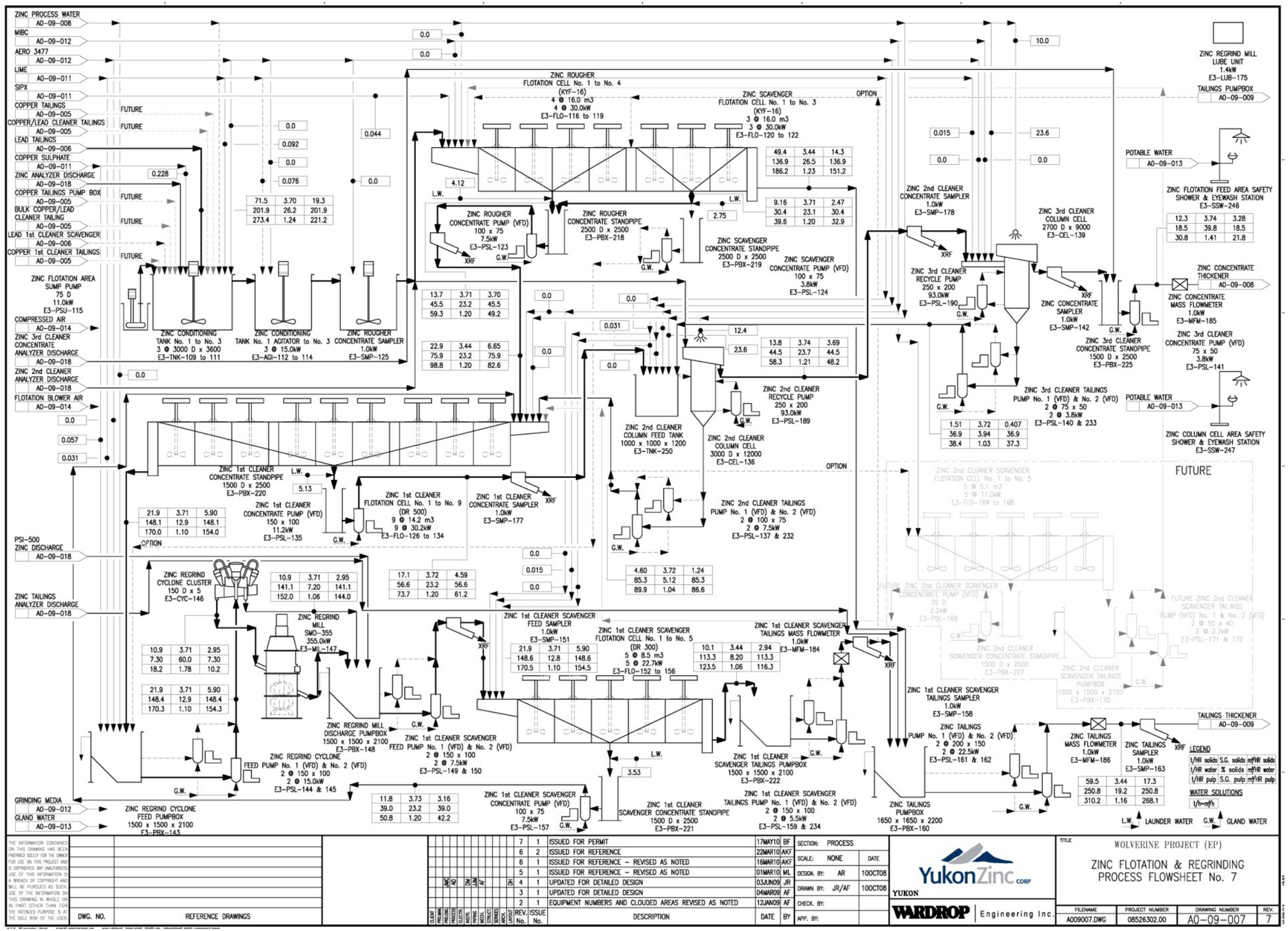


Figure 3-7: Zinc Flotation & Regrinding Process Flow sheet

3.5 Concentrate Handling

The flotation concentrate from each of the three metal circuits is treated in a similar manner, as detailed in Figure 3-8. The flotation cleaner concentrate is thickened, filtered, and then stored until shipment off-site for smelting. Each of the three concentrate handling circuits will have the following equipment:

- concentrate thickener;
- concentrate slurry pump;
- process water pump;
- process water tank;
- concentrate stock tank;
- thickener overflow standpipe;
- concentrate filter press;
- conveyors;
- concentrate storage and dispatch facility; and
- dust collection system.

The concentrate is pumped from the cleaner flotation stage to the concentrate thickener. Flocculant is added to the thickener feed to aid the settling process. The thickened concentrate is pumped at a 60% solution to the concentrate stock tank using thickener underflow slurry pumps. The concentrate stock tank is agitated, and serves as the feed tank for the concentrate pressure filter. Since filtration with a filter press unit is a batch process, the concentrate stock tank also acts as a surge tank for the filtration operation; the storage capacity is 6 h for copper, 8 h for lead and 6 h for zinc concentrate slurries. The filter press dewaters the concentrate to produce a concentrate with about 8-9% moisture content. One filter press is used alternately to dewater the copper concentrate and the lead concentrate with the use of a reversing conveyor belt. The filtrate is discharged to a filtrate tank and distributed by pump, with the excess reporting to the tailings pumpbox. The filter press solids are discharged to stockpiles in the concentrate load-out building via a belt conveyor. Section 5 contains additional details pertaining to concentrate handling and transport and dust control.

The overflow solution from each concentrate thickener is collected in the respective process water tank for recycling in the flotation circuit. The copper, lead and zinc concentrate thickeners will produce 2.6 t/h, 2.0 t/h and 12.3 t/h, respectively.

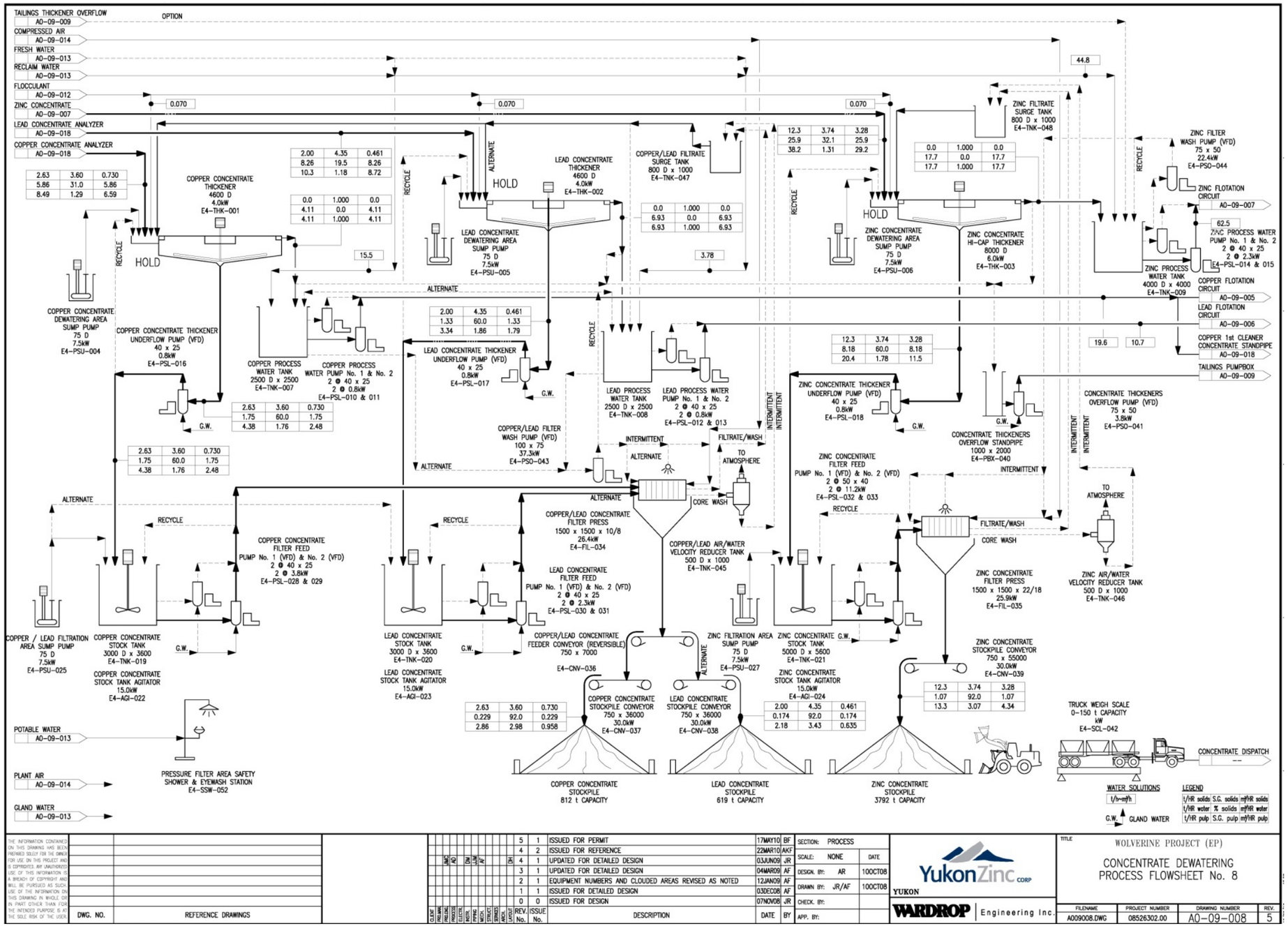


Figure 3-8: Concentrate Dewatering Process Flow sheet

3.6 Tailings Disposal

Tailings are used in paste backfill in the underground mine, and during the periods that the paste backfill is not required, the tailings are pumped to the tailings facility from the tailings pumpbox. The tailings handling circuit is illustrated in Figure 3-9 and has the following equipment:

- tailings thickener;
- slurry pumps;
- filter feed storage tank;
- vacuum disk filters;
- vacuum pumps;
- conveyor belt;
- filtrate receiver; and
- paste backfill plant.

During paste backfill circuit operations, tailings are discharged to the tailings thickener with flocculant to facilitate the settling of the solids to a density of about 65% solids. The thickened tailings are pumped from the thickener to a filter feed stock tank, which serves as a surge tank to feed the vacuum disc filters. The filters dewater the tailings slurry to a moisture content of 20%. The dewatered tailings are conveyed to the paste backfill preparation plant.

The tailings are mixed with cement and water to the consistency required for pumping the paste to a designated area in the underground workings. The paste backfill plant has a cement silo, a screw feeder, a paste mixer and pumps to deliver the paste underground. The filtrate from the dewatering process is pumped to the tailings pumpbox, for discharge to the tailings facility.

The paste backfill plant operates approximately 52% of the time, and the remaining 48% of the time, tailings are pumped via the tailings pumpbox to the tailings facility (Figure 2-4). Operation of the tailings facility is detailed in the Wolverine Project Tailings Facility Operation, Maintenance and Surveillance Manual Version 2010-01 (final draft in preparation for submission as per QML-0006 in June 2010).

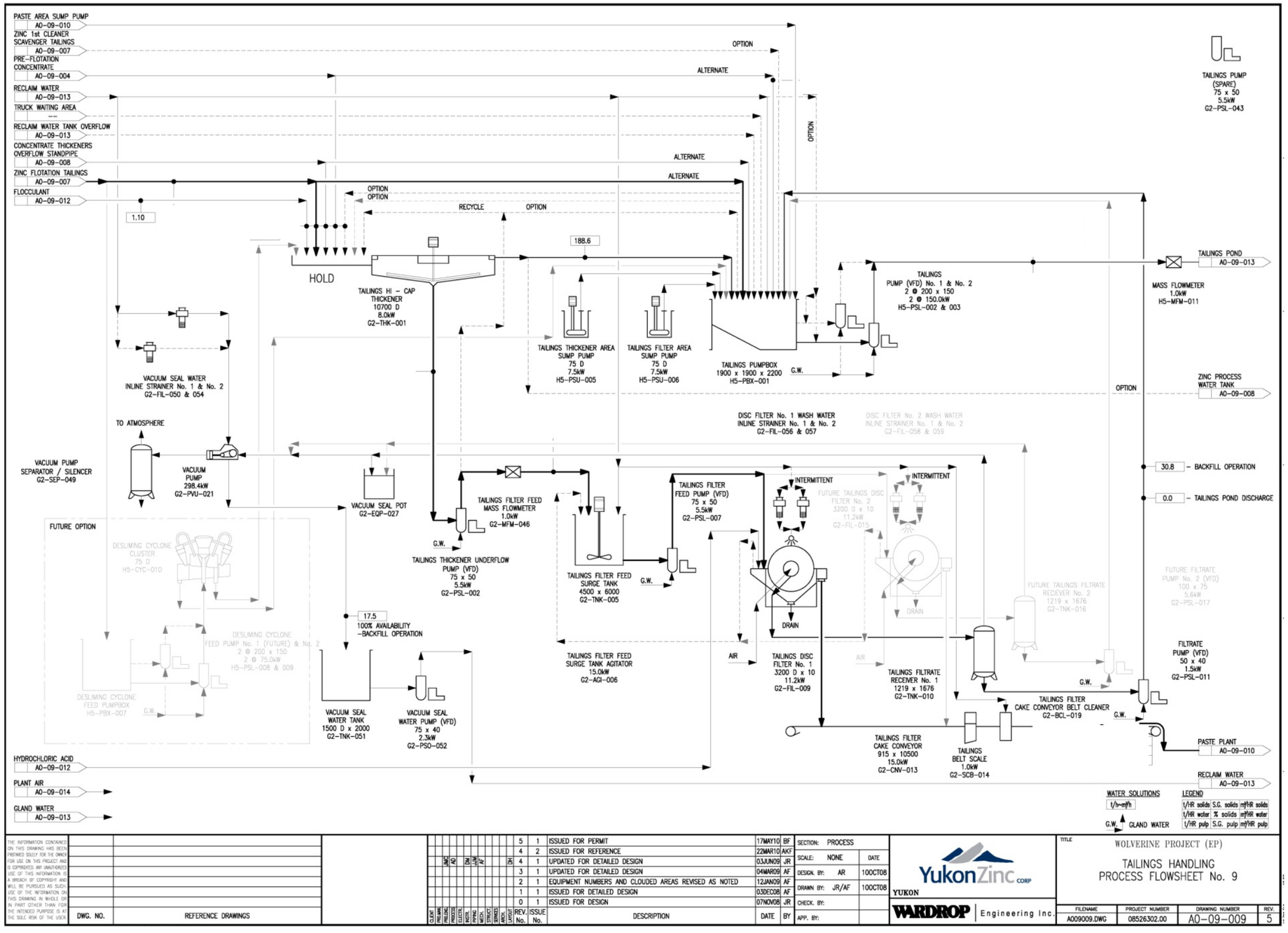


Figure 3-9: Tailings Handling Process Flowsheet

3.7 Reagent Handling and Preparation

Chemical reagents are added during milling to facilitate the separation and flotation processes, as discussed above in Sections 3.3 and 3.4. Reagents used in the grinding and flotation circuits are summarized in Table 3-1, and the reagent systems process flow sheets are provided in Figure 3-10 and Figure 3-11.

Table 3-1: Reagents Used in the Milling Process

Substance	Storage
Lime	50 t in silo storage - made into 20% solution
SMBS (sodium metabisulphide)	Solid (made into ~ 10% solution)
TNC312	bulk container
MIBC (methyl isobutyl carbinol)	bulk container
Aero 3477 (isobutly dithiophosphate)	bulk container
SIPX (sodium isopropyl xanthate)	200 kg drums or kg bags
Sodium cyanide	Solid (made into ~ 10% solution)
Zn sulphate & Cu sulphate	Solid (made into ~ 10% solution)
Flocculant	Drums

The preparation of the various reagents utilizes the following equipment:

- bulk handling system;
- mix and holding tanks;
- metering pumps;
- transfer pumps;
- flocculant preparation facility; and
- lime slaking and distribution facility.

Various chemical reagents are added to the grinding and flotation circuits to modify the mineral particle surfaces to enhance the flotability of the mineral particles into selective concentrate products. Each reagent is prepared within its own area in order to contain spillage. A dedicated spillage pump will return spillage from the sump to the mixing tank of that reagent for re-use in the plant. Spill training is provided for all personnel handling the mill reagents. The MSDS for the reagents are provided in Appendix C.

Water is used for various reagents that are supplied in powder/solid form, or those requiring dilution prior to addition to the slurry. These solutions are added to the various streams using metering pumps. Solid reagents, including SMBS, copper sulphate, zinc sulphate, SIPX and sodium cyanide, are made up to a solution of 10% strength in mixing tanks, and transferred to holding tanks for distribution to the point of addition. The mixing and holding tanks are equipped with ventilation fan systems that vent out to the atmosphere.

The reagents MIBC, Aero 3477, and TNC312 do not require dilution and are pumped directly from drums to their respective holding tanks and then to the point of addition using metering pumps. Flocculant is prepared as a dilute solution with 0.10 % solution strength.

Lime is delivered in bulk by trucks, off-loaded pneumatically into a silo, then prepared to 20% concentration solution and pumped to the points of addition using a closed loop system. The valves in the system are controlled by pH monitors, which will control the amount of lime added.

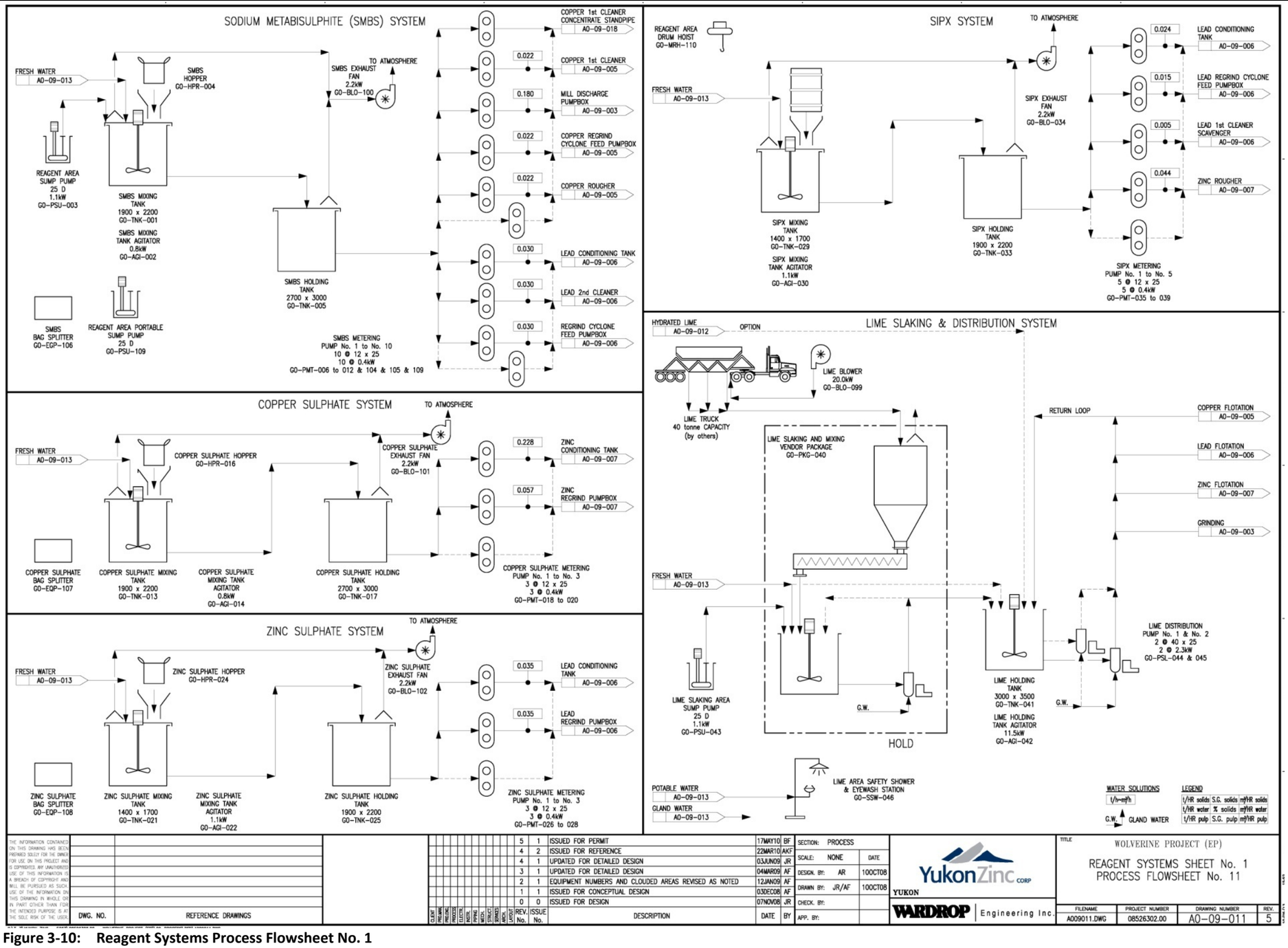


Figure 3-10: Reagent Systems Process Flowsheet No. 1

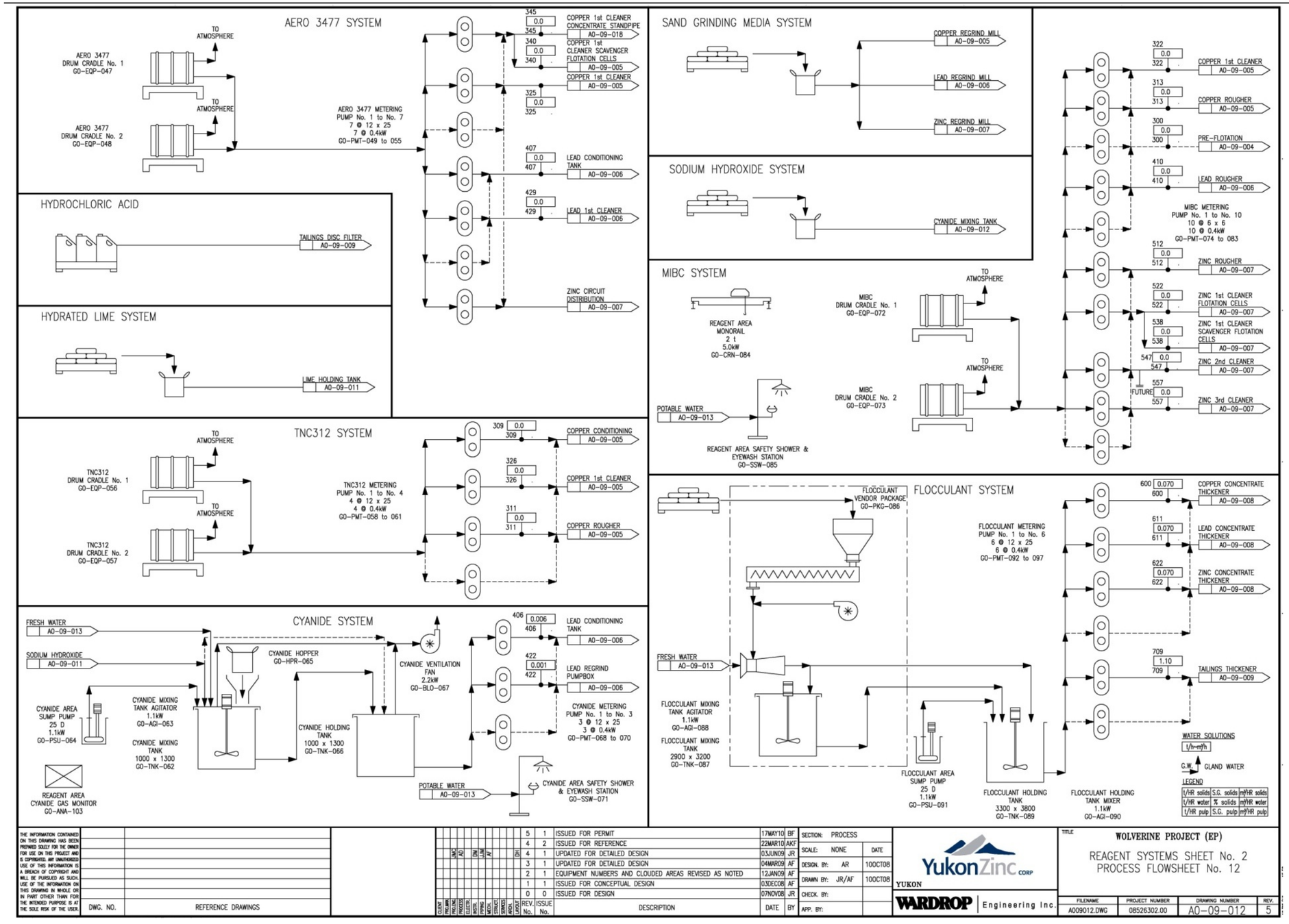


Figure 3-11: Reagent Systems Process Flowsheet No.2

4 Concentration Production

At a milling rate of 1700 t/d copper, lead and zinc concentrates will be produced at a rate of 2.6, 2.0 and 12.3 t/hr (solids), respectively, as per Figure 3-8. At the average mill feed grades of 0.91% Cu, 1.26% Pb, 9.66% Zn, 1.36 g/t Au and 282 g/t Ag, the daily production (in tonnes) for the three concentrates and the concentrate grades (as percent) and metal recoveries (as percent) are as provided in Table 4-1. As summarized in Table 4-1 and Table 4-2, gold and silver are contained within the three concentrates and will be separated from the concentrate during the smelting process off site.

Table 4-1: Daily Concentrate Grades and Metal Recoveries

Daily Production		**Concentrate Grades**					**Metal Recoveries, %**				
Products	*tonnes*	*Cu %*	*Pb %*	*Zn %*	*Au (g/t)*	*Ag (g/t)*	*Cu*	*Pb*	*Zn*	*Au*	*Ag*
Cu Concentrates	58.2	21.25	2.25	3.74	11.3	4409.4	79.9	8.0	1.2	33.4	60.0
Pb Concentrates	46.4	1.97	21.25	12.41	13.5	1625.4	4.3	46.0	2.4	23.2	12.9
Zn Concentrates	270.8	0.36	0.98	54.21	0.7	151.2	6.7	17.2	89.4	10.9	10.2

Table 4-2: Daily Concentrate Production Rates

Metal	**Daily Production**	**Metal**	**Daily Production**	**Metal**	**Daily Production**
Cu Concentrate (tonnes)	58.2	Pb Concentrate (tonnes)	46.4	Zn Concentrate (tonnes)	270.8
Cu Metal (Lbs)	27,250.3	Pb Metal (Lbs)	21,722.6	Zn Metal (Lbs)	323,666.5
Au Metal in Cu Con. (oz)	24.8	Au Metal in Pb Con. (oz)	17.2	Au Metal in Zn Con. (oz)	8.1
Ag Metal in Cu Con. (oz)	9,253.3	Ag Metal in Pb Con. (oz)	1,981.0	Ag Metal in Zn Con. (oz)	1,574.3

The Material Safety Data Sheets (MSDS) for the three concentrates are provided in Appendix C. These MSDS were derived from concentrates obtained from locked cycle metallurgical test work. They will be updated using the plant production data, once available.

5 Concentrate Storage and Haulage

As discussed in Section 3.5, following filtration in the filter press the solids (concentrate) are discharged to the respective concentrate stockpile in the concentrate load-out building. A front end loader loads the concentrate into haul trucks for transport. Due to the moisture content of the product, excessive dusting is not anticipated, but the action of loading and unloading will generate dust. The dust control system in the concentrate storage area is a dry aspirated duct collection system handled by a single dust collector and exhaust fan with duct openings located in four areas namely: the truck loading area; zinc stockpile; lead stockpile and copper stockpile. This system is primarily a ventilation system that filters out the particulate in the exhaust prior to discharge to the atmosphere. Plan details of the concentrate loadout builing dust control are provided in Figure 5-1 and Figure 5-2.

Concentrates will be trucked via the Robert Campbell Highway southward through Watson Lake to the existing Stewart Bulk Terminal in Stewart, BC. Concentrate will then be transported via ocean freighters to smelters in Asia.

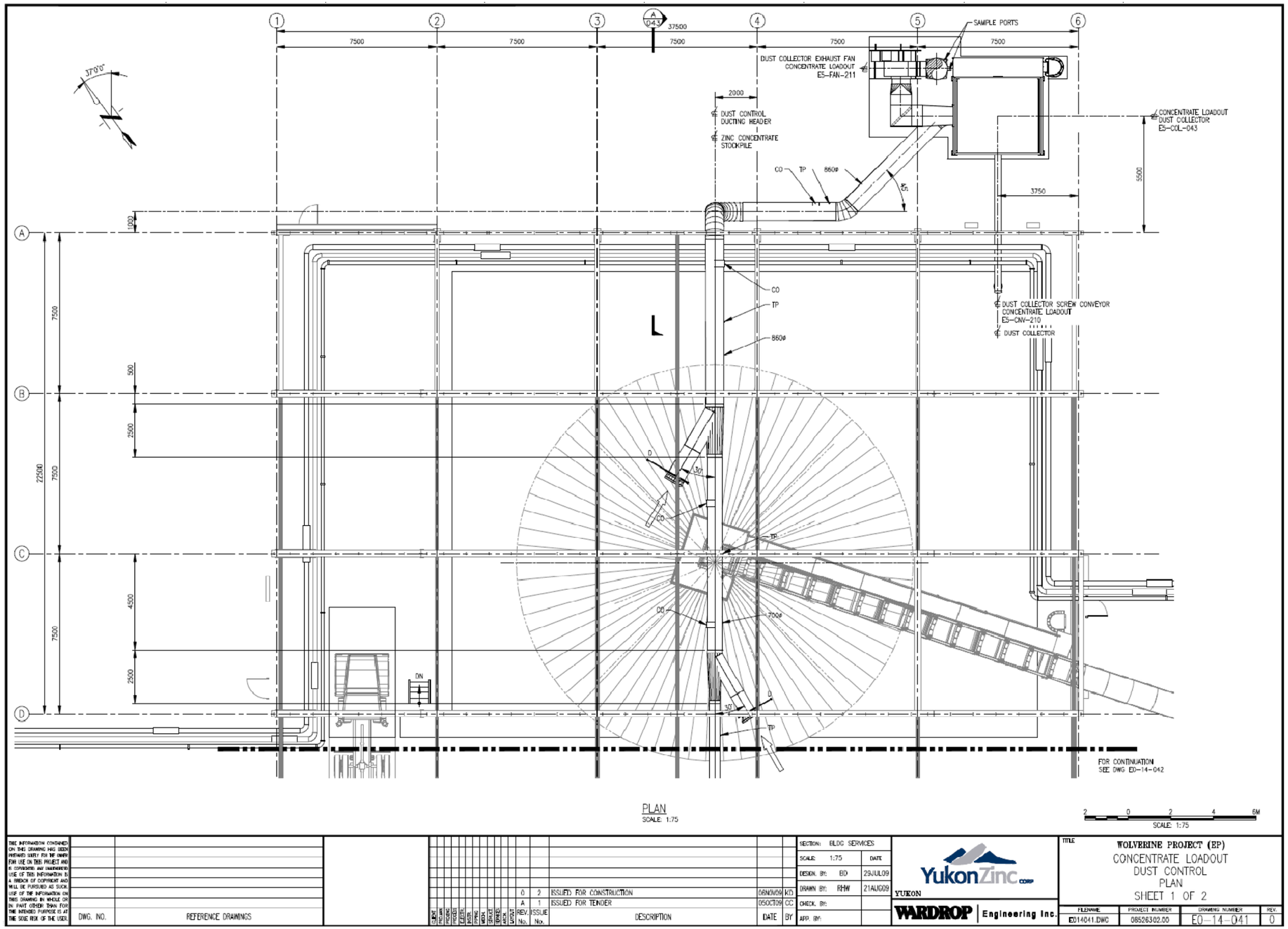


Figure 5-1: Concentrate Loadout Dust Control Plan Sheet 1 of 2

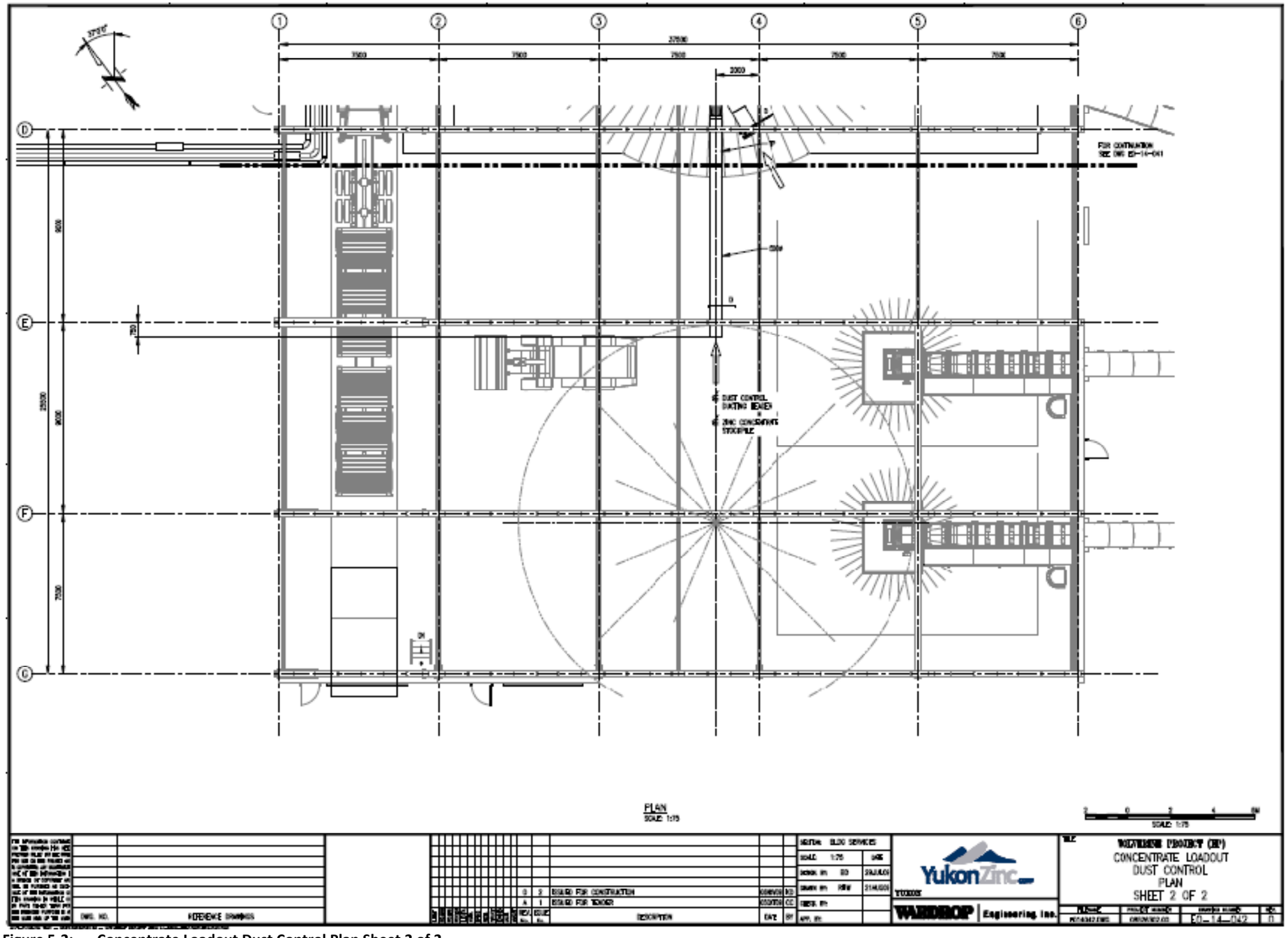


Figure 5-2: Concentrate Loadout Dust Control Plan Sheet 2 of 2

6 Power Plant

Power plant infrastructure for the industrial complex consists of seven diesel generators, each with a power generation capacity of 1.45 MW. The diesel generation power system will supply the surface milling facilities under all conditions for the life of mine. The power generation system is designed to operate 24 hours per day at continuous heavy duty service for 10 years. The generators will run at around 75% capacity, for a total power generation capacity of 7.5 MW. The infrastructure for an additional generator, to bring the total power generation capacity to around 8.5 MW, is in place if required. The location of the power plant is shown on Figure 1-2, labelled “genset pad”. The layout for the power plant is provided in Figure 7-1, and in Picture 7-1 and the issued-for-construction drawings, including electrical diagrams, are provided in Appendix B.

7 Fuel Storage

Fuel storage at the Wolverine Project includes diesel storage for machinery fuelling and powering of the diesel generator sets, and propane storage for fuelling of the mine raise heater house and camp facilities.

7.1 Diesel Storage

The fuel storage site layout is shown in Figure 7-2 and in Picture 7-1. The diesel storage system consists of six 75,000 L tanks, for a total storage capacity of 450,000 L. Gasoline is stored in an 8,500 L tank, located adjacent to the diesel storage tanks. In addition to supplying fuel to the gensets, the diesel is used for light duty vehicles, heavy equipment (surface and underground) and transport trucks.



Picture 7-1: Fuel Storage and Power Plant Layout (crusher building in background)

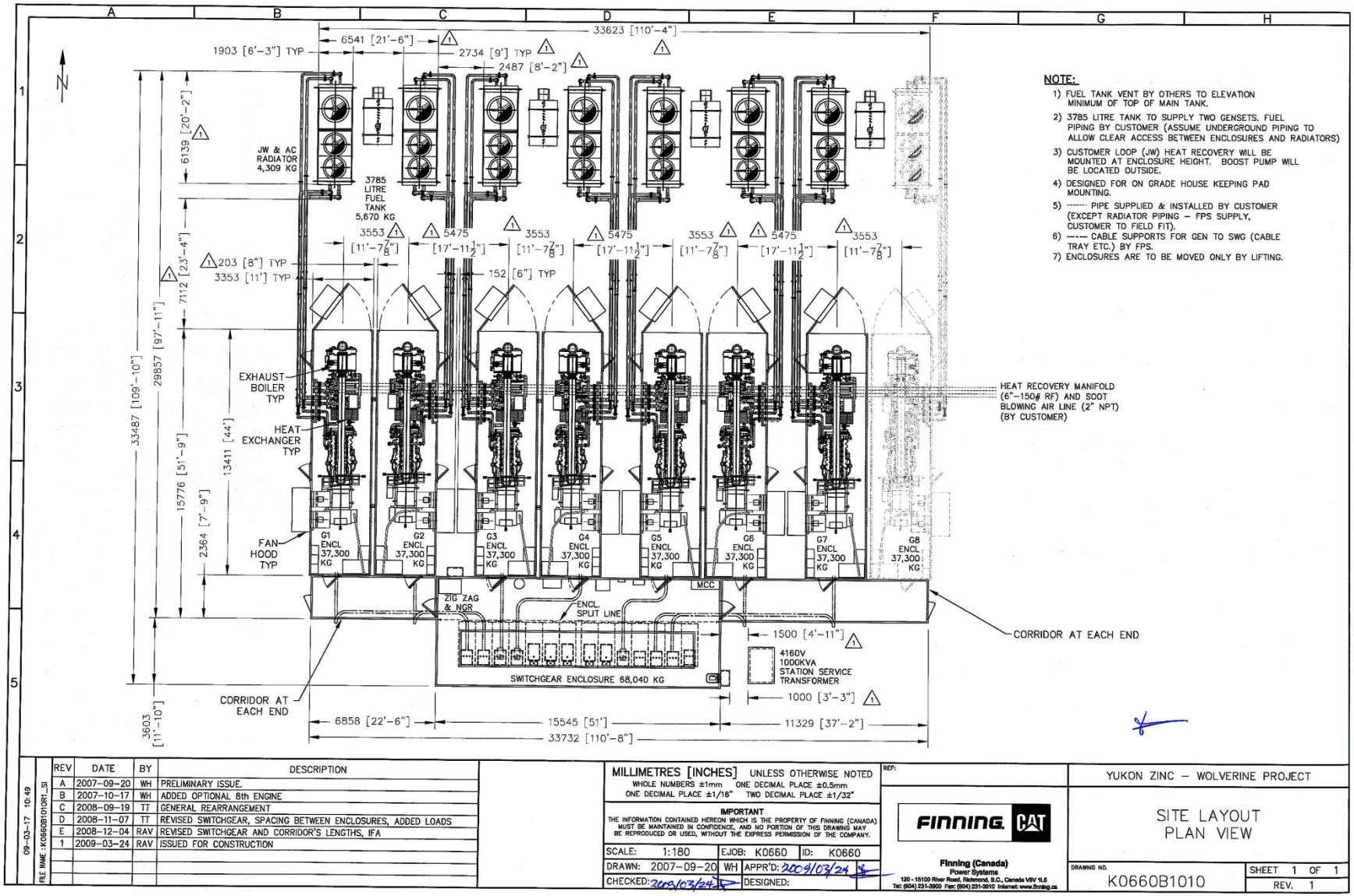


Figure 7-1: Power Plant Site Layout – Plan View

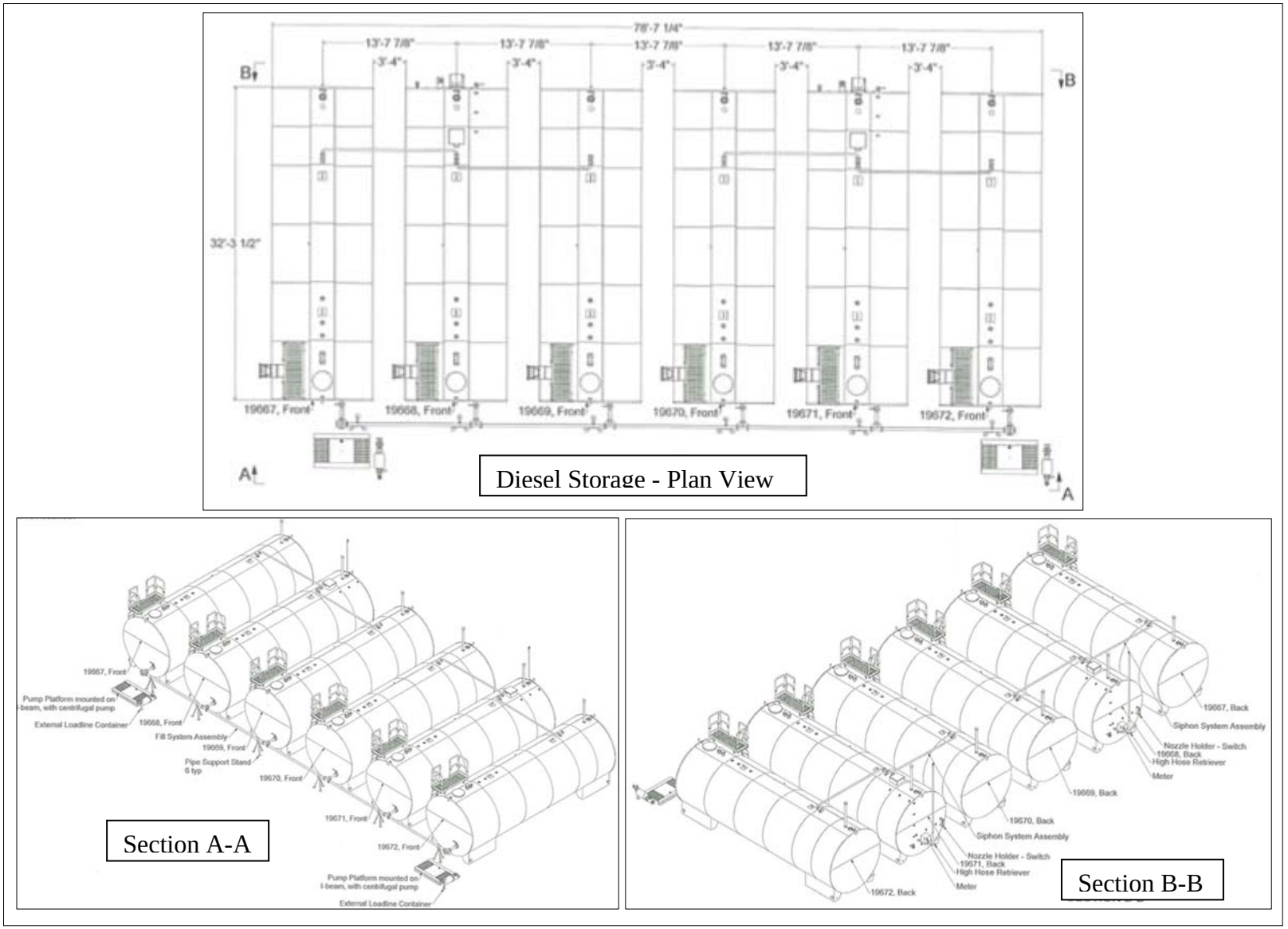


Figure 7-2: Fuel Storage Site Layout

7.2 Propane Storage

Propane is stored in two 113,560 L (30,000 USG) tanks located at the camp pad and near the assay lab, and at two 264,980L (70,000 USG) tanks located west of the mine heater building. The quantities meet the propane requirements as summarized in Table 7-1. Storage of liquid propane is sufficient to meet 14 days of winter operation.

Table 7-1: Propane Storage Requirements

System	Service	Total Appliance Nameplate kW (Btu/hr)
System No. 1	Mine Air Heating System (Direct Fired)	8792 (30,000,000)
System No. 2	Administration Building and Change / Dry (Heating & Ventilation)	596 (2,000,000)
System No. 3	Mill Assay Lab (Makeup Air Heating)	644 (2,200,000)

8 Summary

This Mill Operating Plan incorporates the requirements of QML-0006 Section 13.2. It will be updated as necessary to reflect current operating conditions.

John Kinyon
Mine General Manager
YUKON ZINC CORPORATION

Raymond Mah, P.Eng.
Chief Operating Officer
YUKON ZINC CORPORATION

Appendix A: Process Plant General Arrangement Drawings

Appendix A includes the following WEI drawings:

Crushing and Screening	Mill			Concentrate Load-Out
C1-10-001	E0-10-001	E0-10-016	E0-10-031	E5-10-001
C1-10-002	E0-10-002	E0-10-017	E0-10-032	E5-10-002
C1-10-003	E0-10-003	E0-10-018	E0-10-033	E5-10-003
C1-10-004	E0-10-004	E0-10-019	E0-10-034	E5-10-004
C1-10-005	E0-10-005	E0-10-020	E0-10-035	
C1-10-006	E0-10-006	E0-10-021	E0-10-036	
C1-10-007	E0-10-007	E0-10-022	E0-10-037	
C1-10-008	E0-10-008	E0-10-023	E0-10-038	
C1-10-009	E0-10-009	E0-10-024	E0-10-039	
C1-10-010	E0-10-010	E0-10-025	E0-10-040	
C1-10-011	E0-10-011	E0-10-026	E0-10-041	
C1-10-012	E0-10-012	E0-10-027	E0-10-042	
	E0-10-013	E0-10-028	E0-10-043	
	E0-10-014	E0-10-029	E0-10-044	
	E0-10-015	E0-10-030	E0-10-045	

Appendix B: Power Plant Issued-For-Construction Drawings

Appendix B includes the following WEI drawings:

G313001 R0
G313002 R0
G318055 R3

Appendix C: Material Safety Data Sheets

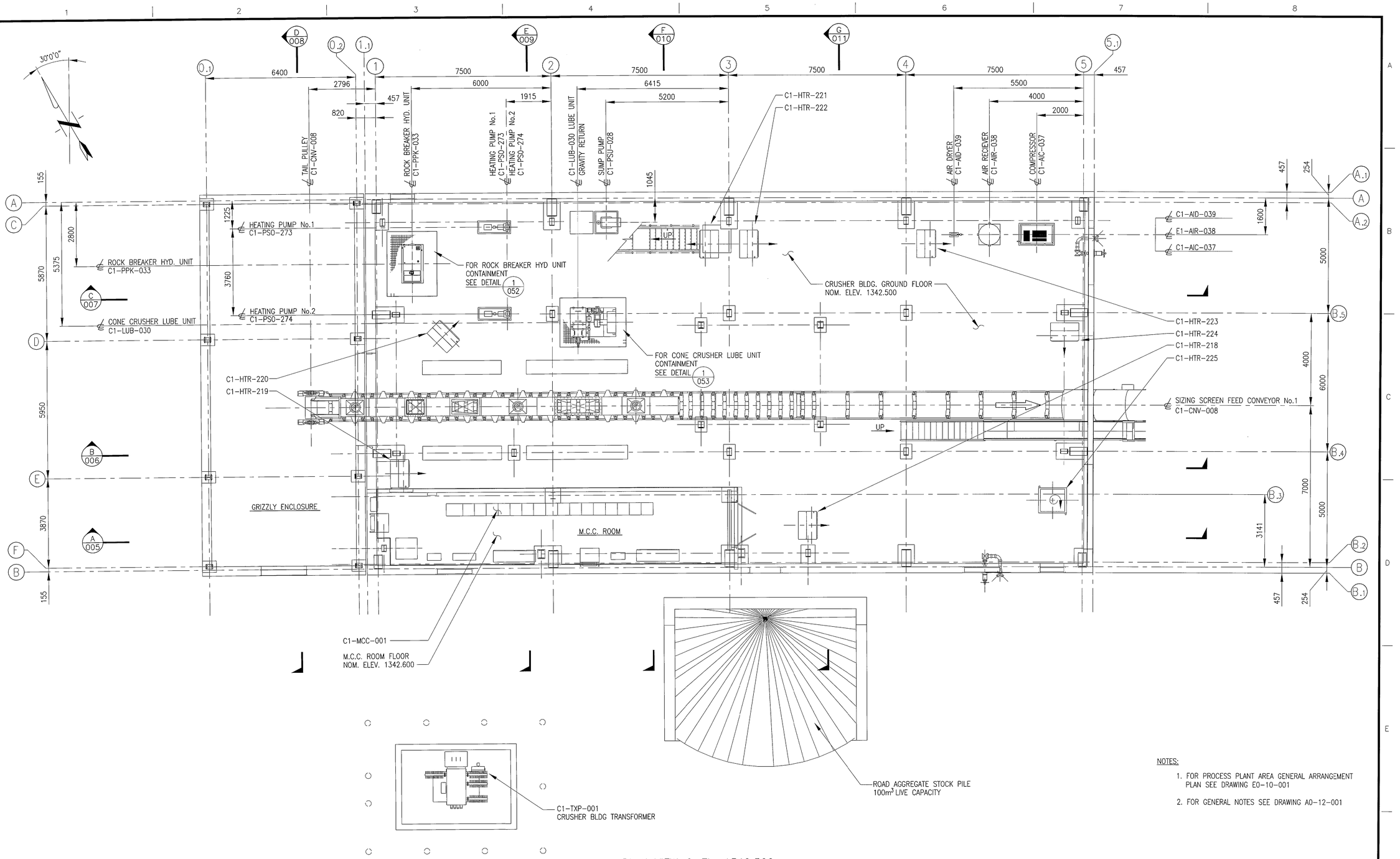
Appendix C includes MSDS for the following:

- Copper Concentrate
- Lead Concentrate
- Zinc Concentrate
- Copper sulphate
- Flocculant
- Isobutyl dithiophosphate (Aero 3477)
- Lime
- Methyl isobutyl carbinol (MIBC)
- Sodium cyanide
- Sodium isopropyl xanthate (SIPX)
- Sodium Metabisulphide (SMBS)
- TNC312
- Zinc sulphate

Appendix A: Process Plant General Arrangement Drawings

Appendix A includes the following WEI drawings:

Crushing and Screening	Mill			Concentrate Load-Out
C1-10-001	E0-10-001	E0-10-016	E0-10-031	E5-10-001
C1-10-002	E0-10-002	E0-10-017	E0-10-032	E5-10-002
C1-10-003	E0-10-003	E0-10-018	E0-10-033	E5-10-003
C1-10-004	E0-10-004	E0-10-019	E0-10-034	E5-10-004
C1-10-005	E0-10-005	E0-10-020	E0-10-035	
C1-10-006	E0-10-006	E0-10-021	E0-10-036	
C1-10-007	E0-10-007	E0-10-022	E0-10-037	
C1-10-008	E0-10-008	E0-10-023	E0-10-038	
C1-10-009	E0-10-009	E0-10-024	E0-10-039	
C1-10-010	E0-10-010	E0-10-025	E0-10-040	
C1-10-011	E0-10-011	E0-10-026	E0-10-041	
C1-10-012	E0-10-012	E0-10-027	E0-10-042	
	E0-10-013	E0-10-028	E0-10-043	
	E0-10-014	E0-10-029	E0-10-044	
	E0-10-015	E0-10-030	E0-10-045	



NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

PLAN VIEW @ EL. 1342.500

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DWG. NO. | REFERENCE DRAWINGS

PROFESSIONAL ENGINEER — KEVIN KOZAR — YUKON TERRITORY — Aug 5 2009

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT, CONSULTANT, PROJ.ENG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., ARCH., LAYOUT

SECTION:	LAYOUT
SCALE:	1:75
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CHECK. BY:	KK 14AUG09
APP. BY:	

Yukon Zinc CORP — YUKON

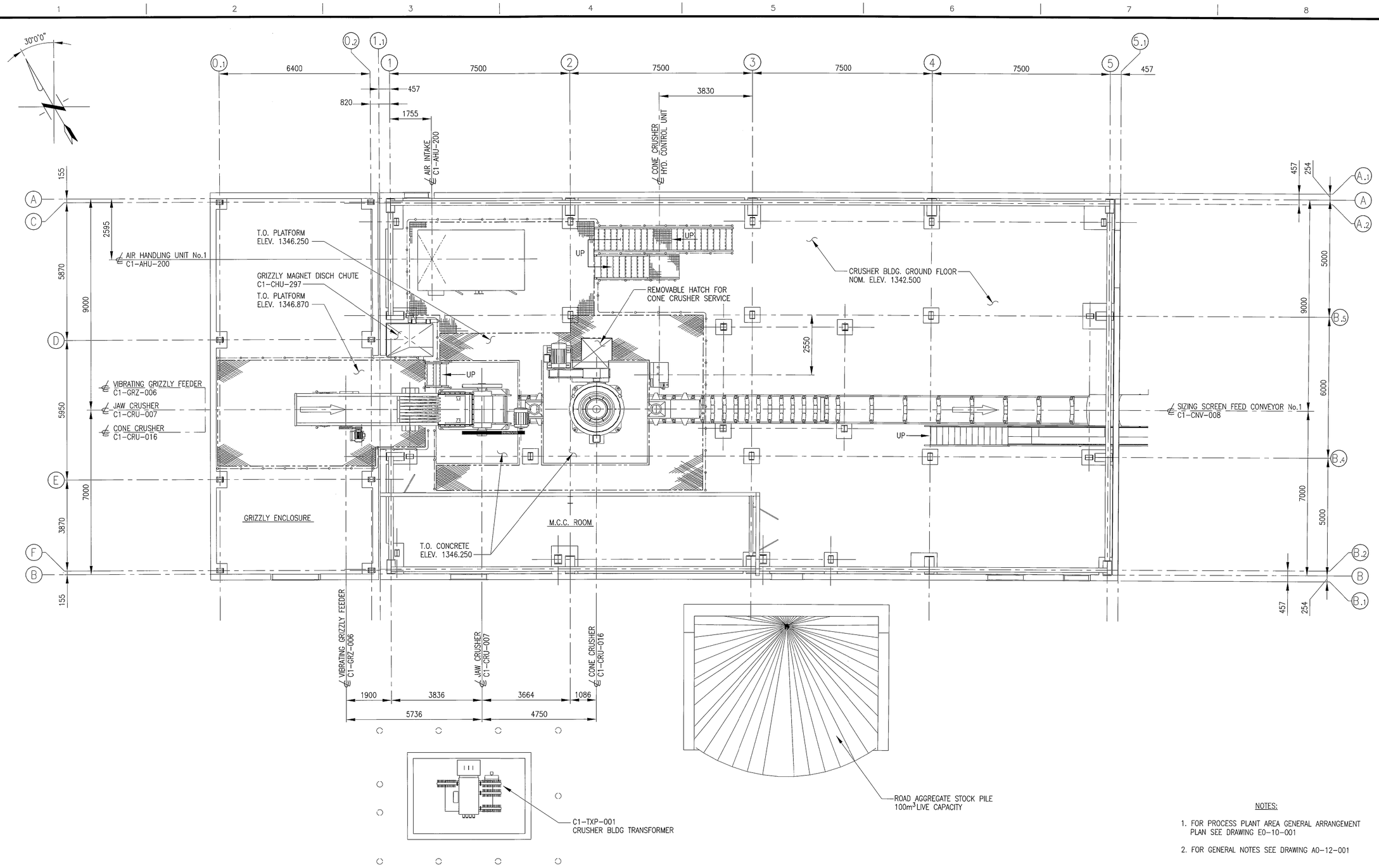
WARDROP | Engineering Inc.

TITLE

WOLVERINE PROJECT (EP)

CRUSHING & SCREENING GENERAL ARRANGEMENT AT GROUND FLOOR ELEV. 1342.500

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110001.DWG	08526302.00	C1-10-001	0



PLAN VIEW @ EL. 1346.250

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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DWG. NO.	REFERENCE DRAWINGS

PROFESSIONAL ENGINEER — YUKON — KEVIN KOZAR — TERRITORY — Aug 13, 2009

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT, PROJMAN, PROJENG, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

SECTION:	LAYOUT	
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Yukon Zinc CORP — YUKON

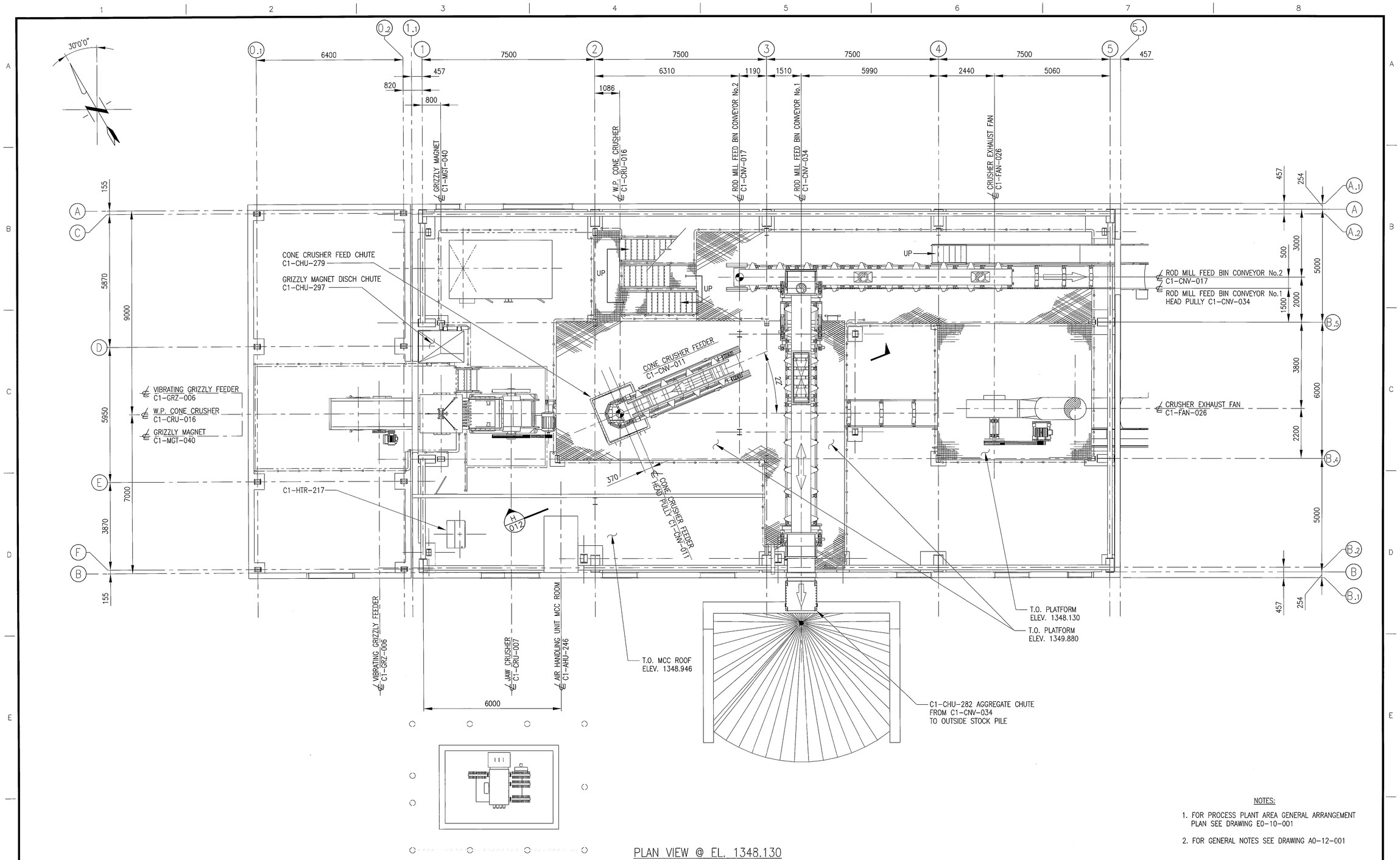
WARDROP | Engineering Inc.

TITLE

WOLVERINE PROJECT (EP)

CRUSHING & SCREENING GENERAL ARRANGEMENT AT CRUSHER FLOOR ELEV. 1346.250

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110002.DWG	08526302.00	C1-10-002	0



PLAN VIEW @ EL. 1348.130

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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DWG. NO.	REFERENCE DRAWINGS

PROFESSIONAL ENGINEER — YUKON — KEVIN KOZAR — TERRITORY — Aug 13, 2009

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT / GENERAL / PROJECT / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / SAFETY

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	JB	16JUN09
DRAWN BY:	JB	16JUN09
CHECK. BY:	KK	14AUG09
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YukonZinc CORP — YUKON

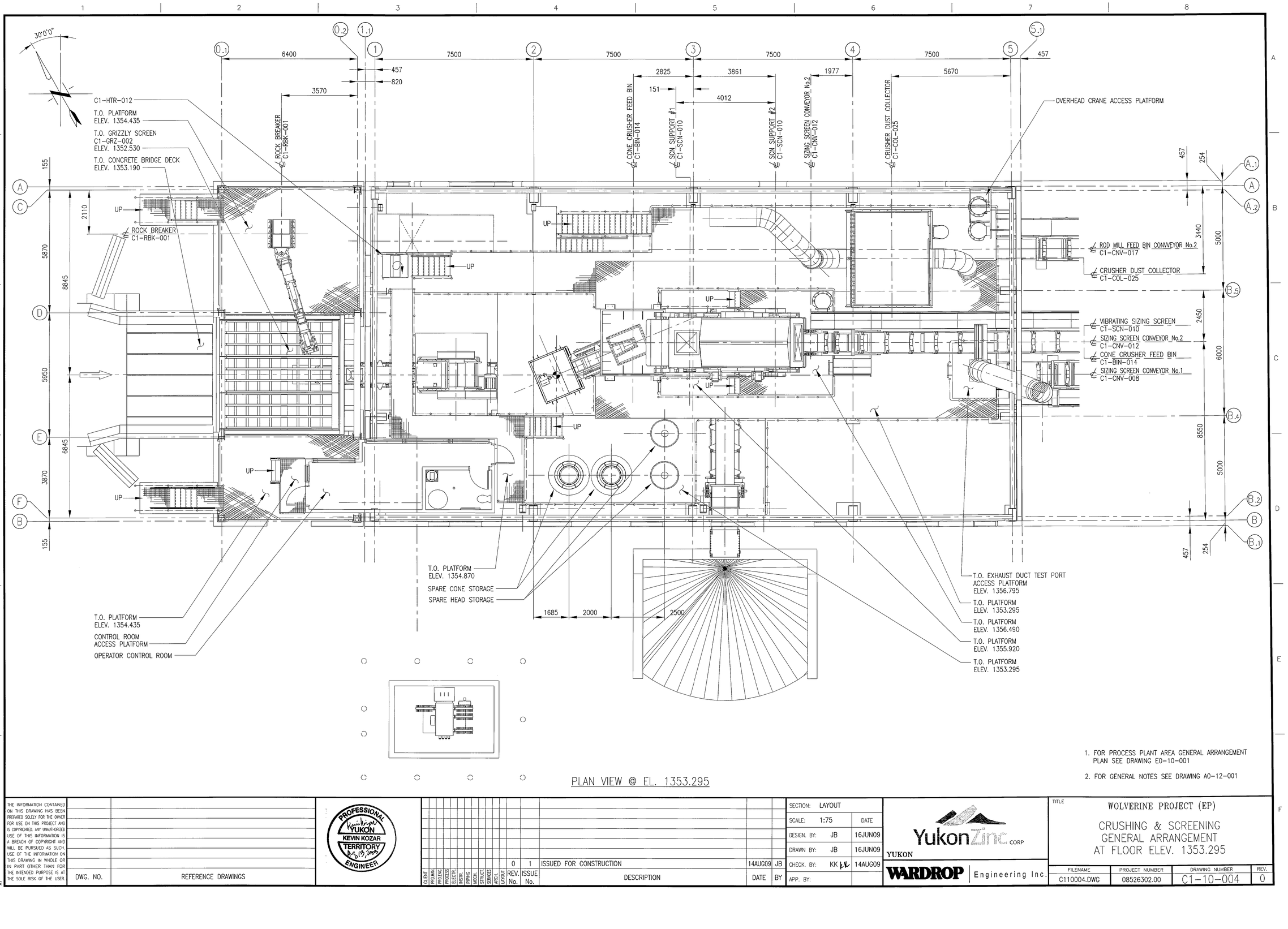
WARDROP | Engineering Inc.

TITLE

WOLVERINE PROJECT (EP)

CRUSHING & SCREENING
GENERAL ARRANGEMENT
AT CONVEYOR FLOOR 1348.130

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110003.DWG	08526302.00	C1-10-003	0



PLAN VIEW @ EL. 1353.295

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

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SECTION:	LAYOUT	
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Yukon Zinc CORP — YUKON

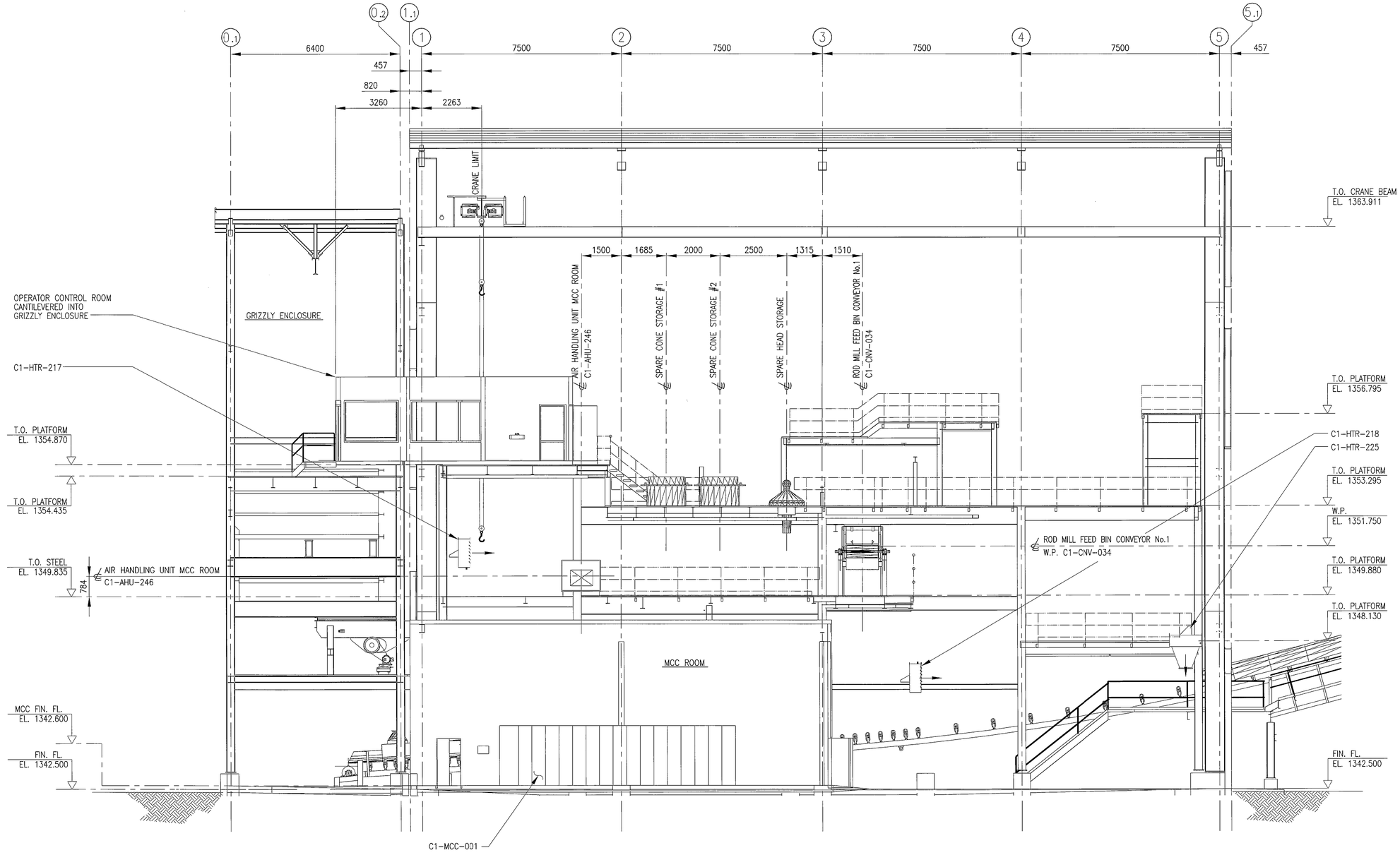
WARDROP | Engineering Inc.

TITLE

WOLVERINE PROJECT (EP)

CRUSHING & SCREENING GENERAL ARRANGEMENT AT FLOOR ELEV. 1353.295

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110004.DWG	08526302.00	C1-10-004	0



SECTION A-001
SCALE: 1:75

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT, PROJMAN, PROJENG, PROCESS, GEOTECH, MINING, PIPING, MECH, STRUCT, SERVICES, ARCH, LAYOUT

SECTION:	LAYOUT	
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APP. BY:		

Yukon Zinc Corp — YUKON

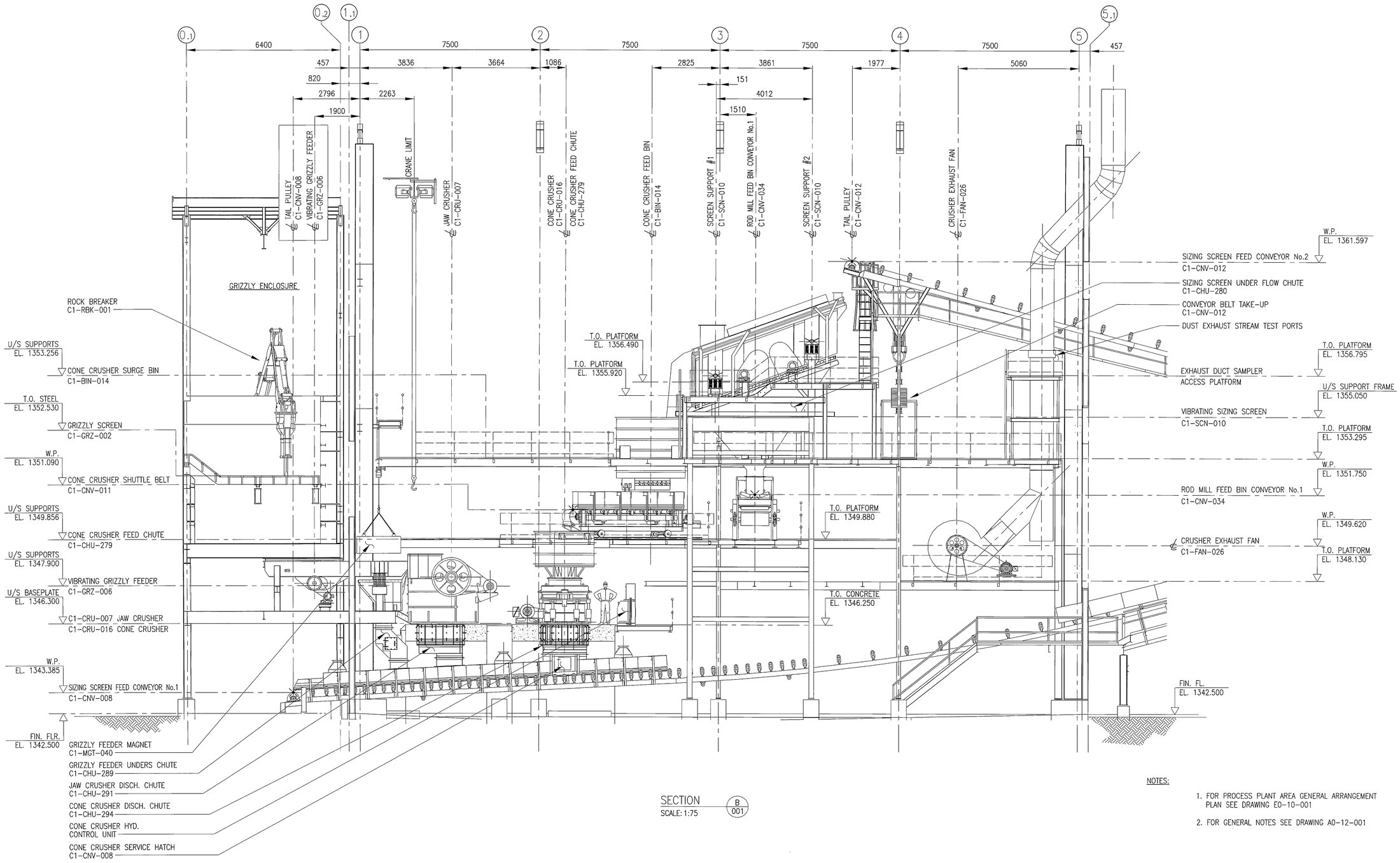
WARDROP Engineering Inc.

TITLE

WOLVERINE PROJECT (EP)

CRUSHING & SCREENING GENEAL ARRANGEMENT SECTION-A

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110005.DWG	08526302.00	C1-10-005	0



SECTION B 001
SCALE: 1:75

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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DWG. NO.	REFERENCE DRAWINGS

PROFESSIONAL ENGINEER — KEVIN KOZAR — YUKON TERRITORY — May 13, 2009

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

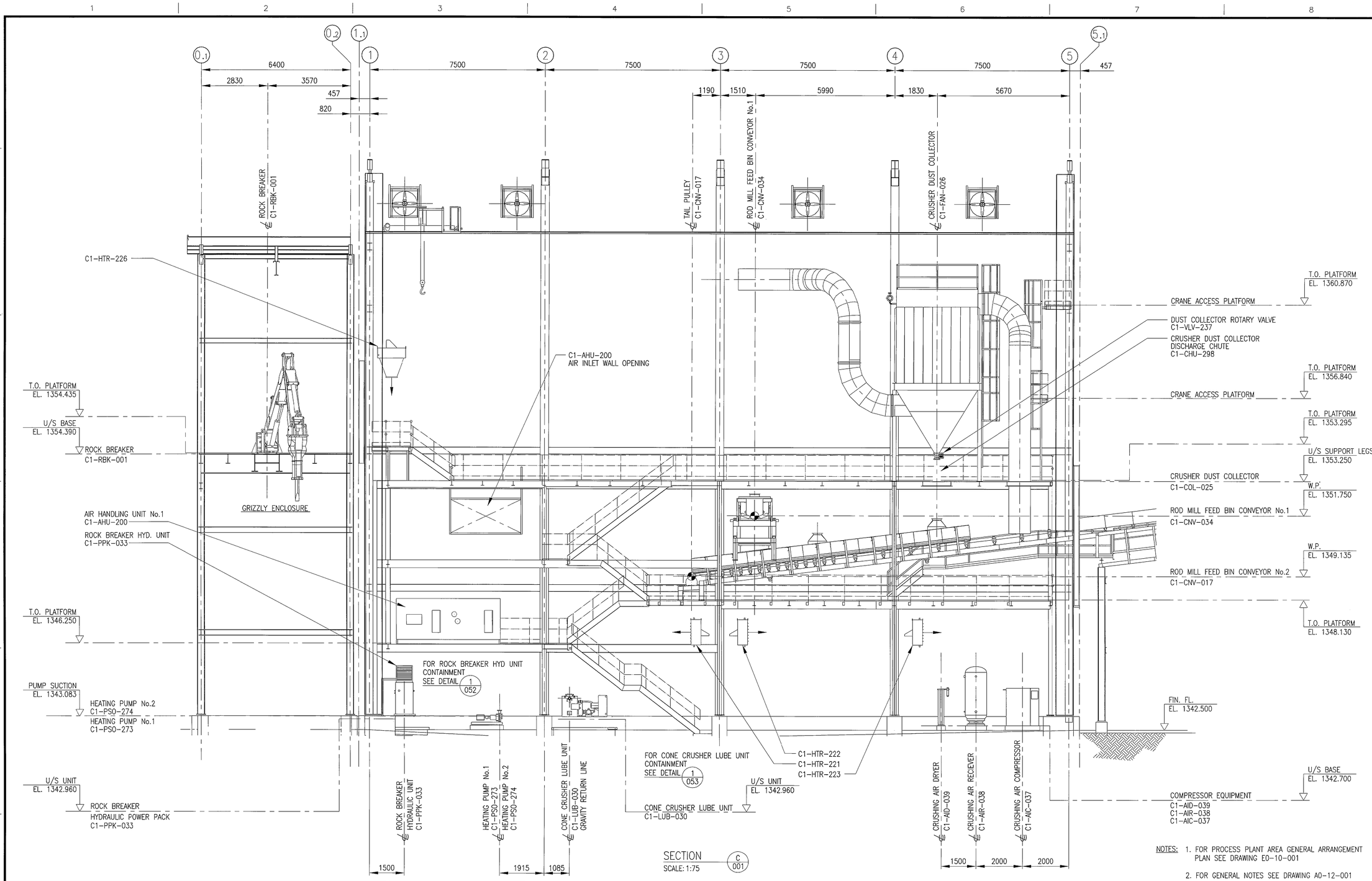
CLIENT / PROJMAN / PROENG / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

SECTION:	LAYOUT	
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DESIGN. BY:	JB	17JUN09
DRAWN BY:	JB	17JUN09
CHECK. BY:	KK	14AUG09
APP. BY:		

YukonZinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
CRUSHING & SCREENING
GENERAL ARRANGEMENT
SECTION-B
SHEET 1 OF 1

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110006.DWG	08526302.00	C1-10-006	0



SECTION C/001
SCALE: 1:75

NOTES:
1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT / PROJMAN / PROJENG / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SOILWKS / ARCH. / LAYOUT

SECTION:	LAYOUT	
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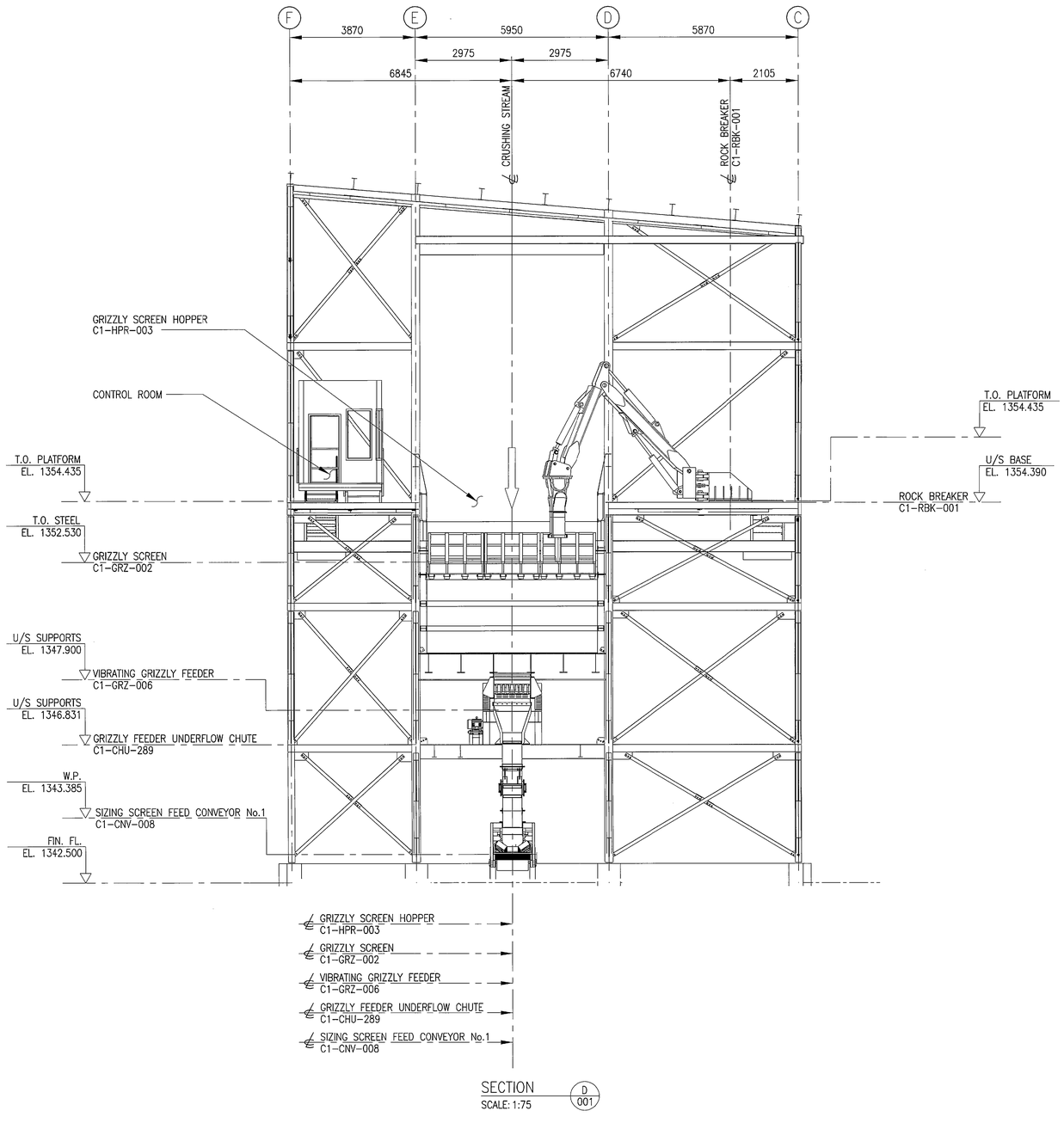
Yukon Zinc CORP — YUKON

WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
CRUSHING & SCREENING GENERAL ARRANGEMENT SECTION-C SHEET 1 OF 1

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110007.DWG	08526302.00	C1-10-007	0

A1



SECTION
SCALE: 1:75
D
001

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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DWG. NO.	REFERENCE DRAWINGS

PROFESSIONAL ENGINEER — YUKON TERRITORY — KEVIN KOZAR — August 17, 2009

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT / PROJMAN / PROJ.ENG / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SYSTEMS / ARCH. / LAYOUT

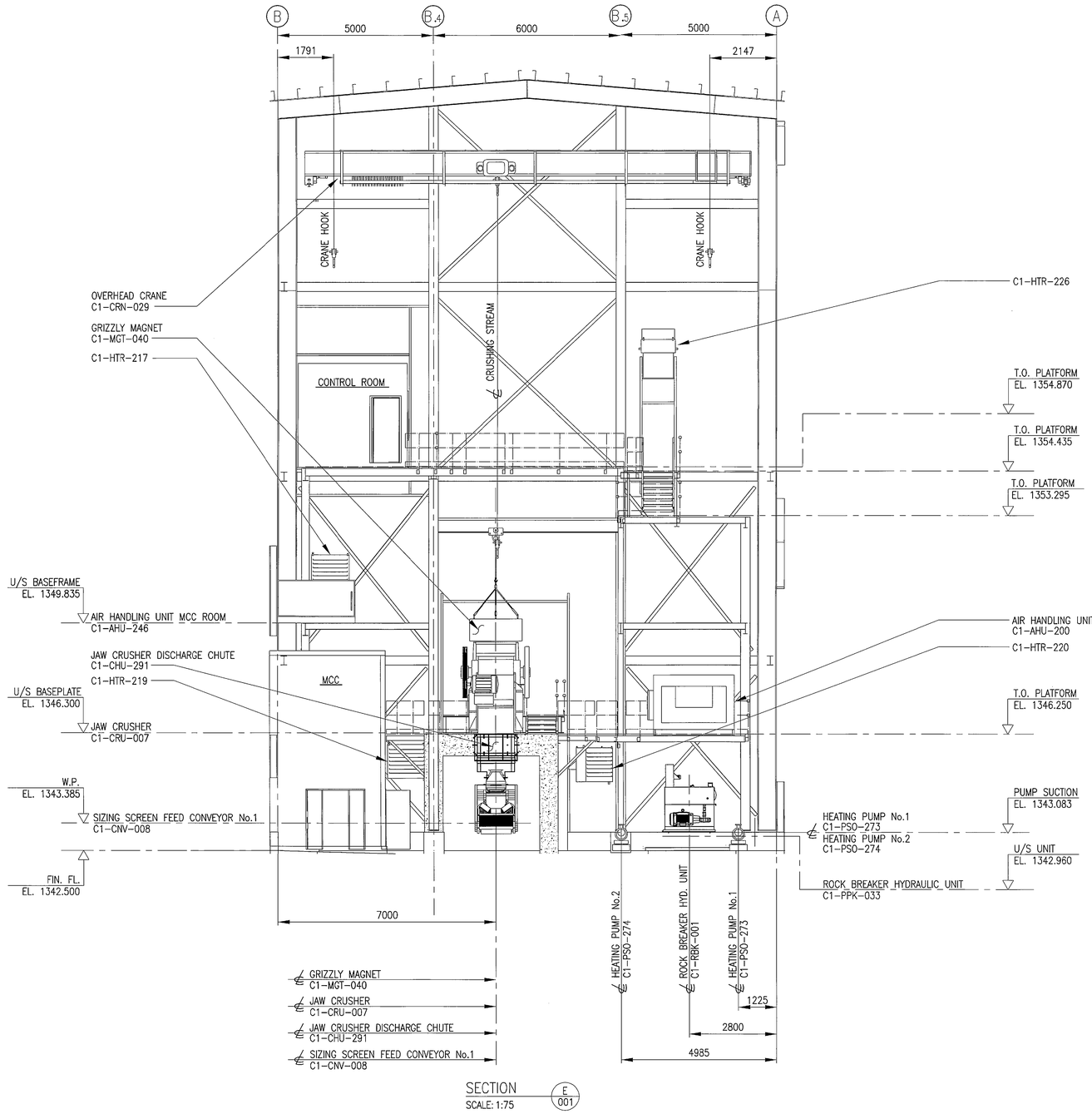
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CHECK. BY:	KK	08JUL09
APP. BY:		

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YUKON

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TITLE
WOLVERINE PROJECT (EP)
CRUSHING & SCREENING
GENERAL ARRANGEMENT
SECTION-D
SHEET 1 OF 1

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110012.DWG	08526302.00	C1-10-008	0



SECTION E 001

SCALE: 1:75

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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DWG. NO.	REFERENCE DRAWINGS

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT, PROJ.MAN., PROJ.ENG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	JB	22JUN09
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CHECK. BY:	KK	14AUG09
APP. BY:		

YUKON ZINC CORP

YUKON

WARDROP | Engineering Inc.

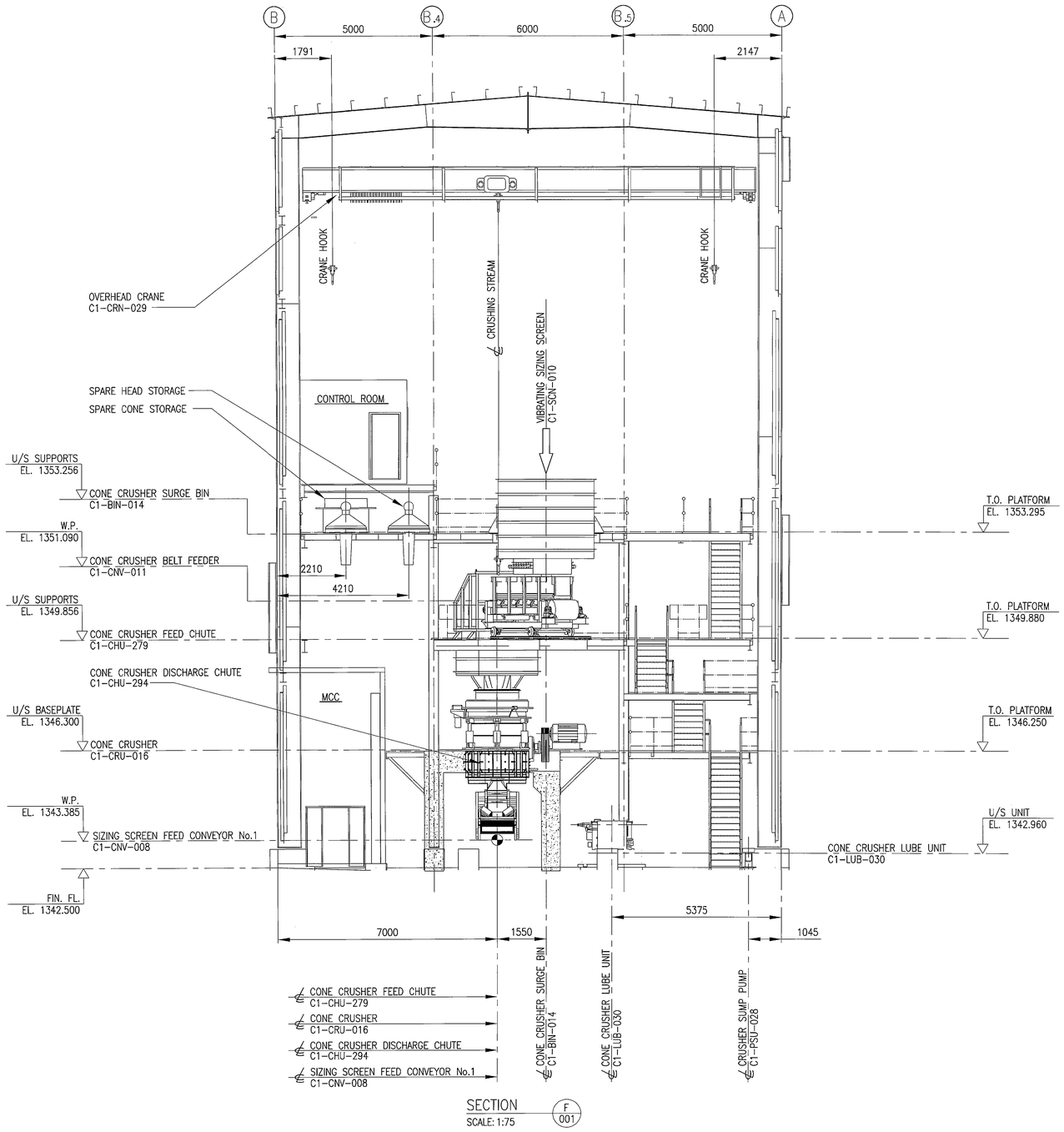
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WOLVERINE PROJECT (EP)

CRUSHING & SCREENING GENERAL ARRANGEMENT SECTION-E SHEET 1 OF 1

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110009.DWG	08526302.00	C1-10-009	0

A1



SECTION F
SCALE: 1:75 001

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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DWG. NO. | REFERENCE DRAWINGS

PROFESSIONAL ENGINEER — YUKON — KEVIN KOZAR — TERRITORY — B. 2009

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT / PROJMAN / PROJENG / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

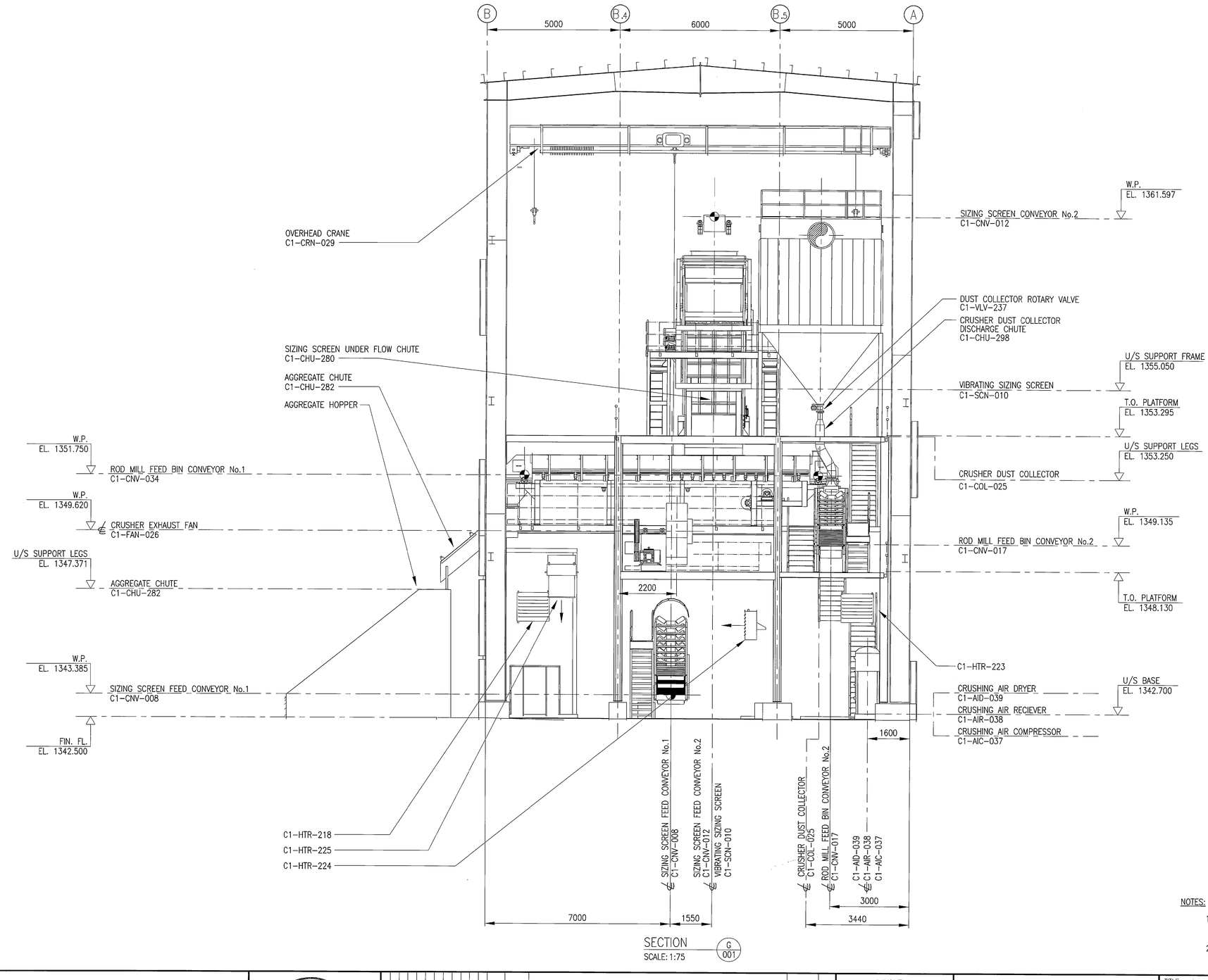
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TITLE:
WOLVERINE PROJECT (EP)
CRUSHING & SCREENING GENERAL ARRANGEMENT SECTION-F SHEET 1 OF 1

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110010.DWG	08526302.00	C1-10-010	0



SECTION
SCALE: 1:75

G
001

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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DWG. NO. | REFERENCE DRAWINGS

PROFESSIONAL ENGINEER — YUKON — KEVIN KOZAR — TERRITORY — Aug 17, 2009

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT, PROJMNG, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT, SERVICES, ARCH., LAYOUT

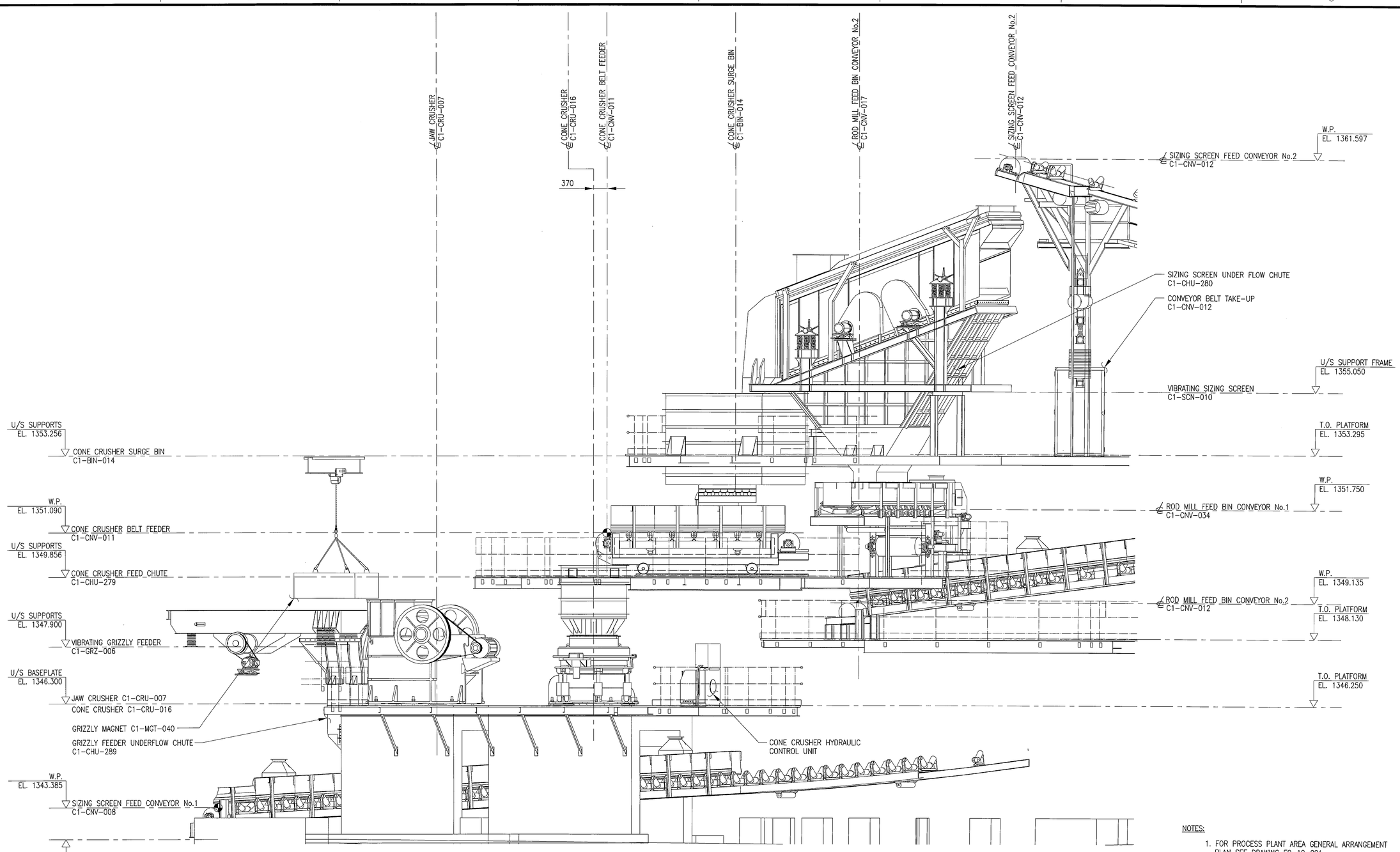
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CHECK. BY:	KK	14AUG09
APP. BY:		

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TITLE
WOLVERINE PROJECT (EP)
CRUSHING & SCREENING
GENERAL ARRANGEMENT
SECTION-G
SHEET 1 OF 1

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110011.DWG	08526302.00	C1-10-011	0

A1



SECTION H
SCALE: 1:50 003

NOTES:

1. FOR PROCESS PLANT AREA GENERAL ARRANGEMENT PLAN SEE DRAWING E0-10-001
2. FOR GENERAL NOTES SEE DRAWING A0-12-001

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	14AUG09	JB

CLIENT, PROJMAN, PROJENG, PROCESS, ELECTR, INSTRU, MECHAN, STRUCT, SERVICES, ARCH, LAYOUT

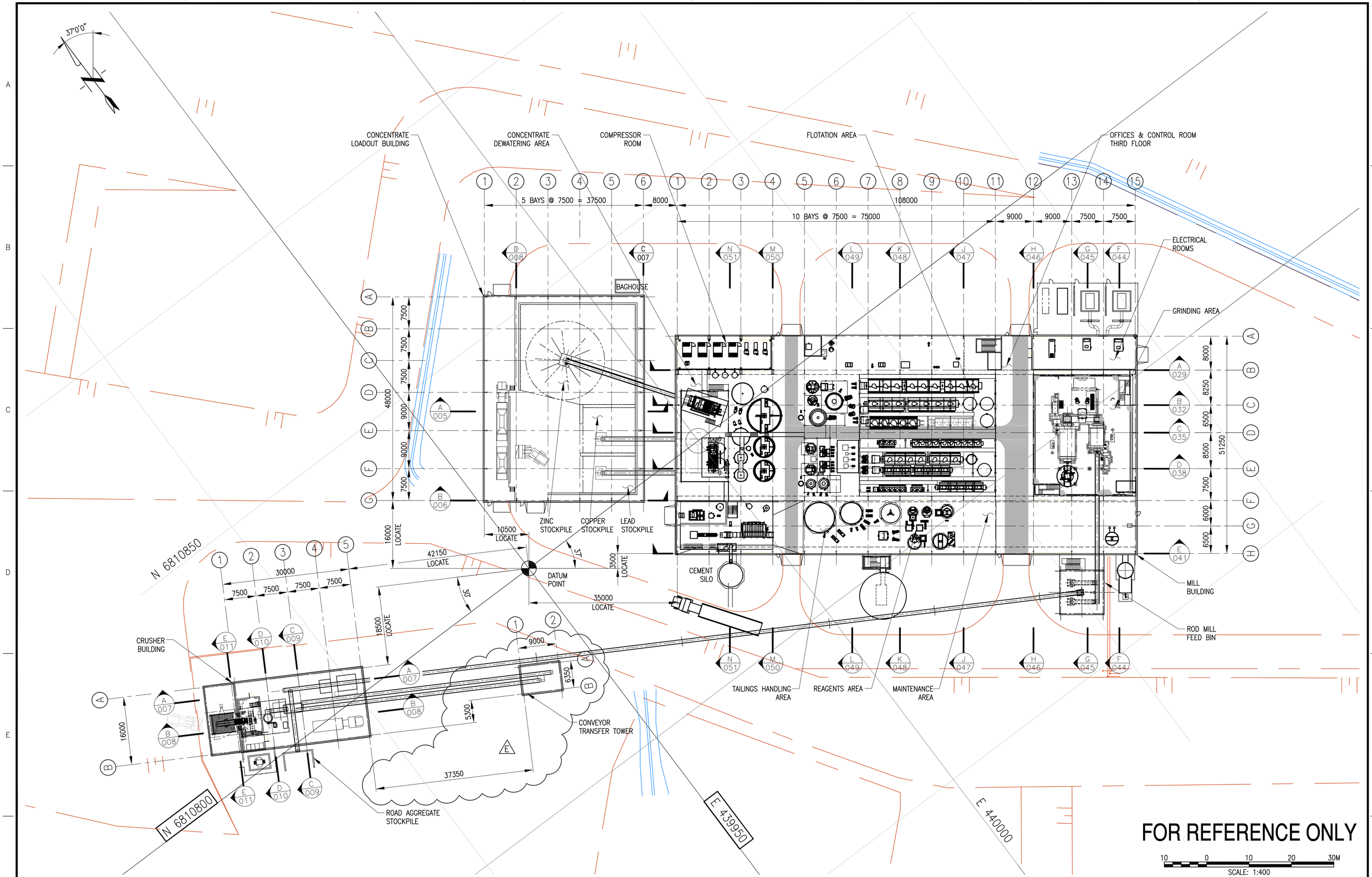
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APP. BY:		

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YUKON
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TITLE
WOLVERINE PROJECT (EP)
CRUSHING & SCREENING
GENERAL ARRANGEMENT
SECTION-H
SHEET 1 OF 1

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
C110012.DWG	08526302.00	C1-10-012	0

A1



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DWG. NO.	REFERENCE DRAWINGS

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
E	1	TRANSFER TOWER LOCATION UPDATED	24NOV09	DH
D	1	ISSUED FOR APPROVAL	08JUL09	JR
C	2	ISSUED FOR APPROVAL	26JUN09	JR
C	1	ISSUED FOR BUILDING LOCATIONS	25MAY09	JR
B	1	CRUSHER BUILDING REALIGNED	29JAN09	JR
A	1	ISSUED FOR DETAILED DESIGN	12DEC08	JR

CLIENT · PROJMAN · PROJENG · PROCESS · ELECTR. · INSTR. · PIPING · MECH. · STRUCT. · SERVICES · ARCH. · LAYOUT

		DATE
SECTION:	LAYOUT	
SCALE:	1:400	
DESIGN. BY:	DH	03NOV08
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CHECK. BY:		
APP. BY:		

YukonZinc CORP
YUKON
WARDROP | Engineering Inc.

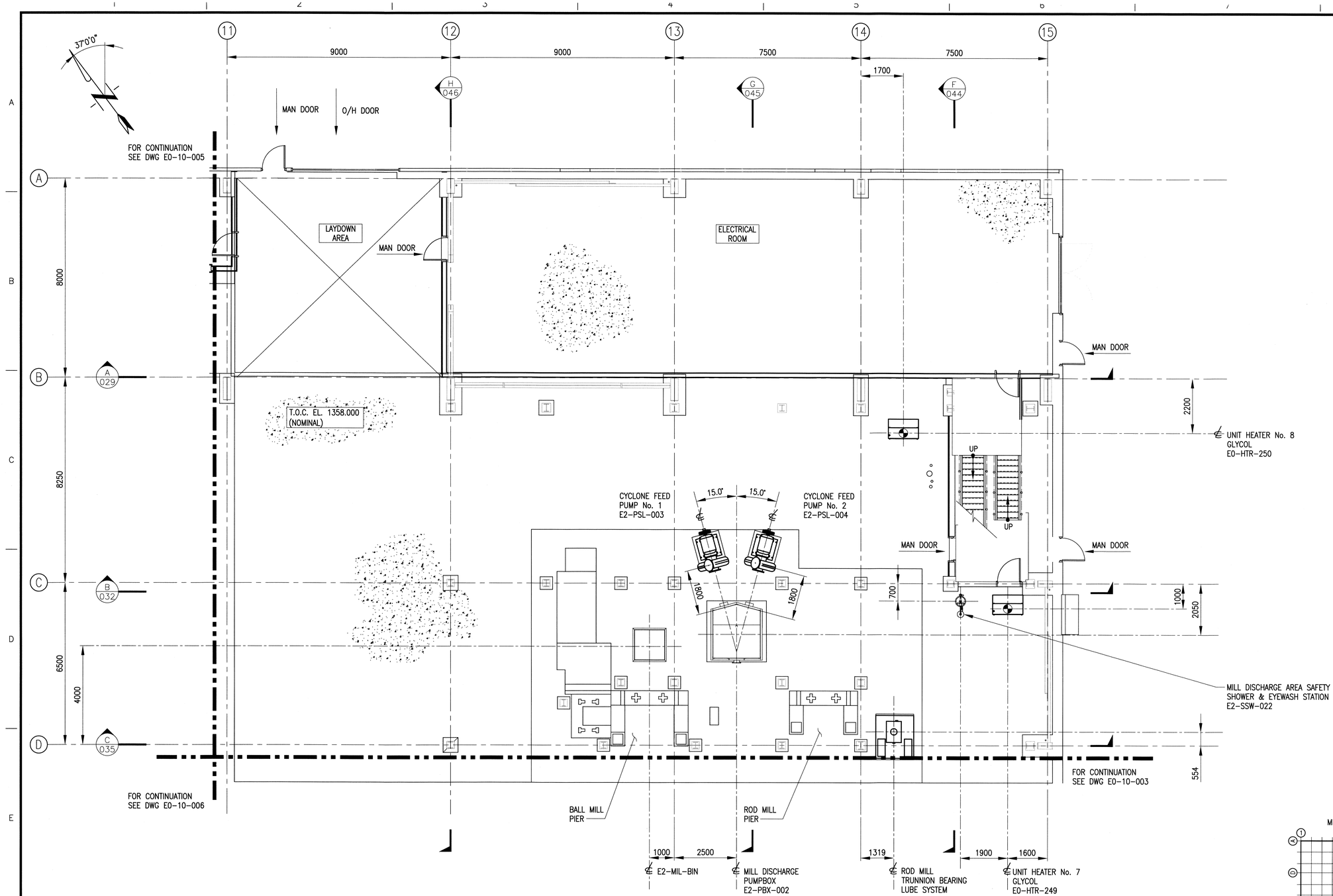
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WOLVERINE PROJECT (EP)
PROCESS PLANT AREA
GENERAL ARRANGEMENT PLAN

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
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09/11/24 10:43

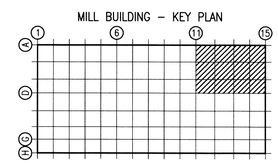
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G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E010001.DWG



PLAN
SCALE: 1:75

MILL BUILDING – KEY PLAN



2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-006	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-005	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-003	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PROJMAN, PROJ.ENG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SYSTEMS, ARCH., LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
C	1	ISSUED FOR TENDER	17SEP09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

SECTION: LAYOUT
SCALE: 1:75 DATE
DESIGN. BY: DH 06NOV08
DRAWN BY: JR 06NOV08
CHECK. BY: DH 30 OCT 09
APP. BY: 30OCT09

YUKON
Yukon Zinc CORP
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 1 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010002.DWG	08526302.00	E0-10-002	0

A1
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09/10/29
1:47

37°0'0"

11 12 13 14 15

9000 9000 7500 7500

1000 1300

PSI-300 PARTICLE SIZE ANALYZER DISCHARGE PUMPBOX E2-PBX-019

H 046 G 045 F 044

BALL MILL PIER

ROD MILL PIER

FOR CONTINUATION SEE DWG E0-10-005

FOR CONTINUATION SEE DWG E0-10-002

D C 035

4492

8500

BALL MILL TRUNNION BEARING LUBE SYSTEM

3682

E D 038

750

PSI-300 PARTICLE SIZE ANALYZER DISCHARGE PUMP E2-PSL-020

T.O.C. EL. 1358.000 (NOMINAL)

1825

2175

7500

FOR CONTINUATION SEE DWG E0-10-006

UP

UP

F

6000

G

MAN DOOR

FOR CONTINUATION SEE DWG E0-10-004

FOR CONTINUATION SEE DWG E0-10-007

2400

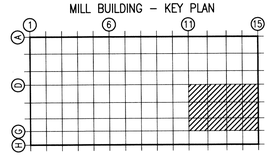
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GRINDING AREA SUMP PUMP E2-PSU-007

ROD MILL FEED CONVEYOR C1-CNV-022

PLAN
SCALE: 1:75

MILL BUILDING - KEY PLAN



2 0 2 4 6M
SCALE: 1:75

E0-10-007	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9	
E0-10-006	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9	
E0-10-005	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9	
E0-10-004	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 3 OF 9	
E0-10-002	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 1 OF 9	
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN	
DWG. NO.	REFERENCE DRAWINGS	

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT PROJMAN PROCESS ELECTR. INSTR. PIPING MECH. STRUCT. SERVICES ARCH. LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30OCT09
APP. BY:	GM	30OCT09

Yukon Zinc CORP
YUKON
WARDROP | Engineering Inc.

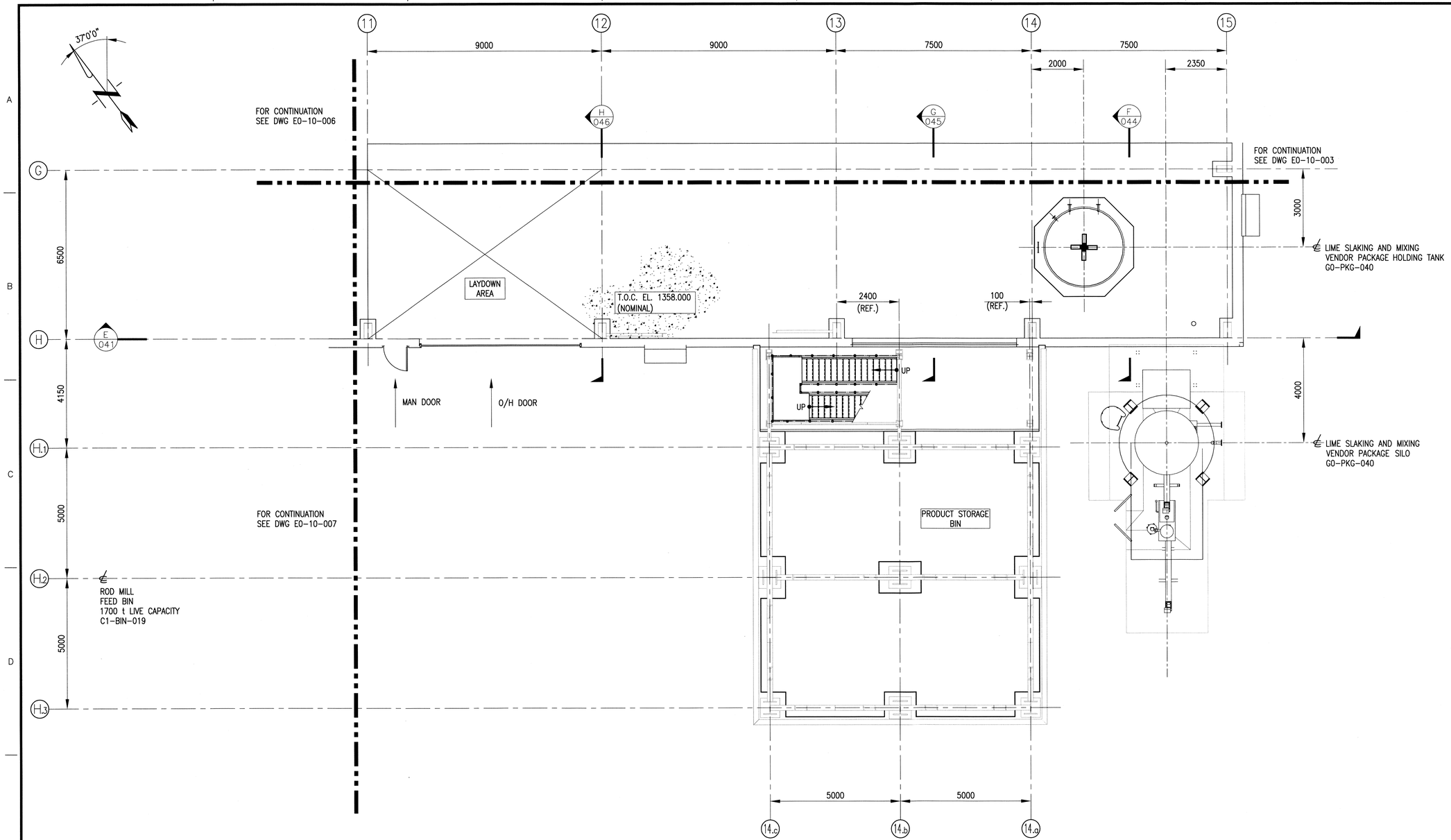
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 2 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010003.DWG	08526302.00	E0-10-003	0

09/10/29 14:05

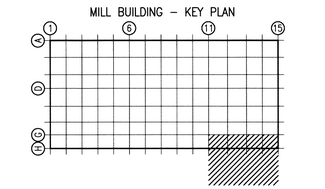
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PLAN
SCALE: 1:75

MILL BUILDING – KEY PLAN



2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-007	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-006	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-003	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PROJMAN, PROLDNG, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., CIVIL, ARCH., LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	JM	30 OCT 09

YukonZinc CORP
YUKON
WARDROP | Engineering Inc.

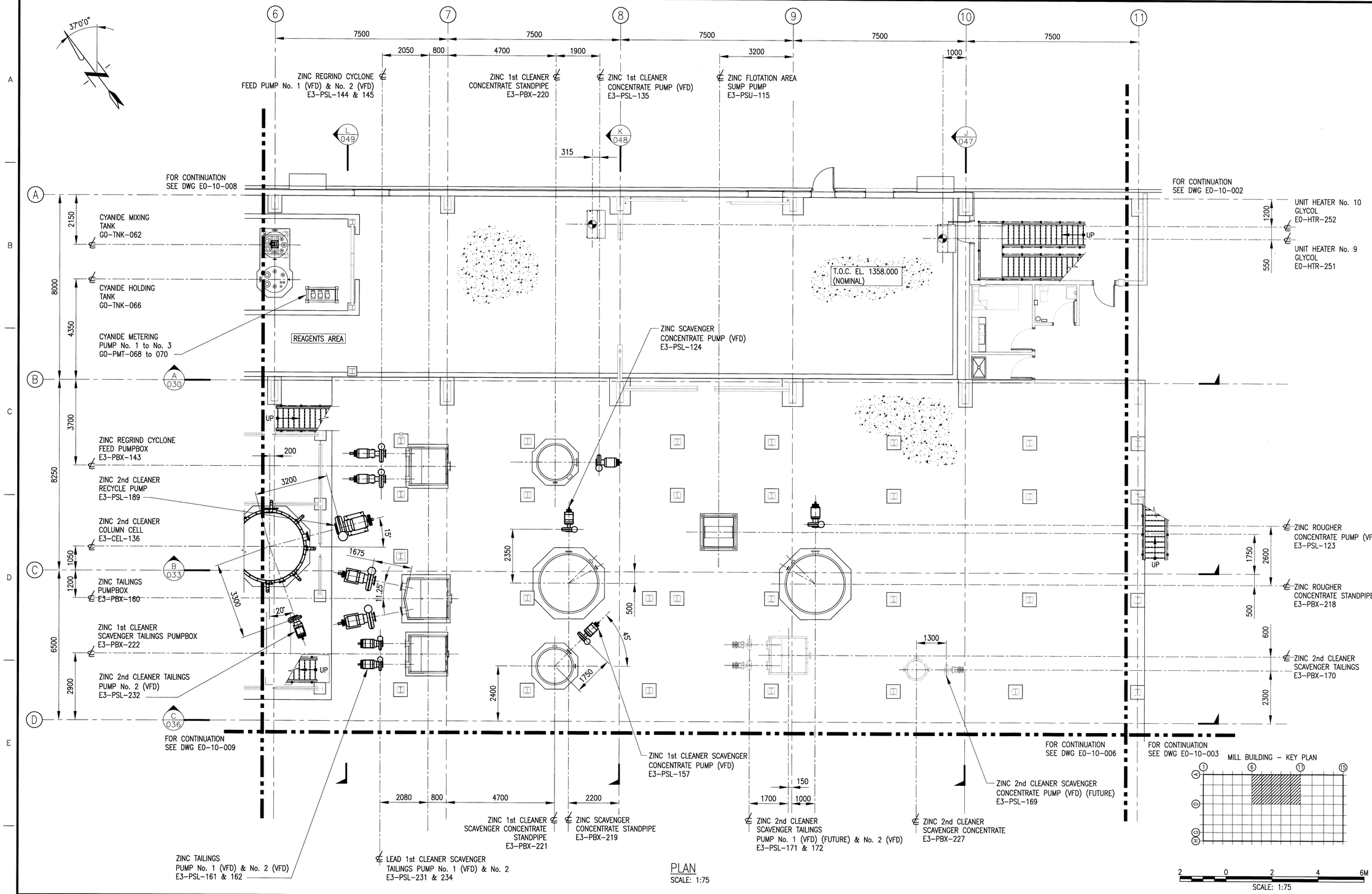
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 3 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010004.DWG	08526302.00	E0-10-004	0

09/10/29 14:53

A1

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DWG. NO.	REFERENCE DRAWINGS
E0-10-009	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-008	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 7 OF 9
E0-10-006	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-003	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-002	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 1 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT / PM / PM ENG. / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

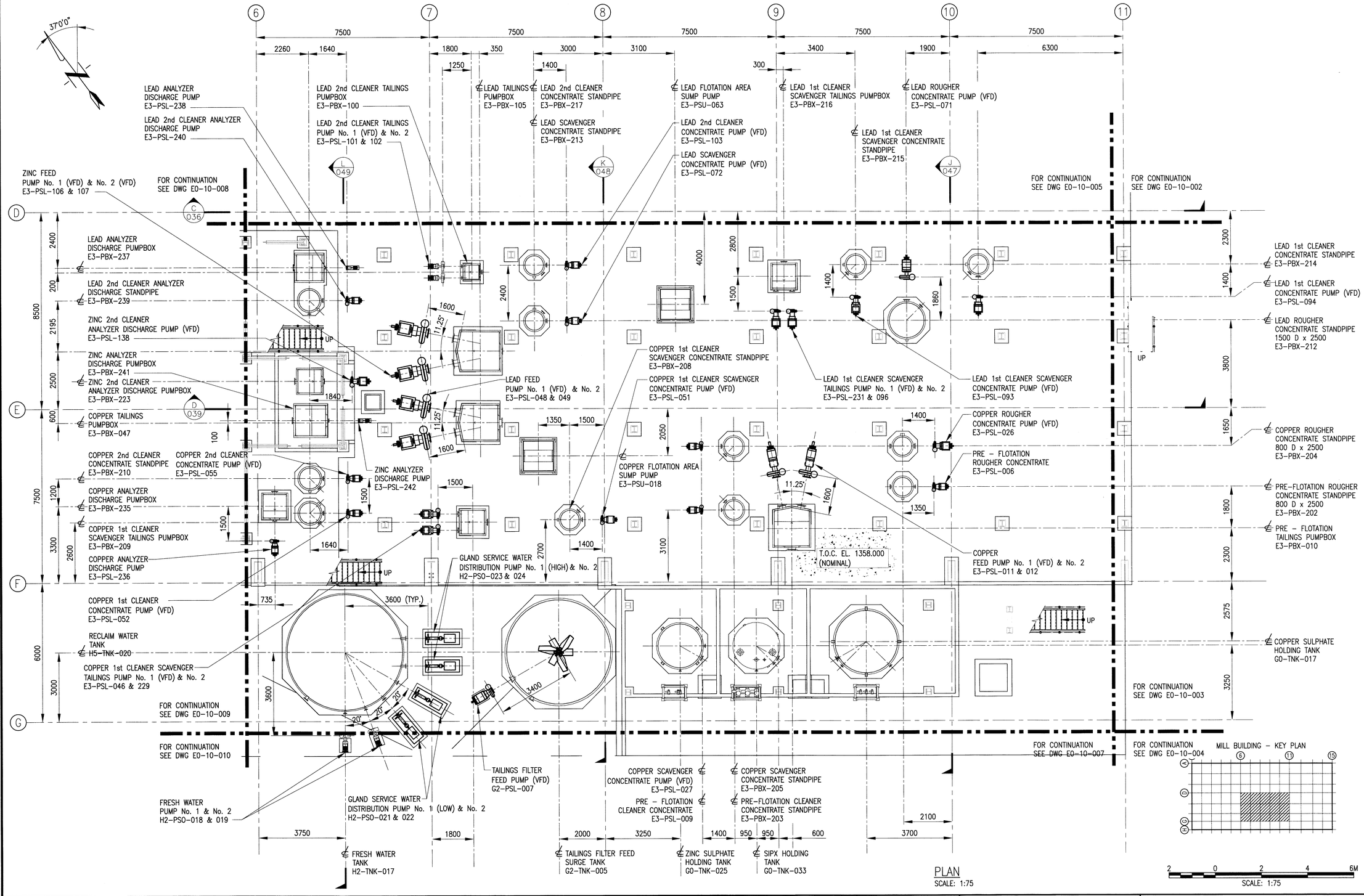
SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 Nov 09
APP. BY:	JM	30 Nov 09

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YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 4 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010005.DWG	08526302.00	E0-10-005	0

A1
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09/11/03 06:32



DWG. NO.	REFERENCE DRAWINGS
E0-10-010	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 9 OF 9
E0-10-008/9	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 7/8 OF 9
E0-10-005/7	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4/6 OF 9
E0-10-004	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 3 OF 9
E0-10-003	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-002	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 1 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, CIVIL, STRUCT, PROJ.ENG, PROCESS, ELECTR, INSTR, PIPING, MECH, STRUCT, DRAWGS, LAYOUT

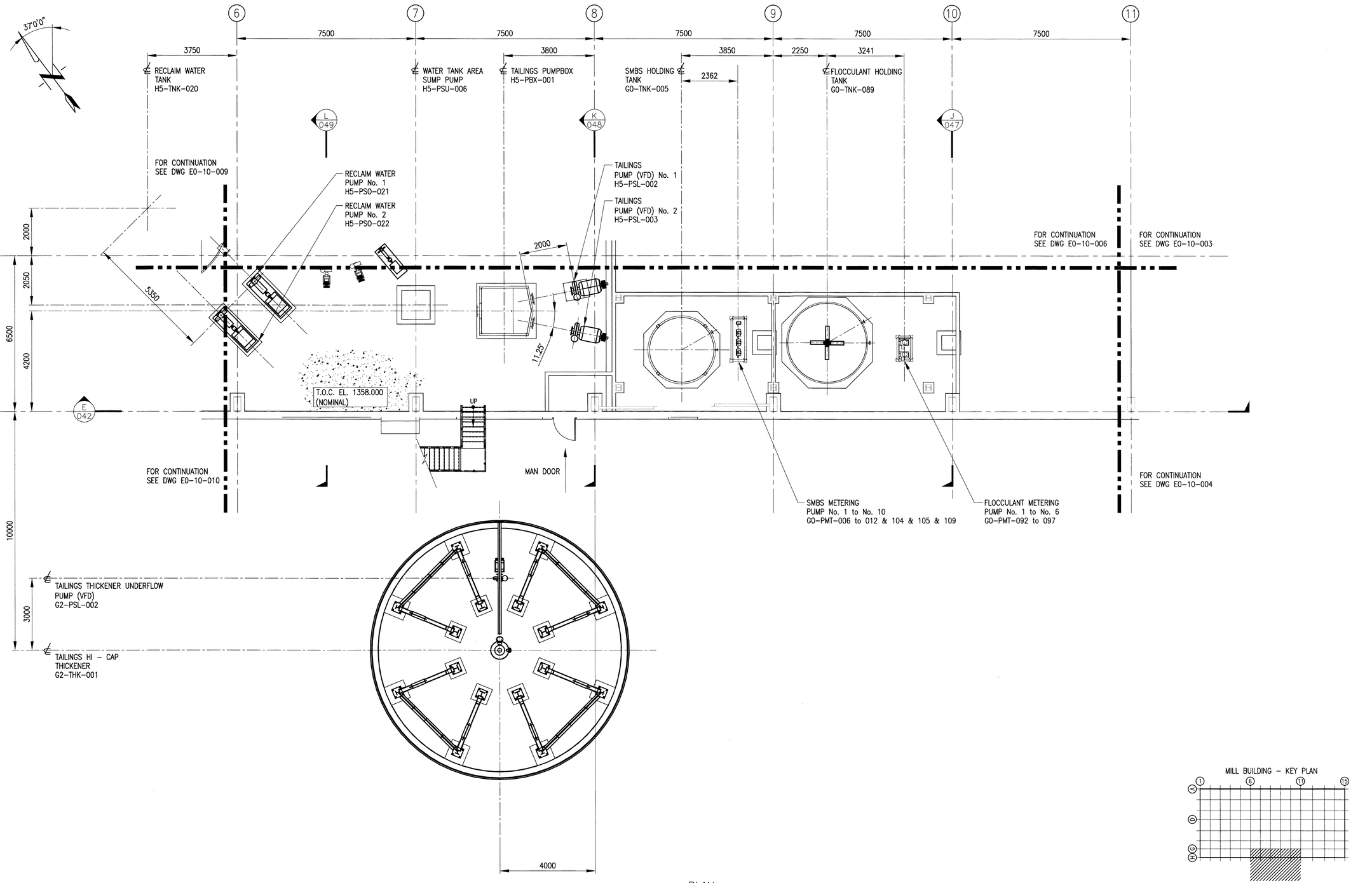
SECTION: LAYOUT
SCALE: 1:75 DATE
DESIGN. BY: DH 06NOV08
DRAWN BY: JR 06NOV08
CHECK. BY: DH 30 oct 09
APP. BY: AM 30 OCT 09

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 5 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010006.DWG	08526302.00	E0-10-006	0

A1
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09/11/03 09:41



PLAN
SCALE: 1:75

MILL BUILDING - KEY PLAN

2 0 2 4 6M
SCALE: 1:75

DWG. NO.	REFERENCE DRAWINGS
E0-10-010	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 9 OF 9
E0-10-009	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-006	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-004	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 3 OF 9
E0-10-003	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT/PROJMAN/PROJ.ENG./PROCESS/ELECTR./INSTR./PIPING/MECH./STRUCT./STORES/ARCH./LAYOUT

SECTION: LAYOUT

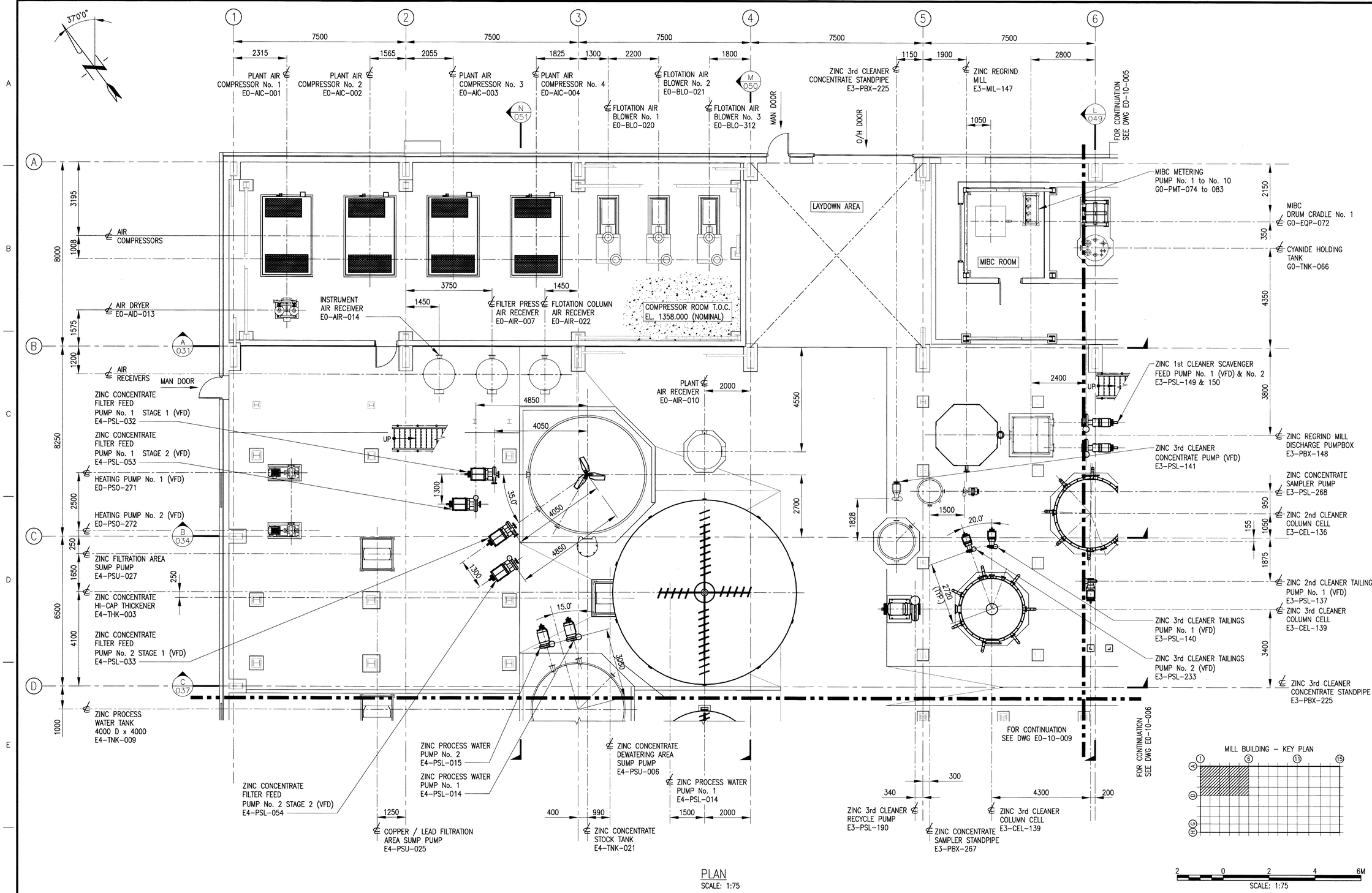
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DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	06 NOV 09
APP. BY:	JWV	06 NOV 09

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 6 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010007.DWG	08526302.00	E0-10-007	0

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09/11/06 09:50



PLAN
SCALE: 1:75

SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-009	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-006	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-005	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PROJMAN, PROJENG, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., STRUCRES, ARCH., LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

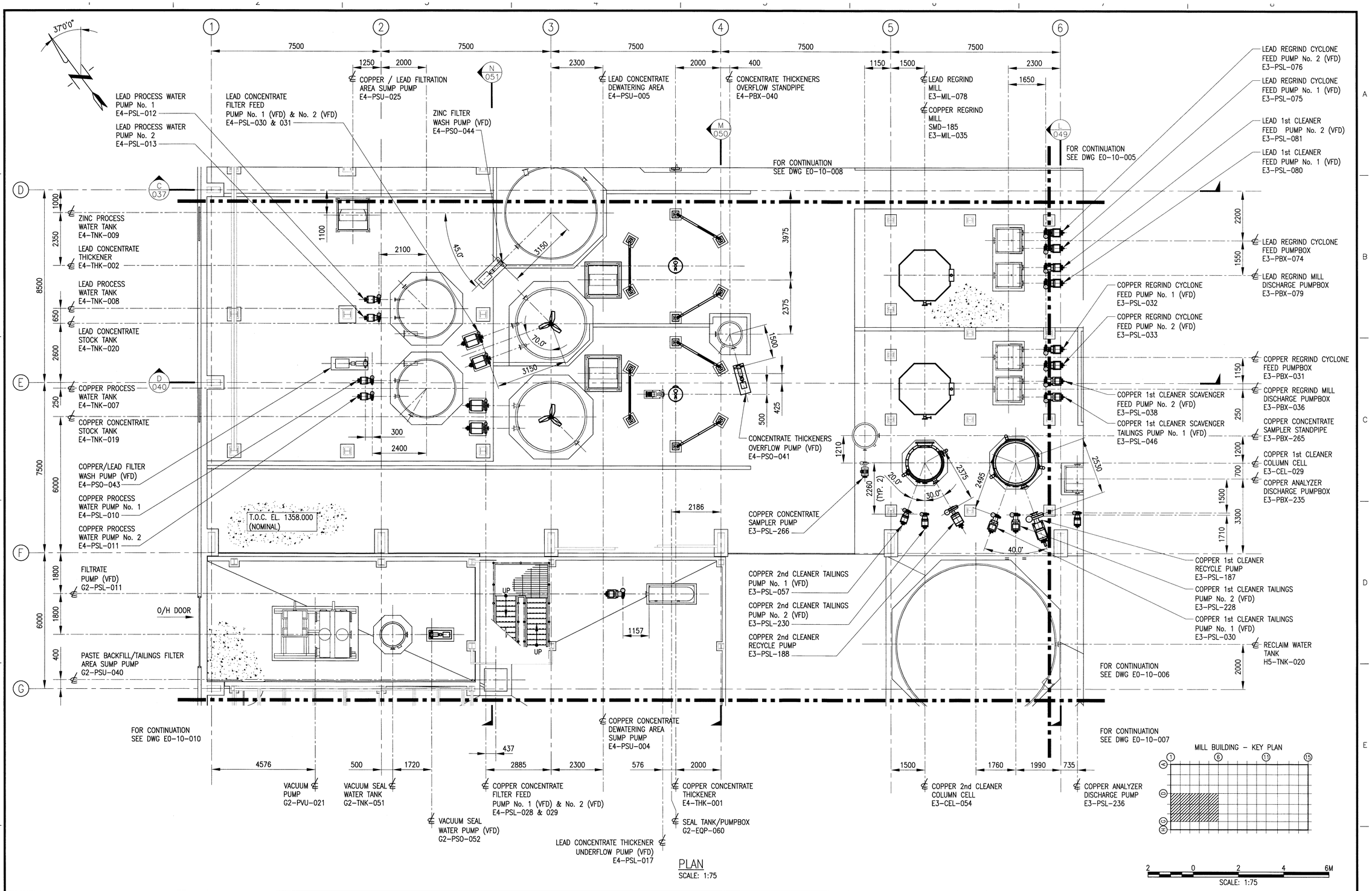
SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	MM	30 OCT 09

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 7 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010008.DWG	08526302.00	E0-10-008	0

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09/11/03
1321



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DWG. NO.	REFERENCE DRAWINGS
E0-10-010	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 9 OF 9
E0-10-008	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 7 OF 9
E0-10-007	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-006	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-005	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT APPROVAL | PROJMNG. | PROCESS | ELECTR. | INSTR. | PIPING | MECH. | STRUCT. | SIGNAGE | ARCH. | LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN: BY:	JR	06NOV08
CHECK. BY:	DH	06NOV08
APP. BY:	JW	06NOV08

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YUKON
WARDROP | Engineering Inc.

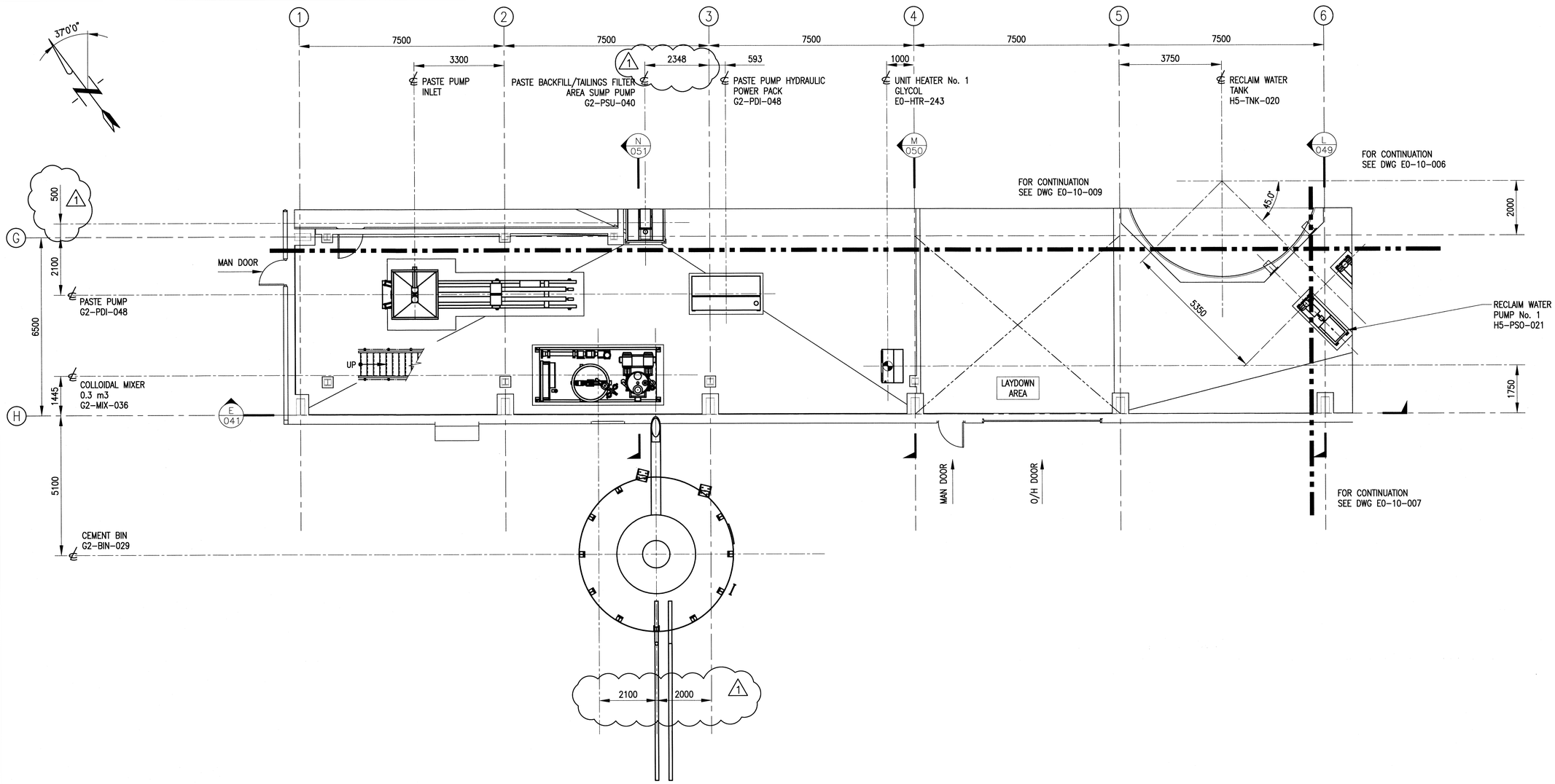
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING GENERAL ARRANGEMENT GROUND FLOOR PLAN SHEET 8 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
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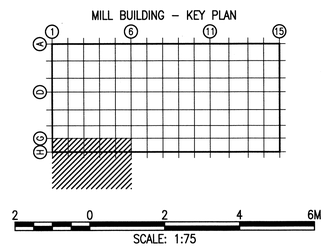
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07/02/02
09/11/05



PLAN
SCALE: 1:75



E0-10-009	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-007	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-006	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN
DWG. NO.	REFERENCE DRAWINGS

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
1	1	REVISED CEMENT BIN AND SUMP LOCATION	22JAN10	JR
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT JM
PROJMAN JM
PROJENG JM
PROCESS JM
ELECTR. JWM
INSTR. JR
PIPING KL
STRUCT.
SERVICES
ARCH. DH
LAYOUT DH

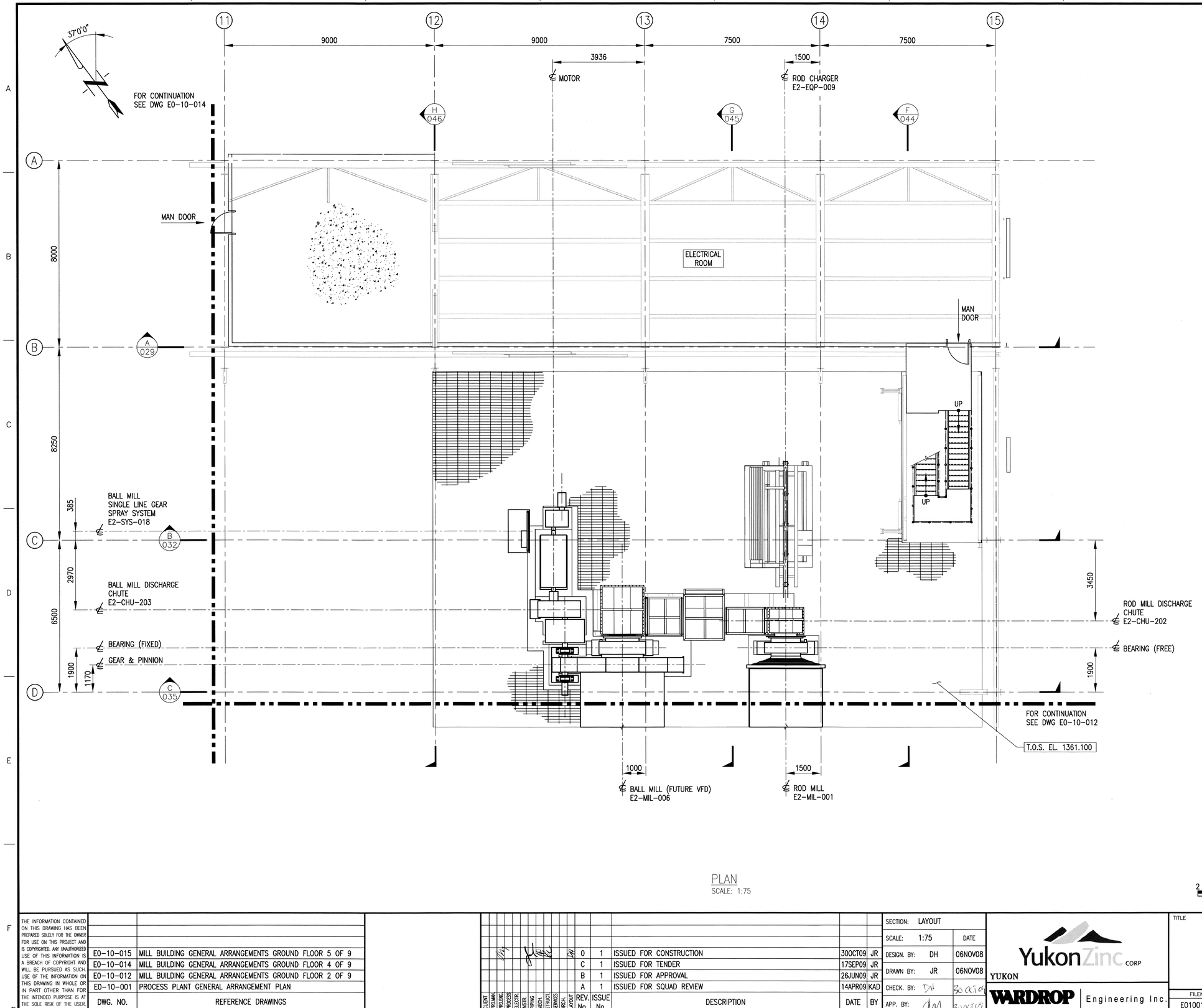
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SCALE:	1:75
DESIGN. BY:	DH 06NOV08
DRAWN BY:	JR 06NOV08
CHECK. BY:	DH 30OCT09
APP. BY:	JM 30OCT09

YukonZinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 9 OF 9

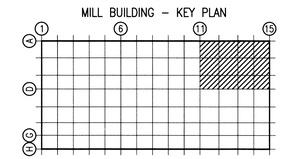
FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010010.DWG	08526302.00	E0-10-010	1

A1
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10/01/22 07:19



PLAN
SCALE: 1:75

MILL BUILDING - KEY PLAN



2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-015	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-014	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-012	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PROJMAN, PROJ.ENG, PROCESS, ELECTR, INSTR., PIPING, MECH., STRUCT, STRMOS, ARCH, LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
C	1	ISSUED FOR TENDER	17SEP09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

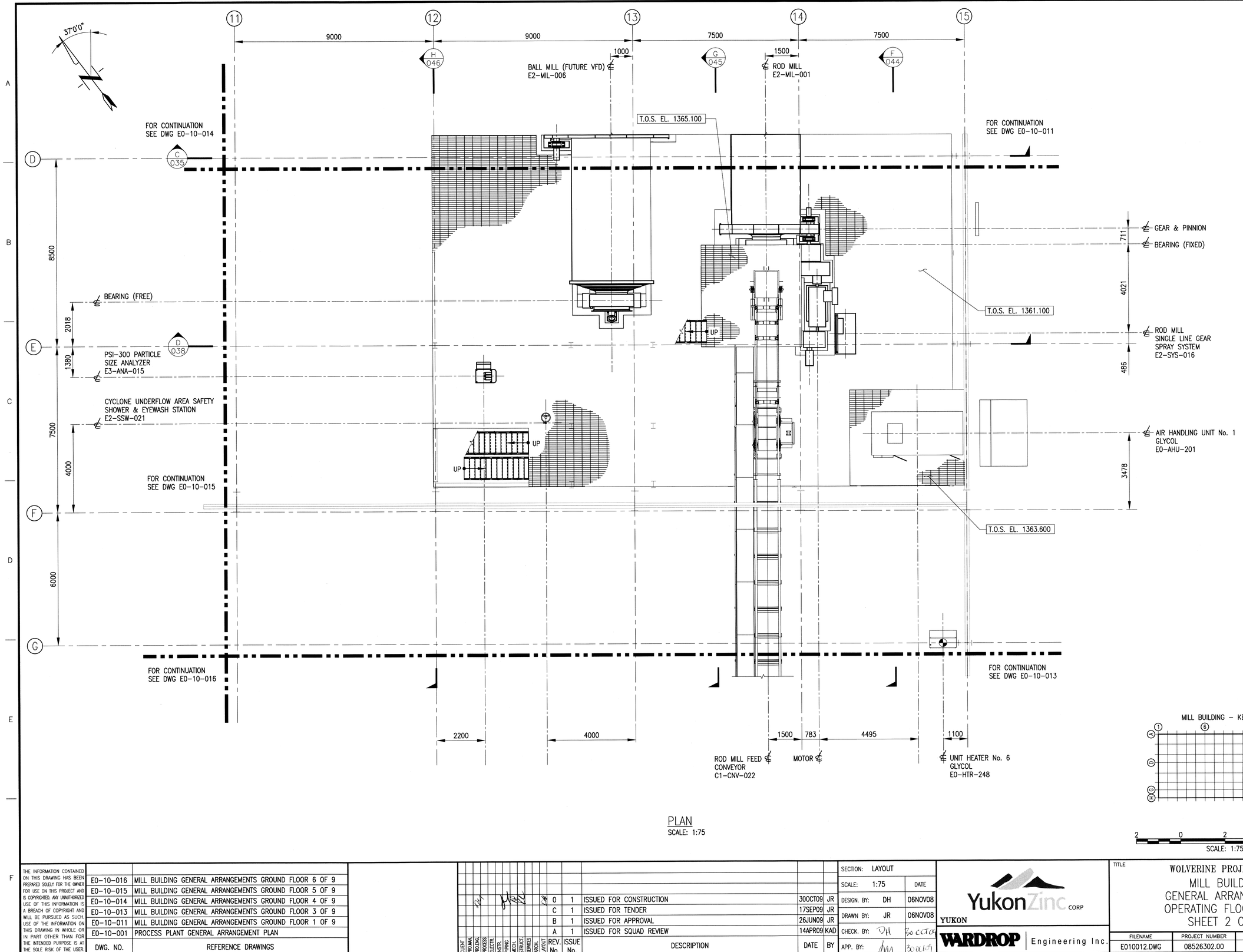
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SCALE:	1:75	
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30OCT09
APP. BY:	JM	30OCT09

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YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
OPERATING FLOOR PLAN
SHEET 1 OF 9

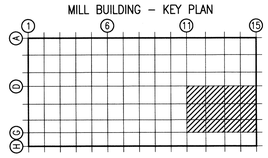
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E010011.DWG	08526302.00	E0-10-011	0

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09/10/30 07:00



PLAN
SCALE: 1:75

MILL BUILDING – KEY PLAN



2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-016	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-015	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-014	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-013	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 3 OF 9
E0-10-011	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 1 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT APPROVAL / PROJ.MNG. / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
C	1	ISSUED FOR TENDER	17SEP09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

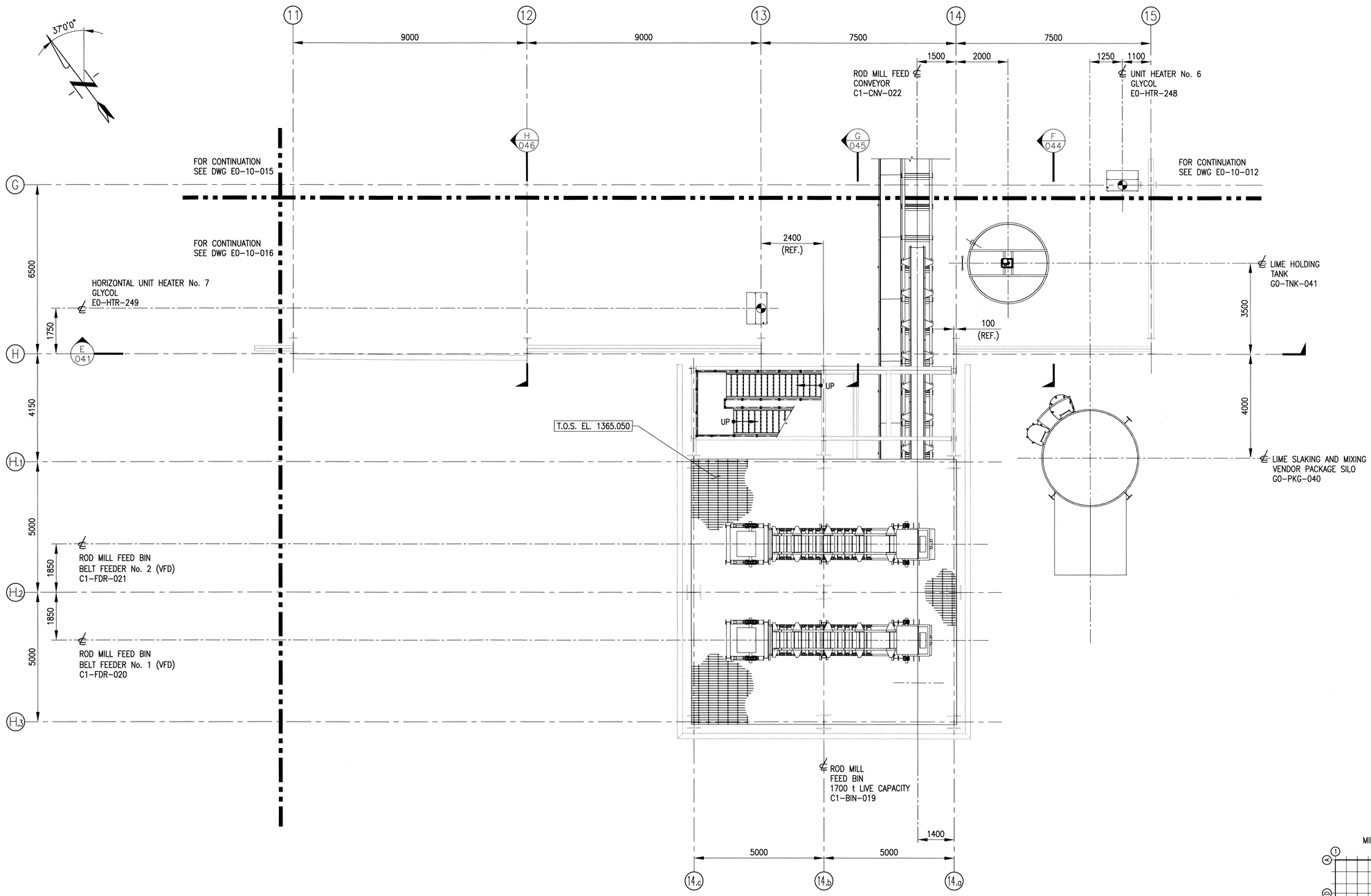
SECTION:	LAYOUT	
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DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:		30 OCT 09

Yukon Zinc CORP
YUKON
WARDROP | Engineering Inc.

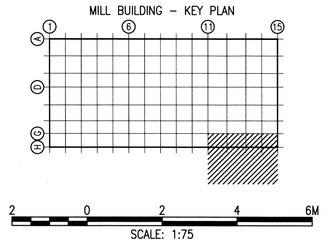
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
OPERATING FLOOR PLAN
SHEET 2 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010012.DWG	08526302.00	E0-10-012	0

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09/10/30 10:06



PLAN
SCALE: 1:75



SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-016	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-015	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-012	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PRO.MAN, PRO.ENG, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

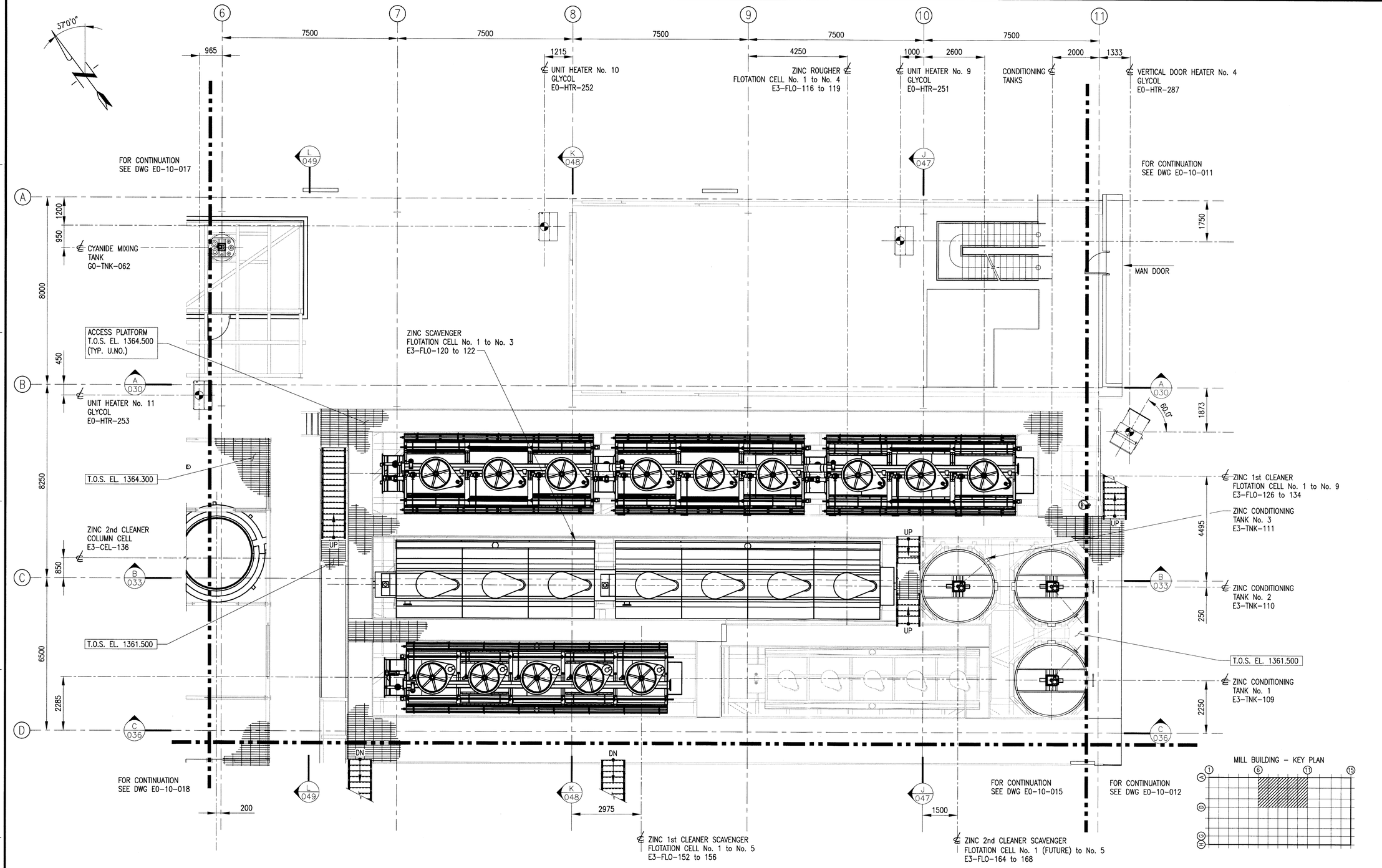
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SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	[illegible]	30 OCT 09

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Yukon Zinc CORP
WARDROP | Engineering Inc.

TITLE.
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
OPERATING FLOOR PLAN
SHEET 3 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010013.DWG	08526302.00	E0-10-013	0

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09/10/30
07:16



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DWG. NO.	REFERENCE DRAWINGS
E0-10-018	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-017	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 7 OF 9
E0-10-015	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-012	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-011	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 1 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PROJMAN, PROLONG, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., STRUCRES, ARCH., LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	[illegible]	[illegible]
APP. BY:	[illegible]	[illegible]

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TITLE

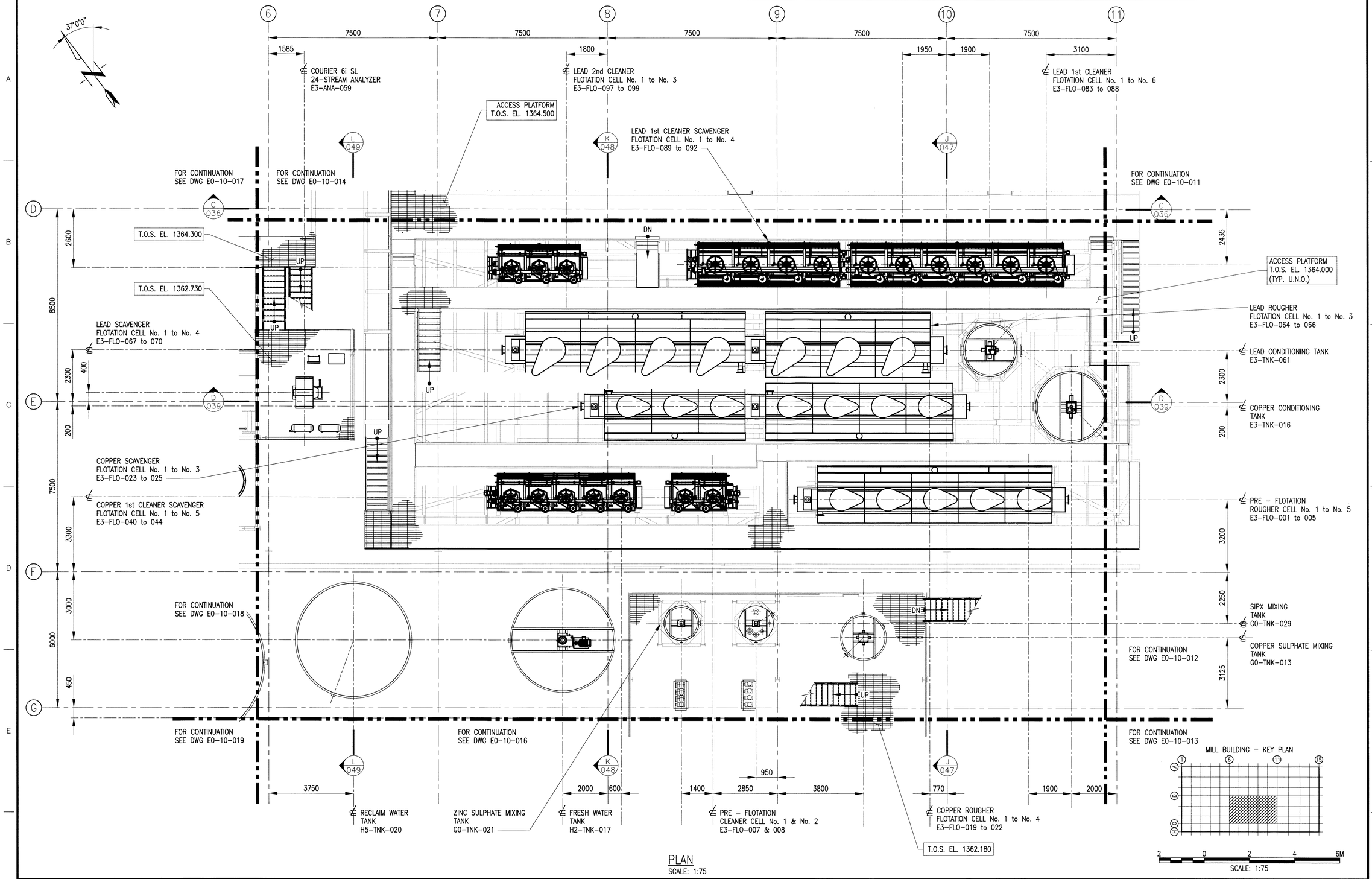
WOLVERINE PROJECT (EP)
MILL BUILDING GENERAL ARRANGEMENT OPERATING FLOOR PLAN SHEET 4 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010014.DWG	08526302.00	E0-10-014	0

A1

G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E010014.DWG

09/11/04 06:48



PLAN

DWG. NO.	REFERENCE DRAWINGS
E0-10-019	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 9 OF 9
E0-10-017/8	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 7/8 OF 9
E0-10-014/6	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4/6 OF 9
E0-10-013	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 3 OF 9
E0-10-012	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-011	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 1 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT APPROVAL / PROJ.MNG. / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

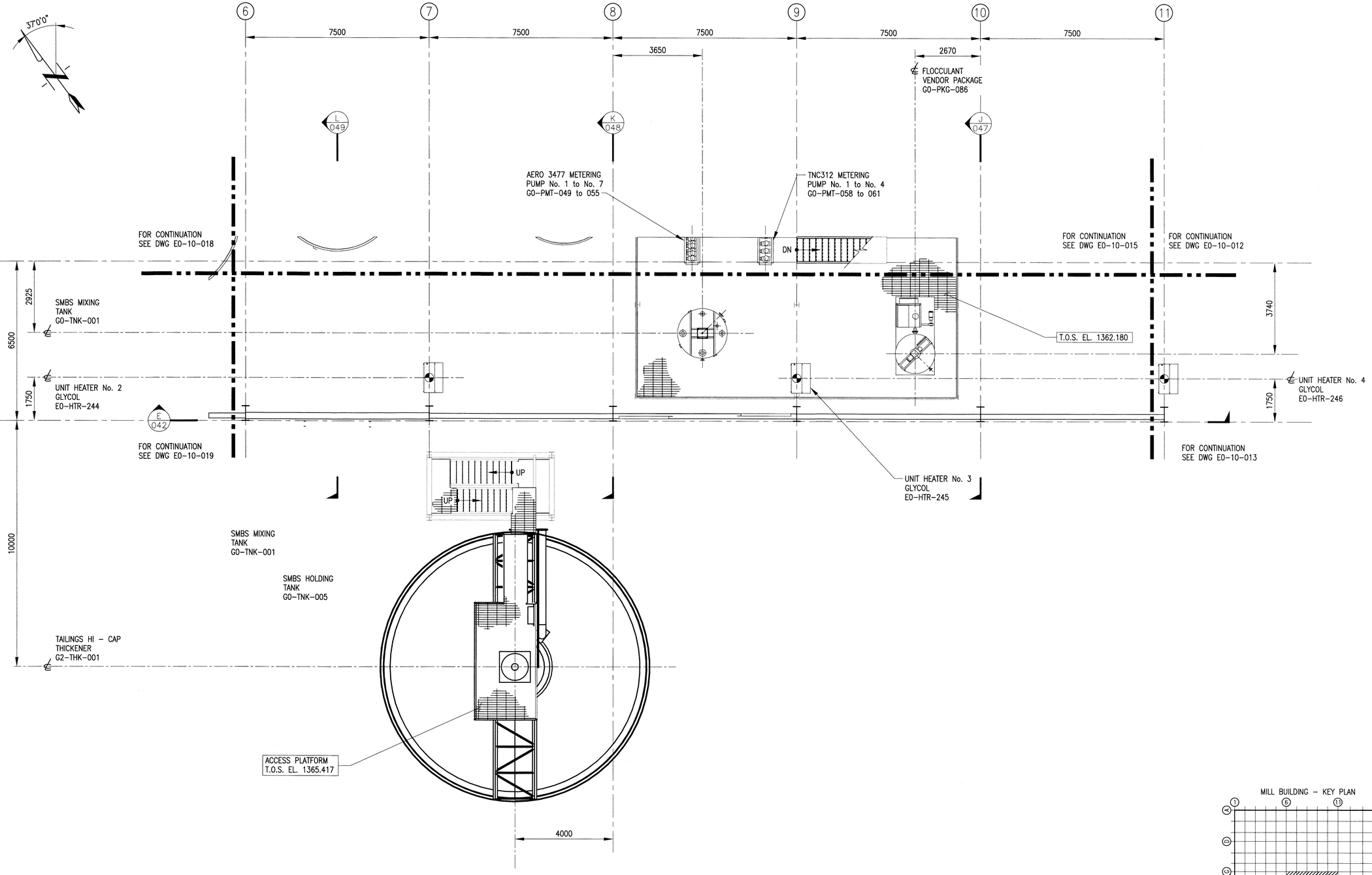
SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	06 NOV 08
APP. BY:		

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YUKON
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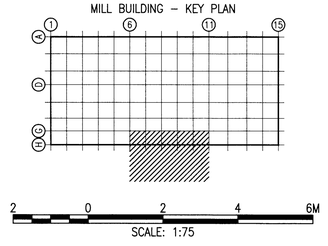
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
OPERATING FLOOR PLAN
SHEET 5 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010015.DWG	08526302.00	E0-10-015	0

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09/11/04 11:26



PLAN
SCALE: 1:75



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DWG. NO.	REFERENCE DRAWINGS
E0-10-019	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 9 OF 9
E0-10-018	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-015	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-013	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 3 OF 9
E0-10-012	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PROJMAN, PROJMG, PROCESS, ELECTR, INSTR., PIPING, MECH., STRUCT, DRAWGS, SURVEY, LAYOUT

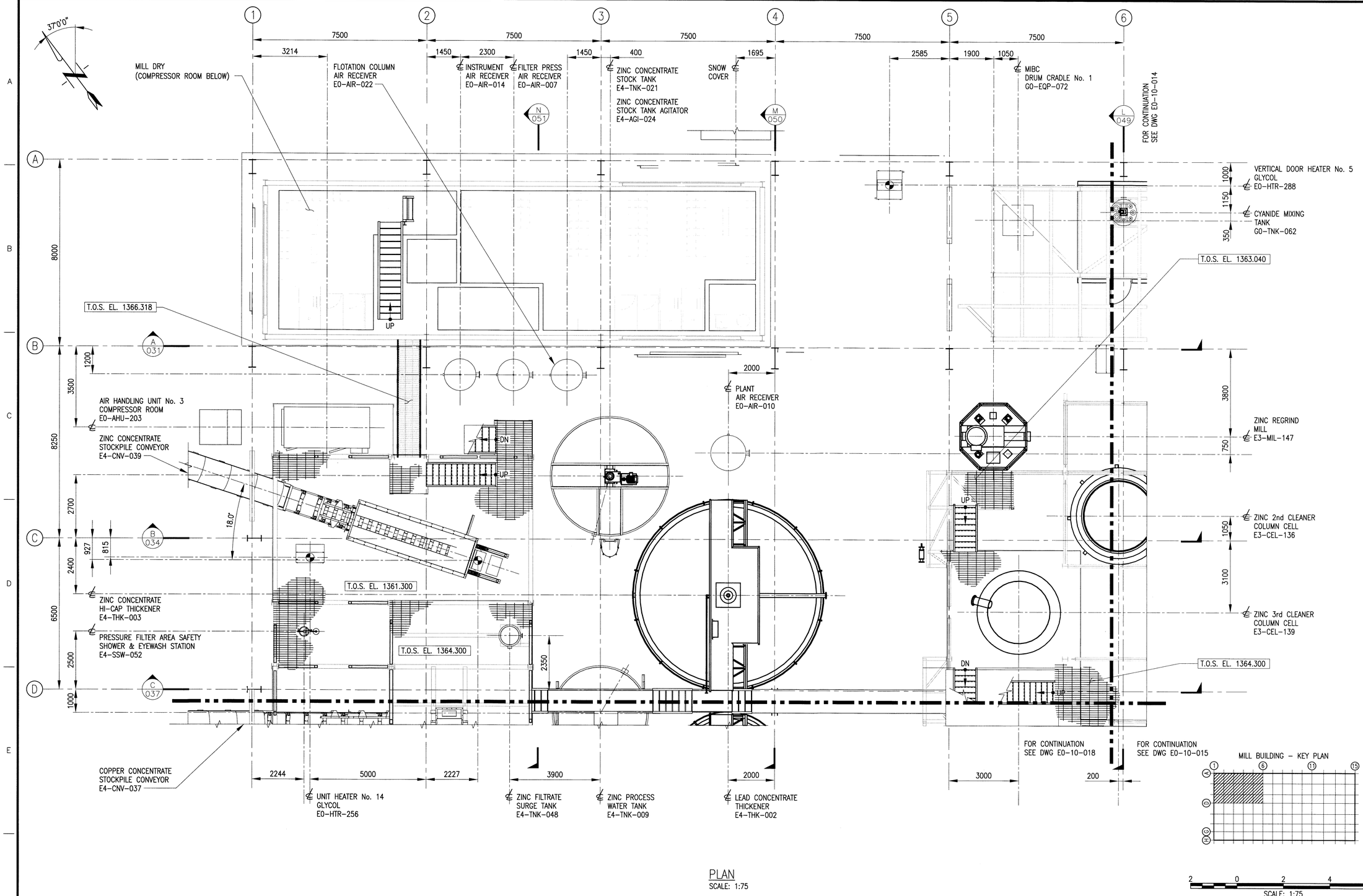
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DESIGN. BY: DH 06NOV08
DRAWN BY: JR 06NOV08
CHECK. BY: DH 30 oct 09
APP. BY: JM 30/10/09

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YUKON
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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
OPERATING FLOOR PLAN
SHEET 6 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010016.DWG	08526302.00	E0-10-016	0

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09/11/04 12:59



PLAN
SCALE: 1:75

SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-018	MILL BUILDING GENERAL ARRANGEMENTS OPERATING FLOOR 8 OF 9
E0-10-015	MILL BUILDING GENERAL ARRANGEMENTS OPERATING FLOOR 5 OF 9
E0-10-014	MILL BUILDING GENERAL ARRANGEMENTS OPERATING FLOOR 4 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PROJMAN, PROLDNG, PROCESS, ELECTR, INSTR, PIPING, MECH, STRUCT, STRMSES, ARCH, LAYOUT

SECTION: LAYOUT
SCALE: 1:75 DATE
DESIGN. BY: DH 06NOV08
DRAWN BY: JR 06NOV08
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APP. BY: DH

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YUKON
WARDROP Engineering Inc.

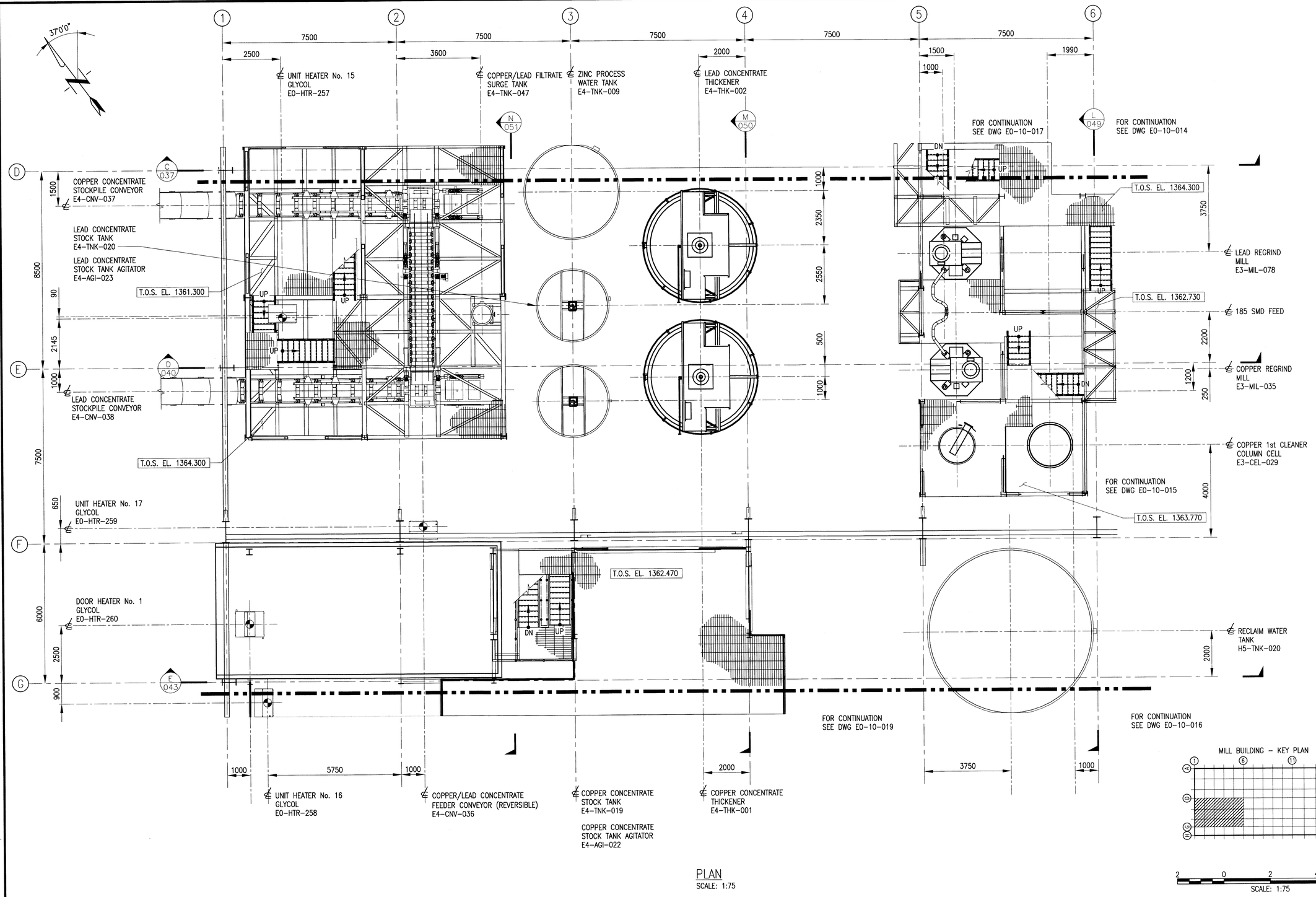
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WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
OPERATING FLOOR PLAN
SHEET 7 OF 9

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
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09/09/15 15:32

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PLAN
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-019	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 9 OF 9
E0-10-017	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 7 OF 9
E0-10-016	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-015	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-014	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT | PROJMAN | PROCESS | ELECTR. | INSTR. | PIPING | MECH. | STRUCT. | SERVICES | ARCH. | LAYOUT

SECTION:	LAYOUT
SCALE:	1:75
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DRAWN BY:	JR 06NOV08
CHECK. BY:	DH
APP. BY:	

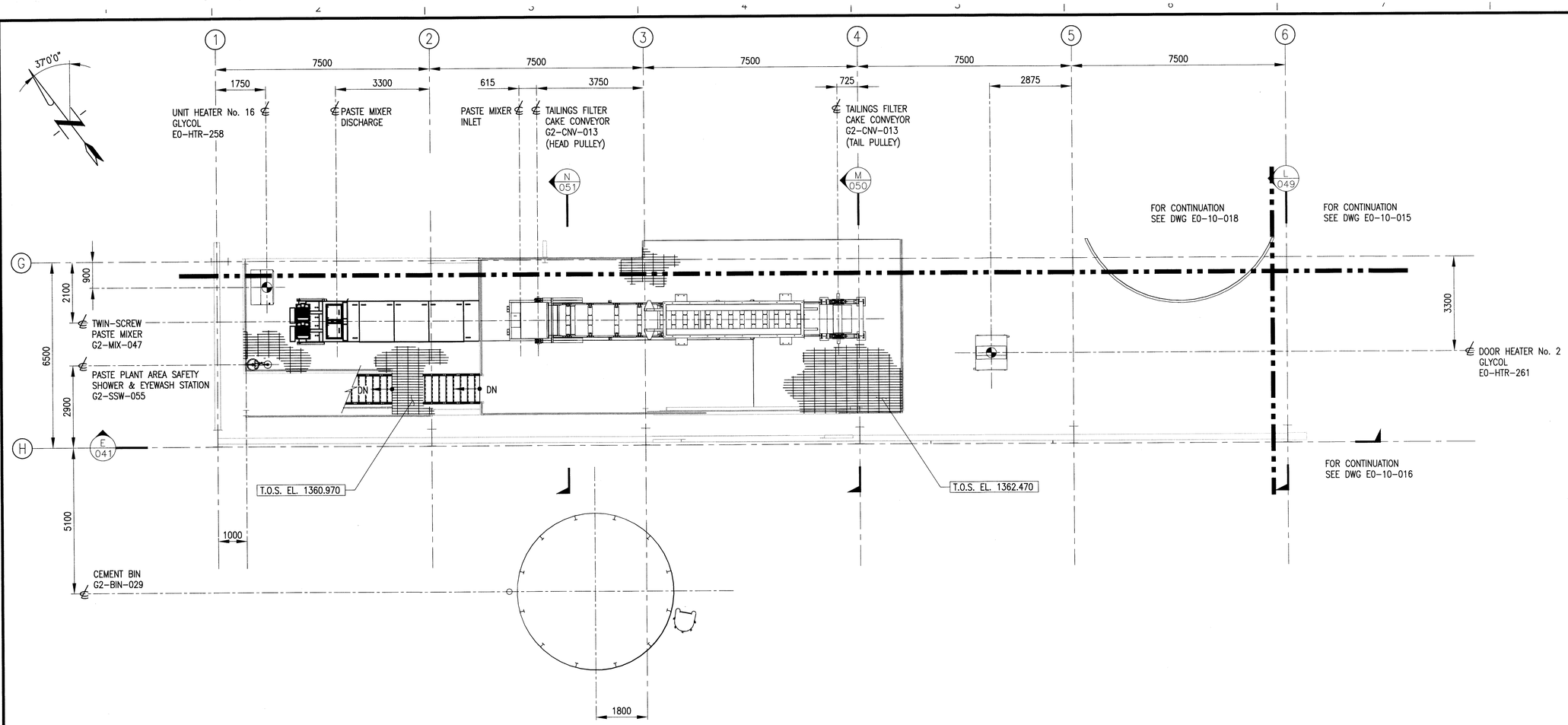
DATE

Yukon Zinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
OPERATING FLOOR PLAN
SHEET 8 OF 9

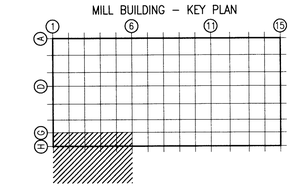
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08:04
09/11/05



PLAN
SCALE: 1:75

MILL BUILDING – KEY PLAN



2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-018	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-016	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-015	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PROJ.MANA., PROJ.ENG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

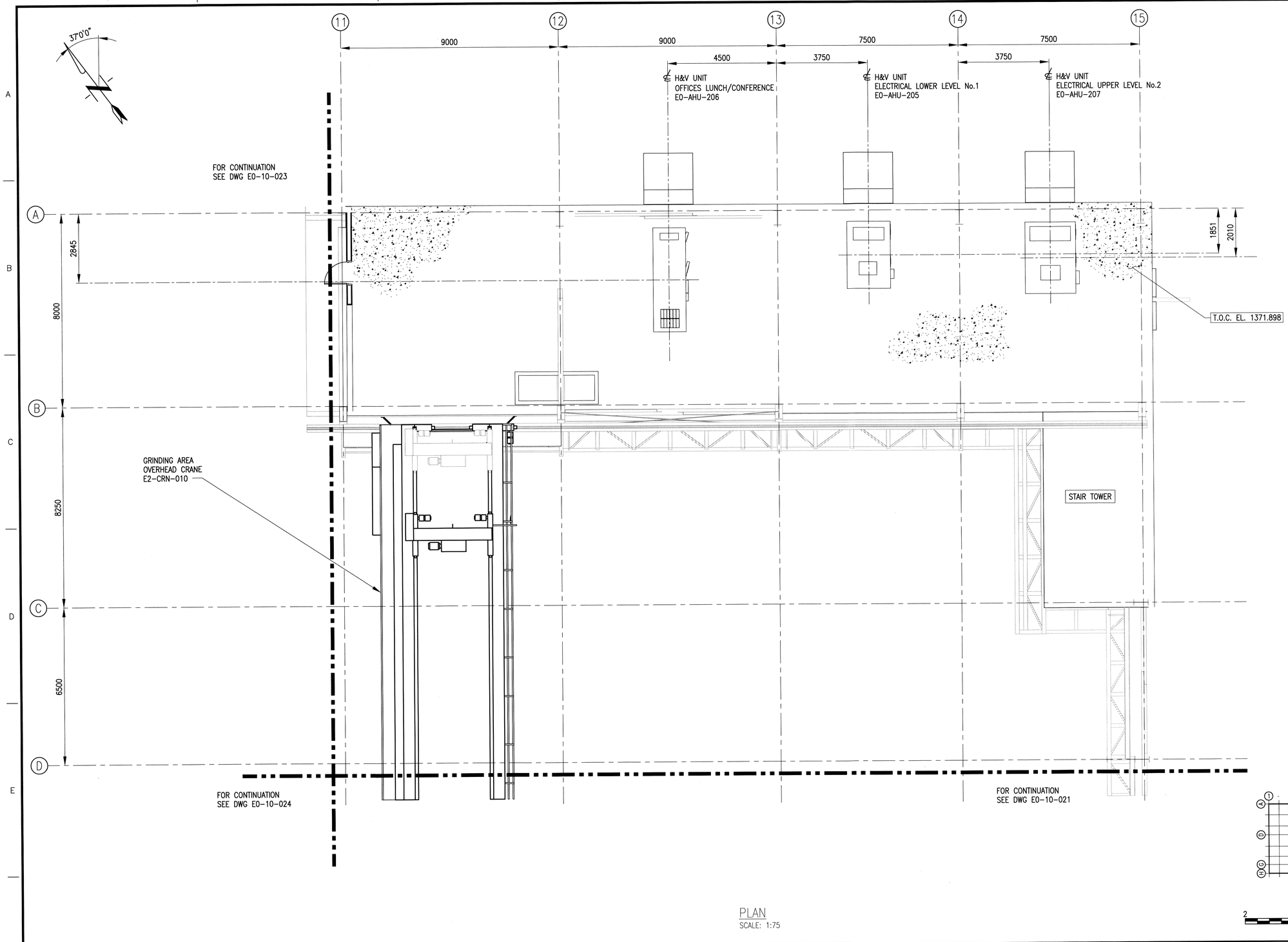
SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 oct 09
APP. BY:	JW	30 oct 09

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YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
OPERATING FLOOR PLAN
SHEET 9 OF 9

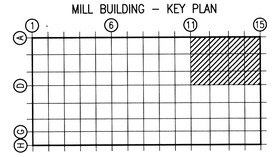
FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010019.DWG	08526302.00	E0-10-019	0

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09/11/05 08:24



PLAN
SCALE: 1:75

MILL BUILDING - KEY PLAN



2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-024	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-023	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-021	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT / PROJMAN / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT / SERVICES / ARCH. / LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
C	1	ISSUED FOR TENDER	17SEP09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

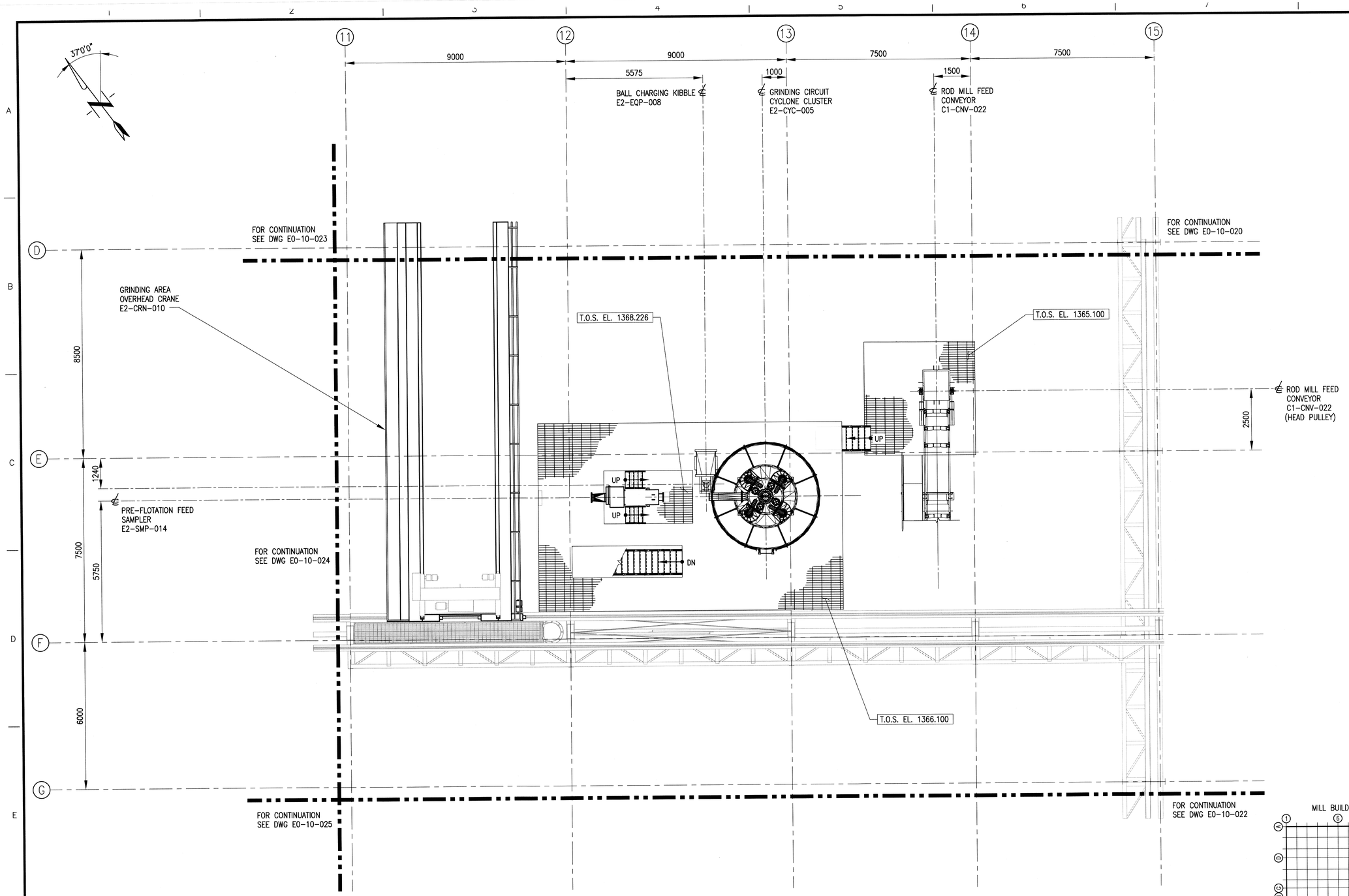
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SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	JM	30OCT09

Yukon Zinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
UPPER FLOOR PLAN
SHEET 1 OF 7

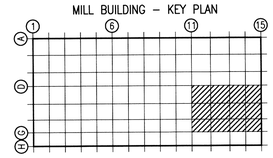
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E010020.DWG	08526302.00	E0-10-020	0

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09/10/30 07:19



PLAN
SCALE: 1:75

MILL BUILDING – KEY PLAN



2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-025	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-024	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-023	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-022	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 3 OF 9
E0-10-020	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 1 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PROJMAN, PROJENG, PROCESS, ELECTRL, MINING, PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
C	1	ISSUED FOR TENDER	17SEP09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

		DATE
SECTION:	LAYOUT	
SCALE:	1:75	
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	JM	30 OCT 09

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
UPPER FLOOR PLAN
SHEET 2 OF 7

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010021.DWG	08526302.00	E0-10-021	0

08/10/30

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37°0'0"

11 12 13 14 15

9000 9000 7500 7500

3905

1350

DOOR HEATER No. 3
GLYCOL
E0-HTR-262

ROD MILL FEED BIN
DUST COLLECTOR
C1-COL-251

FOR CONTINUATION
SEE DWG E0-10-024

FOR CONTINUATION
SEE DWG E0-10-021

G

6500

3000

H

2400
(REF.)

ROD MILL
FEED BIN
C1-BIN-019

100
(REF.)

FOR CONTINUATION
SEE DWG E0-10-025

UP

UP

4150

H.1

5000

2000

ROD MILL FEED BIN
BELT FEEDER No. 2 (VFD)
FEED CHUTE
C1-FDR-021

1850

H.2

5000

1850

ROD MILL FEED BIN
BELT FEEDER No. 1 (VFD)
FEED CHUTE
C1-FDR-020

H.3

5000 5000

14.c 14.b 14.a

PLAN
SCALE: 1:75

MILL BUILDING - KEY PLAN

1 6 11 15

K G C

2 0 2 4 6M

SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-025	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-024	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-021	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT PROJMNG PROCESS ELECTR. INSTR. PIPING MECH. STRUCT. SERVICES ARCH. LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
C	1	ISSUED FOR TENDER	17SEP09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

		DATE
SECTION:	LAYOUT	
SCALE:	1:75	
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	DM	30 OCT 09

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TITLE

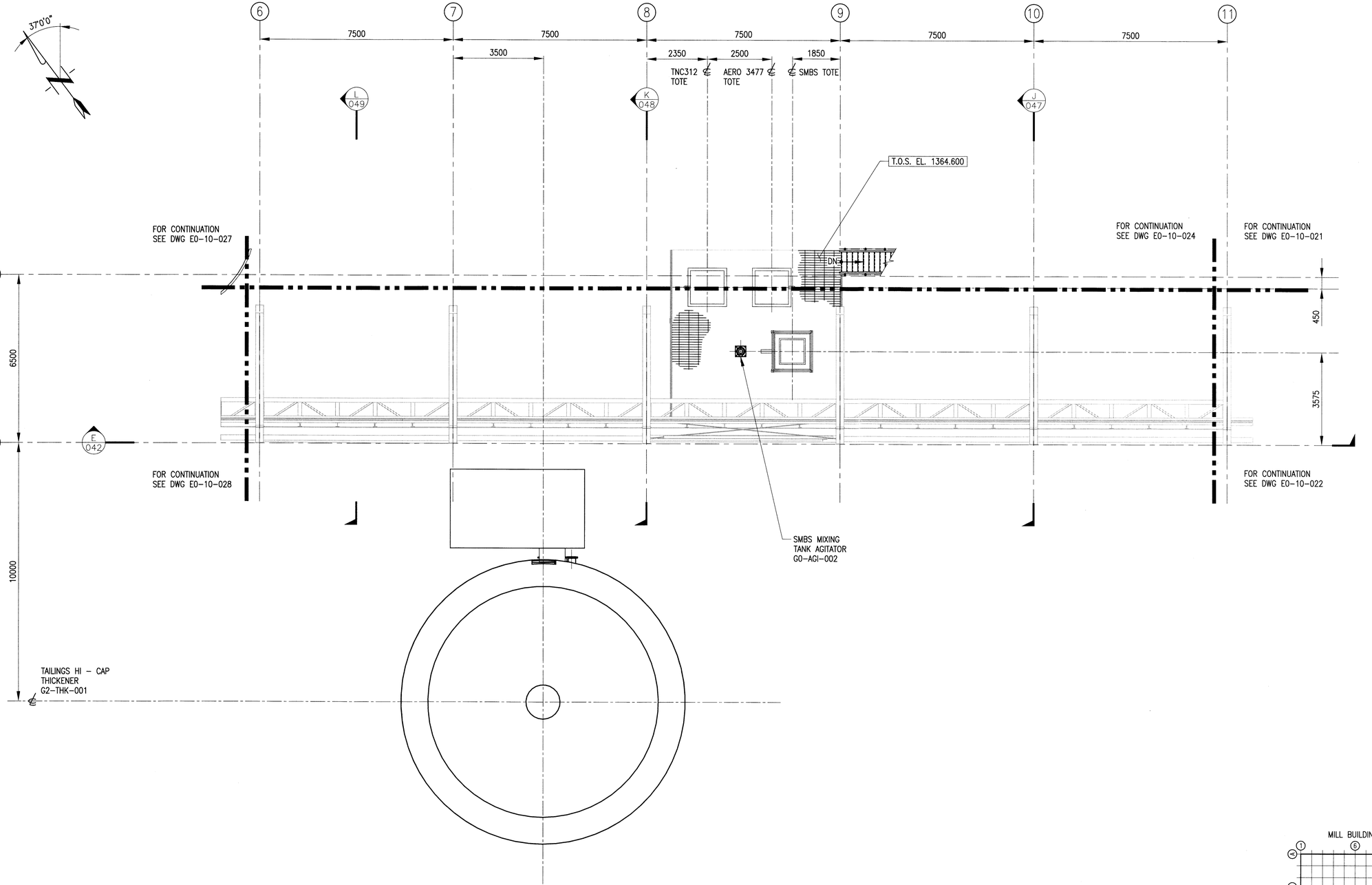
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
UPPER FLOOR PLAN
SHEET 3 OF 7

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
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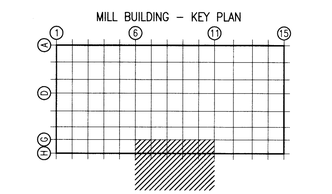
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09/10/30 08:21



PLAN
SCALE: 1:75



SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-028	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 9 OF 9
E0-10-027	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-024	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-022	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 3 OF 9
E0-10-021	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 2 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PROJMGR, PROJ.ENG, PROCESS, ELECTR, INSTR, PIPING, MECH, STRUCT, SERVICES, ARCH, LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION: LAYOUT

		DATE
SCALE:	1:75	
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	DM	30 OCT 09

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YUKON

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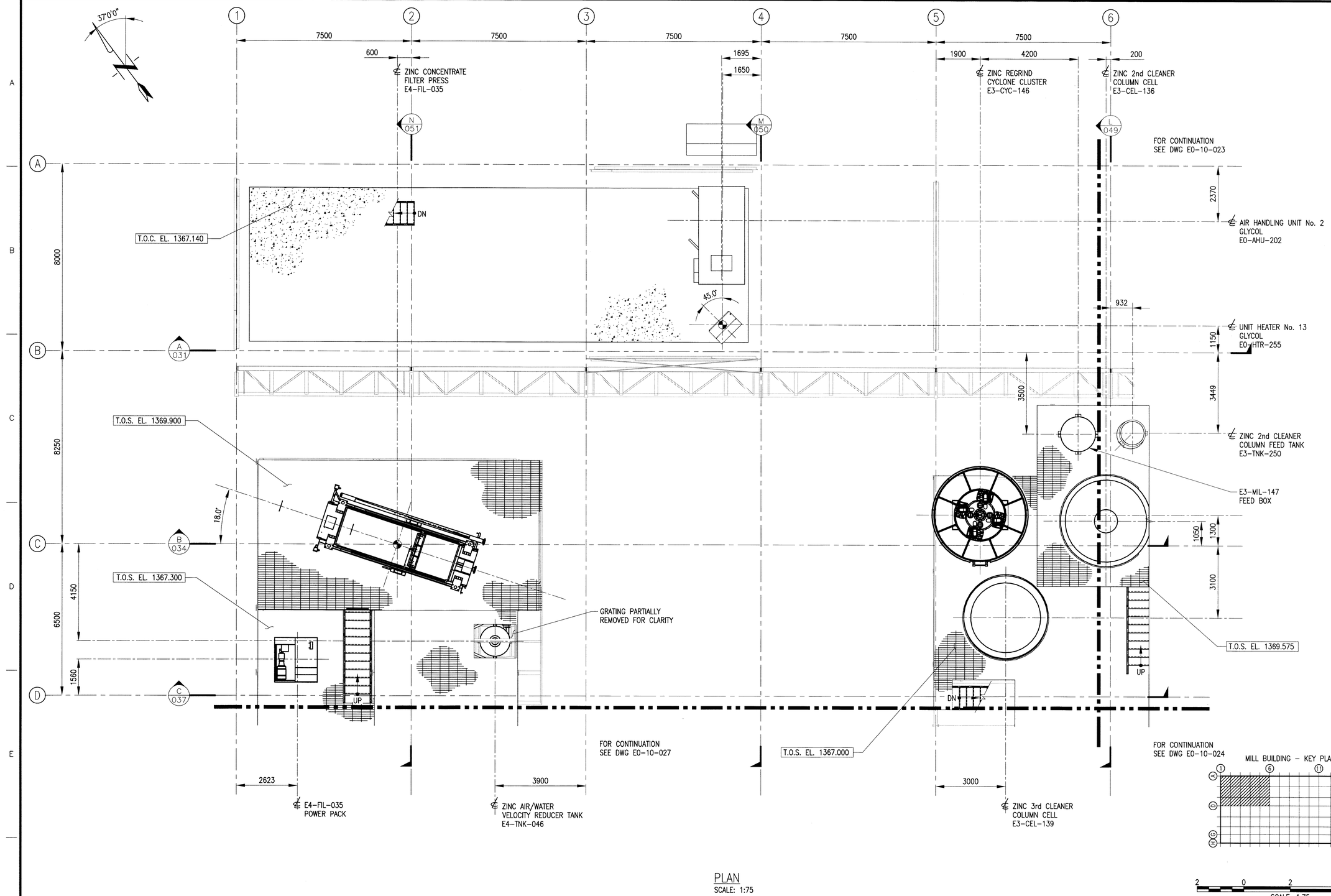
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
UPPER FLOOR PLAN
SHEET 4 OF 7

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010025.DWG	08526302.00	E0-10-025	0

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09/11/05 08:29



PLAN
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-027	MILL BUILDING GENERAL ARRANGEMENTS OPERATING FLOOR 8 OF 9
E0-10-024	MILL BUILDING GENERAL ARRANGEMENTS OPERATING FLOOR 5 OF 9
E0-10-023	MILL BUILDING GENERAL ARRANGEMENTS OPERATING FLOOR 4 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT	PROJMAN	PROJ.ENG.	PROCESS	ELECTR.	INSTR.	PIPING	MECH.	STRUCT.	DRAWN	ARCH	LAYOUT	REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
												0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
												B	1	ISSUED FOR TENDER	17SEP09	JR
												A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
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DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	2009/11/09
APP. BY:	DW	2009/11/09

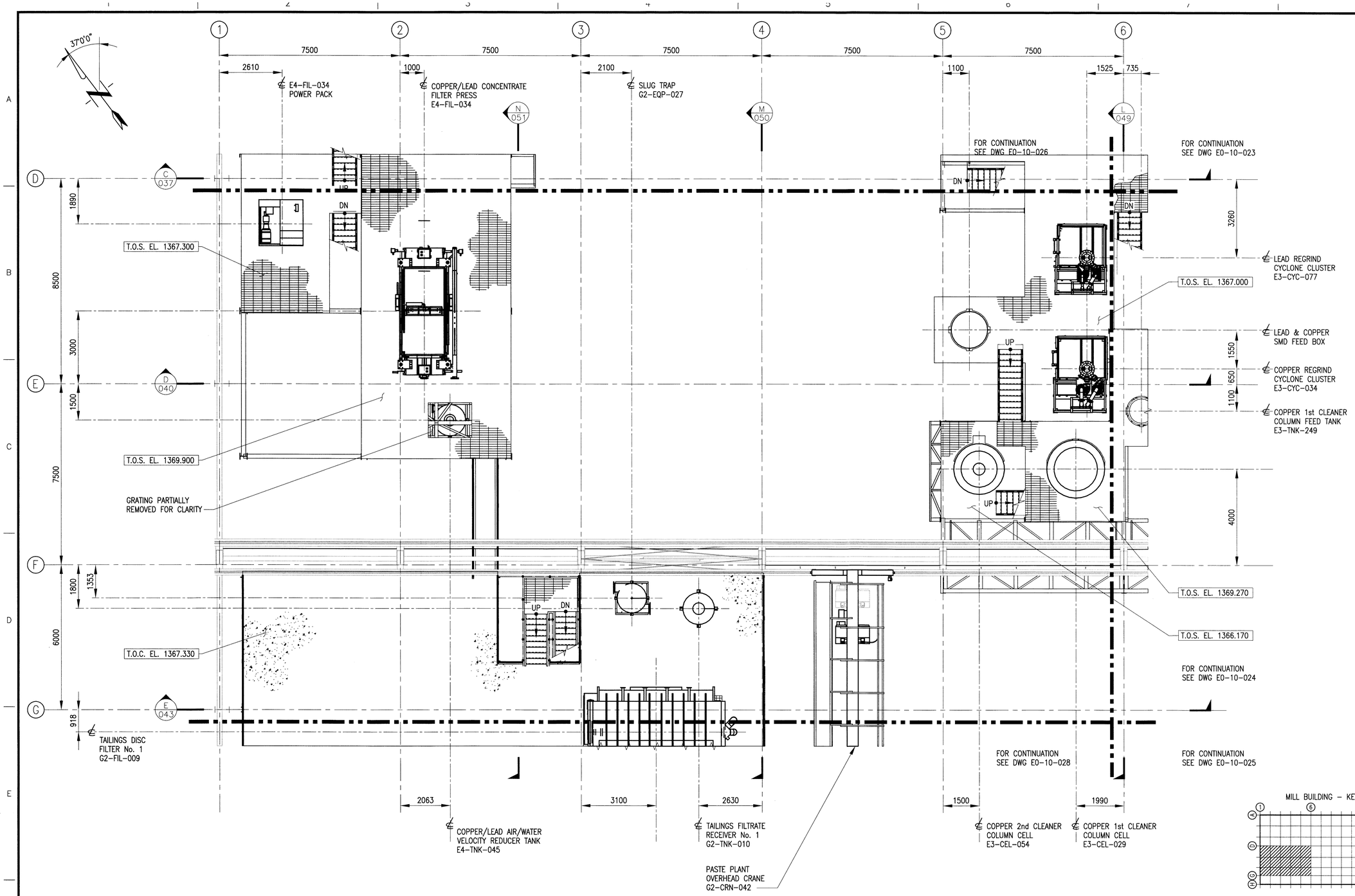
YukonZinc CORP
YUKON

WARDROP | Engineering Inc.

TITLE.
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
UPPER FLOOR PLAN
SHEET 5 OF 7

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010026.DWG	08526302.00	E0-10-026	0

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09/11/05
09:17



PLAN
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-028	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 9 OF 9
E0-10-026	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 7 OF 9
E0-10-025	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-024	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-023	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 4 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PROJMAN, PROJ.ENG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., STRUCT., ARCH., LAYOUT

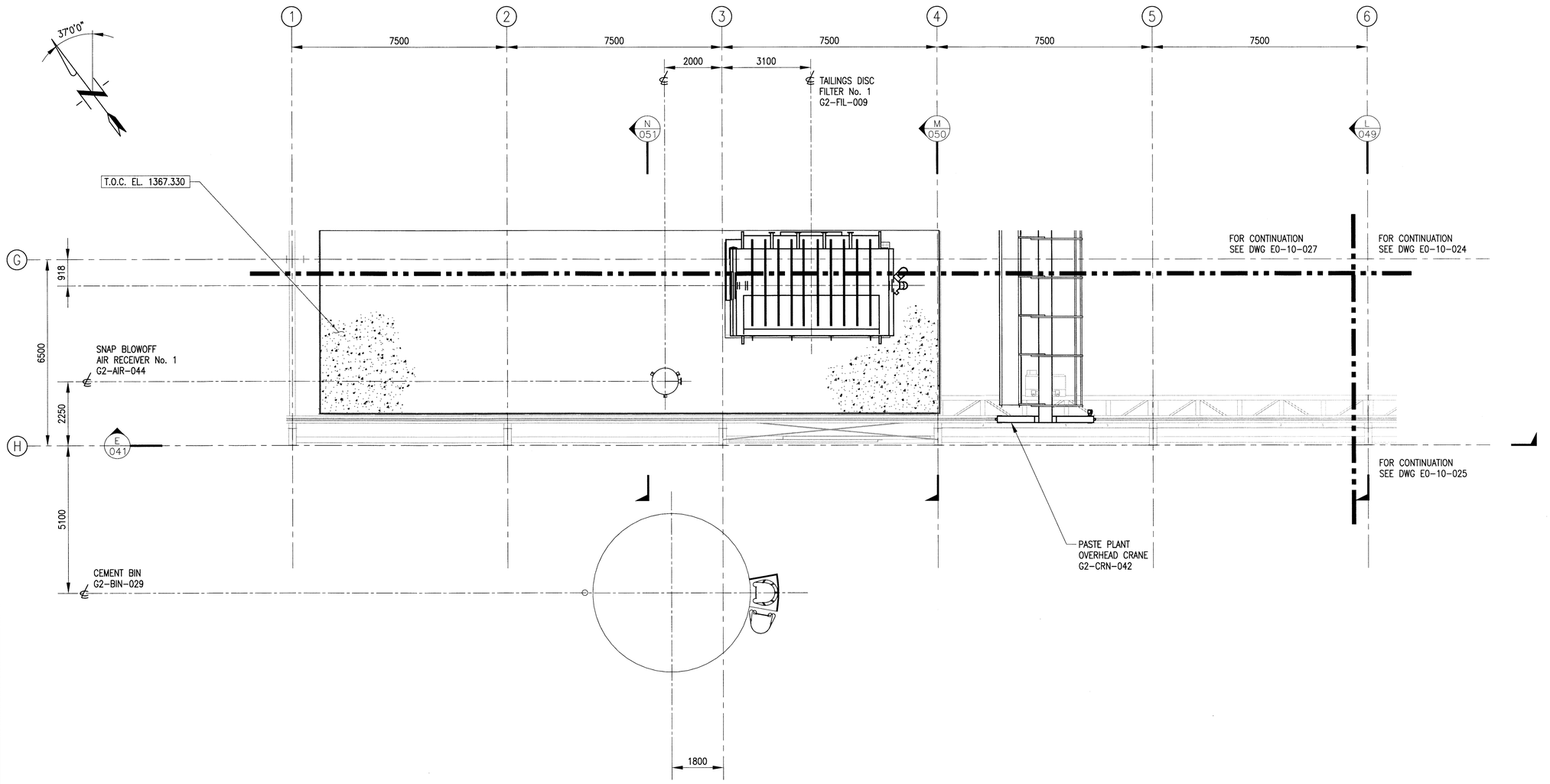
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DESIGN. BY: DH 06NOV08
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CHECK. BY: DH
APP. BY: DW

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
UPPER FLOOR PLAN
SHEET 6 OF 7

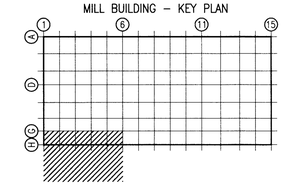
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09/11/05 13:13



PLAN
SCALE: 1:75

MILL BUILDING – KEY PLAN



2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-027	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 8 OF 9
E0-10-025	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 6 OF 9
E0-10-024	MILL BUILDING GENERAL ARRANGEMENTS GROUND FLOOR 5 OF 9
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PROJMN, PROJDIG, PROCESS, ELECTR, INSTR, PIPING, MECH, STRUCT, SERVICES, ARCH, LAYOUT

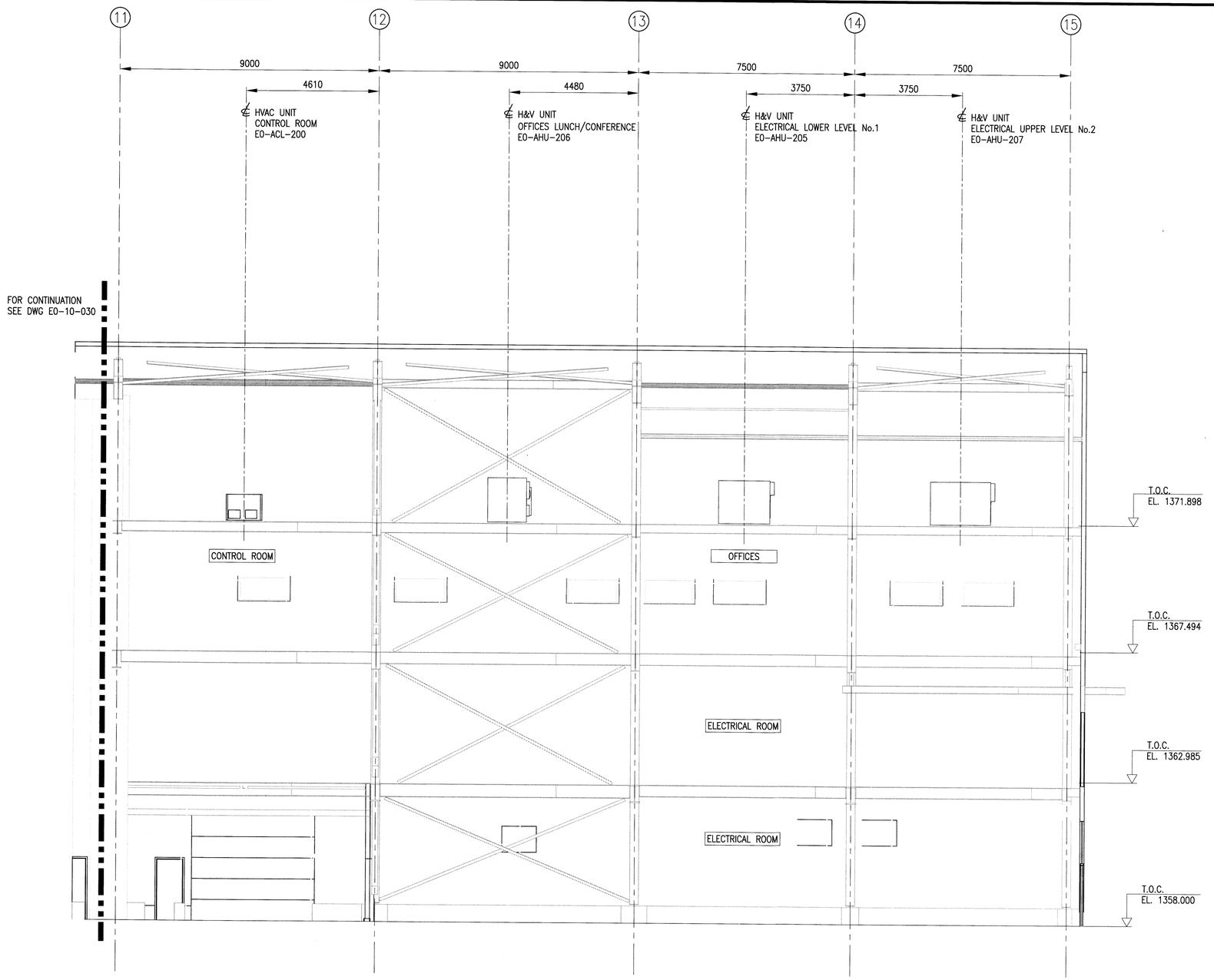
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SCALE:	1:75	
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT. 09
APP. BY:		

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
UPPER FLOOR PLAN
SHEET 7 OF 7

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010028.DWG	08526302.00	E0-10-028	0

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09/11/05 13:23



SECTION A 001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	E0-10-001
REFERENCE DRAWINGS	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PRO.MAN., PRO.ENG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

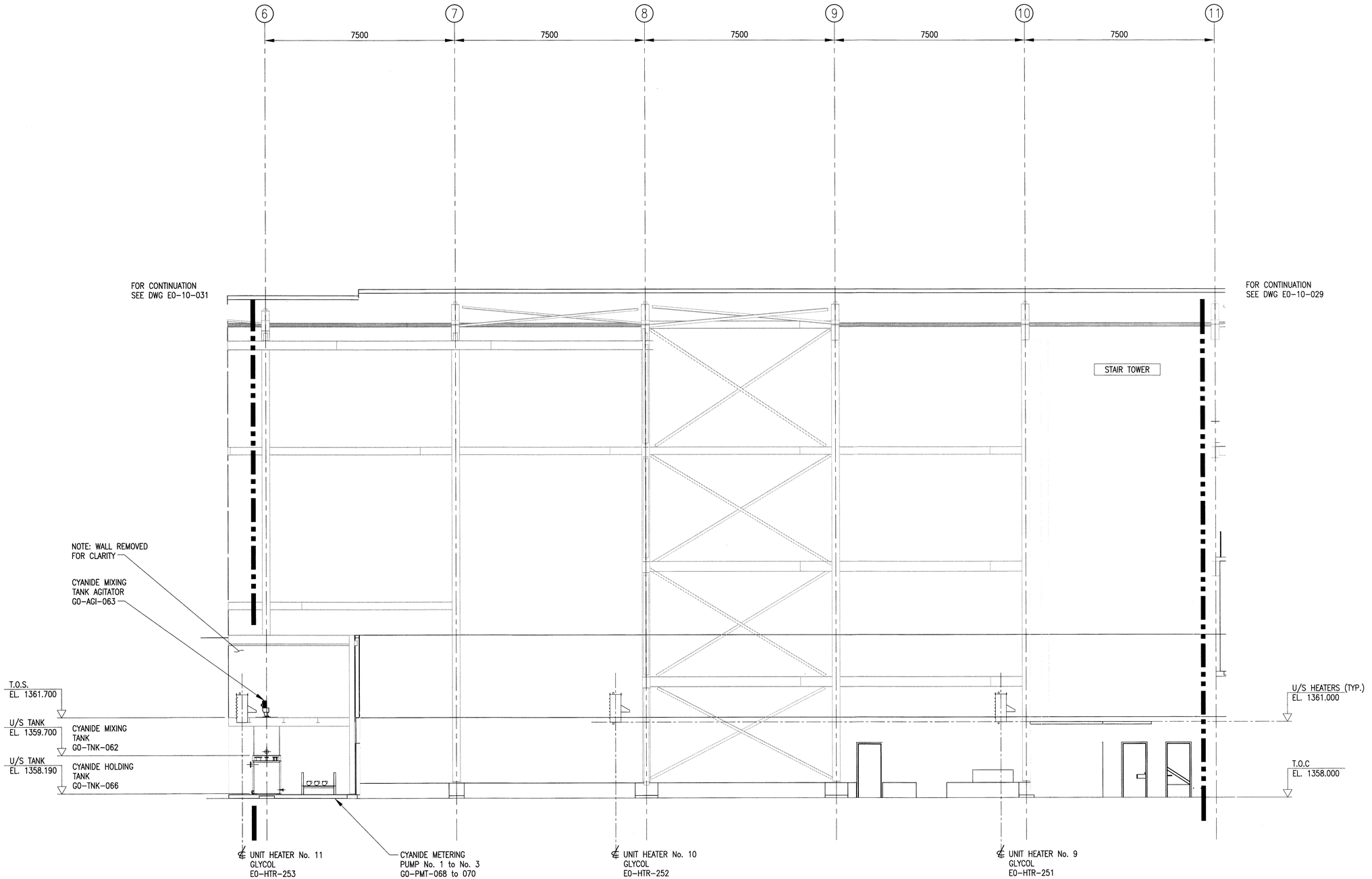
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CHECK. BY:	DH	30.11.09
APP. BY:	dm	3.12.09

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION A
SHEET 1 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010029.DWG	08526302.00	E0-10-029	0

A1
G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E010029.DWG
09/11/05
1343



SECTION A/001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, OWNER, PROJ.MNG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
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APP. BY:	JM	09NOV08

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YUKON
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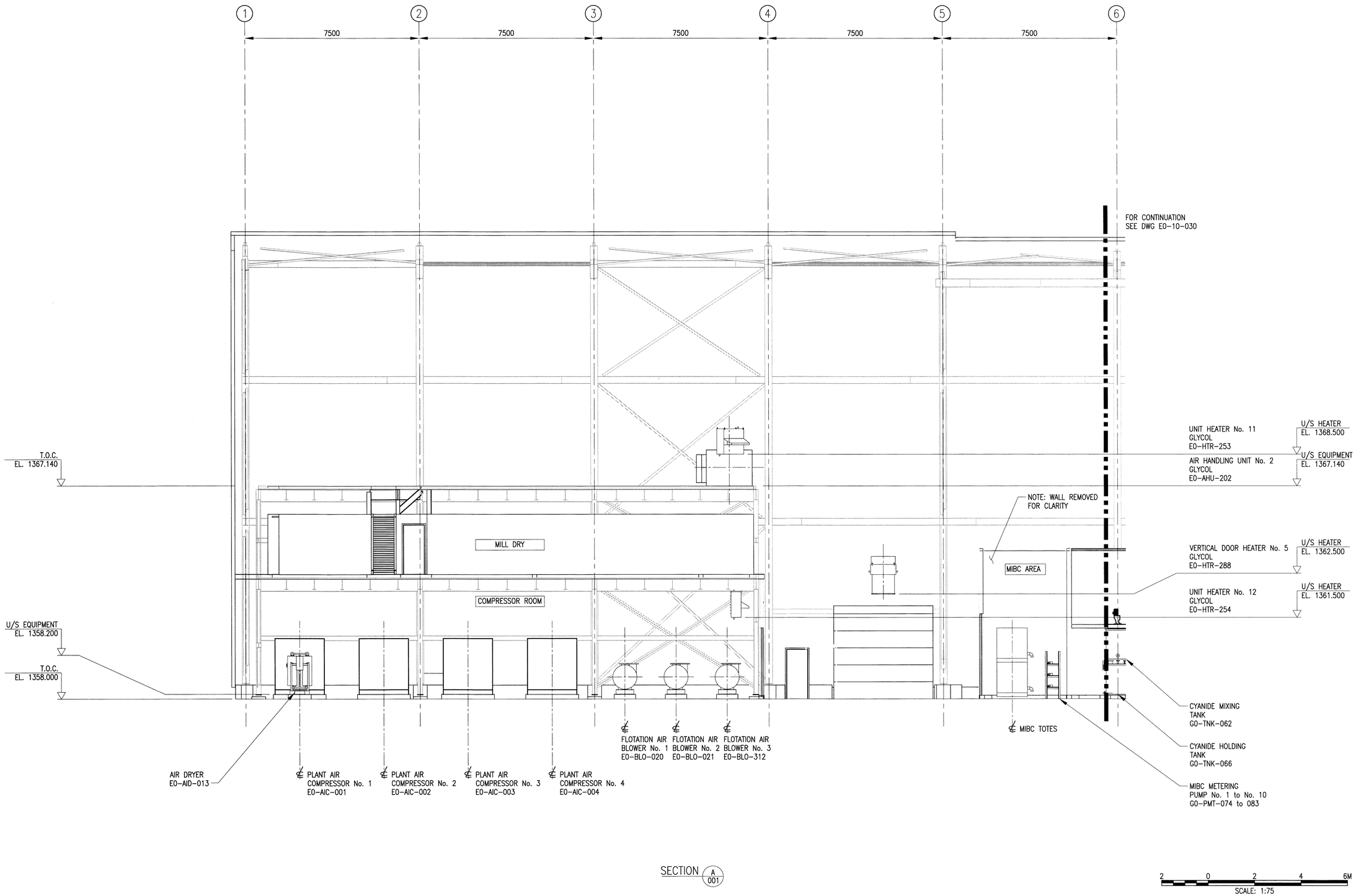
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION A
SHEET 2 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010030.DWG	08526302.00	E0-10-030	0

09/11/05 14:45

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SECTION A 001

2 0 2 4 6M

SCALE: 1:75

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E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN
DWG. NO.	REFERENCE DRAWINGS

CLIENT, PROJMAN, PROJENG, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., DRAWING, APPROV., LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30OCT09
APP. BY:		

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YUKON

WARDROP Engineering Inc.

TITLE

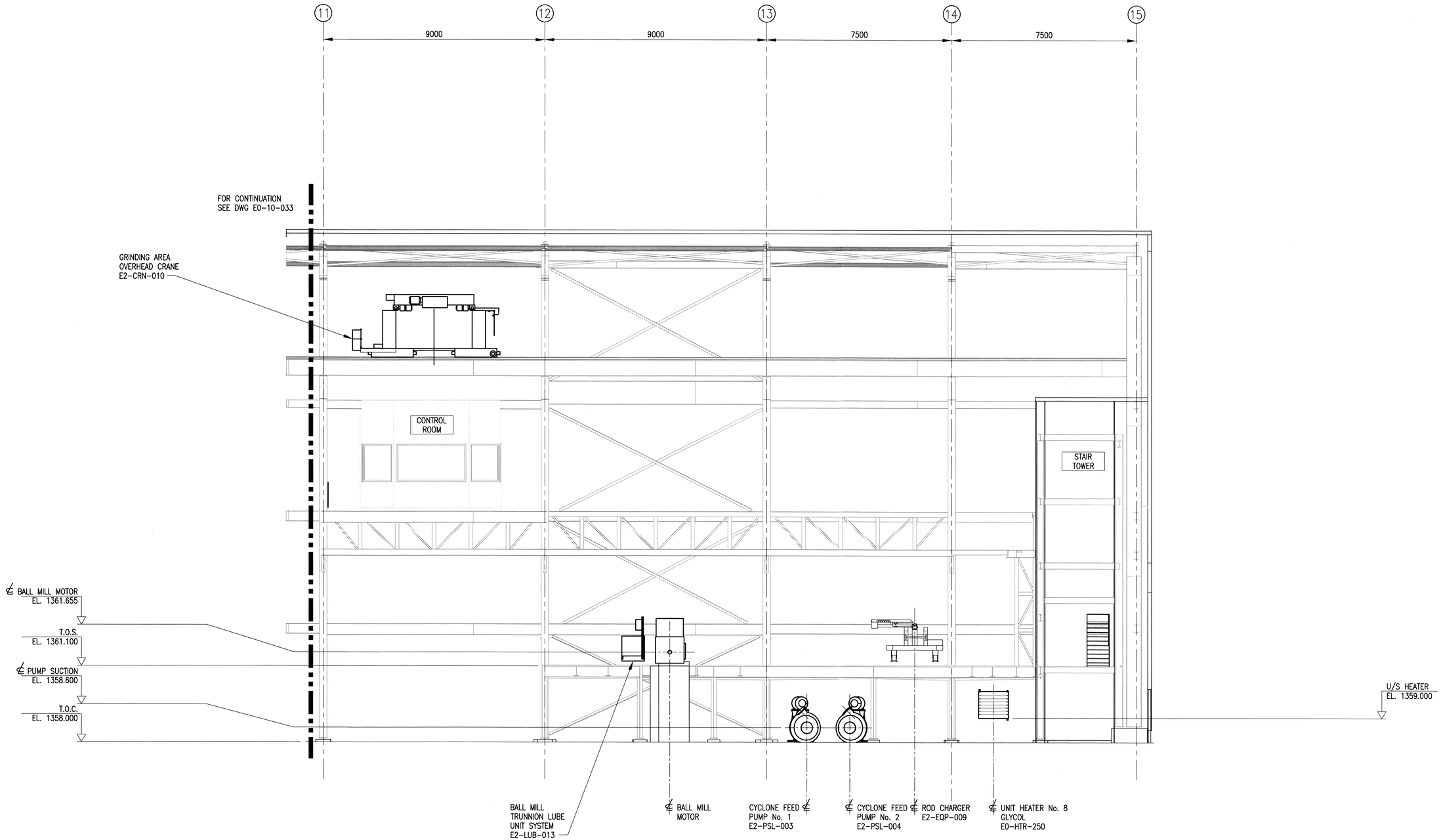
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION A
SHEET 3 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010031.DWG	08526302.00	E0-10-031	0

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09/11/05 15:35



SECTION B 001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

CLIENT, PRO.MAN., PRO.ENG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., STRUCES, ARCH., LAYOUT

SECTION:	LAYOUT
SCALE:	1:75
DESIGN. BY:	DH 06NOV08
DRAWN BY:	JR 06NOV08
CHECK. BY:	DH 30 OCT 09
APP. BY:	JM 300CT09

DATE

YukonZinc CORP
YUKON
WARDROP Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION B
SHEET 1 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010032.DWG	08526302.00	E0-10-032	0

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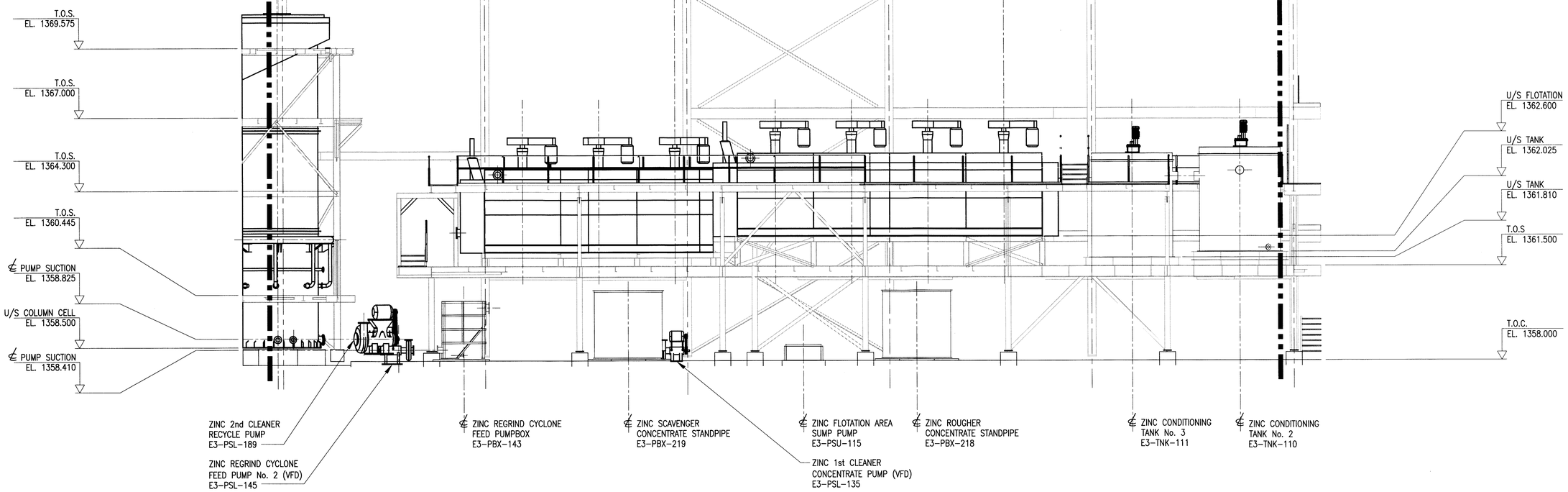
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COLUMN CELL
E3-CEL-136

℄ ZINC SCAVENGER
FLOTATION CELL No. 1 to No. 3
3 @ 16.0 m3
E3-FLO-120 to 122

℄ ZINC ROUGHER
FLOTATION CELL No. 1 to No. 4
E3-FLO-116 to 119

FOR CONTINUATION
SEE DWG E0-10-034

FOR CONTINUATION
SEE DWG E0-10-032



SECTION B/001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT, PREL.MIN, PROJ.ENG, PROCESS, ELECTR, INSTR, PIPING, MECH, STRUCT, SERVICES, ARCH, LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN: BY:	JR	06NOV08
CHECK. BY:	DH	2008.11.07
APP. BY:	DM	2008.11.07

YUKON Yukon Zinc CORP

WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION B
SHEET 2 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010033.DWG	08526302.00	E0-10-033	0

A1

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09/11/06 18:36

1 2 3 4 5 6

7500 7500 7500 7500 7500

AIR HANDLING UNIT No. 3
COMPRESSOR ROOM
E0-AHU-203

INSTRUMENT AIR RECEIVER
E0-AIR-014

FILTER PRESS AIR RECEIVER
E0-AIR-007

FOR CONTINUATION
SEE DWG E0-10-033

ZINC CONCENTRATE
FILTER PRESS
E4-FIL-035

T.O. FILTER ACCESS
EL. 1369.900

T.O. FILTER SUPPORT
EL. 1367.730

T.O.S.
EL. 1367.300

ZINC CONCENTRATE
STOCKPILE CONVEYOR
E4-CNV-039

U/S AIR UNIT
EL. 1361.300

T.O.S.
EL. 1361.300

PUMP SUCTION
EL. 1358.541

PUMP SUCTION
EL. 1358.493

U/S RECEIVERS
EL. 1358.200

T.O.S.
EL. 1369.500

ZINC REGRIND
CYCLONE CLUSTER
E3-CYC-146

U/S CYCLONE
EL. 1367.000

T.O.S.
EL. 1364.268

T.O.S.
EL. 1362.808

ZINC REGRIND
MILL
E3-MIL-147

U/S MILL
EL. 1360.550

ZINC CONCENTRATE
SAMPLER PUMP
E3-PSL-268

PUMP SUCTION
EL. 1358.373

T.O.C.
EL. 1358.000

HEATING PUMP No. 1 (VFD)
E0-PSO-271

ZINC CONCENTRATE
FILTER FEED
E4-PSL-053

ZINC CONCENTRATE
FILTER FEED
E4-PSL-032

ZINC CONCENTRATE
FILTER FEED
E4-PSL-033

ZINC CONCENTRATE
STOCK TANK
E4-TNK-021

ZINC CONCENTRATE
STOCK TANK AGITATOR
E4-AGI-024

PLANT
AIR RECEIVER
E0-AIR-010

ZINC 3rd CLEANER
CONCENTRATE STANDPIPE
E3-PBX-225

ZINC CONCENTRATE
SAMPLER STANDPIPE
E3-PBX-267

ZINC REGRIND MILL
DISCHARGE PUMPBOX
E3-PBX-148

SECTION B/001

2 0 2 4 6M
SCALE: 1:75

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REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT / PROJMAN / PROJ.ENG. / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:		

Yukon Zinc CORP
YUKON

WARDROP | Engineering Inc.

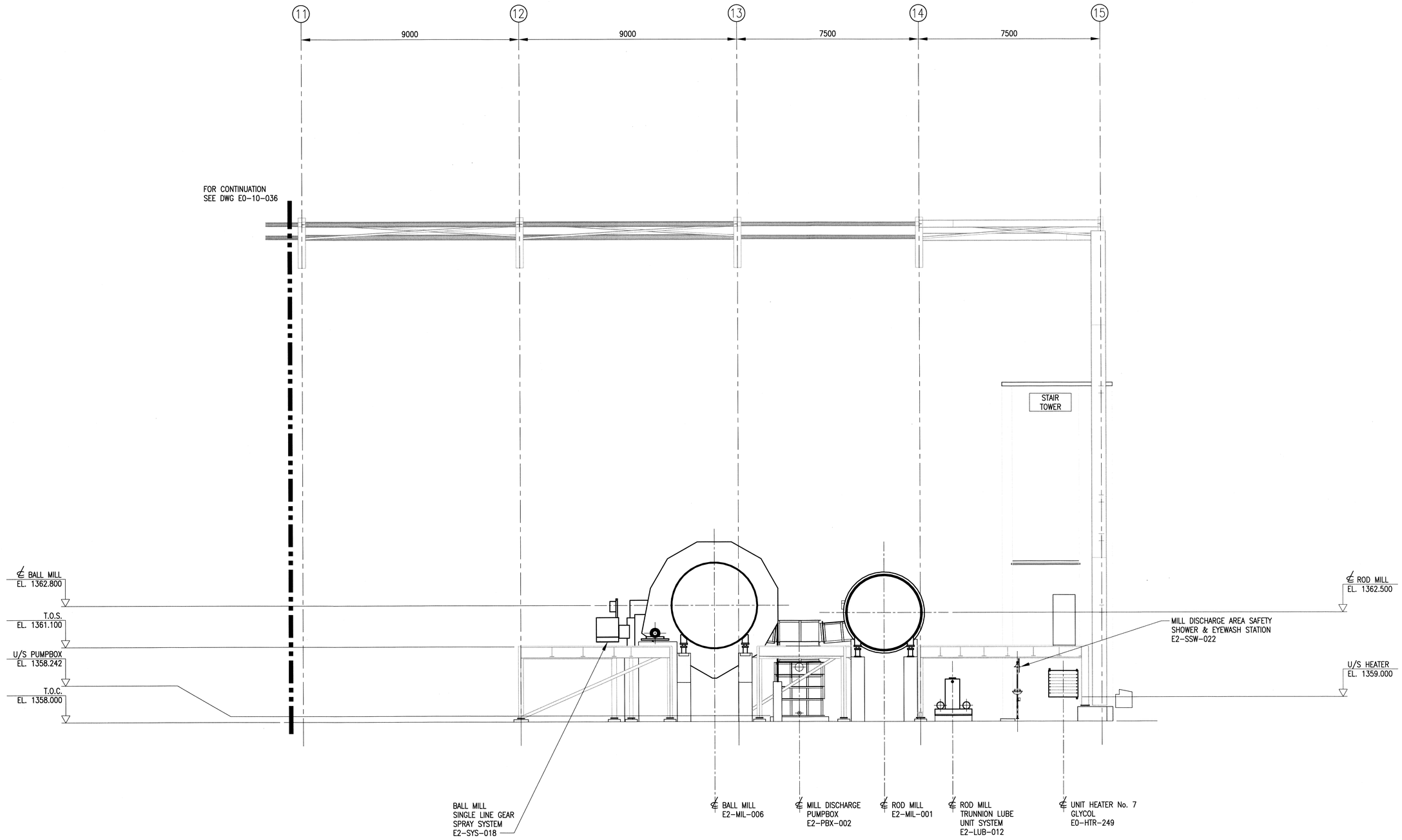
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION B
SHEET 3 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010034.DWG	08526302.00	E0-10-034	0

A1

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SECTION C 001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT / PROJMAN / PROJDNG / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / DRAWOS / APPROV / LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

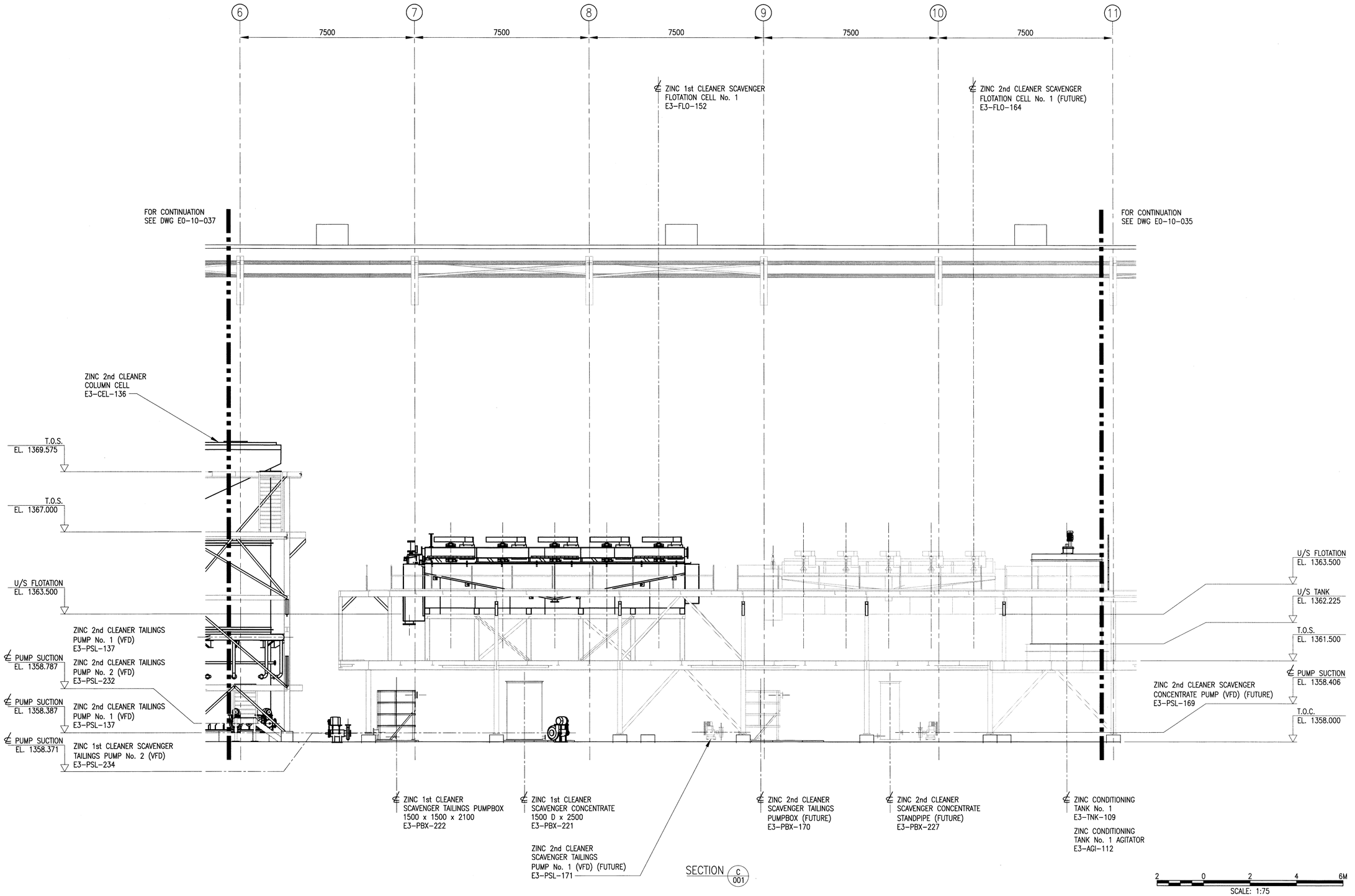
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SCALE: 1:75
DESIGN. BY: DH 06NOV08
DRAWN BY: JR 06NOV08
CHECK. BY: DH 26 OCT 09
APP. BY: JM 30 OCT 09

YukonZinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION C
SHEET 1 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010035.DWG	08526302.00	E0-10-035	0

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G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E010035.DWG
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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PROJMAN, PROJENG, PROCESS, ELECTR, INSTR, PIPING, MECH, STRUCT, ARCH, LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:		
APP. BY:		

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION C
SHEET 2 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010036.DWG	08526302.00	E0-10-036	0

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1 2 3 4 5 6

7500 7500 7500 7500 7500

E4–FIL–035
POWER PACK

ZINC CONCENTRATE
FILTER PRESS
E4–FIL–035

ZINC AIR/WATER
VELOCITY REDUCER TANK
E4–TNK–046

FOR CONTINUATION
SEE DWG E0–10–036

T.O. FILTER ACCESS
EL. 1369.900

T.O. FILTER SUPPORT
EL. 1367.730

T.O.S.
EL. 1367.300

U/S HEATER
EL. 1365.000

T.O.S.
EL. 1364.300

T.O.S.
EL. 1361.300

PUMP SUCTION
EL. 1358.493

T.O.C.
EL. 1358.000

ZINC CONCENTRATE
STOCKPILE CONVEYOR
E4–CNV–039

ZINC PRESSURE FILTER
OUTFEED CHUTE
E4–CHU–204

ZINC CONCENTRATE
FILTER FEED
E4–PSL–054

T.O.S.
EL. 1369.575

T.O.S.
EL. 1367.000

T.O.S.
EL. 1364.300

T.O.S.
EL. 1360.445

PUMP SUCTION
EL. 1358.825

ZINC 3rd CLEANER
RECYCLE PUMP
E3–PSL–190

U/S COLUMN CELLS
EL. 1358.500

PUMP SUCTION
EL. 1358.269

ZINC CONCENTRATE THICKENER
UNDERFLOW PUMP (VFD)
E4–PSL–018

UNIT HEATER No. 14
GLYCOL
E0–HTR–256

ZINC FILTRATION AREA
SUMP PUMP
E4–PSU–027

ZINC FILTRATE
SURGE TANK
E4–TNK–048

ZINC CONCENTRATE
DEWATERING AREA
SUMP PUMP
E4–PSU–006

ZINC CONCENTRATE
HI–CAP THICKENER
E4–THK–003

ZINC 3rd CLEANER
CONCENTRATE STANDPIPE
E3–PBX–225

ZINC 3rd CLEANER
COLUMN CELL
E3–CEL–139

ZINC 2nd CLEANER
COLUMN CELL
E3–CEL–136

SECTION C 001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0–10–001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT APPROVAL, PROJ.MG, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

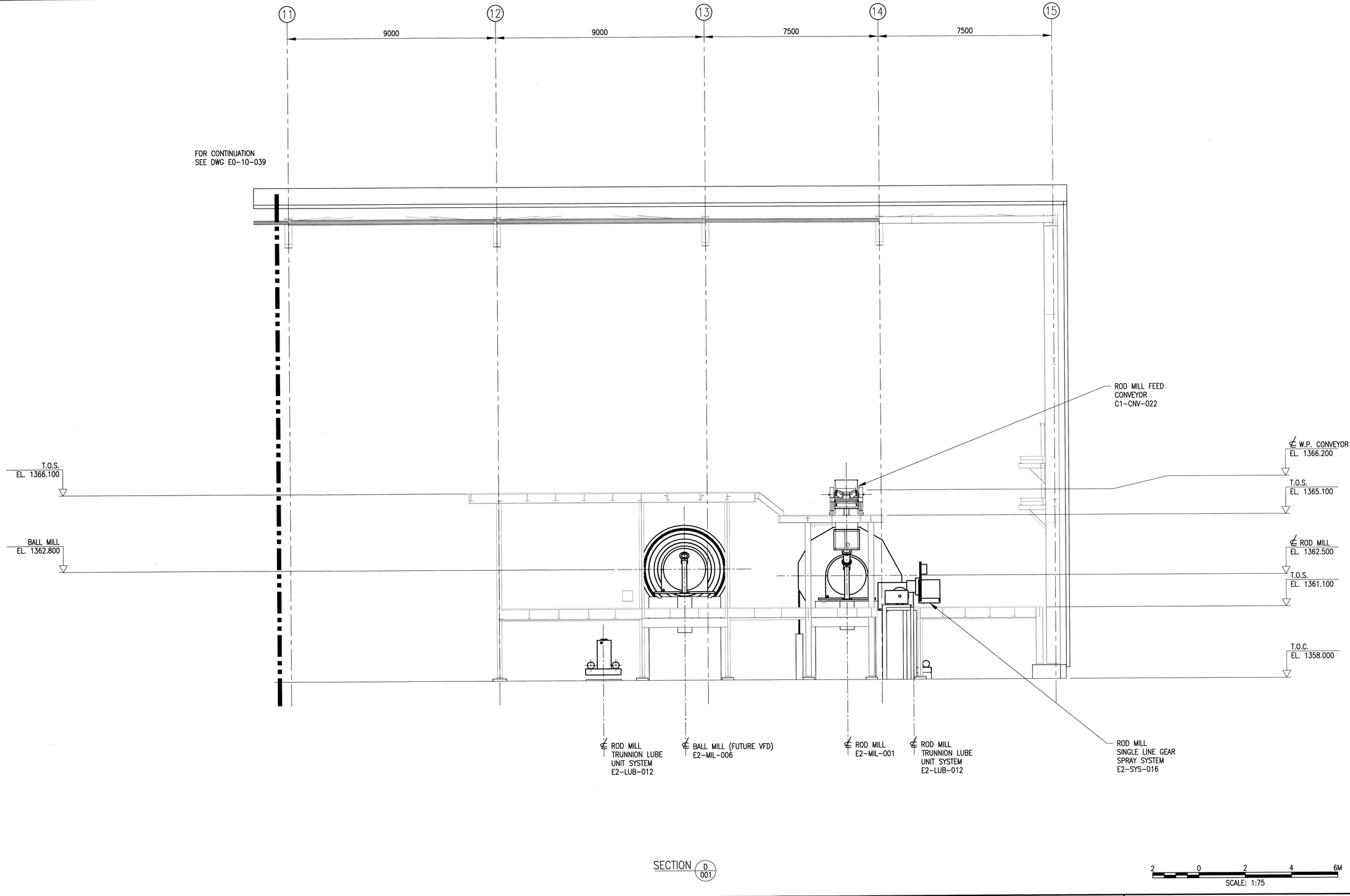
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DRAWN BY:	JR 06NOV08
CHECK. BY:	
APP. BY:	
DATE	

Yukon Zinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION C
SHEET 3 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010037.DWG	08526302.00	E0–10–037	0

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09/11/06 06:25



SECTION D 001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT / PROJMAN / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

SECTION: LAYOUT

		DATE
SCALE:	1:75	
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	JM	30OCT09

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TITLE

WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION D
SHEET 1 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010038.DWG	08526302.00	E0-10-038	0

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6 7 8 9 10 11

7500 7500 7500 7500 7500

MULTIPLEXER No. 3
E3-ANA-063

MULTIPLEXER No. 4
E3-ANA-064

LEAD FLOTATION AREA SUMP PUMP
E3-PSU-063

COPPER SCAVENGER FLOTATION CELL No. 1 to No. 3
E3-FLO-023 to 025

COPPER ROUGHER FLOTATION CELL No. 1 to No. 4
E3-FLO-019 to 022

LEAD CONDITIONING TANK
E3-TNK-061

LEAD CONDITIONING TANK AGITATOR
E3-AGI-062

COPPER CONDITIONING TANK
E3-TNK-016

COPPER CONDITIONING TANK AGITATOR
E3-AGI-017

FOR CONTINUATION SEE DWG E0-10-040

FOR CONTINUATION SEE DWG E0-10-038

ZINC TAILINGS SAMPLER
E3-SMP-163

T.O.S.
EL. 1365.030

COURIER 6i SL
24-STREAM ANALYZER
E3-ANA-059

T.O.S.
EL. 1362.700

DEMULTIPLEXER No. 1
E3-ANA-065

T.O.S.
EL. 1360.000

PSI-500 PARTICLE SIZE ANALYZER
E3-ANA-060

PUMP SUCTION
EL. 1358.297

ZINC 2nd CLEANER ANALYZER DISCHARGE PUMP (VFD)
E3-PSL-138

PUMP SUCTION
EL. 1358.410

ZINC FEED PUMP No. 2 (VFD)
E3-PSL-107

U/S FLOTATION
EL. 1362.700

U/S TANK
EL. 1362.275

U/S TANK
EL. 1361.810

T.O.S.
EL. 1361.500

LEAD SCAVENGER CONCENTRATE PUMP (VFD)
E3-PSL-072

PUMP SUCTION
EL. 1358.000

T.O.C.
EL. 1358.000

ZINC 2nd CLEANER ANALYZER DISCHARGE PUMPBOX
E3-PBX-223

LEAD SCAVENGER CONCENTRATE STANDPIPE
E3-PBX-213

COPPER TAILINGS PUMPBOX
E3-PBX-047

LEAD 1st CLEANER SCAVENGER TAILINGS PUMP No. 1 (VFD) & No. 2
E3-PSL-096 & 231

LEAD 1st CLEANER SCAVENGER TAILINGS PUMPBOX
E3-PBX-216

LEAD 1st CLEANER SCAVENGER CONCENTRATE
E3-PBX-215

LEAD ROUGHER CONCENTRATE STANDPIPE
E3-PBX-212

LEAD 1st CLEANER CONCENTRATE STANDPIPE
E3-PBX-214

LEAD 1st CLEANER CONCENTRATE PUMP (VFD)
E3-PSL-094

LEAD 1st CLEANER SCAVENGER CONCENTRATE PUMP (VFD)
E3-PSL-093

SECTION D 001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT APPROVAL, PROJ.MNG., PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	06NOV08
APP. BY:	DM	06NOV08

Yukon Zinc CORP
YUKON

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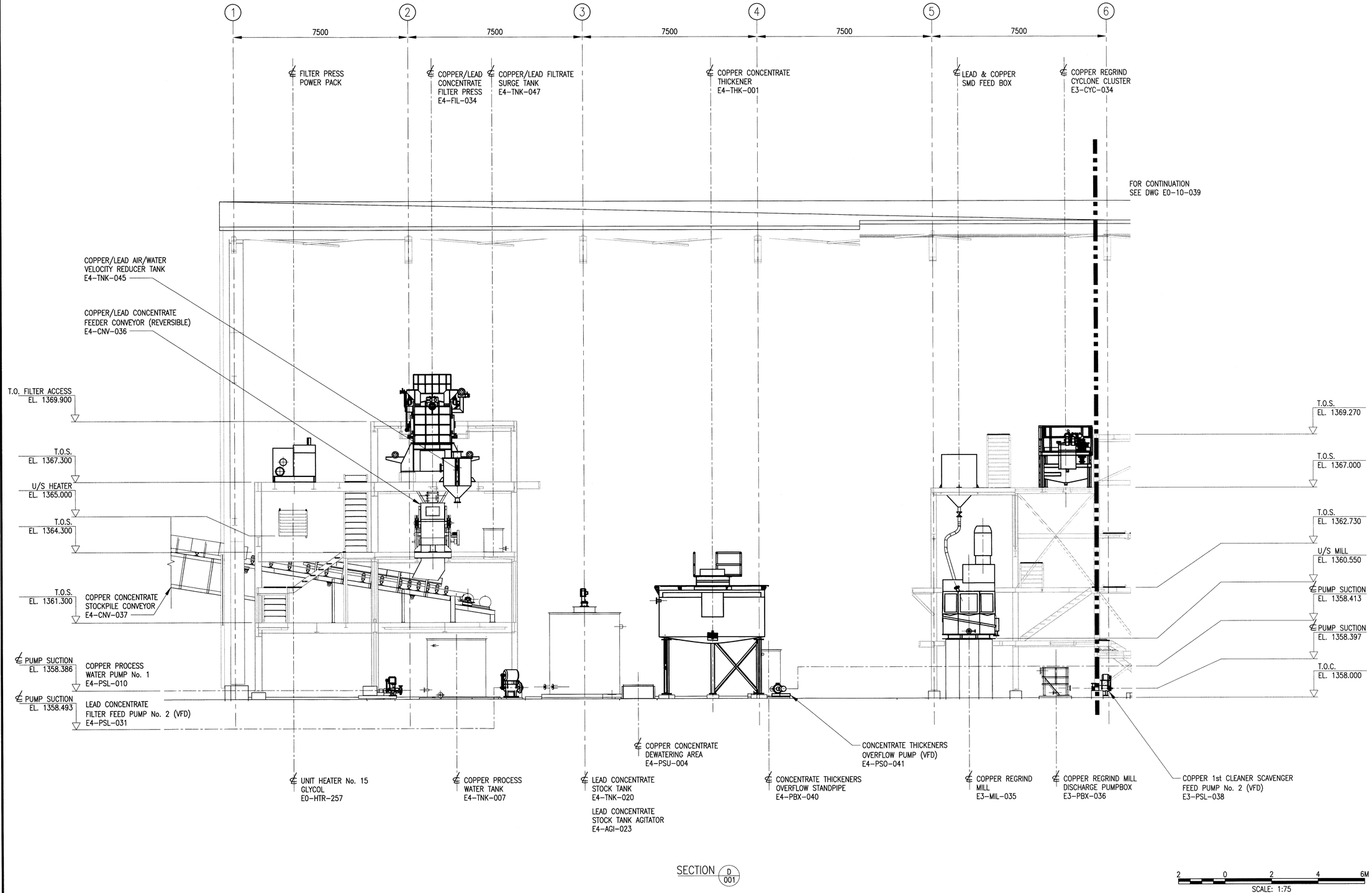
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION D
SHEET 2 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010039.DWG	08526302.00	E0-10-039	0

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09/11/06 08:10



SECTION D 001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PRELIMINARY, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCHIT., LAYOUT

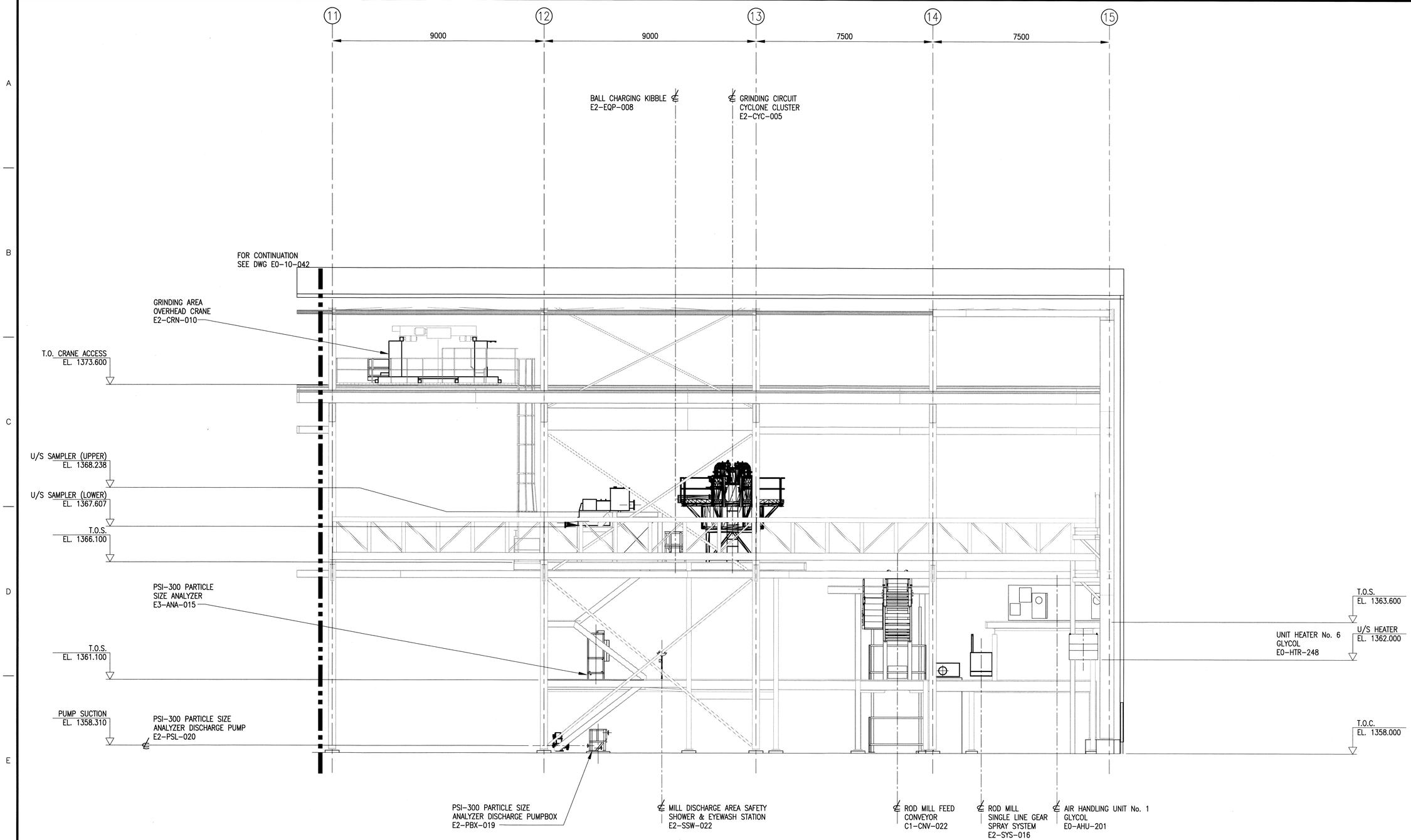
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DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	06NOV09
APP. BY:	JW	06NOV09

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TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION D
SHEET 3 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010040.DWG	08526302.00	E0-10-040	0

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09/11/06 09:30



SECTION E/001

2 0 2 4 6M
SCALE: 1:75

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A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

CLIENT, PROJMAN, PROJENG, PROCESS, ELECTR, INSTR, PIPING, MECH, STRUCT, STRMOS, ARCH, LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:		
APP. BY:		

Yukon Zinc CORP
YUKON
WARDROP | Engineering Inc.

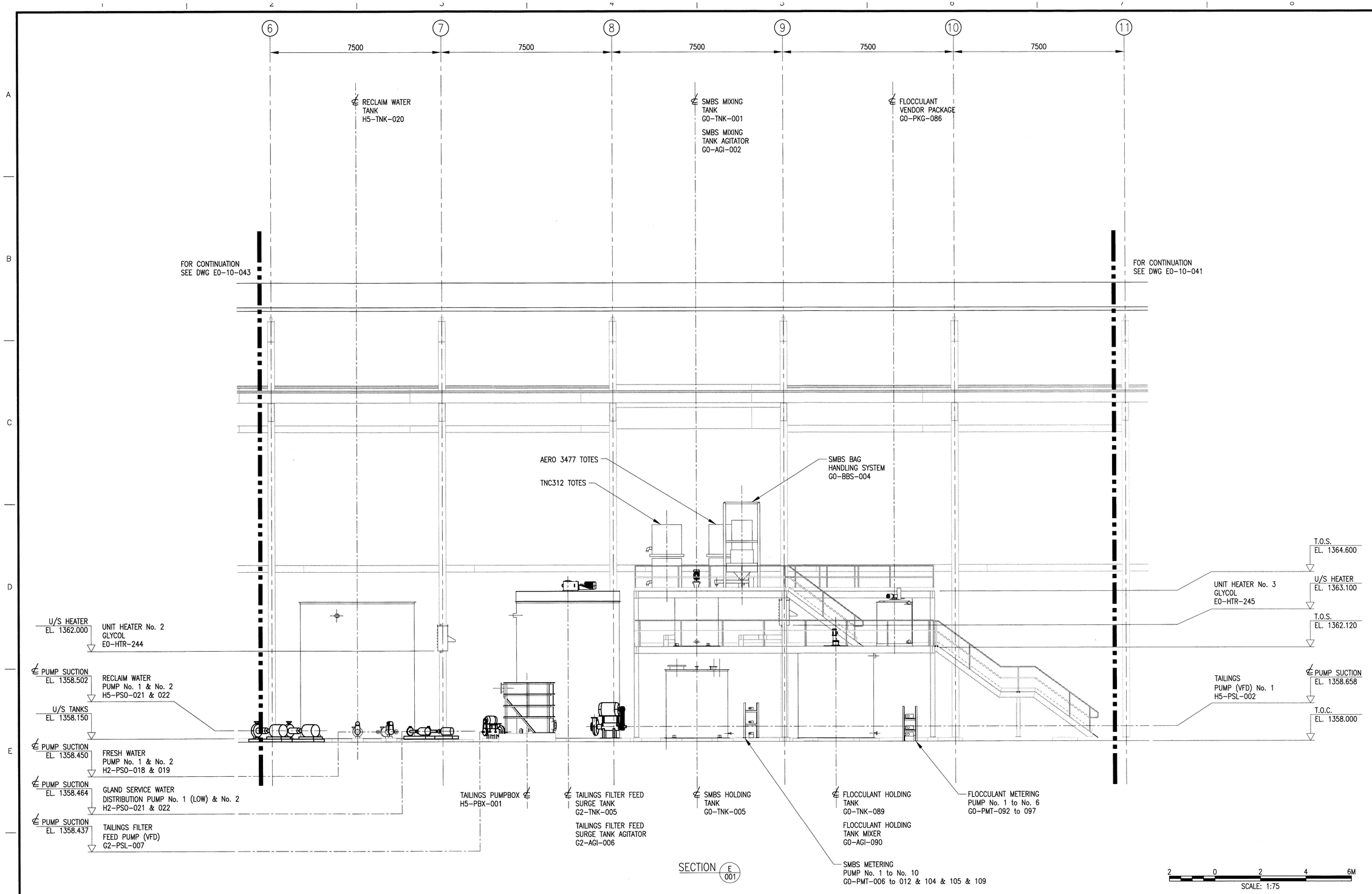
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WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION E
SHEET 1 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010041.DWG	08526302.00	E0-10-041	0

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PROJMAN, PROJENG, PROCESS, ELECTR, INSTR, PIPING, MECH., STRUCT, SERVICES, ARCHIT., LAYOUT

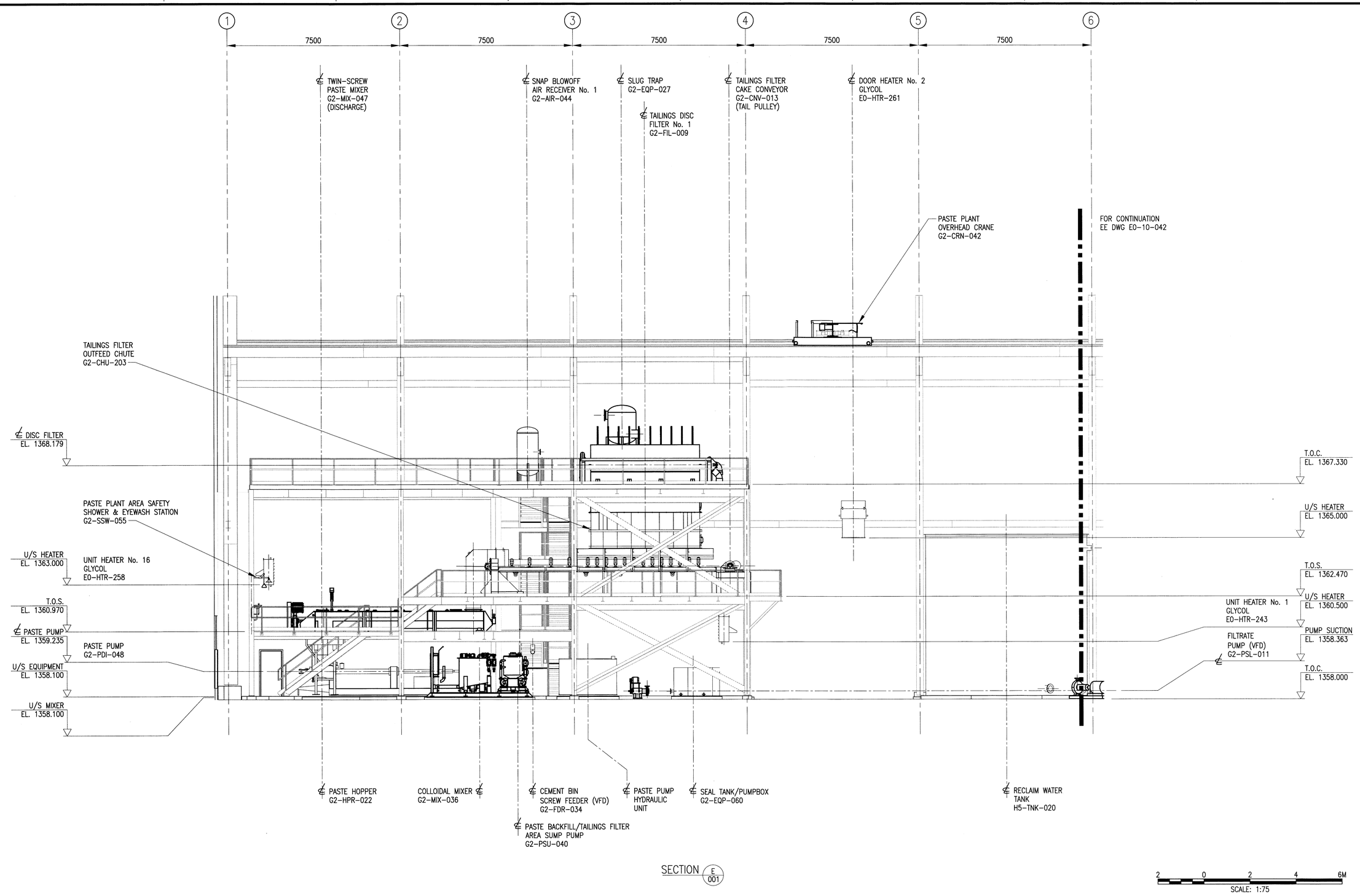
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CHECK. BY:	DH	06 OCT 09
APP. BY:	[illegible]	[illegible]

Yukon Zinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION E
SHEET 2 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010042.DWG	08526302.00	E0-10-042	0

A1
G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E010042.DWG
09/11/06 09:38



SECTION E 001

2 0 2 4 6M
SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

CLIENT	ORIGINAL	PROCESS	ELECTR.	INSTR.	PIPING	MECH.	STRUCT.	SERVICES	ARCH.	LAYOUT	REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
											0	1	ISSUED FOR CONSTRUCTION	06NOV09	JR
											A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	26JUN09
APP. BY:	JM	26JUN09

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YUKON

WARDROP | Engineering Inc.

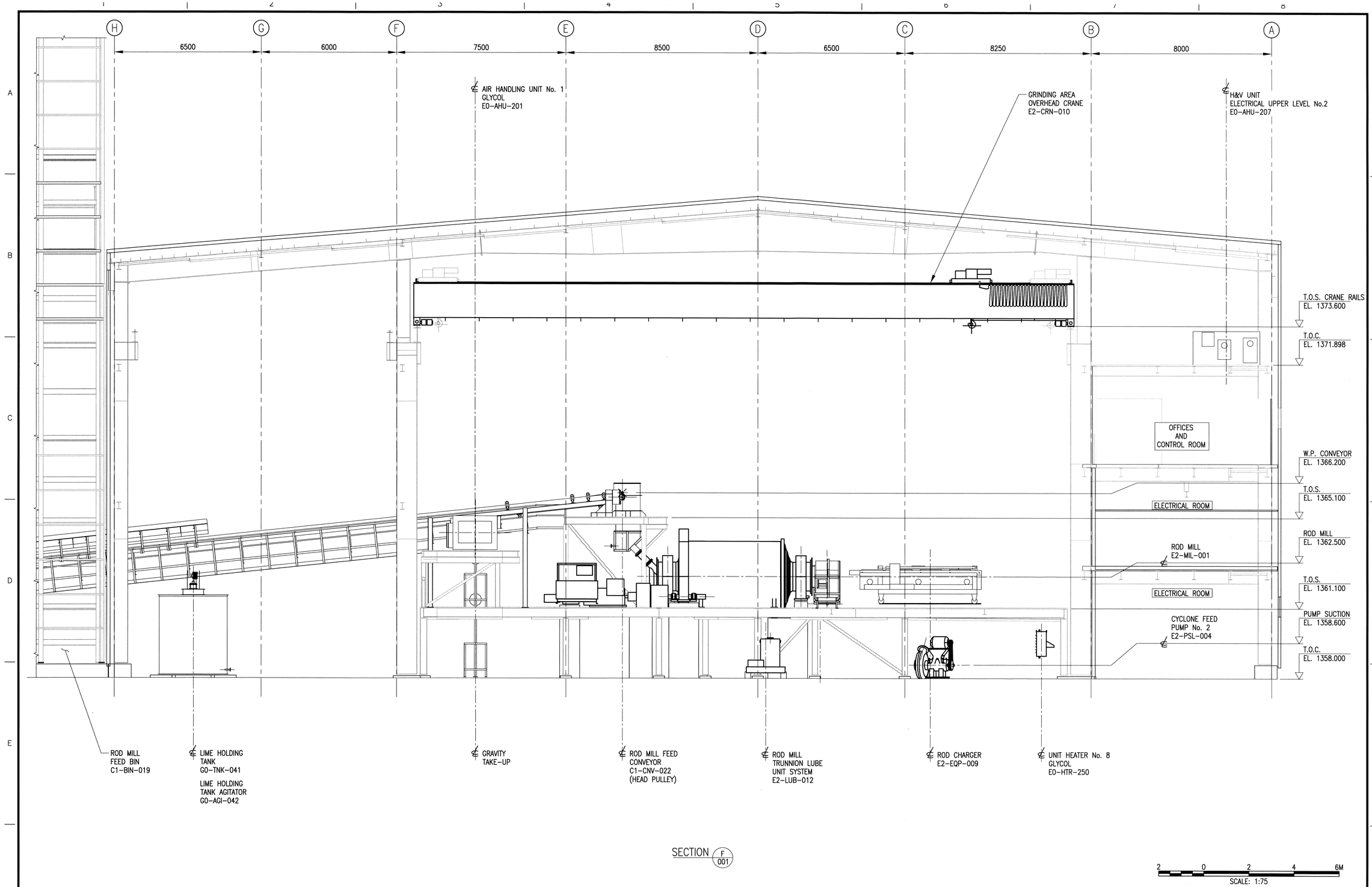
TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION E
SHEET 3 OF 3

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010043.DWG	08526302.00	E0-10-043	0

09/11/06 10:25

A1

G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E010043.DWG



SECTION F 001

2 0 2 4 6M

SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS
E0-10-001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

CLIENT / PROJMAN / PROJENG / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

		DATE
SECTION:	LAYOUT	
SCALE:	1:75	
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:	DH	30 OCT 09
APP. BY:	DM	30 OCT 09

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TITLE

WOLVERINE PROJECT (EP)

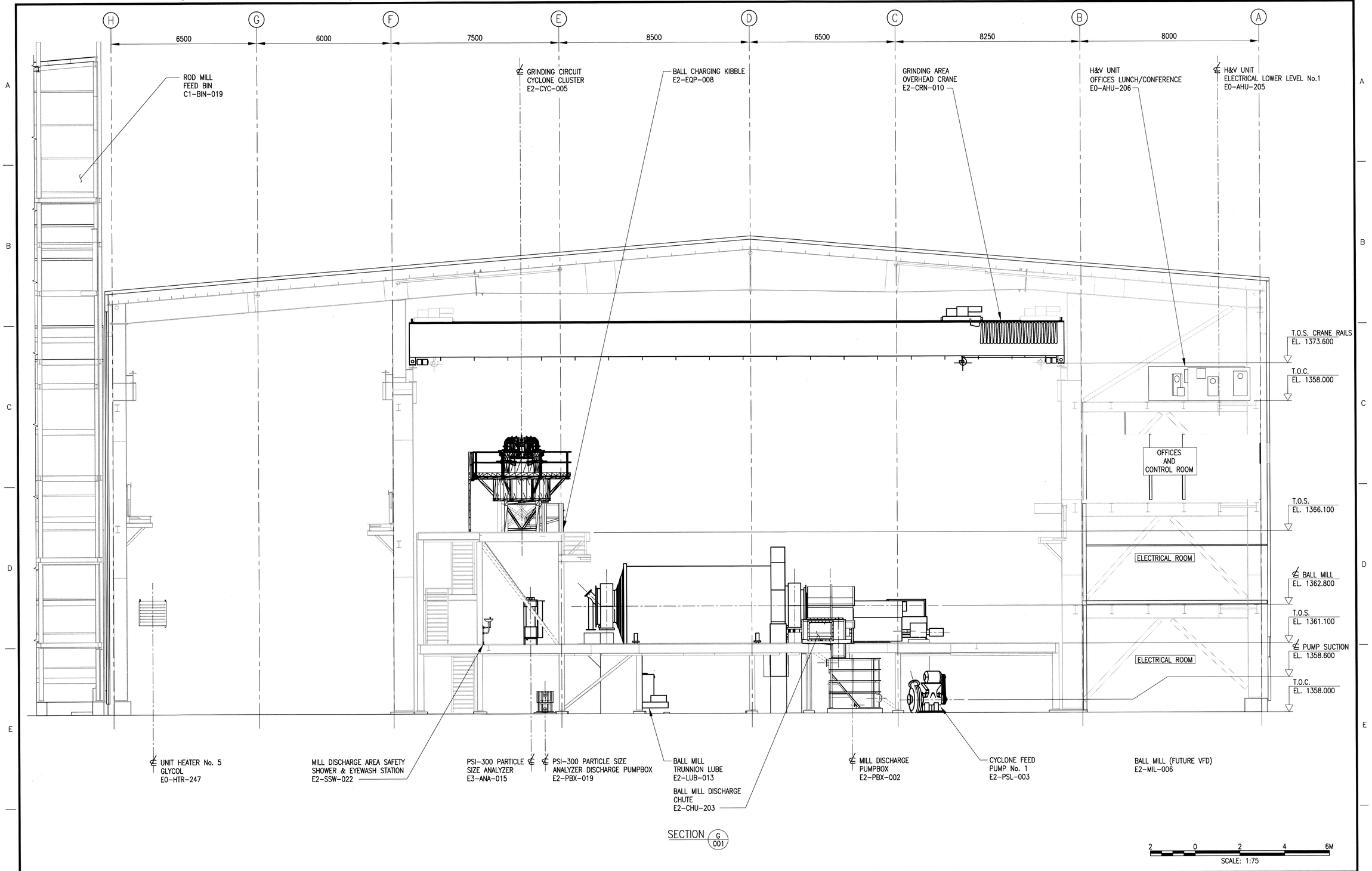
MILL BUILDING
GENERAL ARRANGEMENT
SECTION F

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010044.DWG	08526302.00	E0-10-044	0

A1

G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E010044.DWG

09/10/30 08:48



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DWG. NO.	REFERENCE DRAWINGS
E0–10–001	PROCESS PLANT GENERAL ARRANGEMENT PLAN

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	30OCT09	JR
B	1	ISSUED FOR APPROVAL	26JUN09	JR
A	1	ISSUED FOR SQUAD REVIEW	14APR09	KAD

CLIENT, PROJMAN, PROCESS, ELECTR., INSTR., PIPING, MECH., STRUCT., SERVICES, ARCH., LAYOUT

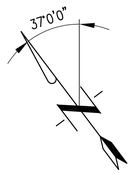
SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:		
APP. BY:		

YukonZinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
MILL BUILDING
GENERAL ARRANGEMENT
SECTION G

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E010045.DWG	08526302.00	E0–10–045	0

A1
G:\T–Z\YUKON ZINC – 5263\08526302.00 – WOLVERINE PROJECT (EP)\10–LAYOUT\DWG\E010045.DWG
09/10/30 08:55



1 2 3 4 5 6 7 8

A B C D E F G

37500

7500 7500 7500 7500 7500

3152 2000 1000

℄ TRUCK WEIGH SCALE
E4-SCL-042

℄ ZINC CONCENTRATE
STOCKPILE

D 008

C 007

DN

FOR CONTINUATION
SEE DWG E5-10-002

A 005

A 005

9000

25500

9000

7500

2000

℄ COPPER CONCENTRATE
STOCKPILE

1000

℄ LEAD CONCENTRATE
STOCKPILE

UP

B 006

B 006

D 008

C 007

2 0 2 4 6M

SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

CLIENT, PROJMAN, PROJDNG, PROCESS, ELECTR, INSTR, PIPING, MECH, STRUCT, SERVICES, ARCH, LAYOUT

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:		
APP. BY:		

YukonZinc CORP

YUKON

WARDROP | Engineering Inc.

TITLE

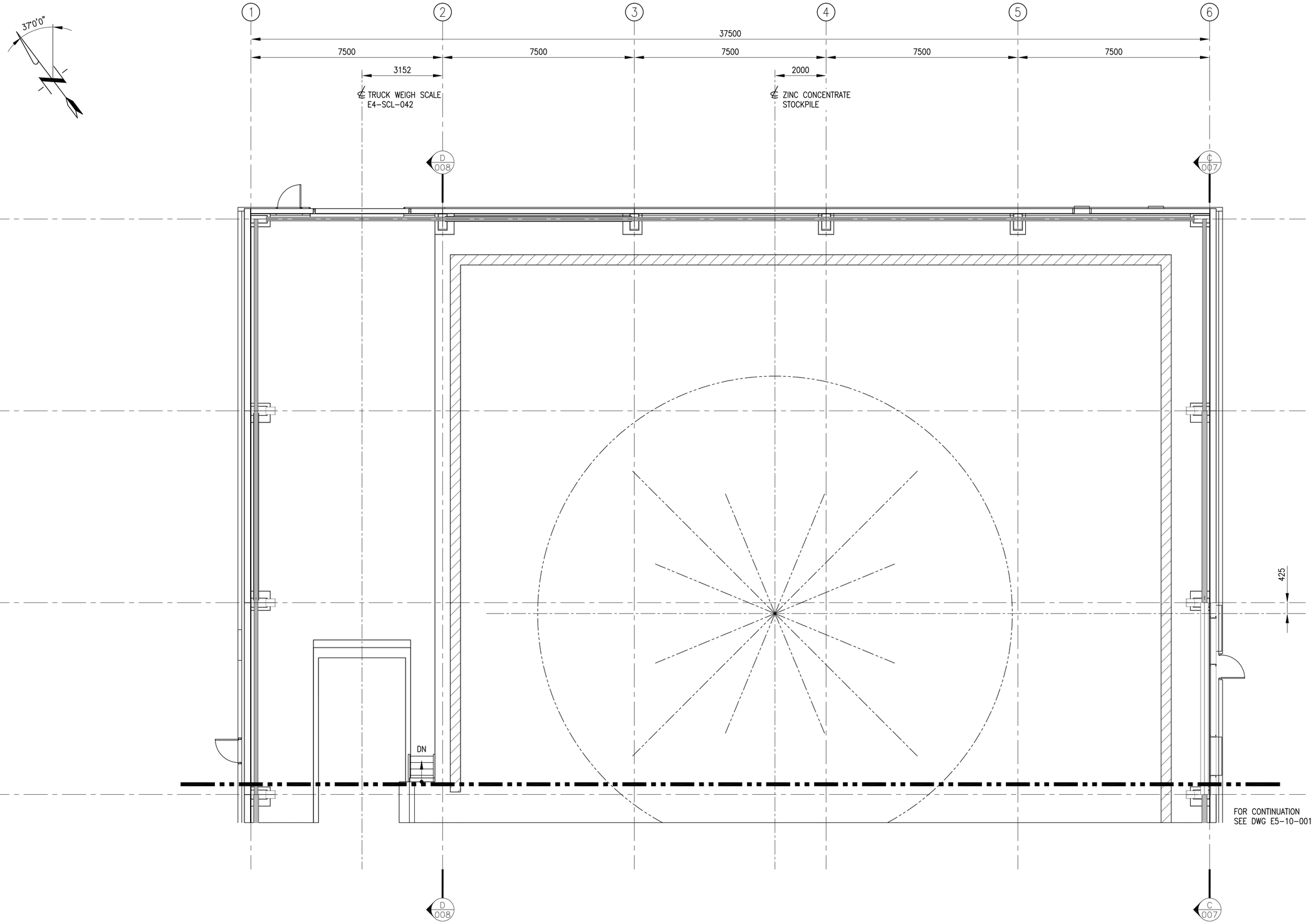
WOLVERINE PROJECT (EP)
CONCENTRATE LOADOUT BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 1 OF 2

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E510001.DWG	08526302.00	E5-10-001	B

09/09/16 17:15

A1

G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E510001.DWG



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DWG. NO.	REFERENCE DRAWINGS

CLIENT / PROJMNG / PROJENG / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:		
APP. BY:		

YUKON

YukonZinc CORP

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TITLE

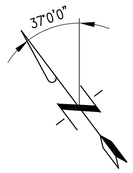
WOLVERINE PROJECT (EP)
CONCENTRATE LOADOUT BUILDING
GENERAL ARRANGEMENT
GROUND FLOOR PLAN
SHEET 2 OF 2

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E510002.DWG	08526302.00	E5-10-002	B

09/09/16 17:21

A1

G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E510002.DWG



1 2 3 4 5 6 7 8

A B C D E F G

37500

7500 7500 7500 7500 7500

2000 1000

D 008 — C 007

℄ ZINC CONCENTRATE STOCKPILE

℄ COPPER & LEAD CONCENTRATE STOCKPILES

FOR CONTINUATION SEE DWG E5-10-004

A 005 — A 005

9000 9000 7500 25500

2000

℄ COPPER CONCENTRATE STOCKPILE CONVEYOR E4-CNV-037

FOR CONVEYOR DETAILS SEE DWG. E4-12-011

1000

℄ LEAD CONCENTRATE STOCKPILE CONVEYOR E4-CNV-038

FOR CONVEYOR DETAILS SEE DWG. E4-12-014

B 006 — B 006

D 008 — C 007

2 0 2 4 6M

SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS

CLIENT / PROJMAN / PROLONG / PROCESS / ELECTR. / INSTR. / PIPING / MECH. / STRUCT. / SERVICES / ARCH. / LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:		
APP. BY:		

YukonZinc CORP

YUKON

WARDROP | Engineering Inc.

TITLE

WOLVERINE PROJECT (EP)

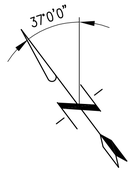
CONCENTRATE LOADOUT BUILDING GENERAL ARRANGEMENT UPPER FLOOR PLAN SHEET 1 OF 2

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E510003.DWG	08526302.00	E5-10-003	B

A1

09/09/16 17:30

G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\10-LAYOUT\DWG\E510003.DWG



1 2 3 4 5 6 7 8

A B C D E F

1 2 3 4 5 6

37500

7500 7500 7500 7500 7500

2000

℄ ZINC CONCENTRATE STOCKPILE

D 008

C 007

A

B

C

D

7500

22500

7500

7500

7500

425

ZINC CONCENTRATE STOCKPILE CONVEYOR E4-CNV-039

FOR CONVEYOR DETAILS SEE DWG. E4-12-018

FOR CONTINUATION SEE DWG E5-10-003

D 008

C 007

2 0 2 4 6M

SCALE: 1:75

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DWG. NO.	REFERENCE DRAWINGS

CLIENT | PROJMAN | PROJMC | PROCESS | ELECTR. | INSTR. | PIPING | MECH. | STRUCT. | SERVICES | ARCH. | LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
B	1	ISSUED FOR TENDER	17SEP09	JR
A	1	ISSUED FOR APPROVAL	26JUN09	JR

SECTION:	LAYOUT	
SCALE:	1:75	DATE
DESIGN. BY:	DH	06NOV08
DRAWN BY:	JR	06NOV08
CHECK. BY:		
APP. BY:		

YukonZinc CORP

YUKON

WARDROP | Engineering Inc.

TITLE

WOLVERINE PROJECT (EP)

CONCENTRATE LOADOUT BUILDING GENERAL ARRANGEMENT UPPER FLOOR PLAN SHEET 2 OF 2

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
E510004.DWG	08526302.00	E5-10-004	B

A1

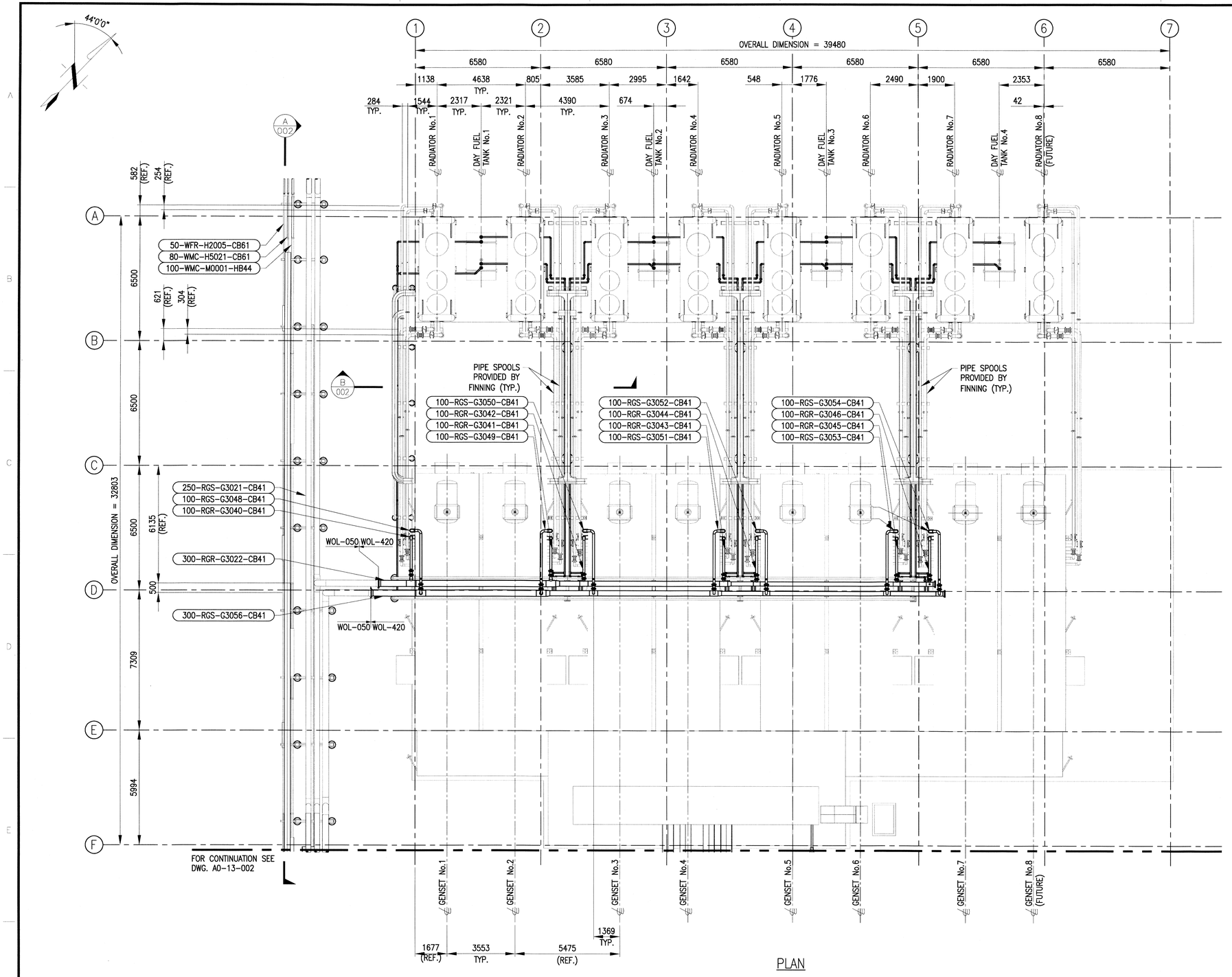
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17:35 09/09/16

Appendix B: Power Plant Issued-For-Construction Drawings

Appendix B includes the following WEI drawings:

G313001 R0
G313002 R0
G318055 R3



PLAN

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS U.N.O. ALL ELEVATIONS ARE IN METERS U.N.O.
2. GENERNAL ARRANGEMENT DRAWINGS ARE TO BE READ IN CONJUNCTION WITH FINNING DRAWINGS.
3. FOR INTERCONNECTING AFTERCOOLER AND JACKET WATER PIPING, REFER TO FINNING DWGS K0660B2301 THRU K0660B2308.
4. FOR PIPE SUPPORT DETAILS SEE PIPING SPECIFICATION 40-05-01.
5. THIS PIPE SUPPORT LAYOUT IS FOR GENERAL INFORMATION ONLY.

2 0 2 4 6 8M
SCALE: 1:100

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DWG. NO.	REFERENCE DRAWINGS

CLIENT JJM
ORIGINAL JJM
PROJ.MG. AF
PROCESS
ELECTR.
INSTR.
PIPING JJM
MECH.
STRUCT.
SERVICES
ARCH.
LAYOUT

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
P/W 0	1	ISSUED FOR CONSTRUCTION	23NOV09	AKF
A	1	ISSUED FOR TENDER	20OCT09	CC

SECTION:	PIPING	
SCALE:	1:100	DATE
DESIGN. BY:		
DRAWN BY:	CC	13OCT09
CHECK. BY:	JJM	20OCT09
APP. BY:		

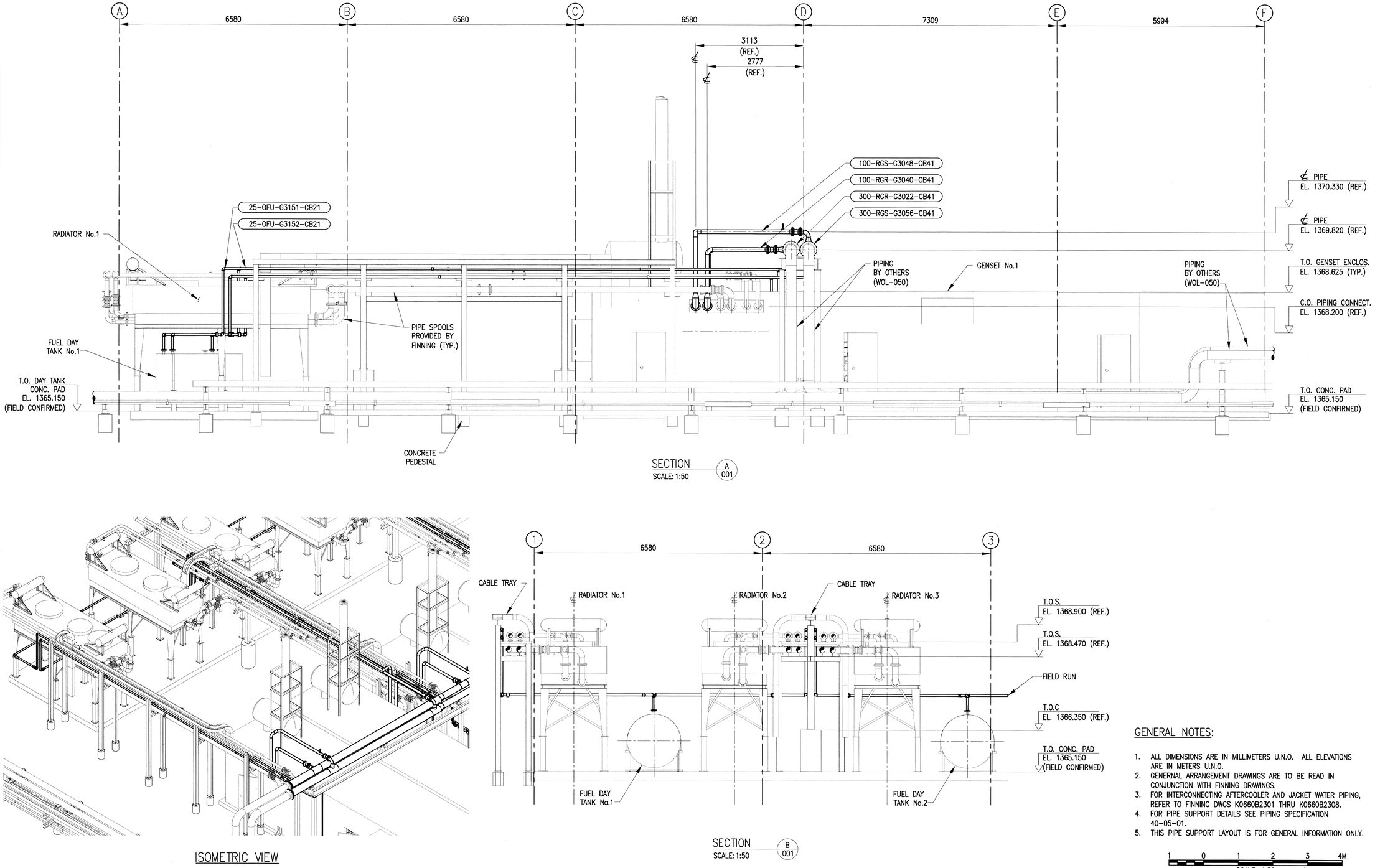
YukonZinc CORP
YUKON
WARDROP | Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)

POWER GENERATING PLANT
PIPING ARRANGEMENT
PLAN

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
G313001.DWG	08526302.00	G3-13-001	0

G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\13-PIPING\DWG\G313001.DWG



SECTION A 001
SCALE: 1:50

ISOMETRIC VIEW

SECTION B 001
SCALE: 1:50

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS U.N.O. ALL ELEVATIONS ARE IN METERS U.N.O.
2. GENERNAL ARRANGEMENT DRAWINGS ARE TO BE READ IN CONJUNCTION WITH FINNING DRAWINGS.
3. FOR INTERCONNECTING AFTERCOOLER AND JACKET WATER PIPING, REFER TO FINNING DWGS K0660B2301 THRU K0660B2308.
4. FOR PIPE SUPPORT DETAILS SEE PIPING SPECIFICATION 40-05-01.
5. THIS PIPE SUPPORT LAYOUT IS FOR GENERAL INFORMATION ONLY.

1 0 1 2 3 4M
SCALE: 1:50

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DWG. NO.	REFERENCE DRAWINGS

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
0	1	ISSUED FOR CONSTRUCTION	23NOV09	AKF
A	1	ISSUED FOR TENDER	20OCT09	CC

CLIENT APPROVAL: DH
PROJ.ENG.: JM
PROCESS
ELECTR.
INSTR.
PIPING: JJM
MECH.: AF
STRUCT.
SERVICES
ARCH.
LAYOUT

SECTION:	PIPING
SCALE:	1:50
DESIGN. BY:	
DRAWN BY:	CC 13OCT09
CHECK. BY:	JJM 20OCT09
APP. BY:	

YUKON Yukon Zinc CORP

WARDROP | Engineering Inc.

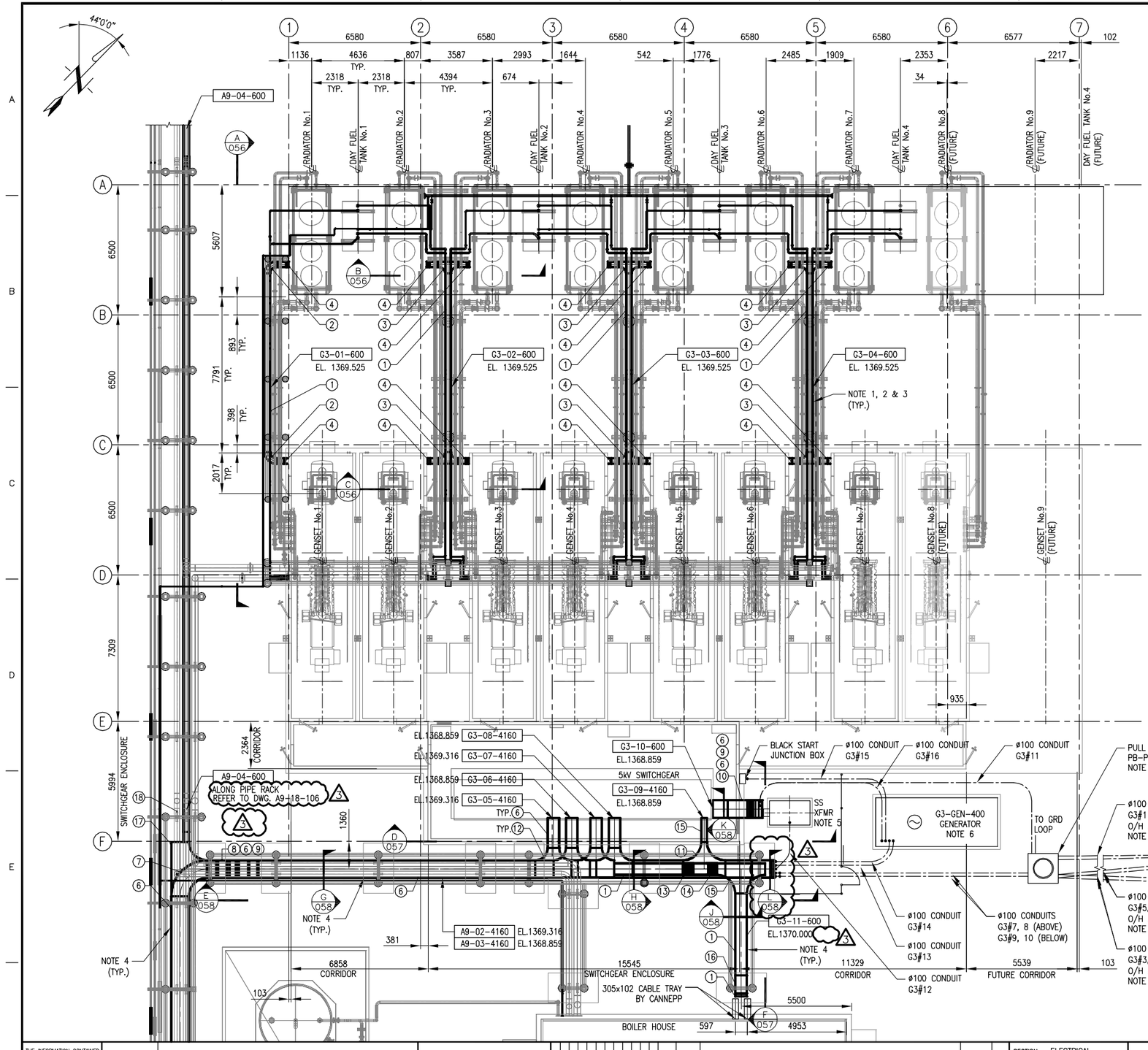
TITLE

WOLVERINE PROJECT (EP)

POWER GENERATING PLANT
PIPING ARRANGEMENT
SECTIONS A & B

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
G313002.DWG	08526302.00	G3-13-002	0

G:\T-Z\YUKON ZINC - 5263\08526302.00 - WOLVERINE PROJECT (EP)\13-PIPING\DWG\G313002.DWG



LEGEND

(X) CABLE TRAY COMPONENT, REFER TO BILL OF MATERIAL.

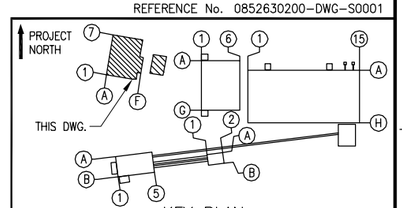
XX-XX-XXXX CABLE TRAY TAG
- AREA
- VOLTAGE
- CABLE TRAY No.

NOTES:

1. FOR CABLE TRAY BETWEEN GENERATOR MODULES AND RADIATORS REFER TO 0852630200-BOM-E0005-00. FINNING TO SUPPLY THE MATERIAL SHOWN IN 0852630200-BOM-E0005-00, CONTRACTOR TO INSTALL THE CABLE TRAYS AND PROVIDE ALL FITTINGS, SUPPORTS, COVERS AND BARRIERS BETWEEN INSTRUMENTATION CABLES AND POWER CABLES.
2. REFER TO PIPING DRAWING SET FOR PIPE & CABLE TRAY SUPPORT DETAILS.
3. FINNING TO SUPPLY ALL CABLES FROM GENERATOR MODULES TO RADIATORS.
4. FOR SITE CABLE TRAY BILL OF MATERIAL REFER TO 0852630200-BOM-E0006-01.
5. STATION SERVICE TRANSFORMER DETAILS BY FINNING, CONTRACTOR TO FIELD LOCATE CABLE TRAY G3-10-600 AND CONDUIT G3#12. ALL CABLES BETWEEN SS TRANSFORMER AND 5kV SWITCHGEAR AND L.V. MCC TO BE SUPPLIED BY FINNING. CONSULT WITH FINNING FOR CABLE RACEWAY DETAILS INSIDE SWITCHGEAR ENCLOSURE.
6. EMERGENCY GENSET DETAILS BY OWNER. CONTRACTOR TO FIELD LOCATE CONDUITS G3#13, 14, 15, 16.
7. CONTRACTOR TO RUN CONDUITS G3#1~#6 TO FIRST POLES OF POWER LINE #1 & #2. FIRST POLES ON THIS DRAWING ARE FOR ILLUSTRATION ONLY, CONFIRM WITH O/H LINE CONTRACTOR FOR FINAL LOCATIONS OF THESE POLES.
8. ALL CONDUITS ARE OF RIGID PVC UNLESS OTHERWISE NOTED, MIN. RADII ARE 900MM. TYPICAL CONDUITS' CENTER TO CENTER DISTANCE IS 190MM, 5kV RUNS NEED TO BE 300MM APART FROM CONTROL CABLES. INSIDE FENCED AREA, CONDUITS STUB UP 1M ABOVE GRADE, CONDUITS STUB UP 2M AT O/H LINE FIRST POLES.
9. REFER TO DWG. A9-18-055 FOR PULL BOX DETAILS.
10. ALL WALL OPENINGS TO BE SEALED TEMPORARILY DURING CONSTRUCTION AND PERMANENTLY FOLLOWING COMPLETION OF INSTALLATION WORK. CONSULT WITH FINNING REPRESENTATIVE FOR GENSETS' WALL SEALING REQUIREMENTS, WITH CANNEPP FOR BOILER HOUSE.
11. SUPPORTS FOR PIPES & CABLE TRAYS ARE FOR ILLUSTRATION ONLY, FINAL DESIGN AND LOCATIONS BY OTHERS.

2 0 2 4 6 8M
SCALE: 1:100

REFERENCE No. 0852630200-DWG-S0001



KEY PLAN

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DWG. NO.	REFERENCE DRAWINGS
A9-18-055	OVERALL SITE POWER DISTRIBUTION BURIED ELECTRICAL CONDUIT
BOM-E0006	BILL OF MATERIAL – SITE CABLE TRAY (WOL-080)
BOM-E0005	BILL OF MATERIAL – FINNING GENSET CABLE TRAY
G3-18-058	POWER PLANT POWER & CONTROL CABLE TRAY SECTIONS
G3-18-057	POWER PLANT POWER & CONTROL SECTIONS D, E & F
G3-18-056	POWER PLANT POWER & CONTROL SECTIONS A, B & C

ORIGINAL DRAWING REVISION "0" SEALED BY MALCOLM CAMERON, P. ENG. 03 DEC 2009

REV. No.	ISSUE No.	DESCRIPTION	DATE	BY
3	1	REVISED AS NOTED	08FEB10	GI
2	1	ISSUED FOR MAIN CABLE TRAYS CONSTRUCTION	23DEC09	MMC
1	1	ADDED SITE CABLE TRAY DETAILS FOR INTERNAL REVIEW	18DEC09	MMC
0	1	ISSUED FOR CONSTRUCTION	02DEC09	MMC

CLIENT, PROJMGR, SV; PROJENG, SV; PROCESS; ELECTR./MMC; MECH.; PIPING, JF; STRUCT.; SERVICES; ARCH.; LAYOUT

SECTION:	ELECTRICAL
SCALE:	1:100
DESIGN. BY:	HZ 26AUG09
DRAWN BY:	HZ 26AUG09
CHECK. BY:	ML 30NOV09
APP. BY:	GI 02DEC09

YukonZinc CORP
YUKON
WARDROP Engineering Inc.

TITLE
WOLVERINE PROJECT (EP)
POWER PLANT POWER & CONTROL LAYOUT

FILENAME	PROJECT NUMBER	DRAWING NUMBER	REV.
G318055.DWG	08526302.00	G3-18-055	3

G:\T-Z\Yukon Zinc - 5263\08526302.00 - Wolverine Project (EP)\18-Elec\DWG\G318055.dwg

Appendix C: Material Safety Data Sheets

Appendix C includes MSDS for the following:

- Copper Concentrate
- Lead Concentrate
- Zinc Concentrate
- Copper sulphate
- Flocculent
- Isobutyl dithiophosphate (Aero 3477)
- Lime
- Methyl isobutyl carbinol (MIBC)
- Sodium cyanide
- Sodium isopropyl xanthate (SIPX)
- Sodium Metabisulphide (SMBS)
- TNC312
- Zinc sulphate

Yukon Zinc Corporation

Material Safety Data Sheet

Wolverine Mine Copper Concentrate

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Wolverine Mine Copper Concentrate
MSDS Number:	Wv-03
Product Uses:	Copper concentrate is the starting material for the production of copper metal and copper alloys.
Company Identification:	Yukon Zinc Corporation Wolverine Project 190 KM Robert Campbell Highway NW Watson Lake, YT Y0A 1C0
Emergency Telephone Number:	(604) 638-0921 Ext. 1

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS Registry No.	CONCENTRATION (% wgt / wgt)
Copper	7440-50-8	20.5 – 24.0% Cu
Sulphur (as mineral sulphides)	7704-34-9	32.0 - 33.6% S
Iron	7439-89-6	34.0 - 38.0% Fe
Zinc	7440-66-6	8 – 10% Zn
Silica	14808-60-7	0.07 – 0.27% Si
Lead	7439-92-1	2.0 – 5.0% Pb
Selenium	7782-49-2	0.32 – 0.62% Se
Arsenic	7440-38-2	0.05 – 0.80% As
Cadmium	7440-43-9	0.08 -11% Cd

3. HAZARDS IDENTIFICATION

Emergency Overview: A heavy, soil-like material that is not flammable or combustible under normal conditions of transport and storage. However, when heated strongly in air it will burn, releasing toxic and irritating sulphur dioxide gas as well as possible copper and other metal oxide fumes. Contact with strong acids will generate flammable and highly toxic hydrogen sulphide gas (H2S). Inhalation or ingestion of concentrate dust may produce both acute and chronic health effects. Possible cancer hazard due to lead, arsenic, silica and cadmium content. Possible reproductive hazard due to lead content. SCBA and full protective clothing required for fire emergency response personnel.

Potential Health Effects: Concentrate dust may be irritating to the nose, throat and respiratory tract. Inhalation or ingestion of copper may cause nausea, vomiting, headaches,

dizziness, and gastrointestinal irritation. Very high concentrations of concentrate dust may result in lead and cadmium absorption and possible intoxication. Pregnant women should be protected from excessive exposure to prevent lead crossing the placental barrier and causing infant neurological disorders. Copper concentrate contains reportable concentrations of the following carcinogens or possible carcinogens: Lead; Cadmium, Arsenic, Silica (see Toxicological Information, Section 11)

Potential Environmental Effects: Copper concentrate is insoluble in water and its constituent metals have low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to the release of contained metals in bioavailable forms. These can cause toxic impacts in organisms.

4. FIRST AID MEASURES

Inhalation: Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of contamination or move victim from exposure area to fresh air. Obtain medical advice.

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.

Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2 – 8 oz. (60 – 240 ml) of water. If vomiting occurs naturally, have victim rinse mouth with water again. Obtain medical advice and bring a copy of this MSDS.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Copper concentrate is not considered a fire or explosion hazard. However, it may burn if heated strongly enough and for sufficient time in a fire situation. When burning, it releases toxic and highly irritating sulphur dioxide gas.

Extinguishing Media: Use any means of extinction appropriate for the surrounding fire conditions such as water spray, foam, carbon dioxide or dry chemical.

Hazardous Combustion Products: Highly irritating and toxic fumes of sulphur dioxide (SO_2) will be released by burning copper concentrate.

Fire Fighting Guidance: Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face piece mask.

Flammability Properties:

Flash Point: *Not Applicable* Explosive Limits: *Not Applicable* Auto ignition Temperature: *Not Applicable*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Persons responding to an accidental release should wear coveralls or other protective clothing; gloves and a respirator (see also Section 8). Workers should wash and change clothing following cleanup of a spill to prevent personal contamination with heavy metal containing dusts.

Spill Management:

Small Spill: Contain spill and clean up spilled material as soon as possible by vacuuming or moistening the material and wet sweeping/shovelling. Place in suitable, covered, labelled container for disposal.

Large Spill: Control source of spillage if possible to do so safely. Restrict access to the area until completion of cleanup. Ventilate the area prior to clean up if visible dust clouds have been generated. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection

and using methods which will minimize dust generation. Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labelled containers or quarantine areas for later recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Environmental Precautions: Components of this material can pose a threat to the environment with prolonged exposure. Care should be taken to immediately clean up any spillage of this material to the terrestrial or aquatic environment. It is also prone to dusting when allowed to dry out, which can lead to windblown contamination. Measures to control dust generation from storage piles should be applied in dry, dusty locations

7. HANDLING AND STORAGE

Handling: The handling, shipment, storage and processing of this material requires appropriate controls and care to prevent spillage and/or gradual accumulation of dust. Avoid generating dust and the release of dust into the workplace. Good housekeeping is important to prevent accumulations of dust in storage, transfer and processing buildings.

Storage: Store in a cool, dry area away from combustible materials and strong oxidizers or strong mineral acids. Minimize dust generation and accumulation.

Some sulphide concentrates may slowly oxidize in storage and generate sulphur dioxide as well as deplete the oxygen content of a confined space, such as a ship's hold. The atmosphere within confined spaces containing concentrate must be tested before entry and the area thoroughly ventilated or self-contained breathing apparatus used, if conditions warrant.

Some sulphide concentrates may oxidize and generate heat which accumulates in storage piles. If material is to be stored for an extended period, the temperature of piles should be monitored periodically.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines:

Component	ACGIH TLV	OSHA PEL	NIOSH REL
Copper	1.0 mg/m^3	1.0 mg/m^3	1.0 mg/m^3
Sulphur (mineral sulphides)	0.25 ppm SO_2	5 ppm SO_2	2 ppm SO_2 / 5 ppm STEL
Iron	None Established†	None Established†	None Established†
Zinc	None Established†	None Established†	None Established†
Silica	0.025 mg/m^3 Respirable SiO_2	Not Applicable ‡	0.05 mg/m^3 Respirable SiO_2
Lead	0.05 mg/m^3	0.05 mg/m^3	0.05 mg/m^3
Arsenic	0.01 mg/m^3	0.01 mg/m^3	0.002 mg/m^3 Ceiling – 15 min
Cadmium	0.01 mg/m^3 (Total Cd) 0.002 mg/m^3 (Respirable Cd)	0.005 mg/m^3 (total Cd) *Also see Notes below*	Lowest feasible concentration
Selenium	0.2 mg/m^3	0.2 mg/m^3	0.2 mg/m^3

NOTE: OELs for individual jurisdictions may differ from those given above. Check with local authorities for the applicable OELs in your jurisdiction.

ACGIH - American Conference of Governmental Industrial Hygienists; OSHA - Occupational Safety and Health Administration; NIOSH - National Institute for Occupational Safety and Health. TLV – Threshold Limit Value, PEL – Permissible Exposure Limit, REL – Recommended Exposure Limit.

† While there are no established Occupational Exposure Limits for zinc and iron as such, there are OELs for their respective oxides which may be formed during burning, welding or other fuming processes. The OSHA PEL for zinc oxide dust is 15 mg/m^3 (total) and 5 mg/m^3 (respirable); the OSHA PEL for zinc oxide fume is 5 mg/m^3. The ACGIH TLV for zinc oxide is 2 mg/ m^3 (respirable fraction) with a Short Term Exposure Limit (STEL) of 10 mg/m^3 (respirable fraction). The NIOSH REL for zinc oxide (dust or fume) is 5 mg/m^3 10 hr TWA with a 15 mg/m^3 ceiling for zinc oxide dust and a 10 mg/m³ STEL for zinc oxide fume (15 min. sample). The OSHA PEL for iron oxide fume is 10 mg/m^3. The NIOSH REL for iron oxide dust and fume is 5 mg/m^3 (as Fe) and the ACGIH TLV is 5 mg/m^3 of iron oxide dust/fume (respirable fraction).

‡ The OSHA PEL for silica applies only to materials containing 1% silica or more as crystalline free silica. As the maximum percent SiO2 in the concentrate is less than 1% (0.58% maximum), the OSHA silica formulas are therefore not applicable.

OSHA Cadmium SECAL: To be achieved in specified processes and work places where it is not possible to achieve the PEL through engineering and work practices alone. The OSHA SECAL for cadmium is 0.015 or 0.05 mg/m3, depending on the processes involved. See Table 1 of 29 CFR § 1910.1017.

While there are no established OELs for sulphide sulphur, there are OELs for the sulphur dioxide formed during any combustion processes.

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Maintenance and Repair: The metals in copper concentrate powder are present as sulphides that are relatively insoluble in the body. However, during maintenance or repair of equipment contaminated with concentrate dust, high temperature operations such as oxy-acetylene cutting, electric arc welding or arc-air gouging on dust–contaminated surfaces will generate copper oxide fume that also contains zinc oxide as well as traces of lead, cadmium and other metal oxides. These oxides are soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

Engineering Controls: Use adequate local or general ventilation to maintain the concentration of copper concentrate dust in the working environment well below the appropriate occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system.

Personal Protective Equipment (PPE):

Protective Clothing: Coveralls or other work clothing, safety glasses and gloves are recommended to prevent prolonged or repeated direct skin and eye contact. Work clothing should be removed before leaving the plant site and should be changed daily and laundered before reuse if there is a reasonable probability that the clothing may be contaminated. If using a commercial or industrial laundry service, inform laundry personnel of contaminant's hazards. Workers should not take dirty work clothes home and launder them with other personal clothing.

Respirators: Where copper concentrate dust is generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge minimum). Higher levels of respiratory protection such as a full face piece air purifying respirator or a powered air purifying respirator may be necessary in some circumstances.

Specific Hygiene Measures: Do not eat, drink or smoke in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas only

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Dark -green, fine-powder	**Odour:** odourless	**Physical State:** Solid	**pH:** Not Applicable
Vapour Pressure: Negligible at room temperature	**Vapour Density:** Not Applicable	**Boiling Point/Range:** Not Applicable	**Melting Point/Range:** Will burn first unless in an inert atmosphere
Specific Gravity: 3.60	**Evaporation Rate:** Not Applicable	**Coefficient of Water/ Oil Distribution:** Not Applicable	**Odour Threshold:** No Data
Solubility: Insoluble in water	**Percent Volatiles:** Approx. 8% moisture		

10. STABILITY AND REACTIVITY

Stability/Reactivity: This material is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Conditions to Avoid: Avoid contact with strong mineral acids (see Hazardous Decomposition below). Avoid contact with fire or open flames. Avoid contact with active metals such as zinc, aluminum or galvanized steel in the presence of acids.

Incompatible Materials: Copper concentrate may react violently with strong oxidizers such as concentrated hydrogen peroxide. Copper concentrate is incompatible with strong acids, as well as zinc, magnesium and cadmium chlorates.

Hazardous Decomposition: Sulphide ores and concentrates can react with strong mineral acids such as sulphuric acid to release hydrogen sulphide gas (rotten egg odour), which is both toxic and flammable. Trace quantities of hydrogen selenide gas may also be generated from this concentrate.

Under reducing conditions (i.e. any strong acid or base plus an active metal such as metallic zinc or aluminum) or in the presence of freshly formed hydrogen, traces of highly toxic ARSINE gas might be evolved.

Though it does not ignite readily, when burning, concentrate will generate irritating and toxic sulphur dioxide gas as well as copper oxide fumes that also contain small amounts of other metal oxides. High temperature operations such as welding or burning will also generate copper oxide fume which, on inhalation in sufficient quantity, can produce metal fume fever.

11. TOXICOLOGICAL INFORMATION

Animal Toxicity:

Acute Oral Toxicity	Copper Sulphide - LD_{50} Rat-Oral	no data
	Iron Sulphide - LD_{50} Rat-Oral	no data
	Zinc Sulphide - LD_{50} Rat-Oral	> 2,000 mg/kg
	Silica - LD50 Rat-Oral	no data
	Lead Sulphide - LD_{50} Guinea Pig-Oral	>10,000 mg/kg
	Arsenic - LD_{50} Rat-Oral	763 mg/kg
	Cadmium Sulphide - LD_{50} Rat-Oral	7,080 mg/kg
	Selenium Sulphide - LD_{50} Rat-Oral	38 mg/kg
Acute Dermal Toxicity	Zinc Sulphide - LD_{50} Rat-Skin	> 2,000 mg/kg
Acute Inhalation Toxicity	Zinc Sulphide - LC_{50} Rat-Inhalation	>5,040 mg/m^3/4Hr

General: The toxicological properties of this material have not been fully investigated. The information contained in this MSDS is therefore based on information in the technical and scientific literature about the material's constituent compounds. The primary route of exposure would be through inhalation of dust or fumes.

Acute:

Skin/Eye: Contact with the eyes may cause local irritation due to direct abrasive action of the particles but would not cause tissue damage. Direct contact with the skin may also cause local mechanical irritation.

Inhalation: Acute inhalation of dust is irritating to the nose, throat and upper respiratory tract. Symptoms may include dryness and irritation of the nose and throat, coughing, possible tightness of the chest and metallic taste. In the powder form in which this product is sold, the metals are present as sulphides that are relatively insoluble and poorly absorbed within the body. However, welding or burning on dust–contaminated surfaces will generate copper oxide fume that also contains some zinc as well as lead and cadmium oxides. These oxides are soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body. The primary risk of inhalation would therefore be through inhalation of metal oxide fumes, composed principally of copper oxides. An intense, short-term exposure to welding/burning fumes could result in the condition called metal fume fever. The symptoms of metal fume fever generally occur within 3 to 10 hours, and include immediate dryness and irritation of the throat, tightness of the chest, and coughing which may be followed later by flu-like symptoms of fever, malaise, perspiration, frontal headache, muscle cramps, low back pain, occasionally blurred vision, nausea, and vomiting. The symptoms are temporary and generally disappear, without medical intervention, within 24 to 48 hours of onset. An acute, short-term exposure to high levels

of copper fumes could also result in the absorption of some lead and cadmium in the body.

Ingestion: Copper sulphide is poorly absorbed from the gut. Symptoms due to ingestion would be similar to those from inhalation. Other health effects such as constipation or bloody diarrhea might also occur.

Chronic: The chronic health effects of copper concentrate have not been fully investigated. Prolonged exposure to copper dust or copper oxide fume can cause irritation to the upper respiratory tract and, occasionally, ulceration and perforation of the nasal septum. A green discolouration of the skin and hair has been reported in some copper workers similar to that caused by wearing jewellery made of copper. A few instances of allergic skin rashes have also been reported in workers exposed to metallic copper. Copper is an essential element, but can become toxic when inhaled or ingested in large doses. Individuals with a rare disease called "Wilson's Disease" (estimated prevalence 0.003% of the population) are predisposed to accumulate copper and should not be occupationally exposed. Chronic inhalation of very high dust concentrations could risk lead arsenic or cadmium intoxication.

Material	Carcinogenicity Classification
Copper	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Iron	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Zinc	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Silica	*Crystalline silica of respirable particle size only* – IARC & NTP – Carcinogen, ACGIH – Suspected Human Carcinogen, Not listed as a carcinogen by OSHA
Lead	IARC – Probable Carcinogen, NTP – Likely Carcinogen, ACGIH – Animal Carcinogen
Arsenic	IARC, ACGIH & OSHA – Carcinogen, NTP – Known Carcinogen
Cadmium	IARC, NTP & OSHA – Known Carcinogen, ACGIH – Suspect Human Carcinogen
Selenium	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.

12. ECOLOGICAL INFORMATION

Acute Toxicity Copper concentrate is insoluble in water and its metals content has low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to some release of contained metals in bioavailable forms. Soluble copper can be quite toxic to aquatic and terrestrial organisms.

Mobility The mobility of the released major metal constituents is media dependent. They can bind with inorganic and organic ligands, reducing their mobility and bioavailability in soil and water. Bioavailability is also influenced by other factors such as pH and hardness. Copper and zinc compounds are quite mobile in surface water or ground waters, as are cadmium compounds, but lead compounds are not particularly mobile in either media.

Persistence/Degradability As the constituents are all metals they are persistent in the environment, once released in bioavailable form.

Bioaccumulation Both lead and cadmium bioaccumulate in plants and animals in both aquatic and terrestrial environments.

13. DISPOSAL CONSIDERATIONS

Material Disposal: Recover and recycle copper concentrate if at all possible. Waste material may meet the requirements of a hazardous waste in many jurisdictions. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated in order to determine the proper waste classification and disposal methods.

Local Legislation: If this material cannot be returned to process or salvage, dispose of in accordance with applicable national, regional and local laws and regulations.

14. TRANSPORT INFORMATION

U.S. DOT HAZARD CLASSIFICATION	Class 9, Packing Group III
U.S. PROPER SHIPPING NAME	Environmentally Hazardous Substance, Solid, n.o.s. (contains lead sulfide)
U.S. DOT RQ	Lead sulfide 10 lbs.
U.S. DOT PRODUCT IDENTIFICATION NUMBER	UN3077
MARINE POLLUTANT	No
IMO CLASSIFICATION	MHB - Materials Hazardous Only in Bulk
TRANSPORT CANADA CLASSIFICATION	Not regulated

15. REGULATORY INFORMATION

USA

TSCA Status: All ingredients in this material are listed on the TSCA inventory.

SARA Title III:

Sec'n 302/304: Extremely Hazardous Substance……None of the ingredients qualify

Sec'n 311/312: Delayed (Chronic Health Effect) – Carcinogen
Delayed (Chronic) Health Effect – Reproductive Toxin

Sec'n 313 : Toxic Release Inventory – RQ Lead sulphide – 10 lbs
Selenium sulphide – 10 lbs
All other ingredients – not assigned

OSHA HCS: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (contains lead, cadmium, arsenic and silica at greater than 0.1%)

Canada

DSL/NDSL: All ingredients are listed on the Domestic Substances List.

WHMIS Classification: **D2A**, (contains listed cancer-causing material(s) at 0.1% or greater)

16. OTHER INFORMATION

MSDS Version Number:	00
MSDS Effective Date:	2010/05/18
Supersedes Previous Edition Dated:	*original edition*
Responsibility for this MSDS:	Yukon Zinc Corporation Suite 701, 474 Howe Street Vancouver, British Columbia V6C 2B3 (604) 682-5474 or 1-877-682-5474

Disclaimer: The information contained in this MSDS is based upon technical information believed to be appropriate and represents the most reliable information available at the indicated date of preparation. However, it may be subject to revision as additional information and experience are gained. No warranty or guarantee is expressed or implied regarding the accuracy or completeness of these data and Yukon Zinc Corp will not be liable for any damages, losses or injuries which may result from the use or reliance on any information provided in this MSDS.
This MSDS is intended to describe the product for the purposes of health, safety and environmental requirements only. It is offered solely for your information, consideration and investigation. It is not warranted or represented to be all inclusive as it does not and cannot advise on all possible situations. Final determination of suitability of any material is the sole responsibility of the user and you should independently evaluate your specific use of this material to determine if additional or other precautions are required.
Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

Yukon Zinc Corporation

Material Safety Data Sheet

Wolverine Mine Lead Concentrate

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Wolverine Mine Lead Concentrate
MSDS Number:	Wv-01
Product Uses:	Lead concentrate is the starting material for the production of lead metal and lead alloys.
Company Identification:	Yukon Zinc Corporation Wolverine Project 190 KM Robert Campbell Highway NW Watson Lake, YT Y0A 1C0
Emergency Telephone Number:	(604) 638-0921 Ext. 1

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS Registry No.	CONCENTRATION (% wgt / wgt)
Lead	7439-92-1	21 – 43% Pb
Sulphur (as mineral sulphides)	7704-34-9	15 - 25% S
Zinc	7440-66-6	12 – 14% Zn
Iron	7439-89-6	14 – 23% Fe
Copper	7440-50-8	2.0 – 2.5% Cu
Selenium	7782-49-2	0.5 – 2.5% Se
Antimony	7440-36-0	0.2 – 0.6% Sb
Arsenic	7440-38-2	0.2 – 0.3% As

3. HAZARDS IDENTIFICATION

Emergency Overview: A dark gray, heavy, soil-like material that is not flammable or combustible under normal conditions of transport and storage. However, when heated strongly in air it will burn, releasing toxic and irritating sulphur dioxide gas as well as possible lead and other metal oxide fumes. Contact with strong acids will generate flammable and highly toxic hydrogen sulphide gas (H2S). Inhalation or ingestion of concentrate dust may produce both acute and chronic health effects. Possible cancer hazard due to lead and arsenic content. Possible reproductive hazard due to lead content. SCBA and full protective clothing required for fire emergency response personnel.

Potential Health Effects: Concentrate dust may be irritating to the nose, throat and respiratory tract. Inhalation or ingestion of high concentrations of concentrate dust will result in lead absorption and possible intoxication. Symptoms include headache, nausea,

vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anaemia and leg, arm, and joint pain. Prolonged exposure may also cause central nervous system damage (e.g., fatigue, headaches, tremors, and hypertension), gastrointestinal disturbances, anaemia, kidney dysfunction and possible reproductive effects. Pregnant women should be protected from excessive exposure to prevent lead crossing the placental barrier and causing infant neurological disorders. Lead concentrate contains reportable concentrations of the following carcinogens or possible carcinogens: Lead; Arsenic (see Toxicological Information, Section 11)

Potential Environmental Effects: Lead concentrate is insoluble in water and its constituent metals have low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to the release of contained metals in bioavailable forms. These can cause toxic impacts in organisms.

4. FIRST AID MEASURES

Inhalation: Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of contamination or move victim from exposure area to fresh air. Obtain medical advice.

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.

Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2 – 8 oz. (60 – 240 ml) of water. If vomiting occurs naturally, have victim rinse mouth with water again. Obtain medical advice and bring a copy of this MSDS.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Lead concentrate is not considered a fire or explosion hazard. However, it may burn if heated strongly enough and for sufficient time in a fire situation. When burning, it releases toxic and highly irritating sulphur dioxide gas.

Extinguishing Media: Use any means of extinction appropriate for the surrounding fire conditions such as water spray, foam, carbon dioxide or dry chemical.

Hazardous Combustion Products: Highly irritating and toxic fumes of sulphur dioxide (SO_2) will be released by burning lead concentrate.

Fire Fighting Guidance: Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face piece mask.

Flammability Properties:

Flash Point: *Not Applicable* Explosive Limits: *Not Applicable* Auto ignition Temperature: *Not Applicable*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Persons responding to an accidental release should wear coveralls or other protective clothing; gloves and a respirator (see also Section 8). Workers should wash and change clothing following cleanup of a spill to prevent personal contamination with heavy metal containing dusts.

Spill Management:

Small Spill: Contain spill and clean up spilled material as soon as possible by vacuuming or moistening the material and wet sweeping/shovelling. Place in suitable, covered, labelled container for disposal.

Large Spill: Control source of spillage if possible to do so safely. Restrict access to the area until completion of cleanup. Ventilate the area prior to clean up if visible dust clouds have been generated. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection and using methods which will minimize dust generation. Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labelled containers or quarantine areas for later recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Environmental Precautions: Components of this material can pose a threat to the environment with prolonged exposure. Care should be taken to immediately clean up any spillage of this material to the terrestrial or aquatic environment. It is also prone to dusting when allowed to dry out, which can lead to windblown contamination. Measures to control dust generation from storage piles should be applied in dry, dusty locations

7. HANDLING AND STORAGE

Handling: The handling, shipment, storage and processing of this material requires appropriate controls and care to prevent spillage and/or gradual accumulation of dust. Avoid generating dust and the release of dust into the workplace. Good housekeeping is important to prevent accumulations of dust in storage, transfer and processing buildings.

Storage: Store in a cool, dry area away from combustible materials and strong oxidizers or strong mineral acids. Minimize dust generation and accumulation.

Some sulphide concentrates may slowly oxidize in storage and generate sulphur dioxide as well as deplete the oxygen content of a confined space, such as a ship's hold. The atmosphere within confined spaces containing concentrate must be tested before entry and the area thoroughly ventilated or self-contained breathing apparatus used, if conditions warrant.

Some sulphide concentrates may oxidize and generate heat which accumulates in storage piles. If material is to be stored for an extended period, the temperature of piles should be monitored periodically.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines:

Component	ACGIH TLV	OSHA PEL	NIOSH REL
Lead	0.05 mg/m^3	0.05 mg/m^3	0.05 mg/m^3
Sulphur (mineral sulphides)	0.25 ppm SO_2	5 ppm SO_2	2 ppm SO_2 / 5 ppm STEL
Zinc	None Established†	None Established†	None Established†
Iron	None Established†	None Established†	None Established†
Copper	1.0 mg/m^3	1.0 mg/m^3	1.0 mg/m^3
Selenium	0.2 mg/m^3	0.2 mg/m^3	0.2 mg/m^3
Antimony	0.5 mg/m^3	0.5 mg/m^3	0.5 mg/m^3
Arsenic	0.01 mg/m^3	0.01 mg/m^3	0.002 mg/m^3 Ceiling – 15 min

NOTE: OELs for individual jurisdictions may differ from those given above. Check with local authorities for the applicable OELs in your jurisdiction.

ACGIH - American Conference of Governmental Industrial Hygienists; OSHA - Occupational Safety and Health Administration; NIOSH - National Institute for Occupational Safety and Health. TLV – Threshold Limit Value, PEL – Permissible Exposure Limit, REL – Recommended Exposure Limit.

† While there are no established Occupational Exposure Limits for zinc and iron as such, there are OELs for their respective oxides which may be formed during burning, welding or other fuming processes. The OSHA PEL for zinc oxide dust is 15 mg/m^3 (total) and 5 mg/m^3 (respirable); the OSHA PEL for zinc oxide fume is 5 mg/m^3. The ACGIH TLV for zinc oxide is 2 mg/ m^3 (respirable fraction) with a Short Term Exposure Limit (STEL) of 10 mg/m^3 (respirable fraction). The NIOSH REL for zinc oxide (dust or fume) is 5 mg/m^3 10 hr TWA with a 15 mg/m^3 ceiling for zinc oxide dust and a 10 mg/m^3 STEL for zinc oxide fume (15 min. sample). The OSHA PEL for iron oxide fume is 10 mg/m^3. The NIOSH REL for iron oxide dust and fume is 5 mg/m^3 (as Fe) and the ACGIH TLV is 5 mg/m^3 of iron oxide dust/fume (respirable fraction).

While there are no established OELs for sulphide sulphur, there are OELs for the sulphur dioxide formed during any combustion processes.

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Maintenance and Repair: The metals in lead concentrate powder are present as sulphides that are relatively insoluble in the body. However, during maintenance or repair of equipment contaminated with concentrate dust, high temperature operations such as oxy-acetylene cutting, electric arc welding or arc-air gouging on dust–contaminated surfaces will generate lead oxide fume that also contains zinc, copper, arsenic and other metal oxides. These oxides are soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

Engineering Controls: Use adequate local or general ventilation to maintain the concentration of lead concentrate dust in the working environment well below the appropriate occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system.

Personal Protective Equipment (PPE):

Protective Clothing: Coveralls or other work clothing, safety glasses and gloves are recommended to prevent prolonged or repeated direct skin and eye contact. Work clothing should be removed and changed immediately if it becomes heavily contaminated. It should be changed daily at the end of the work shift and laundered before reuse. If using a commercial or industrial laundry service, inform laundry personnel of contaminant's hazards. Workers should not take dirty work clothes home and launder them with other personal clothing.

Respirators: Where lead concentrate dust is generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge minimum). Higher levels of respiratory protection such as a full face piece air purifying respirator or a powered air purifying respirator may be necessary in some circumstances.

Specific Hygiene Measures: Do not eat, drink or smoke in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas only. Workers should wash/shower at the end of each work shift. A double locker-shower system with separate clean and dirty sides is usually required for lead handling operations to avoid cross-contamination of street clothes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Fine powder, dark gray color	**Odour:** Weak organic odour from entrained flotation reagent(s)	**Physical State:** Solid	**pH:** Not Applicable
Vapour Pressure: Negligible at room temperature	**Vapour Density:** Not Applicable	**Boiling Point/Range:** Not Applicable	**Melting Point/Range:** Will burn first unless in an inert atmosphere
Specific Gravity: 4.35	**Evaporation Rate:** Not Applicable	**Coefficient of Water/ Oil Distribution:** Not Applicable	**Odour Threshold:** No Data
Solubility: Insoluble in water	**Percent Volatiles:** Approx. 8% moisture		

10. STABILITY AND REACTIVITY

Stability/Reactivity: This material is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Conditions to Avoid: Avoid contact with strong mineral acids (see Hazardous Decomposition below). Avoid contact with fire or open flames. Avoid contact with active metals such as zinc, aluminum or galvanized steel in the presence of acids.

Incompatible Materials: Lead concentrate may react violently with strong oxidizers such as iodine pentachloride or concentrated hydrogen peroxide. Lead concentrate is incompatible with strong acids.

Hazardous Decomposition: Sulphide ores and concentrates can react with strong mineral acids such as sulphuric acid to release hydrogen sulphide gas (rotten egg odour), which is both toxic and flammable. Small quantities of hydrogen selenide gas may also be generated from this concentrate.
Under reducing conditions (i.e. any strong acid or base plus an active metal such as metallic zinc or aluminum) or in the presence of freshly formed hydrogen, traces of highly toxic ARSINE gas might be evolved.
Though it does not ignite readily, when burning, concentrate will generate irritating and toxic sulphur dioxide gas as well as lead oxide fumes that also contain small amounts of other metal oxides.

11. TOXICOLOGICAL INFORMATION

Animal Toxicity:

Acute Oral Toxicity	Lead Sulphide - LD_{50} Guinea Pig-Oral	>10,000 mg/kg
	Zinc Sulphide - LD_{50} Rat-Oral	> 2,000 mg/kg
	Iron Sulphide - LD_{50} Rat-Oral	no data
	Copper Sulphide - LD_{50} Rat-Oral	no data
	Selenium Sulphide - LD_{50} Rat-Oral	38 mg/kg
	Arsenic - LD_{50} Rat-Oral	763 mg/kg
	Antimony - LD50 Rat-Oral	7,000 mg/kg
Acute Dermal Toxicity	Zinc Sulphide - LD_{50} Rat-Skin	> 2,000 mg/kg
Acute Inhalation Toxicity	Zinc Sulphide - LC_{50} Rat-Inhalation	>5,040 mg/m^3/4Hr

General: The toxicological properties of this material have not been fully investigated. The information contained in this MSDS is therefore based on information in the technical and scientific literature about the material's constituent compounds. The primary route of exposure would be through inhalation of dust or fumes.

Acute:

Skin/Eye: Contact with the eyes may cause local irritation due to direct abrasive action of the particles but would not cause tissue damage. Direct contact with the skin may also cause local mechanical irritation.

Inhalation: Acute inhalation of dust or fume is irritating to the nose, throat and respiratory tract. Symptoms may include dryness and irritation of the nose and throat, possible tightness of the chest, coughing and metallic taste. An intense, short-term exposure to welding/burning fumes could result in congestion and pulmonary edema and even acute encephalopathy with seizures, coma and death in extreme cases. However short-term exposures of this magnitude are unlikely in industry today.

Ingestion: Lead sulphide is poorly absorbed from the gut. Symptoms due to ingestion would be similar to those from inhalation. Other health effects such as constipation or bloody diarrhea might also occur.

Chronic: The chronic health effects of lead concentrate have not been fully investigated. Prolonged exposure to lead concentrate dust may be expected to produce generalized fatigue with sleep disturbances, weight loss and pain in the legs, arm and joints. As well, gastrointestinal disturbances including nausea, vomiting and abdominal spasms may be experienced. It may also cause central nervous system damage, kidney dysfunction, anaemia and possible garlic odour of breath and perspiration. Reduced haemoglobin production has been associated with low lead exposures. Symptoms of central nervous system damage due to moderate exposure include fatigue, headaches, tremors and hypertension. Very high exposure can result in lead encephalopathy with symptoms of hallucinations, convulsions, and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic over-exposure to lead has been implicated as a causative agent for the impairment of male and female reproductive capacity. Pregnant women should be protected from excessive exposure as lead can cross the placental barrier and unborn children may suffer neurological damage or

developmental problems. Teratogenic and mutagenic effects from exposure to lead have been reported in some studies but not in others. The literature is inconsistent and no firm conclusions can be drawn.

Material	Carcinogenicity Classification
Lead	IARC – Probable Carcinogen, NTP – Likely Carcinogen, ACGIH – Animal Carcinogen, Not listed as a carcinogen by OSHA
Zinc	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Iron	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Copper	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Selenium	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Antimony	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Arsenic	IARC, ACGIH & OSHA – Carcinogen, NTP – Known Carcinogen

12. ECOLOGICAL INFORMATION

Acute Toxicity Lead concentrate is insoluble in water and its metals content has low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to some release of contained metals in bioavailable forms.

Mobility The mobility of the released major metal constituents is media dependent. They can bind with inorganic and organic ligands, reducing their mobility and bioavailability in soil and water. Bioavailability is also influenced by other factors such as pH and hardness. Lead compounds are not particularly mobile in surface water or groundwater but zinc compounds are quite mobile in both media.

Persistence/Degradability As the constituents are all metals they are persistent in the environment, once released in bioavailable form.

Bioaccumulation Lead bioaccumulates in plants and animals in both aquatic and terrestrial environments.

13. DISPOSAL CONSIDERATIONS

Material Disposal: Recover and recycle lead concentrate if at all possible. Waste material meets the requirements of a hazardous waste in most jurisdictions. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated in order to determine the proper waste classification and disposal methods.

Local Legislation: If this material cannot be returned to process or salvage, dispose of in accordance with applicable national, regional and local laws and regulations.

14. TRANSPORT INFORMATION

U.S. DOT HAZARD CLASSIFICATION	Class 9, Packing Group III
U.S. PROPER SHIPPING NAME	Environmentally Hazardous Substance, Solid, n.o.s. (contains lead sulfide)
U.S. DOT RQ	Lead sulfide 10 lbs.
U.S. DOT PRODUCT IDENTIFICATION NUMBER	UN3077
MARINE POLLUTANT	No
IMO CLASSIFICATION	MHB - Materials Hazardous Only in Bulk
TRANSPORT CANADA CLASSIFICATION	Not regulated

15. REGULATORY INFORMATION

USA

TSCA Status: All ingredients in this material are listed on the TSCA inventory.

SARA Title III:

Sec'n 302/304: Extremely Hazardous Substance……None of the ingredients qualify

Sec'n 311/312: Delayed (Chronic Health Effect) – Carcinogen
Delayed (Chronic) Health Effect – Reproductive Toxin

Sec'n 313 : Toxic Release Inventory – RQ
Lead sulphide – 10 lbs
Selenium sulphide – 10 lbs
All other ingredients – not assigned

OSHA HCS: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (contains lead and arsenic at greater than 0.1%)

Canada

DSL/NDSL: All ingredients are listed on the Domestic Substances List.

WHMIS Classification: **D2A**, (contains listed cancer-causing material(s) at 0.1% or greater)

16. OTHER INFORMATION

MSDS Version Number: 00
MSDS Effective Date: 2010/04/15
Supersedes Previous Edition Dated: *original edition*
Responsibility for this MSDS: Yukon Zinc Corporation
Suite 701, 474 Howe Street
Vancouver, British Columbia
V6C 2B3
(604) 682-5474 or 1-877-682-5474

Disclaimer: The information contained in this MSDS is based upon technical information believed to be appropriate and represents the most reliable information available at the indicated date of preparation. However, it may be subject to revision as additional information and experience are gained. No warranty or guarantee is expressed or implied regarding the accuracy or completeness of these data and Yukon Zinc Corp will not be liable for any damages, losses or injuries which may result from the use of or reliance on any information provided in this MSDS.
This MSDS is intended to describe the product for the purposes of health, safety and environmental requirements only. It is offered solely for your information, consideration and investigation. It is not warranted or represented to be all inclusive as it does not and cannot advise on all possible situations. Final determination of suitability of any material is the sole responsibility of the user and you should independently evaluate your specific use of this material to determine if additional or other precautions are required.
Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

Yukon Zinc Corporation

Material Safety Data Sheet

Wolverine Mine Zinc Concentrate

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Wolverine Mine Zinc Concentrate
MSDS Number:	Wv-02
Product Uses:	Zinc concentrate is the starting material for the production of zinc metal and zinc alloys.
Company Identification:	Yukon Zinc Corporation Wolverine Project 190 KM Robert Campbell Highway NW Watson Lake, YT Y0A 1C0
Emergency Telephone Number:	(604) 638-0921 Ext. 1

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS Registry No.	CONCENTRATION (% wgt / wgt)
Zinc	7440-66-6	48 – 54% Zn
Sulphur (as mineral sulphides)	7704-34-9	32 - 33.2% S
Iron	7439-89-6	7 – 11% Fe
Silica	14808-60-7	0.10 – 0.13% Si
Lead	7439-92-1	0.7 -1.5% Pb
Cadmium	7440-43-9	0.51 – 0.52% Cd
Selenium	7782-49-2	0.18 – 0.23% Se

3. HAZARDS IDENTIFICATION

Emergency Overview: A dark, greenish-brown fine powder, that is not flammable or combustible under normal conditions of transport and storage. However, when heated strongly in air it will burn, releasing toxic and irritating sulphur dioxide gas as well as possible zinc and lead oxide fumes. Contact with strong acids will generate flammable and highly toxic hydrogen sulphide gas (H2S). Inhalation or ingestion of concentrate dust may produce both acute and chronic health effects. Possible cancer hazard due to lead, cadmium and silica content. Possible reproductive hazard due to lead content. SCBA and full protective clothing required for fire emergency response personnel.

Potential Health Effects: Concentrate dust may be irritating to the nose, throat and respiratory tract. Inhalation or ingestion of very high concentrations of concentrate dust may result in lead and cadmium absorption and possible intoxication. Symptoms include headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances,

weight loss, anaemia and leg, arm, and joint pain. Prolonged exposure may also cause central nervous system damage (e.g., fatigue, headaches, tremors, and hypertension), gastrointestinal disturbances, anaemia, kidney dysfunction and possible reproductive effects. Pregnant women should be protected from excessive exposure to prevent lead crossing the placental barrier and causing infant neurological disorders. Zinc concentrate contains reportable concentrations of the following carcinogens or possible carcinogens: Lead; Cadmium, Silica (see Toxicological Information, Section 11)

Potential Environmental Effects: Zinc concentrate is insoluble in water and its constituent metals have low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to the release of contained metals in bioavailable forms. These can cause toxic impacts in organisms.

4. FIRST AID MEASURES

Inhalation: Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of contamination or move victim from exposure area to fresh air. Obtain medical advice.

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.

Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2 – 8 oz. (60 – 240 ml) of water. If vomiting occurs naturally, have victim rinse mouth with water again. Obtain medical advice and bring a copy of this MSDS.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Zinc concentrate is not considered a fire or explosion hazard. However, it may burn if heated strongly enough and for sufficient time in a fire situation. When burning, it releases toxic and highly irritating sulphur dioxide gas.

Extinguishing Media: Use any means of extinction appropriate for the surrounding fire conditions such as water spray, foam, carbon dioxide or dry chemical.

Hazardous Combustion Products: Highly irritating and toxic fumes of sulphur dioxide (SO_2) will be released by burning zinc concentrate.

Fire Fighting Guidance: Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face piece mask.

Flammability Properties:

Flash Point: *Not Applicable* Explosive Limits: *Not Applicable* Auto ignition Temperature: *Not Applicable*

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Persons responding to an accidental release should wear coveralls or other protective clothing; gloves and a respirator (see also Section 8). Workers should wash and change clothing following cleanup of a spill to prevent personal contamination with heavy metal containing dusts.

Spill Management:

Small Spill: Contain spill and clean up spilled material as soon as possible by vacuuming or moistening the material and wet sweeping/shovelling. Place in suitable, covered, labelled container for disposal.

Large Spill: Control source of spillage if possible to do so safely. Restrict access to the area until completion of cleanup. Ventilate the area prior to clean up if visible dust clouds have been generated. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection and using methods which will minimize dust generation. Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labelled containers or quarantine areas for later recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Environmental Precautions: Components of this material can pose a threat to the environment with prolonged exposure. Care should be taken to immediately clean up any spillage of this material to the terrestrial or aquatic environment. It is also prone to dusting when allowed to dry out, which can lead to windblown contamination. Measures to control dust generation from storage piles should be applied in dry, dusty locations

7. HANDLING AND STORAGE

Handling: The handling, shipment, storage and processing of this material requires appropriate controls and care to prevent spillage and/or gradual accumulation of dust. Avoid generating dust and the release of dust into the workplace. Good housekeeping is important to prevent accumulations of dust in storage, transfer and processing buildings.

Storage: Store in a cool, dry area away from combustible materials and strong oxidizers or strong mineral acids. Minimize dust generation and accumulation.

Some sulphide concentrates may slowly oxidize in storage and generate sulphur dioxide as well as deplete the oxygen content of a confined space, such as a ship's hold. The atmosphere within confined spaces containing concentrate must be tested before entry and the area thoroughly ventilated or self-contained breathing apparatus used, if conditions warrant.

Some sulphide concentrates may oxidize and generate heat which accumulates in storage piles. If material is to be stored for an extended period, the temperature of piles should be monitored periodically.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Guidelines:

Component	ACGIH TLV	OSHA PEL	NIOSH REL
Zinc	None Established†	None Established†	None Established†
Sulphur (mineral sulphides)	0.25 ppm SO_2	5 ppm SO_2	2 ppm SO_2 / 5 ppm STEL
Iron	None Established†	None Established†	None Established†
Silica	0.025 mg/m^3 Respirable SiO_2	Not Applicable ‡	0.05 mg/m^3 Respirable SiO_2
Lead	0.05 mg/m^3	0.05 mg/m^3	0.05 mg/m^3
Cadmium	0.01 mg/m^3 (Total Cd) 0.002 mg/m^3 (Respirable Cd)	0.005 mg/m^3 (total Cd) *Also see Notes below*	Lowest feasible concentration
Selenium	0.2 mg/m^3	0.2 mg/m^3	0.2 mg/m^3

NOTE: OELs for individual jurisdictions may differ from those given above. Check with local authorities for the applicable OELs in your jurisdiction.

ACGIH - American Conference of Governmental Industrial Hygienists; OSHA - Occupational Safety and Health Administration; NIOSH - National Institute for Occupational Safety and Health. TLV – Threshold Limit Value, PEL – Permissible Exposure Limit, REL – Recommended Exposure Limit.

† While there are no established Occupational Exposure Limits for zinc and iron as such, there are OELs for their respective oxides which may be formed during burning, welding or other fuming processes. The OSHA PEL for zinc oxide dust is 15 mg/m^3 (total) and 5 mg/m^3 (respirable); the OSHA PEL for zinc oxide fume is 5 mg/m^3. The ACGIH TLV for zinc oxide is 2 mg/ m^3 (respirable fraction) with a Short Term Exposure Limit (STEL) of 10 mg/m^3 (respirable fraction). The NIOSH REL for zinc oxide (dust or fume) is 5 mg/m^3 10 hr TWA with a 15 mg/m^3 ceiling for zinc oxide dust and a 10 mg/m³ STEL for zinc oxide fume (15 min. sample). The OSHA PEL for iron oxide fume is 10 mg/m^3. The NIOSH REL for iron oxide dust and fume is 5 mg/m^3 (as Fe) and the ACGIH TLV is 5 mg/m^3 of iron oxide dust/fume (respirable fraction).

‡ The OSHA PEL for silica applies only to materials containing 1% silica or more as crystalline free silica. As the maximum percent SiO2 in the concentrate is less than 1% (0.28% maximum), the OSHA silica formulas are therefore not applicable.

OSHA Cadmium SECAL: To be achieved in specified processes and work places where it is not possible to achieve the PEL through engineering and work practices alone. The OSHA SECAL for cadmium is 0.015 or 0.05 mg/m3, depending on the processes involved. See Table 1 of 29 CFR § 1910.1017.

While there are no established OELs for sulphide sulphur, there are OELs for the sulphur dioxide formed during any combustion processes.

NOTE: The selection of the necessary level of engineering controls and personal protective equipment will vary depending upon the conditions of use and the potential for exposure. The following are therefore only general guidelines that may not fit all circumstances. Control measures to consider include:

Maintenance and Repair: The metals in zinc concentrate powder are present as sulfides that are relatively insoluble in the body. However, during maintenance or repair of equipment contaminated with concentrate dust, high temperature operations such as oxy-acetylene cutting, electric arc welding or arc-air gouging on dust–contaminated surfaces will generate zinc oxide fume that also contains lead, cadmium, and other metal oxides. These oxides are soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

Engineering Controls: Use adequate local or general ventilation to maintain the concentration of zinc concentrate dust in the working environment well below the appropriate occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system.

Personal Protective Equipment (PPE):

Protective Clothing: Coveralls or other work clothing, safety glasses and gloves are recommended to prevent prolonged or repeated direct skin and eye contact. Work clothing should be removed before leaving the plant site and should be changed daily and laundered before reuse if there is a reasonable probability that the clothing may be contaminated. If using a commercial or industrial laundry service, inform laundry personnel of contaminant's hazards. Workers should not take dirty work clothes home and launder them with other personal clothing.

Respirators: Where zinc concentrate dust is generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge minimum). Higher levels of respiratory protection such as a full face piece air purifying respirator or a powered air purifying respirator may be necessary in some circumstances.

Specific Hygiene Measures: Do not eat, drink or smoke in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas only.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Dark-green-brown, fine grained powder	**Odour:** Weak organic odour from entrained flotation reagent	**Physical State:** Solid	**pH:** Not Applicable
Vapour Pressure: Negligible at room temperature	**Vapour Density:** Not Applicable	**Boiling Point/Range:** Not Applicable	**Melting Point/Range:** Will burn first unless in an inert atmosphere
Specific Gravity: 3.74	**Evaporation Rate:** Not Applicable	**Coefficient of Water/ Oil Distribution:** Not Applicable	**Odour Threshold:** No Data
Solubility: Insoluble in water	**Percent Volatiles:** Approx. 8% moisture		

10. STABILITY AND REACTIVITY

Stability/Reactivity: This material is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur.

Conditions to Avoid: Avoid contact with strong mineral acids (see Hazardous Decomposition below). Avoid contact with fire or open flames.

Incompatible Materials: Zinc concentrate may react violently with strong oxidizers such as iodine pentachloride or concentrated hydrogen peroxide. Zinc concentrate is incompatible with strong acids.

Hazardous Decomposition: Sulphide ores and concentrates can react with strong mineral acids such as sulphuric acid to release hydrogen sulphide gas (rotten egg odour), which is both toxic and flammable. Trace quantities of hydrogen selenide gas may also be generated from this concentrate.
Though it does not ignite readily, when burning, concentrate will generate irritating and toxic sulphur dioxide gas as well as zinc oxide fumes that also contain small amounts of other metal oxides. High temperature operations such as welding or burning will also generate zinc oxide fume which, on inhalation in sufficient quantity, can produce metal fume fever.

11. TOXICOLOGICAL INFORMATION

Animal Toxicity:

Acute Oral Toxicity	Zinc Sulphide - LD_{50} Rat-Oral	> 2,000 mg/kg
	Iron Sulphide - LD_{50} Rat-Oral	no data
	Silica - LD_{50} Rat-Oral	no data
	Lead Sulphide - LD_{50} Guinea Pig-Oral	>10,000 mg/kg
	Cadmium Sulphide - LD_{50} Rat-Oral	7,080 mg/kg
	Selenium Sulphide - LD_{50} Rat-Oral	38 mg/kg
Acute Dermal Toxicity	Zinc Sulphide - LD_{50} Rat-Skin	> 2,000 mg/kg
Acute Inhalation Toxicity	Zinc Sulphide - LC_{50} Rat-Inhalation	>5,040 mg/m^3/4Hr

General: The toxicological properties of this material have not been fully investigated. The information contained in this MSDS is therefore based on information in the technical and scientific literature about the material's constituent compounds. The primary route of exposure would be through inhalation of dust or fumes.

Acute:

Skin/Eye: Contact with the eyes may cause local irritation due to direct abrasive action of the particles but would not cause tissue damage. Direct contact with the skin may also cause local mechanical irritation.

Inhalation: Acute inhalation of dust is irritating to the nose, throat and upper respiratory tract. Symptoms may include dryness and irritation of the nose and throat, coughing, possible tightness of the chest and metallic taste. In the powder form in which this product is sold, the metals are present as sulphides that are relatively insoluble and poorly absorbed within the body. However, welding or burning on dust–contaminated surfaces will generate zinc oxide fume that also contains some lead and cadmium oxides. These oxides are soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body. The primary risk of inhalation would therefore be through inhalation of metal oxide fumes, composed principally of zinc oxide. An intense, short-term exposure to welding/burning fumes could result in the condition called metal fume fever. The symptoms of metal fume fever will occur within 3 to 10 hours, and include immediate dryness and irritation of the throat, tightness of the chest, and coughing which may be followed later by flu-like symptoms of fever, malaise, perspiration, frontal headache, muscle cramps, low back pain, occasionally blurred vision, nausea, and vomiting. The symptoms are temporary and generally disappear, without medical intervention, within 24 to 48 hours of onset. There are no recognized complications, after affects, or chronic affects that result from zinc metal fume fever. An acute, short-term exposure to high levels of zinc concentrate fumes could also result in the absorption of some lead and cadmium in the body.

Ingestion: Zinc sulphide is poorly absorbed from the gut. Symptoms due to ingestion would be similar to those from inhalation. Other health effects such as constipation or bloody diarrhea might also occur.

Chronic: The chronic health effects of zinc concentrate have not been fully investigated. Prolonged exposure to zinc concentrate dust may be expected to produce many of the symptoms of

short-term exposure. There is no chronic form of metal fume fever but in rare instances an acute incident may be followed by complaints such as bronchitis or pneumonia. Some workers may develop a short-term immunity (resistance) so that repeated exposure to zinc oxide fumes does not cause metal fume fever. This immunity however is quickly lost after short absences from work (weekends or vacations). Workers exposed to finely-divided metallic zinc for up to 35 years revealed no acute or chronic illnesses attributable to zinc. Chronic inhalation of very high dust concentrations could also risk cadmium or lead intoxication.

Material	Carcinogenicity Classification
Zinc	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Iron	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.
Silica	*Crystalline silica of respirable particle size only* – IARC & NTP – Carcinogen, ACGIH – Suspected Human Carcinogen, Not listed as a carcinogen by OSHA
Lead	IARC – Probable Carcinogen, NTP – Likely Carcinogen, ACGIH – Animal Carcinogen, Not listed as a carcinogen by OSHA
Cadmium	IARC, NTP & OSHA – Known Carcinogen, ACGIH – Suspect Human Carcinogen
Selenium	Not listed as a carcinogen by IARC, ACGIH, NTP, or OSHA.

12. ECOLOGICAL INFORMATION

Acute Toxicity Zinc concentrate is insoluble in water and its metals content has low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to some release of contained metals in bioavailable forms.

Mobility The mobility of the released major metal constituents is media dependent. They can bind with inorganic and organic ligands, reducing their mobility and bioavailability in soil and water. Bioavailability is also influenced by other factors such as pH and hardness. Zinc compounds are quite mobile in surface water or ground waters, as are cadmium compounds, but lead compounds are not particularly mobile in either media.

Persistence/Degradability As the constituents are all metals they are persistent in the environment, once released in bioavailable form.

Bioaccumulation Both lead and cadmium bioaccumulate in plants and animals in both aquatic and terrestrial environments.

13. DISPOSAL CONSIDERATIONS

Material Disposal: Recover and recycle zinc concentrate if at all possible. Waste material may meet the requirements of a hazardous waste in many jurisdictions. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated in order to determine the proper waste classification and disposal methods.

Local Legislation: If this material cannot be returned to process or salvage, dispose of in accordance with applicable national, regional and local laws and regulations.

14. TRANSPORT INFORMATION

U.S. DOT HAZARD CLASSIFICATION	Class 9, Packing Group III
U.S. PROPER SHIPPING NAME	Environmentally Hazardous Substance, Solid, n.o.s. (contains lead sulfide)
U.S. DOT RQ	Lead sulfide 10 lbs.
U.S. DOT PRODUCT IDENTIFICATION NUMBER	UN3077
MARINE POLLUTANT	No
IMO CLASSIFICATION	MHB - Materials Hazardous Only in Bulk
TRANSPORT CANADA CLASSIFICATION	Not regulated

15. REGULATORY INFORMATION

USA

TSCA Status: All ingredients in this material are listed on the TSCA inventory.

SARA Title III:

Sec'n 302/304: Extremely Hazardous Substance……None of the ingredients qualify

Sec'n 311/312: Delayed (Chronic Health Effect) – Carcinogen
Delayed (Chronic) Health Effect – Reproductive Toxin

Sec'n 313 : Toxic Release Inventory – RQ
Lead sulphide – 10 lbs
Selenium sulphide – 10 lbs
All other ingredients – not assigned

OSHA HCS: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200) (contains lead, cadmium and silica at greater than 0.1%)

Canada

DSL/NDSL: All ingredients are listed on the Domestic Substances List.

WHMIS Classification: **D2A**, (contains listed cancer-causing material(s) at 0.1% or greater)

16. OTHER INFORMATION

MSDS Version Number: 00
MSDS Effective Date: 2010/05/18
Supersedes Previous Edition Dated: *original edition*
Responsibility for this MSDS: Yukon Zinc Corporation
Suite 701, 474 Howe Street
Vancouver, British Columbia
V6C 2B3
(604) 682-5474 or 1-877-682-5474

Disclaimer: The information contained in this MSDS is based upon technical information believed to be appropriate and represents the most reliable information available at the indicated date of preparation. However, it may be subject to revision as additional information and experience are gained. No warranty or guarantee is expressed or implied regarding the accuracy or completeness of these data and Yukon Zinc Corp will not be liable for any damages, losses or injuries which may result from the use of or reliance on any information provided in this MSDS.
This MSDS is intended to describe the product for the purposes of health, safety and environmental requirements only. It is offered solely for your information, consideration and investigation. It is not warranted or represented to be all inclusive as it does not and cannot advise on all possible situations. Final determination of suitability of any material is the sole responsibility of the user and you should independently evaluate your specific use of this material to determine if additional or other precautions are required.
Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

Quadra Material Safety Data Sheet

Validated and verified by: Administrator **Validation date** 5/25/2009.

WHMIS	Protective Clothing	TDG Road / Rail
		

Section 1. Chemical product and company identification

Cupric sulphate (B)

Code : Q04613

Synonym : Not available.

Manufacturer : BBI Bengbau

Supplier : QUADRA CHEMICALS LTD.
3901 F.X. Tessier
Vaudreuil-Dorion, Quebec
Canada J7V 5V5
Tel: 1-800-665-6553

Material uses : Industrial applications

TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK
IN CANADA - CALL 1-800-567-7455

Section 2. Composition, information on ingredients

Name	CAS #	% by weight	Exposure limits
Cupric sulphate pentahydrate	7758-99-8	60 - 100	OSHA PEL: 1 mg/m^3 (as Cu) ACGIH TLV: 1 mg/m^3 (as Cu)

Consult local authorities for acceptable exposure limits.

Section 3. Hazards identification

Emergency overview CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION.
MAY BE HARMFUL IF INHALED OR SWALLOWED.

Routes of entry : Inhalation. Ingestion.

Potential acute health effects

Eyes : Causes eye irritation. Can cause corneal opacity.

Skin : Repeated contact may cause skin irritation.

Inhalation : May cause irritation of the upper respiratory tract.

Ingestion : May cause nausea, gastritis and abdominal pain.

Continued on next page

Potential chronic health effe : **CARCINOGENIC EFFECTS:** Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Prolonged skin contact may cause irritation and eczema.

Medical conditions aggravated by over-exposure : No additional information.

Over-exposure signs/symptoms : No additional information.

See toxicological information (section 11)

Section 4. First aid measures

Eye contact : IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. Seek immediate medical attention.

Skin contact : Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention.

Inhalation : Allow the victim to rest in a well ventilated area. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Seek immediate medical attention.

Ingestion : DO NOT induce vomiting. If the victim is conscious, give a little water or milk. NEVER give an unconscious person anything to ingest. Seek immediate medical attention.

Notes to physician : No additional information.

Section 5. Fire fighting measures

Fl ability of the product : Non-flammable.

Auto-ignition temperature : Not applicable.

Flash points : Not applicable.

Flammable limits : Not applicable.

Products of combustion : May emit toxic fumes of sulphur oxides above 400°C.

Fire hazards in the presence of various substances : Not applicable.

Explosion hazards in the presence of various substances : Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire-fighting media and instructions : Use DRY chemicals, carbon dioxide, water spray or foam. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.

Section 6. Accidental release measures

Spill or leak : Use appropriate tools to put the spilled material in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to federal, provincial and municipal environmental control regulations.

Section 7. Handling and storage

Handling : Follow routine safe handling procedures.

Storage : Keep container tightly closed. Keep in a cool, dry and well ventilated place. Avoid dust generation. Store away from incompatible materials.

Continued on next page

Section 8: Exposure controls/personal protection

Engineering controls : Provide exhaust ventilation or other engeneering controls to keep the airborne concentrations of vapours below their respective threshold limit value. Ensure that eye stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Splash goggles.

Body : Lab coat.

Respiratory : If user operations generate dust, fume, mist or if workplace contaminant level is above threshold limit, ensure to use a MSHA/NIOSH approved respirator or equivalent.

Hands : Gloves.

Feet Safety shoes.

Section 9: Physical and chemical properties

Physical state and Appearance : Solid. (Powder.)

Color : Blue.

Odor : Odourless.

Molecular weight : 249.68 g/mole

Molecular formula : $CuSO_4.5H_2O$

pH : 4 (0.2 mol aqueous solution)

Melting/freezing point : Loses water of hydration at >30°C and becomes anhydrous at 250°C.

Specific gravity : 2.286 (Water = 1) at 15.6°C/4°C

Solubility : Easily soluble in the following materials: water. Soluble in methanol and glycerol..

Section 10: Stability and reactivity

Stability and reactivity : The product is stable.

Conditions of instability : Slowly effloresoing in air.
Avoid elevated temperatures.

Incompatibility with various substances : The aqueous solutions are highly corrosive to iron and can react with magnesium to evolve hydrogen. When dissolved, forms acidic solution which is corrosive to most metals. May react with acetylene gas to form shock sensitive copper acetylides. The anhydrous form can ignite hydroxylamine.

Hazardous decomposition products : Copper oxides and sulphur compounds above 400ºC.

Hazardous polymerization : Will not occur.

Section 11: Toxicological information

Toxicity data : Acute oral toxicity (LD50): 960 mg/kg [Rat].

Chronic effects on humans : No additional information.

Other toxic effects on humans : No additional information.

Remarks on toxicity to animals : No additional information.

Continued on next page

Section 12. Ecological information

Ecotoxicity data : Harmful to the aquatic organisms.

Remarks on the products of biodegradation : No additional remark.

Section 13. Disposal considerations

Waste information : Waste must be disposed of in accordance with federal, provincial and municipal environmental control regulations.

Waste stream : Avoid entry of product into the sewage system or water streams.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory information	Shipping name and Class	UN number	Packing group
TDG Classification	Not regulated under TDG (Canada).	Not applicable.	Not applicable.

Section 15. Regulatory information

WHMIS (Canada) : CAUSES EYE IRRITATION. MAY CAUSE SKIN IRRITATION.
MAY BE HARMFUL IF INHALED OR SWALLOWED.
Class D-2B: Material causing other toxic effects (TOXIC).

DSL (CEPA) : CEPA DSL: All ingredients are listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.

Section 16. Other information

References : Canadian Guide of the Law and Regulations of the Transportation of the Dangerous Goods.
Manufacturer's Material Safety Data Sheet.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Other special considerations : No additional remark.

Regulatory Affairs Department : **(450) 424-0161**

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

DANAFLOAT™ 262

Table of Contents:

1. ♣ Identification of the substance/preparation and of the company/undertaking
2. ♣ Composition/information on ingredients
3. ♣ Hazards identification
4. ♣ First aid measures
5. ♣ Fire-fighting measures
6. ♣ Accidental release measures
7. ♣ Handling and storage
8. ♣ Exposure controls/personal protection
9. Physical and chemical properties
10. Stability and reactivity
11. ♣ Toxicological information
12. ♣ Ecological information
13. ♣ Disposal considerations
14. ♣ Transport information
15. ♣ Regulatory information
16. ♣ Other information

Revision: Sections containing a revision or new information are marked with a ♣.

1. ♣ IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING



Harmful

Product Name:

DANAFLOAT™ 262

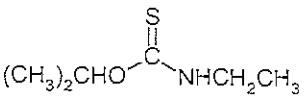
Intended Use: Flotation reagent (flotation collector)

Manufacturer: *CHEMINOVA A/S*
P.O. Box 9
DK-7620 Lemvig
Denmark

Emergency Telephone No. (+45) 97 83 53 53

2. ♣ COMPOSITION/INFORMATION ON INGREDIENTS

2.1. ACTIVE INGREDIENT:

CAS Name	Carbamothioic acid, ethyl-, O-(1-methylethyl) ester
CAS No.	141-98-0
Other Names	Isopropyl ethyl thionocarbamate O-Isopropyl N-ethyl thiocarbamate **Thionocarbamate**
EU Name	O-Isopropylethylthiocarbamate
EC No. (EINECS No.)	205-517-7
EU Index No.	–
EU Classification of the Ingredient	Xn;R22 R53; see 16.
Empirical Formula	$C_6H_{13}NOS$
Molecular Weight	147.24
Structural Formula	

2.2. Typical Content:

Active Ingredient	Thionocarbamate	93-98 % by weight
Reportable Ingredients	Isopropylalcohol	≤ 2 % by weight

CAS No.: 67-63-0, EC No. (EINECS No.): 200-661-7
EU classification: F;R11 Xi;R36 R67; see 16.

1,3-Diethyl-2-thiourea ..... ≤ 2 % by weight
CAS No.: 105-55-5, EC No. (EINECS No.): 203-308-5
EU classification: Xn;R21/22: see 16.

3. ♣ HAZARDS IDENTIFICATION

3.1.	EU Classification of the Product ...	Xn;R22 R53; see 15.
3.2.	Health Hazards (Acute and Chronic)	Thionocarbamate is harmful by ingestion. On prolonged contact it can cause irritation of the skin and mucous membranes.
3.3.	Signs and Symptoms of Exposure	The symptoms of ingestion are unknown. Prolonged contact can result in irritation.
3.4.	Environmental Hazards	The product is not expected to be very dangerous to aquatic organisms. It is not readily biodegradable. See 12.

4. ♣ FIRST AID MEASURES

Emergency and First Aid Procedures

Inhalation	If experiencing any discomfort, immediately remove from exposure. Obtain medical advice if discomfort does not disappear.
Eye Contact	Immediately flush with plenty of water or eyewash solution, occasionally opening eyelids, until no evidence of chemical remains. Remove contact lenses after a few minutes and flush again. See physician if irritation does not disappear.
Skin Contact	Flush with plenty of water and remove contaminated clothing and shoes. Wash with water and soap. See physician if irritation develops.
Ingestion	Let the exposed person rinse mouth with water and let him/her drink several glasses of water or milk if available, but do not induce vomiting. If vomiting does occur, give fluids again. Never give anything by mouth to an unconscious person. Make the exposed person lie down and keep quiet. Get medical attention immediately.

5. ♣ FIRE-FIGHTING MEASURES

5.1.	Extinguishing Media and Procedure	Dry chemical or carbon dioxide for small fires, water spray or foam for large fires. Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapours and toxic decomposition products. Fight fire from protected location or maximum possible

distance. Avoid heavy hose streams. Dike area to prevent water runoff. Firemen should wear self-contained breathing apparatus and protective clothing.

5.2. Hazardous Decomposition or Byproducts in a Fire

The essential breakdown products are volatile, toxic, malodorous, irritant and inflammable compounds such as hydrogen sulphide, sulphur dioxide, nitrogen oxides, carbon monoxide and carbon dioxide.

5.3.♣ Unusual Fire and Explosion Hazards

The substance is not classified as flammable, but it has a low flash point (60°C).

6. ♣ ACCIDENTAL RELEASE MEASURES

6.1. Personal Protection .....

Observe all personal protection and safety precautions. Depending on the magnitude of the spill, this may mean wearing eye protection, gloves and boots when cleaning up spills. See Section 8, Personal Protection. Personal exposure by splashing must be avoided.

6.2. Steps to Be Taken in Case of Spill

It is recommended to have a predetermined plan for the handling of spills.

Stop the source of the spill immediately if safe to do so. Contain the spill to prevent any further contamination of surface, soil or water. Remove sources of ignition.

Spills on the floor or other impervious surface should be swept up by means of an inert absorptive material such as Fuller's earth, bentonite or other absorbent clays. Scoop into suitable containers. Rinse area with strong industrial detergent and much water. Also collect wash liquid in suitable container.

Large spills that soak into the ground should be dug up and placed in metal drums.

Spills in water should be contained as much as possible by isolation of the contaminated water. The contaminated water must be collected and removed for treatment or disposal.

The used containers should be marked. Any collected spill material, contaminated waste or absorbent must be disposed of in accordance with the instructions provided under Disposal (see 13).

Washings must be prevented from entering surface water drains. Uncontrolled discharge into water courses must be alerted to the appropriate regulatory body.

The product may be disposed of through controlled incineration with flue gas scrubbing.

7. ♣ HANDLING AND STORAGE

7.1. Precautions to Be Taken in Handling

In an industrial environment it is recommended to avoid all personal contact with the product, if possible by using closed

systems with remote system control. Splashing and the formation of aerosol or mist should be avoided. For personal protection, see Section 8.

7.2. Precautions to Be Taken in Storing — The product is stable under normal conditions of warehouse storage.

7.3. Fire and Explosion Precautions ..... — It is recommended to take fire prevention measures. Keep away from sources of ignition and protect from exposure to fire and heat.

8. ♣ EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure Limit Values ..... — To our knowledge no personal exposure limits have been established for the active ingredient thionocarbamate. However, exposure limit values defined by local regulations may exist and must be observed.

		Year	
Isopropanol	OSHA (USA) PEL	2000	TWA 400 ppm (980 mg/m^3)
	ACGIH (USA) TLV	2001	TWA 400 ppm (983 mg/m^3)
			STEL 500 ppm (1230 mg/m^3)
	Germany, MAK	2002	TWA 200 ppm (500 mg/m^3)
			Peak level 400 ppm (1000 mg/m^3)
			Max. duration per shift: 15 min. (average value)
			Max. frequency per shift: 4; interval 1 h
			BAT

However, other exposure limit values defined by local regulations may exist and must be observed.

8.2. Personal Protection ..... — When used in a closed system, personal protection equipment will not be required. The following is meant for other situations, when the use of a closed system is not possible, or when it is necessary to open the system in case of maintenance, repair, sampling, removal of foreign bodies, etc., or in case of spill.

Respiratory Protection ..... — Avoid inhalation of vapours. In the event of discharge of the material during manufacturing or handling which produces a heavy vapour or mist, workers should put on officially approved respiratory protection equipment with a universal filter type including particle filter.

Protective Gloves ..... — Wear chemical resistant gloves, such as barrier laminate, butyl rubber or nitrile rubber. The breakthrough times of these materials for this product are unknown. Generally, however, the use of protective gloves will give only partial protection against dermal exposure. Small tears in the gloves and cross-contamination can easily occur. It is recommended to shift the gloves frequently and to limit the work to be done manually.

Eye Protection ..... — Wear safety glasses.

Other Protection ..... — Wear appropriate chemical resistant clothing.

8.3. Work/Hygienic Practices ..... — Before removing gloves, wash them with water and soap. Always

wash hands, face and arms with water and soap before smoking, eating or drinking.

After work, take off all work clothes and shoes. Shower, using water and soap. Wear only clean clothes when leaving job. Do not wear contaminated clothing/protective equipment.

8.4. Environmental Exposure Controls — See Section 13.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1.	Physical State	Liquid
9.2.	Colour	Yellow to reddish-brown
9.3.	Odour	Characteristic odour of sulphur compounds
9.4.	Melting/Freezing Point	-4°C
9.5.	Boiling Point	Approx. 217°C
9.6.	Specific Gravity	0.99 g/ml at 20°C
9.7.	Solubility in Water	Insoluble
9.8.	pH	Not available
9.9.	Flash Point	60°C
9.10.	Autoignition Temperature	Not available
9.11.	Flammable Limits	Not available

10. STABILITY AND REACTIVITY

10.1.	Thermal Decomposition	Stable at ambient temperatures
10.2.	Hazardous Decomposition or Byproducts	See 5.2.
10.3.	Materials to Avoid	Oxidizing materials. The product is corrosive to copper and brass.

11. ♣ TOXICOLOGICAL INFORMATION

11.1.	Health Hazards		See 3.1.
11.2.	Acute Toxicity		The product is expected to be harmful by ingestion.
	Route(s) of Entry	- Ingestion	LD_{50}, oral, rat: 500-2000 mg/kg
		- Skin	LD_{50}, dermal, rat: not available
		- Inhalation	LC_{50}, inhalation, rat: not available
11.3.	Irritancy		Causes irritation to eyes, skin and mucous membranes.

12. ♣ ECOLOGICAL INFORMATION

12.1.	Ecotoxicity	The toxicity of the product to fish, aquatic organisms and other wildlife is unknown, but is not expected to be severe.
12.2.	Mobility	In the environment the product is expected to be moderately mobile.
12.3.	Persistence and Biodegradability	The product is biodegradable, but does not fulfill the criteria for being readily biodegradable. It undergoes degradation in the environment and in waste water treatment plants. Biodegradability thionocarbamate: 30-70% (OECD Test 302 B).

12.4. Bioaccumulative Potential ..... Bioaccumulation is not expected.

13. ♣ DISPOSAL CONSIDERATIONS

13.1. Waste Disposal Method ..... Left-over material collected from maintenance, cleaning, filtering of ventilation exhaust systems and other procedures can be removed by controlled discharge to a waste water treatment plant. Other possible methods of disposal are controlled incineration with flue gas scrubbing or removal to a licensed chemical destruction plant.

Do not contaminate water, food or feed by storage or disposal.

13.2. Packaging/Container Disposal ..... Triple rinse (or equivalent) and offer for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill.

Disposal of waste and packagings must always be in accordance with all applicable local regulations.

14. ♣ TRANSPORT INFORMATION

UN CLASSIFICATION:

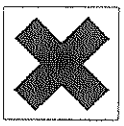
Proper Shipping Name	Flammable Liquid, N.O.S. (O-Isopropyl N-ethyl thiocarbamate)
Class	3
UN No.	1993
Packaging Group	III
Primary Hazard	Flammable
Subsidiary Risk	–
Marine Pollutant (P/PP) ..... (IMDG-Code)	–

15. ♣ REGULATORY INFORMATION

15.1. IN THE EU:

Classification and Labelling
(according to 67/548/EEC as amended):

Hazard Symbol .....



Harmful

Contains ..... **O-Isopropyl N-ethyl thiocarbamate**

R-Phrases ..... R22-53: Harmful if swallowed. May cause long-term adverse effects in the aquatic environment.

S-Phrases ..... S26-28-37/39-61: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water and soap. Wear suitable protective gloves and eye/face protection. Avoid release to the environment. Refer to special instructions/safety data sheets.

15.2. Regulatory Status ..... This product is covered by EU chemical legistation.

16. ♣ OTHER INFORMATION

Used R-Phrases .....

R11	Highly flammable.
R21/22	Harmful in contact with skin and if swallowed.
R22	Harmful if swallowed.
R36	Irritating to eyes.
R53	May cause long-term adverse effects in the aquatic environment.
R67	Vapours may cause drowsiness and dizziness.

The information provided in this safety data sheet is believed to be accurate and reliable, but uses of the product may vary and situations unforeseen by Cheminova A/S may exist. The user of the material has to check the validity of the information under local circumstances.

Technical data sheet

Danafloat™ 262 mineral collector

Application

Danafloat 262 is a water-insoluble collector of the thionocarbamate type.

Danafloat 262 has no frother action, and because of the water-insolubility it is often added to the grinding circuit. To increase the dispersion into the pulp *Danafloat 262* can be added as an emulsion with a carrier liquid such as a frother.

Because of the high selectivity over pyrite, the main application of *Danafloat 262* is in the flotation of copper sulphides and Cu-activated sphalerite.

Danafloat 262 is a very powerful collector which can operate in the pH range of 4-12. It is a fast collector and produces moderate recovery in many applications.

Danafloat 262 is subject to overdosing and should be used in smaller quantities than xanthates. Many operators prefer to use *Danafloat 262* as a primary collector and xanthate as a scavenger collector.

Composition

Chemical name:	thionocarbamate
CAS name:	Carbamothioic acid, ethyl-, O-(1-methyl ethyl) ester
Active ingredient:	approx. 95% by weight

Physical properties

Appearance:	Yellow to reddish brown
Form:	Liquid (aqueous solution)
Boiling point:	Approx. 217 degrees C
Melting/freezing point:	-
Specific gravity:	0.98 g/ml
Flash point:	Above 65 degrees C

P.T.O.

Safety and handling

Danafloat flotation collectors are manufactured under carefully controlled conditions. However, to varying degrees they can be considered harmful and therefore before handling this product always carefully read and understand the MSDS for this product.

On prolonged contact *Danafloat 262* causes irritation to skin and mocous membranes.

Safe handling includes the use of safety glasses, natural rubber gloves and protective clothing. Additionally, avoid inhalation of vapours.

Storage

+ Store in a dry and well-ventilated place away from heat and sunlight after the principle "first in/first out"
+ Store in plastic drums or coated steel drums

Environmental impact

Danafloat 262 is biodegradable. The majority of the collector is tied up with the concentrate and is destroyed in the subsequent processing operations. The remainder is transferred to the tailings. Release into the water systems should be avoided.

Packing

Danafloat mineral collectors are supplied in tank containers or plastic drums. If preferred, *Danafloat* collectors may be supplied in coated steel drums.

Tank containers	Net weight:	approx. 20 mt
Drums	Net weight:	200 kg
	Gross weight:	approx. 210.5 kg for plastic drums
		approx. 222 kg for coated steel drums

Notice to customer: The information presented herein is believed to be accurate and reliable, but is presented without guarantee or responsibility on the part of Cheminova A/S

25-2-02

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CHEMINOVA A/S
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Phone +45 96 90 96 90 · Fax +45 96 90 96 91
www.cheminova.com

Quadra Material Safety Data Sheet

Validated and verified by: Administrator Validation date 5/21/2009.

WHMIS



Protective Clothing



TDG Road / Rail



Section 1 Chemical product and company identification

AERO® 3477 promoter

Code : Q02399

Synonym : Not available.

Manufacturer : Cytec

Supplier : QUADRA CHEMICALS LTD.
3901 F.X. Tessier
Vaudreuil-Dorion, Quebec
Canada J7V 5V5
Tel: 1-800-665-6553

Material uses : Industrial applications: Flotation agent.

TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK
IN CANADA - CALL 1-800-567-7455

Section 2 Composition, information on ingredients

Name	CAS #	% by weight	Exposure limits
Phosphorodithioic acid, O,O-bis(2-methylpropyl) ester, sodium salt	53378-51-1	30-60	Not available.
Sodium hydroxide	1310-73-2	0.5 - 1.5	ACGIH TLV CEIL: 2 mg/m³ OSHA PEL TWA: 2 mg/m³ 8 hour(s).

Consult local authorities for acceptable exposure limits.

Section 3 Hazards identification

Emergency overview CAUSES SEVERE EYE AND SKIN IRRITATION AND BURNS. MAY CAUSE ALLERGIC SKIN REACTION. HARMFUL IF INHALED OR SWALLOWED.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Eyes : Causes eye irritation and burns. Can cause irreversible eye damage.

Skin : Can cause severe skin irritation or burns. May cause allergic skin reactions with repeated exposure. Severe allergic reaction is possible.

Continued on next page

Inhalation : Severely irritating to the respiratory tract. May cause coughing and sneezing.

Ingestion : Severely irritating to the gastrointestinal tract.

Potential chronic health effects : **CARCINOGENIC EFFECTS:** Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.

Medical conditions aggravated by over-exposure : Pre-existing skin or eyes disorders.

Over-exposure signs/symptoms : No additional information.

See toxicological information (section 11)

Section 4. First aid measures

Eye contact : IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. Seek immediate medical attention.

Skin contact : Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention.

Inhalation : Allow the victim to rest in a well ventilated area. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Seek immediate medical attention.

Ingestion : DO NOT induce vomiting. If the victim is conscious, give a little water or milk. NEVER give an unconscious person anything to ingest. Seek immediate medical attention.

Notes to physician : No additional information.

Section 5. Fire fighting measures

Flammability of the product : Non-flammable.

Auto-ignition temperature : Not applicable.

Flash points : Closed cup: >93.333°C (200°F).

Flammable limits : Not applicable.

Products of combustion : Sulphur dioxide or hydrogen sulphide may be formed under fire conditions.

Fire hazards in the presence of various substances : Not applicable.

Explosion hazards in the presence of various substances : Risk of explosion of the product in the presence of mechanical impact: Not available.
Risk of explosion of the product in the presence of static discharge: Not available.

Fire-fighting media and instructions : Use DRY chemicals, carbon dioxide, water spray or foam. Use water spray to cool fire exposed containers. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.

Section 6. Accidental release measures

Spill or leak : Use appropriate tools to put the spilled material in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to federal, provincial and municipal environmental control regulations.

Section 7. Handling and storage

Handling : Follow routine safe handling procedures.

Storage : Keep container tightly closed. Keep in a cool, well-ventilated place. Store away from incompatible materials. Avoid freezing.

Continued on next page

Section 8. Exposure controls/personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Face shield.

Body : Full suit.

Respiratory : If user operations generate dust, fume, mist or if workplace contaminant level is above threshold limit, ensure to use a MSHA/NIOSH approved respirator or equivalent.

Hands : Butyl or nitrile gloves.

Feet Boots.

Section 9. Physical and chemical properties

Physical state and Appearance : Liquid.

Color : Amber-brown.

Odor : Sulphur like.

pH : >12

Boiling/condensation point : Lowest known value: 100°C (212°F) (water).

Melting/freezing point : <-21°C (-5.8°F)

Specific gravity : 1.105 (Water = 1) (@ 25°C)

Vapor pressure : Highest known value: 2.3 kPa (17.5 mm Hg) (at 20°C) (water).

Vapor density : Highest known value: 0.62 (Air = 1) (water).

Volatility : approx. 50% (w/w)

Evaporation rate : 0.36 (water) compared with Ether =1

Solubility : Easily soluble in the following materials: water.

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Conditions of instability : No additional remark.

Incompatibility with various substances : Reactive with strong oxidizing agents, mineral acids. Evolves hydrogen sulfide on contact with acids.

Hazardous decomposition products : Carbon monoxide, carbone dioxide, hydrogen sulphide, sulphur oxides, phosphorus oxides.

Hazardous polymerization : Will not occur.

Section 11. Toxicological information

Toxicity data : Acute oral toxicity (LD50): >2000 mg/kg [Rat] [estimated]
Acute dermal toxicity (LD50): >2000 mg/kg [Rat] [estimated]

Chronic effects on humans : No additional information.

Other toxic effects on humans : No additional information.

Remarks on toxicity to animals : No additional information.

Continued on next page

Section 12. Ecological information

Ecotoxicity data : Ecotoxicity in water: >125 mg/l [LC50], 96 hour(s) [Fish (Rainbow trout)]. 132 mg/l [EC50], 48 hour(s) [Daphnia (Daphnia magna)].

Biodegradable/OECD : Biodegradability: 11.6% (28 days) (OECD 301D). This product is not expected to bioaccumulate.

Remarks on the products of biodegradation : No additional information.

Section 13. Disposal considerations

Waste information : Waste and empty packaging must be disposed of in accordance with federal, provincial, and municipal environmental control regulations.

Waste stream : Avoid entry of product into the sewage system or water streams.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory information	Shipping name and Class	UN number	Packing group
TDG Classification	CAUSTIC ALKALI LIQUID, N.O.S. (dithiophosphate salt) Class 8	1719	II

Section 15. Regulatory information

WHMIS (Canada) : CAUSES SEVERE EYE AND SKIN IRRITATION AND BURNS. HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE ALLERGIC SKIN REACTION.
Class E, D-2B.

DSL (CEPA) : CEPA DSL: All ingredients are listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.

Section 16. Other information

References : Canadian Guide of the Law and Regulations of the Transportation of the Dangerous Goods.
Manufacturer's Material Safety Data Sheet.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Other special considerations : No additional remark.

Regulatory Affairs Department : **(450) 424-0161**

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Quadra Material Safety Data Sheet

Validated and verified by: Administrator **Validation date** 5/25/2009.

WHMIS



Protective Clothing



TDG Road / Rail



Section 1. Chemical product and company identification

Lime hydrated type N (STD)

Code : Q04842

Synonym : Not available.

Manufacturer : Chemical Lime

Supplier : QUADRA CHEMICALS LTD.
3901 F.X. Tessier
Vaudreuil-Dorion, Quebec
Canada J7V 5V5
Tel: 1-800-665-6553

Material uses : Industrial applications

TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK
IN CANADA - CALL 1-800-567-7455

Section 2. Composition, information on ingredients

Name	CAS #	% by weight	Exposure limits
calcium hydroxide	1305-62-0	60 - 100	ACGIH TLV TWA: 5 mg/m³ 8 hour(s).
magnesium hydroxide	1309-42-8	1 - 5	Not available.
magnesium oxide	1309-48-4	1 - 5	ACGIH TLV TWA: 10 mg/m³ 8 hour(s).
calcium carbonate	1317-65-3	1 - 5	Not available.
silica -cristalline, quartz	14808-60-7	1 - 5	ACGIH TLV Notes: Respirable TWA: 0.05 mg/m³ 8 hour(s). OSHA PEL Notes: Respirable : 0.1 mg/m³

Consult local authorities for acceptable exposure limits.

Section 3. Hazards identification

Emergency overview CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
CORROSIVE TO THE EYES AND SKIN. HARMFUL IF SWALLOWED.
CANCER HAZARD

Routes of entry : Inhalation. Ingestion.

Potential acute health effects

Continued on next page

Eyes : Causes severe eye irritation. May be corrosive to the eyes. Can cause burns to the cornea. Product reacts with the moisture and protein of the eyes to form clumps which are difficult to remove.

Skin : Causes severe irritation, burns and inflammation.

Inhalation : Causes irritation to the nose, throat and lungs.

Ingestion : Causes burns to the mouth, throat, esophagus and stomach, cramps, vomiting, diarrhea and collapse.

Potential chronic health effects : **CARCINOGENIC EFFECTS**: Classified 1 (Proven for humans.) by IARC, 1 (Known to be human carcinogens.) by NTP [Silicon dioxide]. Classified A2 (Suspected for humans.) by ACGIH [Silicon dioxide].
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Prolonged skin contact may cause dermatitis.

Medical conditions aggravated by over-exposure : No additional information.

Over-exposure signs/symptoms : Long term exposure to the silica may result in the production of silicosis.

See toxicological information (section 11)

Section 4. First aid measures

Eye contact : IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. Seek immediate medical attention.

Skin contact : Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention.

Inhalation : Allow the victim to rest in a well ventilated area. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Seek immediate medical attention.

Ingestion : DO NOT induce vomiting. If the victim is conscious, give a little water or milk. NEVER give an unconscious person anything to ingest. Seek immediate medical attention.

Notes to physician : No additional information.

Section 5. Fire fighting measures

Flammability of the product : Non-flammable.

Auto-ignition temperature : Not applicable.

Flash points : Not applicable.

Flammable limits : Not applicable.

Products of combustion : Not applicable.

Fire hazards in the presence of various substances : Not applicable.

Explosion hazards in the presence of various substances : Risk of explosion of the product in the presence of mechanical impact: Not available.
Risk of explosion of the product in the presence of static discharge: Not available.

Fire-fighting media and instructions : Use extinguishing media suitable for surrounding fire. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.

Section 6. Accidental release measures

Spill or leak : Use appropriate tools to put the spilled material in a convenient waste disposal container. Neutralize with a dilute solution of acetic or hydrochloric acid. Finish cleaning by spreading water on the contaminated surface and dispose of according to federal, provincial and municipal environmental control regulations.

Continued on next page

S tion 7 Handling and storage

Handling : Follow routine safe handling procedures.

Storage : Keep container tightly closed. Keep in a cool, well ventilated place. Avoid dust generation. Store away from incompatible materials.

Section 8. Exposure controls/personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value. Ensure that eye stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Splash goggles.

Body : Full suit.

Respiratory : If user operations generate dust, fume, mist or if workplace contaminant level is above threshold limit, ensure to use a MSHA/NIOSH approved respirator or equivalent.

Hands : Chemical resistant gloves, such as nitrile rubber, PVC or neoprene.

Feet Chemical resistant boots.

Section 9. Physical and chemical properties

Physical state and Appearance : Solid. (Powder.)

Color : White or grey.

Odor : Odourless.

pH : 12.4 saturated solution (25°C).

Boiling/condensation point : 2850°C (5162°F)

Melting/freezing point : Decomposition temperature: 580°C (1076°F)

Specific gravity : Density: 2.2÷2.4 g/cm^3

Solubility : Slightly soluble in water. Soluble in acids, glycerol, sugar and ammonia salt solutions. Insoluble in alcohol.

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Conditions of instability : No additional remark.

Incompatibility with various substances : Highly reactive with acids; may produce heat.
May form flammable products with phosphorus.
Reactive with nitro-organic compounds; may form explosive salts.
May react explosively with maleic anhydride.
May react with aluminium to form hydrogen gas.

Hazardous decomposition products : Oxides of calcium when heated to decomposition.

Hazardous polymerization : Will not occur.

Section 11. Toxicological information

Toxicity data : Acute oral toxicity (LD50): 7300 mg/kg [Mouse]. (calcium hydroxide).

Chronic effects on humans : No additional information.

Other toxic effects on humans : No additional information.

Remarks on toxicity to animals : No additional information.

Continued on next page

S tion 12. Ecological information

Ecotoxicity data : Not available.

Remarks on the products of biodegradation : No additional remark.

Section 13. Disposal considerations

Waste information : Waste must be disposed of in accordance with federal, provincial and municipal environmental control regulations.

Waste stream : Avoid entry of product into the sewage system or water streams.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory information	Shipping name and Class	UN number	Packing group
TDG Classification	Not regulated under TDG (Canada).	Not applicable.	Not applicable.

Section 15. Regulatory information

WHMIS (Canada) : CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CORROSIVE TO THE EYES AND SKIN. HARMFUL IF SWALLOWED.
CANCER HAZARD
Class D-2A, E

DSL (CEPA) : CEPA DSL: All ingredients are listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.

Section 16. Other information

References : Canadian Guide of the Law and Regulations of the Transportation of the Dangerous Goods.
Manufacturer's Material Safety Data Sheet.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Other special considerations : No additional remark.

Regulatory Affairs Department : **(450) 424-0161**

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Quadra Material Safety Data Sheet

Validated and verified by: Administrator **Validation date 5/21/2009.**

WHMIS	Protective Clothing	TDG Road / Rail
		

Section 1. Chemical product and company identification

MIBC

Code : Q02223/ M01009

Synonym : Not available.

Manufacturer : Celanese Chemicals

Supplier : QUADRA CHEMICALS LTD.
370, boul. Joseph-Carrier
Vaudreuil-Dorion QC J7V 5V5
Tel: (450) 424-0161

Burlington ON Tel: (905) 336-9133
Delta BC Tel: (604) 940-2313
Edmonton AB Tel: (780) 451-9222
Calgary AB Tel: (403) 232-8130

Material uses : Frothing agent. Intermediate.

TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK
IN CANADA - CALL 1-800-567-7455

Section 2. Composition, information on ingredients

Name	CAS #	% by weight	Exposure limits
methyl isobutyl carbinol	108-11-2	60 - 100	ACGIH TLV Skin TWA: 25 ppm 8 hour(s). STEL: 40 ppm 15 minute(s). OSHA PEL Skin TWA: 25 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Continued on next page

Section 3. Hazards identification

Emergency overview COMBUSTIBLE LIQUID AND VAPOUR.
MAY BE HARMFUL IF INHALED, ABSORBED THROUGH SKIN OR SWALLOWED.
CAUSES RESPIRATORY TRACT AND EYE IRRITATION.
MAY CAUSE SKIN IRRITATION.

Routes of entry : Absorbed through skin. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Eyes : Causes eye irritation. Symptoms of exposure may include watering, burning sensation, pain and vision changes.

Skin : May cause skin irritation. Prolonged or repeated contact may dry skin and cause irritation. May be harmful if absorbed through the skin. Symptoms include drying, cracking and inflammation of the skin.

Inhalation : Causes respiratory tract irritation. Harmful if inhaled. Exposure symptoms may include nasal discharge, hoarseness, coughing, chest pain and breathing difficulty.

Ingestion : May be harmful if swallowed. Symptoms of exposure may include nausea, vomiting, loss of appetite, gastrointestinal irritation and diarrhea.

Potential chronic health effects : **CARCINOGENIC EFFECTS**: Not available.
MUTAGENIC EFFECTS: None.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
May cause central nervous system depression with headache, nausea, dizziness, stupor, uncoordinated behavior, unconsciousness.

Medical conditions aggravated by over-exposure : Pre-existing eyes, skin, respiratory, gastrointestinal, kidneys and central nervous system disorders.

Over exposure signs/symptoms : Overexposure may cause kidney damage, central nervous system depression, injury to the eyes, irritation of the respiratory and digestive tract.

See toxicological information (section 11)

Section 4. First aid measures

Eye contact : IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. Seek immediate medical attention.

Skin contact : Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention.

Inhalation : Allow the victim to rest in a well ventilated area. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Seek immediate medical attention.

Ingestion : DO NOT induce vomiting. If the victim is conscious, give a little water or milk. NEVER give an unconscious person anything to ingest. Seek immediate medical attention.

Notes to physician : No additional information.

Section 5. Fire fighting measures

Flammability of the product : Combustible.

Auto-ignition temperature : 360.3°C (680.5°F)

Flash points : 42.4°C (108.3°F).

Flammable limits : Lower: 1% Upper: 5.5%

Products of combustion : Carbon monoxide.

Fire hazards in the presence of various substances : Highly flammable in the presence of open flames, sparks and static discharge, of heat.

Explosion hazards in the presence of various substances : Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Continued on next page

Fire-fighting media and instructions : Use DRY chemicals, carbon dioxide or an aqueous film forming foam. Use water spray to cool fire exposed containers. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.

Section 6. Accidental release measures

Spill or leak : CAUTION! Liquid will float on surface of water. Eliminate all ignition sources. Use appropriate tools to put the spilled material in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to federal, provincial and municipal environmental control regulations.

Section 7. Handling and storage

Handling : Follow routine safe handling procedures. Avoid breathing vapours or spray mists. Ground drums and bond transfer containers.

Storage : Keep container tightly closed. Keep in a cool, well-ventilated place. Store away from incompatible materials. Ground to prevent build-up of electrostatic charges. Keep away from direct sunlight.

Section 8. Exposure controls/personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value. Ensure that eye stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Splash goggles.

Body : Full suit.

Respiratory : If user operations generate dust, fume, mist or if workplace contaminant level is above threshold limit, ensure to use a MSHA/NIOSH approved respirator or equivalent.

Hands : Butyl rubber gloves.

Feet Boots.

Section 9. Physical and chemical properties

Physical state and Appearance : Liquid. (Clear, mobile.)

Color : Colourless.

Odor : Irritating, alcohol. (Slight.)

Molecular weight : 102.2 g/mole

Molecular formula : $C_6H_{14}O$

Boiling/condensation point : 132°C (269.6°F)

Melting/freezing point : <-50°C (-58°F)

Specific gravity : 0.808 (Water = 1) (@ 20°C)

Vapor pressure : 0.6 kPa (4.7 mm Hg) (at 20°C)

Vapor density : 3.53 (Air = 1)

Odor threshold : 0.3 ppm

Evaporation rate : 0.26 compared with (n-butyl acetate = 1)

Solubility : Partially soluble in the following materials: water: 1.82 g/100g water @ 20°C.

Continued on next page

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Conditions of instability : Avoid all possible sources of ignition (spark or flame).

Incompatibility with various substances : Keep away from sulphuric and other strong inorganic acids, aluminum or lead (including equipment made of these metals), and oxidizing agents such as peroxides, nitric acid, perchloric acid or chromium trioxide.

Hazardous decomposition products : Thermal decomposition products may include oxides of carbon.

Hazardous polymerization : Will not occur.

Section 11. Toxicological information

Toxicity data : Acute oral toxicity (LD50): 2600 mg/kg [Rat].
Acute dermal toxicity (LD50): 2900 mg/kg [Rabbit].
Acute toxicity of the vapour (LC50): >3776 ppm 4 hour(s) [Rat].

Chronic effects on humans : No additional information.

Other toxic effects on humans : No additional information.

Remarks on toxicity to animals : No additional information.

Section 12. Ecological information

Ecotoxicity data : Ecotoxicity in water: >92.4 ppm [LC50], 96 hour(s) [Fish (Pimephales promelas)]. 360 ppm [LC50], 24 hour(s) [Fish (Carassius auratus)].

Remarks on the products of biodegradation : No additional remark.

Section 13. Disposal considerations

Waste information : Waste must be disposed of in accordance with federal, provincial and municipal environmental control regulations.

Waste stream : Avoid entry of product into the sewage system or water streams.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory information	Shipping name and Class	UN number	Packing group
TDG Classification	Regulated for large means of containment (>450 litres) METHYL ISOBUTYL CARBINOL Class 3	2053	III

Section 15. Regulatory information

WHMIS (Canada) : COMBUSTIBLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. HARMFUL IF INHALED, SWALLOWED OR ABSORBED THROUGH SKIN.
Class B-3, D-2B.

DSL (EPA) : CEPA DSL: All ingredients are listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.

Continued on next page

Section 16 Other information

References : Canadian Guide of the Law and Regulations of the Transportation of the Dangerous Goods. Controlled products regulations. Manufacturer's Material Safety Data Sheet. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Other special considerations : No additional remark.

Regulatory Affairs Department : **(450) 424-0161**

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Quadra Material Safety Data Sheet

alidated and verified by: Regulatory Affairs / Affaires réglementaires Validation date 10/11/2006.

WHMIS



Protective Clothing



TDG Road / Rail



Section 1. Chemical product and company identification

Sodium cyanide (briquettes)

Code : Q02244

Synonym : Cyanide of sodium; Prussiate of soda.

Manufacturer : DUPONT CANADA

Supplier : QUADRA CHEMICALS LTD.
370, boul. Joseph-Carrier
Vaudreuil-Dorion QC J7V 5V5
Tel: (450) 424-0161

Burlington ON Tel: (905) 336-9133
Delta BC Tel: (604) 940-2313
Edmonton AB Tel: (780) 451-9222
Calgary AB Tel: (403) 232-8130

Material uses : Ore leaching and flotation.

TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK
IN CANADA - CALL 1-800-567-7455

Section 2. Composition, Information on Ingredients

Name	CAS #	% by weight	Exposure limits
sodium cyanide	143-33-9	60-100	**ACGIH TLV Skin** CEIL: 5 mg/m³ 8 hour(s). **OSHA PEL Skin** TWA: 5 mg/m³ 8 hour(s). * AEL Du Pont: 5mg/m³, 15 min TWA, skin STEL: 10 ppm; 11 mg/m³
other sodium salts	Not available.	1-5	Not available.

Consult local authorities for acceptable exposure limits.

Section 3. Hazards identification

Emergency overview: MAY BE FATAL IF INHALED, ABSORBED THROUGH SKIN OR EYES OR SWALLOWED.
MAY CAUSE EYE BURNS, SKIN IRRITATION AND RASHES.
MAY CAUSE RAPID RESPIRATIONS AND PULSE, REDNESS OF EYES, FLUSHED SKIN, WEAKNESS, HEADACHE, DIZZINESS, CONFUSION, NAUSEA AND VOMITING.
THESE MAY BE FOLLOWED BY UNCONSCIOUSNESS, CONVULSIONS, CESSATION OF BREATHING, LOSS OF BLOOD PRESSURE, HEART BEAT IRREGULARITIES, DILATION OF PUPILS AND DEATH. THE LUNGS MAY FILL WITH LIQUID.

Routes of entry : Absorbed through skin, eyes, respiratory and gastrointestinal tract.

otential acute health effects

Eyes : Contact with sodium cyanide may cause eye irritation with discomfort, tearing or blurred vision. Prolonged exposure may cause eye corrosion with corneal or conjunctival ulceration.

Continued on next page

Skin : Contact with sodium cyanide may cause skin irritation with discomfort or rash; strong solutions may cause skin burns or ulceration. Skin permeation may produce systemic toxicity.

Inhalation : Inhalation, ingestion or skin contact of sodium cyanide may cause redness of the eyes, irritation of the throat, difficulty in breathing, palpitation, salivation, numbness, nausea, headache, weakness of arms and legs, giddiness, collapse and convulsions.

Ingestion : Central nervous system stimulation followed by central nervous system depression may occur with hypoxic convulsions and death due to respiratory arrest.

Potential chronic health effects : CARCINOGENIC EFFECTS Not available.
MUTAGENIC EFFECTS Not available.
TERATOGENIC EFFECTS Not available.
DEVELOPMENTAL TOXICITY: Not available.

Medical conditions aggravated by overexposure : Individuals with preexisting diseases of the central nervous system may have increased susceptibility to the toxicity of excessive exposures.

Over-exposure signs/symptoms : Overexposure may lead to rapid respiration and pulse, flushing, cyanosis, acidosis, thyroid effects sometimes observed in individuals with nutritional deficiencies, symptoms associated with Parkinsonian syndrome, pulmonary edema and death. In the few cases of disturbance of vision or damage to the optic nerve or retina, the poisoning has been acute and severe or lethal. There are reports of increased incidence of insomnia, agitated sleep, tremors, dermatitis and nose bleed in electroplating workers.

See toxicological Information (section 11)

Section 4. First aid measures

Eye Contact : IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. Seek immediate medical attention.

Skin Contact : Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention.

Inhalation : Allow the victim to rest in a well ventilated area. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Do not give mouth-to-mouth resuscitation if swallowed. To protect rescuer, use one way anti-reflux mask. Seek immediate medical attention.

gestion : DO NOT induce vomiting. If the victim is conscious, give a little water or milk. NEVER give an unconscious person anything to ingest. If the victim is not breathing, perform artificial respiration. Do not give mouth-to-mouth resuscitation if swallowed. To protect rescuer, use one way anti-reflux mask. Seek immediate medical attention.

Notes to Physician : First aid treatment uses oxygen and amyl nitrite and can be given by first responder before medical help arrives.
Medical treatment is given if the patient does not respond to oxygen and amyl nitrite. Medical treatment is a more aggresive treatment requiring intravenous injections of sodium nitrite and sodium thiosulphate and must be administered by qualified medical personnel. It provides a larger quantity of antidote which helps eliminate cyanide from the body.
When antidotal treatment is necessary, it should be started immediately.
In most cases, cyanide poisoning causes a deceptively healthy pink to red skin colour. However, if a physical injury or lack of oxygen is involved, the skin colour may be bluish. Reddening of the eyes and pupil dilation are also symptoms of cyanide poisoning. Cyanosis tends to be associated with severe cyanide poisonings whereas red coloration of the skin is more common in industrial accidents that involve less cyanide.
IN CASE OF CYANIDE POISONING, START FIRST AID TREATMENT IMMEDIATELY.
MEDICAL TREATMENT PROCEDURE
A. Sodium nitrite: Adult - 10ml of 3% solution (300mg). Draw solution from the ampoule and inject slowly over 4-5 minutes (2 to 2.5ml/minute). As soon as practical, monitor blood pressure and continue checking pulse. Slow the rate of injection if hypotension occurs.
B. Sodium thiosulphate: Adult - 50ml of 25% solution (12.5 grams). Follow sodium nitrite with sodium thiosulphate injected at a rate of 2.5 ml/minute (10-20minutes).
The total time for injection of these initial doses of both components at the recommended rates is lengthy, approximately 20-25 minutes.
Consider the body weight and condition of the patient when treating a cyanide exposed patient with sodium nitrite. Both amyl nitrite and sodium nitrite produce methemoglobin, which reduces the oxygen carrying capacity of the blood. Methemoglobinemia is potentially harmful when methemoglobin levels exceed 20-30%.
If symptoms persist or recur after the initial treatment, repeat the antidote at one half the original doses one hour after the original administration. Monitor methemoglobin levels when practical in every patient treated with the intravenous antidote.
AVOID OVER-TREATMENT
The above sodium nitrite injection discussed in the Medical treatment procedure section is about one-

Continued on next page

third the lethal dose, so care should be taken to avoid excessive use. It is not essential that full quantities of antidote be given just because treatment was started. Should injection be stopped for any reason, keep track of the amount administered in case treatment needs to be restarted.

ANTIDOTAL EFFECTS

Nitrites can produce hypotension through peripheral vasodilatation. Methemoglobin formation, although considered a therapeutic effect, may cause symptoms if levels exceed 20-30%. Recommended intravenous doses of sodium nitrite discussed in the Medical treatment procedure section usually produce methemoglobin levels under 20%. Headache, nausea, vomiting and syncope (fainting) may follow nitrite administration and syncope may occur if the patient is not lying down.

RECOVERY AND DISPOSITION

For most accidental poisonings, patients can be revived in a few minutes using oxygen and amyl nitrite with complete recovery within a few hours

If necessary, the patient should be monitored for 24-48 hours. Any patient whose symptoms require the use of IV antidote should be considered for admittance to an intensive care unit.

Observe for return of symptoms. Monitor methemoglobin levels, blood pH and oxygenation through arterial blood gas analysis. Calculate anion gap from serum electrolytes. Cyanide poisoning causes lactate accumulation and an anion gap metabolic acidosis.

Delayed neurotoxic effects are not expected consequences of cyanide exposure although neurotoxic effects may occur if hypoxia (oxygen deficiency) was prolonged or occurred following massive cyanide exposure.

In the presence of smoke inhalation that occur during fires, with holding amyl nitrite or sodium nitrite administration should be considered because of the potential for high carboxyhemoglobin levels. However, administration of oxygen and possibly sodium thiosulphate should be continued.

NOTES TO FIRST AID RESPONDER TRAINED FOR USE OF OXYGEN AND AMYL NITRITE

All persons with the potential for cyanide poisoning should be trained to provide immediate First aid using oxygen and amyl nitrite. Always have on hand the materials listed below in the First aid and Medical treatment sections. Identification of community hospital resources and emergency medical squads in order to equip and train them on handling of cyanide emergencies essential.

FIRST AID SUPPLIES

Adequate First aid supplies for cyanide poisoning should be conveniently placed throughout the cyanide areas and should be immediately accesible at all times, but secured against tampering or theft. Supplies should be routinely inspected by people who would use them in an emergency. The total number of each item listed below should be adequate to handle the largest number of exposure cases reasonably anticipated, taking into account that some supplies may be wasted, destroyed or inaccesible in the emergency.

1. Oxygen resuscitators - Any positive pressure resuscitator capable of giving oxygen in conjunction with amyl nitrite can be used.

2. Amyl nitrite ampoules (antidote) - One box of one dozen ampoules per station is satisfactory. Locate stations throughout the cyanide area.

Caution: Amyl nitrite is not stable and must be replaced every 1-2 years (depending on storage conditions). Store in the original dated box away from heat and freezing temperatures.

3. A set of cyanide first aid instructions should be located at each amyl nitrite storage location. Workers should be fully trained since in a real emergency there will be insufficient time to "read the book".

Amyl nitrite notes:

a. Amyl nitrite is highly volatile and flammable; do not smoke or use around a source of ignition.

b. If treating a patient in a windy or drafty area, provide something - a rag, shirt, wall, drum, etc., to prevent the amyl nitrite vapours from being blown away. Keep the ampoule upwind from the nose. The objective is to get amyl nitrite into the patient's lungs.

c. Rescuers should avoid amyl nitrite inhalation to avoid becoming dizzy and losing competence.

d. Lay the patient down. Since amyl nitrite dilates blood vessels and lowers blood pressure, laying the patient down will help prevent unconsciousness.

e. Do not overuse. Monitor the patient for shock which would indicate excessive use.

f. Review and adhere to proper storage, inspection and replacement requirements given above.

FIRST AID PROCEDURE

The exposed person should be removed from the contaminated area, contaminated clothing removed and the individual washed off. The person providing first aid is subject to exposure if the affected person's clothing is wetted with cyanide.

As soon as possible, even while clothing is being removed or washing is taking place, First aid should be started.

1. If no symptoms are evident, no treatment is necessary; decontaminate patient.

2. If conscious but symptoms (nausea, difficult breathing, dizziness, etc.) are evident, give oxygen.

3. If consciousness is impaired (non-responsiveness, slurred speech, confusion, drowsiness) or the patient is unconscious but breathing, give oxygen and amyl nitrite by means of a resuscitator.

To give amyl nitrite, break an ampoule in a gauze pad and insert into lip of the resuscitator mask for 15 seconds, then take away for fifteen seconds. Repeat 5-6 times. If necessary, use a fresh ampoule every

Continued on next page

3 minutes until the patient regains consciousness (usually 1-4 ampoules). Administer oxygen continuously. Guard against the ampoule entering the patient's mouth.
4. If not breathing, give oxygen and amyl nitrite immediately by means of a positive pressure resuscitator (artificial respiration).
Administer amyl nitrite and continue to give oxygen simultaneously to aid recovery. If massive exposure occurred, consider keeping the first one or two ampoules in the lip of resuscitator mask continuously. Guard against the ampoule entering the patient's mouth.
MEDICAL TREATMENT
THE FIRST AID GIVEN PROMPTLY IS USUALLY THE ONLY TREATMENT NEEDED FOR TYPICAL INDUSTRIAL CYANIDE POISONING. LARGER CYANIDE POISONINGS INCREASE THE NEED FOR MEDICAL TREATMENT.
Do not over-react. Although prompt action is essential when poisoning has occurred, a lucid, conscious person who can communicate may not have significant cyanide poisoning and Medical treatment will rarely be necessary. "Treat what you see" is a good rule of thumb. Mildly symptomatic patients who remain alert may be managed by supportive care only.
The half-life of cyanide in the body is about 20-90 minutes. In diagnosis and monitoring of patients, the critical period for treatment is short. Normally the effects from cyanide poisoning occur in the first few minutes and will indicate the degree of poisoning.
"Preventive" use of cyanide antidote in the absence of impaired consciousness is not normally warranted. Keep the patient calm by assurance over the next 30 minutes and closely monitor the patient's condition. If skin contact with cyanide has been prolonged and/or extensive cyanide has been ingested, watch the individual closely for at least 30 minutes to assure there are no effects from delayed absorption of cyanide into the blood stream.
Consider assuring intravenous access in cases where significant toxicity is possible. Establishment of IV access with normal saline, Ringer's lactate or other available IV fluid will facilitate administration of the antidote if necessary.
MEDICAL TREATMENT KITS
Medical treatment kits should be conveniently located for easy access. Materials for intravenous injection are intended for use only by a physician or fully qualified medical personnel. The location of kits should be carefully planned as part of the emergency program. Suggested locations for kits include:
- in or near the cyanide area;
- plant medical station;
- guard house entrance;
- local hospital;
- doctor's office and residance.

Medical treatment kits should contain the following:
1. One box containing one doze (12) amyl nitrite ampoules.
2. Two sterile ampoules of sodium nitrite solution (10 ml of 3% solution in each).
3. Two sterile ampoules of sodium thiosulphate solution (50 ml of a 25% solution in each).
4. One 10 ml sterile syringe. One 50 ml sterile syringe. Two sterile intravenous needles. One tourniquet.
5. One dozen gauze pads.
6. Latex gloves.
7. A "biohazard" bag for disposal of bloody/ contaminated equipment.
8. A set of cyanide instructions on first aid and medical treatment.

Note: Amyl nitrite ampoules and Medical treatment supplies can be purchased through local pharmacies with a physician's prescription.

Section 5. Fire fighting measures

Flammability of the product	:	Non-flammable.
Auto-ignition Temperature	:	Not applicable.
Flash Points	:	Not applicable.
Flammable limits	:	Not applicable.
Products of combustion	:	Not applicable.
Fire hazards in presence of various substances	:	Not applicable.
Explosion hazards in presence of various substances	:	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire fighting media and structions	:	Use water spray or fog. Do not use carbon dioxide which reacts with sodium cyanide to produce hydrogen cyanide in the presence of moisture. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.

Continued on next page

Section 6. Accidental release measures

ill or leak : Use appropriate tools to put the spilled material in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to federal, provincial and municipal environmental control regulations.

Section 7. Handling and storage

Handling : Follow routine safe handling procedures. Avoid dust generation. Avoid all contact with skin and eyes. Emergency pre-planning and training required. Always handle under ventilation with exhaust system. Always have cyanide antidote readily available if the product is used at remote facilities that would not receive rapid fire and emergency assistance.

Storage : Keep container tightly closed. Keep in a cool, dry and well ventilated place. Avoid dust generation. Store away from incompatible materials.

Section 8. Exposure Controls, Personal Protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value. Ensure that eye stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Splash goggles or faceshield.

Body : Rubber full suit and apron.

Respiratory : If user operations generate dust, fume, mist or if workplace contaminant level is above threshold limit, ensure to use a MSHA/NIOSH approved respirator or equivalent.

Hands : Butyl rubber or neoprene gloves.

Feet Rubber boots.

Section 9. Physical and chemical properties

Physical State and Appearance : Solid. (Granular; briquettes.)

Color : White.

Odor : Odourless.
Solid cyanide has no odour, but it can have a slight ammonia and/or hydrogen cyanide odour if damp.

pH : 11 to 12 (Conc. (% w/w): 5 - 25)

Boiling/condensation point : 1496°C (2724.8°F) @ 760 mmHg

Melting/freezing point : 564°C (1047.2°F)

Specific Gravity : 1.6 (Water = 1)

Vapor pressure : Negligible.

Solubility : Soluble in cold water: 37% @ 20°C.

Section 10. Stability and reactivity

Stability and Reactivity : The product is stable.

Conditions of instability : No additional remark.

Incompatibility with various substances : Large amounts of poisonous, flammable hydrogen cyanide (HCN) gas will be evolved from contact with acids. Reacts violently with strong oxidizing agents when heated. Water or weak alkaline solutions can produce dangerous amounts of hydrogen cyanide in confined areas.

Hazardous Decomposition Products : Moisture will cause slow decomposition, releasing poisonous hydrogen cyanide and ammonia gases.

Hazardous polymerization : Will not occur.

Continued on next page

Section 11. Toxicological information

oxicity data : Acute oral toxicity (LD50): 7 mg/kg (Rat) (Calculated value for the mixture)Oral LD 50: 15mg/Kg [rat], (sodium cyanide). Dermal LD50: 11.28-14.63 mg/Kg [rabbit] (sodium cyanide)
Acute dermal toxicity (LD50): 13 mg/kg (Rat) (Calculated value for the mixture).
Acute eye toxicity (LD50) (Rat) = 4,47 mg/kg (sodium cyanide)

Chronic effects on humans : No additional information.

Other toxic effects on humans : No additional information.

Remarks on toxicity to animals : Administration of sodium cyanide to rats, cats or dogs by the intravenous or intraperitoneal routes resulted in rapid respiration, confusion, unconsciousness, vomiting, decreased blood pressure, cardiac rate changes, seizures and respiratory failure.
Systemic toxicity and death is possible from contamination of the eye (rabbits).
Sodium cyanide applied to the skin of rabbits produced tremors, retrocolic spasms, convulsions, abnormal breathing patterns and prostration.
Repeated administration of cassava diets containing unspecified cyanide ion caused decreased thyroid activity and kidney changes. Long-term administration of 0.5; 1.0 or 2.0 mg/kg/day to dogs produced unspecified acute intoxication symptoms and increased numbers of red blood cells and decreased proteins were observed at doses greater than 1.0 mg/kg/day. Central nervous system changes occurred in all treated dogs.

Section 12. Ecological information

Ecotoxicity data : Ecotoxicity in water: 0.43 to 0.66 mg/l [LC50], 96 hours [Fish (Fathead minnow.)]. 0.046 to 0.075 mg/l [LC50], 96 hours [Fish (Rainbow trout.)]. 0.28 mg/l [LC50], 96 hours [Fish (Bluegill sunfish.)] [sodium cyanide].

Remarks on the products of biodegradation : No additional remark.

Section 13. Disposal considerations

Waste information : Waste must be disposed of in accordance with federal, provincial and municipal environmental control regulations.

Waste stream : Avoid entry of product into the sewage system or water streams.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory Information	Shipping name and Class	UN number	Packing group
TDG Classification	SODIUM CYANIDE Class 6.1	1689	I

Section 15. Regulatory information

WHMIS (Canada) : MAY BE FATAL IF INHALED, ABSORBED THROUGH SKIN OR EYES OR SWALLOWED. MAY CAUSE EYE BURNS, SKIN IRRITATION AND RASHES.
CLASS B-6: Reactive and very flammable material.
Class D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
Class E: Corrosive solid.

DSL (CEPA) : CEPA DSL: All ingredients are listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.

Continued on next page

Section 16. Other information

:ferences : Canadian Guide of the Law and Regulations of the Transportation of the Dangerous Goods. Controlled products regulations. Manufacturer's Material Safety Data Sheet.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Other special considerations : * AEL is DuPont's (the manufacturer) Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

Regulatory Affairs Department : (450) 424-0161

Notice to reader

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Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

PRODUCT NAME: CYANOBRIK® SODIUM CYANIDE

Site: MEMPHIS

PRODUCT NUMBER: 1220

SBU: DCSE
Business: CYANIDES

Revision: 2

Date Issued: 2003-02-26
Date Superseded: 2003-01-24

Similar Names: Cyanide of Sodium
Prussiate of Soda

SALES SPECIFICATIONS:

		--- LIMITS ---		Typical	
Property	Units	Min.	Max.	Analysis	Test Method
Sodium Cyanide	(%)	98.0		99	C6350.445.01.ME
Sodium Hydroxide	(%)	0.06	0.5	0.3	C6350.005.01.ME
Sodium Formate	(%)		0.8	0.3	C6350.575.01.ME
H2O	(%)		0.2	0.05	C6350.570.01.ME
Color				White	C6350.065.01.ME
Sodium Carbonate	(%)		0.9	0.4	C6350.005.01.ME

APPEARANCE: Briquettes with dimensions of approximately 1-3/8 x 1-3/8 x 0.5 in. (3.5 x 3.5 x 1.3 cm.) weighing about 18 grams

OTHER INFORMATION:

DOT Hazard Classification: 6.1, DOT/IMO label Toxic, UN number 1689

PHYSICAL DESCRIPTION:

Property	Typical Value	Units
Formula Weight	49.007	
Melting Point, C (F)	562 (1044)	
Boiling Point @ 760mm Hg, C (F)	1530 (2786)	
Specific Gravity (solid) @ 25C (77F)	1.60	
(liquid) @ 850C (1560F)	1.19	
Solubility in Water, g/100g water		
@ -20C (-4F)	35.4	
@ 20C (68F)	58.3	
Sodium Chloride (%)	0.01	
Sulfides as S (ppm)	<1.0	

PRODUCT NAME: CYANOBRIK® SODIUM CYANIDE Site: MEMPHIS

PRODUCT NUMBER: 1220 SBU: DCSE Revision: 2
Business: CYANIDES

MANUFACTURING CONTROL SPECIFICATIONS:

Property	Units	Minimum	Maximum	Typical Analysis	Test Method
Briquette flow		Free Flowing		Pass	Visual

APPROVALS:

Submitted by:	J.Seymour	R&D Division:	J.Allison
Product Division:	D.Elliott	Tech Services:	D. Whitworth

AUTHORIZED
Business Division: N/A

Quadra Material Safety Data Sheet

Validated and verified by: Administrator **Validation date** 5/21/2009.

WHMIS



Protective Clothing



TDG Road / Rail



Section 1. Chemical product and company identification

Sodium isopropyl xanthate

Code : Q00904

Synonym : Not available.

Manufacturer : Aslchem International

Supplier : QUADRA CHEMICALS LTD.
370, boul. Joseph-Carrier
Vaudreuil-Dorion QC J7V 5V5
Tel: (450) 424-0161

Burlington ON Tel: (905) 336-9133
Delta BC Tel: (604) 940-2313
Edmonton AB Tel: (780) 451-9222
Calgary AB Tel: (403) 232-8130

Material uses : Industrial applications

TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK
IN CANADA - CALL 1-800-567-7455

Section 2. Composition, information on ingredients

Name	CAS #	% by weight	Exposure limits
sopropylxanthic acid sodium salt	140-93-2	60 - 100	Not available.
sodium hydroxide	1310-73-2	1 - 5	ACGIH TLV CEIL: 2 mg/m^3 OSHA PEL TWA: 2 mg/m^3 8 hour(s).
disodium sulfide	1313-82-2	0.5 - 1.5	Not available.
sopropanol	67-63-0	0.1 - 1	ACGIH TLV TWA: 200 ppm 8 hour(s). STEL: 400 ppm 15 minute(s).

Consult local authorities for acceptable exposure limits.

Continued on next page

Section 3. Hazards identification

Emergency overview PYROPHORIC CHEMICAL.
CAUSES EYE IRRITATION.
MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Eyes : Causes eye irritation. May cause severe eye irritation or burns.

Skin : Prolonged or repeated contact may cause irritation.

Inhalation : Dust may be irritating to nose and throat, causing coughing and chocking.

Ingestion : Swallowing large quantities causes headaches, nausea, vomiting, and perhaps unconsciousness.

Potential chronic health effects : **CARCINOGENIC EFFECTS**: Not listed as carcinogen by OSHA, NTP, IARC.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.

Medical conditions aggravated by over-exposure : No additional information.

Over-exposure signs/symptoms : No additional information.

See toxicological information (section 11)

Section 4. First aid measures

Eye contact : IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. Seek immediate medical attention.

Skin contact : Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention.

Inhalation : Allow the victim to rest in a well ventilated area. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Seek immediate medical attention.

Ingestion : DO NOT induce vomiting. If the victim is conscious, give a little water or milk. NEVER give an unconscious person anything to ingest. Seek immediate medical attention.

Notes to physician : No additional information.

Section 5. Fire fighting measures

Flammability of the product : Combustible.

Auto-ignition temperature : Not available.

Flash points : Not available.

Flammable limits : Lower: 1.25% Upper: 50%

Products of combustion : These products are carbon oxides (CO, CO2), sulfur oxides (SO_2, SO_3...), nitrogen oxides (NO, NO2...). Exposure to heat and moisture may cause the decomposition of the isopropyl xanthate to flammable and explosive vapours of carbon disulphide.

Fire hazards in the presence of various substances : Flammable in the presence of open flames, sparks and static discharge, of heat.

Explosion hazards in the presence of various substances : Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Dust can combine with air to form an explosive mixture.

Fire-fighting media and instructions : Use DRY chemicals, carbon dioxide or alcohol foam. Do not use water. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.

Continued on next page

Section 6. Accidental release measures

Spill or leak : Use appropriate tools to put the spilled material in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to federal, provincial and municipal environmental control regulations.

Section 7. Handling and storage

Handling : Follow routine safe handling procedures. Keep away from sources of ignition.

Storage : Keep container tightly closed. Keep in a cool, well-ventilated place. Store away from incompatible materials. Avoid all possible sources of ignition (spark or flame). Avoid moisture.

Section 8. Exposure controls/personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of dusts below their respective threshold limit value. Ensure that eye stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Splash goggles or faceshield.

Body : Synthetic apron. Full suit.

Respiratory : If user operations generate dust, fume, mist or if workplace contaminant level is above threshold limit, ensure to use a MSHA/NIOSH approved respirator or equivalent.

Hands : Gloves.

Feet Boots.

Section 9. Physical and chemical properties

Physical state and Appearance : Solid. (Powder or pellets.)

Color : Yellow.

Odor : Disagreeable. (Slight.)

Melting/freezing point : >182°C (359.6°F)

Specific gravity : 1.263 (Water = 1)

Solubility : Soluble in water: 450 g/l (@ 25ºC)

Section 10. Stability and reactivity

Stability and reactivity : Stable under normal conditions of use.

Conditions of instability : Avoid elevated temperatures. Avoid moisture.

Incompatibility with various substances : Reactive with oxidizing agents, acids, alkalis, moisture.

Hazardous decomposition products : May liberate carbon disulphide, isobutyl alcohol, oxides of carbon and sulphur.

Hazardous polymerization : Will not occur.

Section 11. Toxicological information

Toxicity data : Acute oral toxicity (LD50): 569 mg/kg [Rat].
Acute dermal toxicity (LD50): 400 to 1000 mg/kg [Rabbit].

Chronic effects on humans : No additional information.

Other toxic effects on humans : No additional information.

Remarks on toxicity to animals : No additional information.

Continued on next page

Section 12. Ecological information

Ecotoxicity data : May be harmful to aquatic life.

Remarks on the products of biodegradation : No additional remark.

Section 13. Disposal considerations

Waste information : Waste and empty packaging must be disposed of in accordance with federal, provincial, and municipal environmental control regulations.

Waste stream : Avoid entry of product into the sewage system or water streams.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory information	Shipping name and Class	UN number	Packing group
TDG Classification	XANTHATES CLASS 4.2	3342	III

Section 15. Regulatory information

WHMIS (Canada) : PYROPHORIC CHEMICAL. CAUSES EYE IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR SWALLOWED.
Class B-6, D-1B, D-2B.

DSL (CEPA) : CEPA DSL: All ingredients are listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.

Section 16. Other information

References : Canadian Guide of the Law and Regulations of the Transportation of the Dangerous Goods.
Manufacturer's Material Safety Data Sheet.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Other special considerations : No additional remark.

Regulatory Affairs Department : **(450) 424-0161**

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Quadra Material Safety Data Sheet

Validated and verified by: Administrator **Validation date** 5/25/2009.

WHMIS



Protective Clothing



TDG Road / Rail



Section 1. Chemical product and company identification

Sodium metabisulphite 97%

Code : Q05772

Synonym : Not available.

Manufacturer : Not available.

Supplier : QUADRA CHEMICALS LTD.
3901 F.X. Tessier
Vaudreuil-Dorion, Quebec
Canada J7V 5V5
Tel: 1-800-665-6553

Material uses : Industrial applications.

TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK
IN CANADA - CALL 1-800-567-7455

Section 2. Composition, information on ingredients

Name	CAS #	% by weight	Exposure limits
Sodium metabisulphite	7681-57-4	60 - 100	ACGIH TLV TWA: 5 mg/m^3 8 hour(s).

Consult local authorities for acceptable exposure limits.

Section 3. Hazards identification

Emergency overview CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
HARMFUL IF INHALED OR SWALLOWED.
MAY CAUSE ALLERGIC RESPIRATORY AND SKIN REACTION.

Routes of entry : Inhalation. Ingestion.

Potential acute health effects

Eyes : Causes eye irritation.

Skin : Causes skin irritation. May cause skin sensitization.

Inhalation : Causes respiratory tract irritation, coughing and wheezing. Sulphite sensitive individuals may experience a severe allergic reaction.

Ingestion : Harmful if swallowed. May cause gastrointestinal tract irritation with abdominal pain, nausea, vomiting, diarrhea, violent colic.

Continued on next page

Potential chronic health effe : **CARCINOGENIC EFFECTS**: Classified A4 (Not classifiable for humans or animals.) by ACGIH, 3 (Not classifiable for humans.) by IARC [sodium metabisulphite].
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Prolonged skin contact may cause dermatitis. May cause damage to the liver, lungs and nervous system.

Medical conditions aggravated by over-exposure : No additional information.

Over-exposure signs/symptoms : May cause central nervous system depression.

See toxicological information (section 11)

Section 4. First aid measures

Eye contact : IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. Seek immediate medical attention.

Skin contact : Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention.

Inhalation : Allow the victim to rest in a well ventilated area. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Seek immediate medical attention.

Ingestion : If the victim is conscious, give large amount of water and induce vomiting. NEVER give an unconscious person anything to ingest. Seek immediate medical attention.

Notes to physician : No additional information.

Section 5. Fire fighting measures

Flammability of the product : Non-flammable.

Auto-ignition temperature : Not applicable.

Flash points : Not applicable.

Flammable limits : Not applicable.

Products of combustion : Thermal decomposition (150°C): sulphur oxides, sodium oxide.

Fire hazards in the presence of various substances : Not applicable.

Explosion hazards in the presence of various substances : Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire-fighting media and instructions : Use extinguishing media suitable for surrounding fire. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.

Section 6. Accidental release measures

Spill or leak : Use appropriate tools to put the spilled material in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to federal, provincial and municipal environmental control regulations.

Section 7. Handling and storage

Handling : Follow routine safe handling procedures. Avoid breathing vapours or spray mists.

Storage : Keep container tightly closed. Keep in a cool, dry and well ventilated place. Avoid dust generation. Store away from incompatible materials. Protect from humidity.

Continued on next page

Section 8: Exposure controls/personal protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eye stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Splash goggles.

Body : Full suit.

Respiratory : If user operations generate dust, fume, mist or if workplace contaminant level is above threshold limit, ensure to use a MSHA/NIOSH approved respirator or equivalent.

Hands : Gloves.

Feet Boots.

Section 9: Physical and chemical properties

Physical state and Appearance : Solid. (Crystals or powder.)

Color : White to yellowish.

Odor : Sulphur dioxide.

Molecular weight : 190.13 g/mole

Molecular formula : $Na_2S_2O_5$

pH : 4.3 (Conc. (%): 1)

Melting/freezing point : Decomposition temperature: 150°C (302°F)

Specific gravity : 1.4 (Water = 1)

Solubility : Easily soluble in the following materials: water. Soluble in glycerol; slightly soluble in alcohol.

Section 10: Stability and reactivity

Stability and reactivity : The product is stable.

Conditions of instability : Avoid elevated temperatures and moisture.

Incompatibility with various substances : Reactive with oxidizing agents, acids, moisture.

Hazardous decomposition products : Contact with heat (>150°C), water, acids or oxidizing agents releases sulphur dioxide gas.

Hazardous polymerization : Will not occur.

Section 11: Toxicological information

Toxicity data : Acute oral toxicity (LD50): 1131 mg/kg [Rat].
Acute dermal toxicity (LD50): >1000 mg/kg [Guinea pig].

Chronic effects on humans : No additional information.

Other toxic effects on humans : No additional information.

Remarks on toxicity to animals : May cause adverse reproductive effects.

Section 12: Ecological information

Ecotoxicity data : Not available.

Remarks on the products of biodegradation : No additional remark.

Continued on next page

Section 13. Disposal considerations

Waste information : Waste and empty packaging must be disposed of in accordance with federal, provincial, and municipal environmental control regulations.

Waste stream : Avoid entry of product into the sewage system or water streams.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory information	Shipping name and Class	UN number	Packing group
TDG Classification	Not regulated under TDG (Canada).	Not applicable.	Not applicable.

Section 15. Regulatory information

WHMIS (Canada) : CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE ALLERGIC RESPIRATORY AND SKIN REACTION.
Class D-2A, D-2B.

DSL (CEPA) : CEPA DSL: All ingredients are listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.

Section 16. Other information

References : Canadian Guide of the Law and Regulations of the Transportation of the Dangerous Goods.
Manufacturer's Material Safety Data Sheet.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Other special considerations : No additional remark.

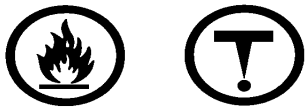
Regulatory Affairs Department : **(450) 424-0161**

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

PROSPEC CHEMICALS
P.O. BOX 3478
176 STURGEON DRIVE
STURGEON COUNTY; ALBERTA; T8L 2T4
CANADA

PRODUCT: TNC 312



Section 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURERS.....	PROSPEC CHEMICALS P.O. BOX 3478 176 STURGEON DRIVE STURGEON COUNTY, ALBERTA T8L 2T4 (780) 992-1522
PRODUCT NAME	TNC 312
CHEMICAL NAME:.....	MIXTURE. SEE SECTION 3 "HAZARDOUS INGREDIENTS " .
MATERIAL USE:.....	ORE PROCESSING.
CHEMICAL FAMILY:.....	THIO COMPOUNDS.
CHEMICAL FORMULA:.....	NOT APPLICABLE.
MOLECULAR WEIGHT:.....	NOT APPLICABLE.

Section 02: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:

SKIN CONTACT:.....	MODERATE IRRITANT.
SKIN ABSORPTION:.....	NOT AVAILABLE.
EYE	WILL BE PAINFUL AND IRRITATING.
INHALATION	NOSE AND THROAT IRRITATION.
INHALATION CHRONIC:.....	CAN CAUSE NASAL AND RESPIRATORY IRRITATION, DIZZINESS, WEAKNESS, FATIGUE, NAUSEA AND HEADACHE.
INGESTION:.....	TOXIC IF INGESTED. CAN CAUSE GASTRO-INTESTINAL IRRITATION, NAUSEA, VOMITING AND DIARRHEA.
EFFECTS OF ACUTE EXPOSURE:.....	REFER TO ROUTE OF ENTRY.
EFFECTS OF CHRONIC EXPOSURE:.....	NOT AVAILABLE. REFER TO ROUTE OF ENTRY.

Section 03: COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	%	Exposure Limit	C.A.S.#	LD/50, Route,Species	LC/50 Route,Species
ISOPROPYL ETHYL THIONOCARBAMATE	60-100	250ppm	141-98-0	NOT AVAILABLE	NOT AVAILABLE
ISOPROPANOL	1-3	400 p.p.m.	67-63-0	ORAL RAT 4710 mg/Kg DERMAL RABBIT 12.87 g/kg	RAT 12,000 ppm/8H

Section 04: FIRST AID MEASURES

SKIN:.....	REMOVE ALL CONTAMINATED CLOTHING. WASH SKIN AREAS FOR 20 MINUTES OR UNTIL CHEMICAL IS REMOVED WITH SOAP AND WATER. DO NOT USE SOLVENTS. LAUNDER CLOTHES BEFORE RE-USE.
EYE:.....	CHECK FOR AND REMOVE ANY CONTACT LENSES. FLUSH WITH COPIOUS AMOUNTS OF WATER. IF IRRITATION PERSISTS SEEK MEDICAL ATTENTION.
INHALATION:.....	REMOVE TO FRESH AIR, APPLY ARTIFICIAL RESPIRATION OR ADMINISTER OXYGEN IF NECESSARY. OXYGEN SHOULD BE ADMINISTERED BY TRAINED PERSONNEL OR UNDER DOCTOR SUPERVISION. SEEK PROMPT MEDICAL ATTENTION IF SYMPTOMS PERSIST.
INGESTION:.....	DO NOT INDUCE VOMITING. SEEK IMMEDIATE MEDICAL ATTENTION.
NOTES TO PHYSICIAN:.....	THERE IS NO SPECIFIC ANTIDOTE. TREATMENT OF EXPOSURE SHOULD BE DIRECTED AT THE CONTROL OF SYMPTOMS AND THE CLINICAL CONDITION OF THE PATIENT.
GENERAL ADVICE:.....	AVOID HIGH VAPOUR CONCENTRATIONS, USE WITH ADEQUATE VENTILATION. PRECAUTIONS SHOULD ALWAYS BE TAKEN TO AVOID SKIN/EYE CONTACT WITH ANY CHEMICAL SUBSTANCE.

PRODUCT: TNC 312

Section 05: FIRE FIGHTING MEASURES

FLAMMABLE LIMITS IN AIR.....	NONE KNOWN.
IF YES, UNDER WHICH CONDITIONS?	
MEANS OF EXTINCTION:.....	CARBON DIOXIDE. DRY CHEMICAL. FOAM. WATER FOG.
SPECIAL PROCEDURES:.....	SELF-CONTAINED, POSITIVE PRESSURE BREATHING APPARATUS AND PROPER PROTECTIVE CLOTHING SHOULD BE WORN IN FIGHTING FIRES INVOLVING ANY CHEMICAL SUBSTANCE. ELIMINATE SOURCES OF IGNITION. USE WATER SPRAY TO KEEP CONTAINERS COOL.
FLASH POINT, F, COC.....	81.0 C ASTM D93-02.
AUTO IGNITION TEMPERATURE °C:.....	NOT AVAILABLE.
T.D.G. FLAMMABLE CLASS:.....	NON REGULATED.
UPPER EXPLOSION LIMIT:.....	NOT AVAILABLE.
LOWER EXPLOSION LIMIT:.....	NOT AVAILABLE.
HAZARDOUS COMBUSTION PRODUCTS..	SULPHUR DIOXIDE. OXIDES OF NITROGEN. OXIDES OF CARBON (CO,CO2).
EXPLOSION DATA:	
SENSITIVITY TO STATIC DISCHARGE:.....	NOT AVAILABLE.
SENSITIVITY TO IMPACT:.....	NOT AVAILABLE.
RATE OF BURNING:.....	NOT AVAILABLE.
EXPLOSIVE POWER:.....	NOT AVAILABLE.

Section 06: ACCIDENTAL RELEASE MEASURES

CLEAN-UP PROCEDURES, LEAK/SPILL:...	STOP SPILL AT SOURCE. CONTAIN ANY SPILLED MATERIAL TO PREVENT DISCHARGE INTO THE ENVIRONMENT. ELIMINATE ALL SOURCES OF IGNITION. PERSONS NOT WEARING PROTECTIVE EQUIPMENT SHOULD BE EXCLUDED FROM THE AREA. ABSORB WITH INERT DRY MATERIAL. PUT INTO AN APPROVED METAL SALVAGE DRUM FOR DISPOSAL.

Section 07: HANDLING AND STORAGE

STORAGE NEEDS:.....	STORE IN A COOL, DRY AND WELL-VENTILATED AREA.
HANDLING PROCEDURES AND ..... EQUIPMENT:	AVOID ALL SKIN CONTACT. AVOID CONTACT WITH EYES. AVOID BREATHING VAPOURS. HANDLE AWAY FROM ALL SOURCES OF IGNITION. USE NON-SPARKING TOOLS AND DO NOT SMOKE.
SPECIAL SHIPPING INSTRUCTIONS.....	USE PRECAUTION WHEN HANDLING OR SHIPPING ANY CHEMICAL SUBSTANCE. PROTECT AGAINST PHYSICAL DAMAGE. PRESENT APPROPRIATE PLACARDS WHEN APPLICABLE, BE SURE DOCUMENTATION IS CORRECT, AND EACH CONTAINER HAS THE PROPER SAFETY MARKS AFFIXED.

Section 08: EXPOSURE CONTROLS/PERSONAL PROTECTION

PROTECTIVE EQUIPMENT:	
GLOVES/TYPE:.....	WEAR IMPERVIOUS GLOVES (E.G. NEOPRENE, RUBBER).
RESPIRATOR/TYPE:.....	IN THE PRESENCE OF VAPOURS, USE A NIOSH OR MSHA APPROVED RESPIRATOR FOR ORGANIC VAPOURS, AIRLINE RESPIRATOR OR SELF CONTAINED BREATHING APPARATUS.
EYE/TYPE:.....	FACE SHIELD.
FOOTWEAR/TYPE:.....	SAFETY BOOTS.
CLOTHING/TYPE:.....	WEAR IMPERVIOUS PROTECTIVE CLOTHING.
OTHER/TYPE:.....	AN EYE WASH STATION AND SAFETY SHOWER SHOULD BE NEAR THE WORK AREA.
ENGINEERING CONTROLS:.....	EXPLOSION PROOF MECHANICAL VENTILATION TO LIMIT VAPOUR CONCENTRATION BELOW T.L.V.

Section 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:.....	LIQUID.
ODOUR/APPEARANCE:.....	ETHEREAL ODOUR, COLOURLESS, TO AMBER LIQUID.
ODOUR THRESHOLD:.....	NOT AVAILABLE.
VAPOUR PRESSURE:.....	NOT AVAILABLE.
REL. VAPOUR DENSITY.....	HEAVIER THAN AIR.
% VOLATILE:	
BY VOLUME	
BY WEIGHT.....	0 - 2.
EVAPORATION RATE:.....	SLOWER THAN ETHER.
BOILING POINT °C:.....	> 125 (decomposes).
FREEZING POINT °C:.....	NOT AVAILABLE.
pH:.....	5% H2O 8.0 +/- 0.5.
SPECIFIC GRAVITY:.....	1.0 +/- 0.05.
SOLUBILITY IN WATER (20 °C):.....	VERY SLIGHT.
COEFFICIENT WATER/OIL DIST.:.....	NOT AVAILABLE.

PRODUCT: TNC 312

Section 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY:	
YES.....	YES.
NO, WHICH CONDITIONS?	
COMPATIBILITY WITH OTHER SUBSTANCES:	
YES.	
NO, WHICH ONES?.....	COPPER OR BRASS.
REACTS VIOLENTLY WITH.....	IN THE PRESENCE OF ANY OF THE ABOVE.
DECOMPOSITION:.....	OXIDES OF SULPHUR. OXIDES OF NITROGEN. OXIDES OF CARBON (CO,CO2).

Section 11: TOXICOLOGICAL INFORMATION

ACUTE ORAL TOXICITY.....	NOT AVAILABLE. SEE SECTION 3, HAZARDOUS INGREDIENTS.
LC 50 OF MATERIAL, SPECIES & ROUTE:.	NOT AVAILABLE. SEE SECTION 3, HAZARDOUS INGREDIENTS.
EXPOSURE LIMIT OF MATERIAL:.....	NOT AVAILABLE. SEE SECTION 3, HAZARDOUS INGREDIENTS.
IRRITANCY OF MATERIAL:.....	IRRITANT. REFER TO ROUTE OF ENTRY, SECTION 2.
SENSITIZING CAPABILITY OF MATERIAL:	NOT AVAILABLE.
CARCINOGENICITY OF MATERIAL:.....	NOT AVAILABLE.
REPRODUCTIVE EFFECTS:	
REPRODUCTIVE TOXICITY:.....	NOT AVAILABLE.
MUTAGENICITY:.....	NOT AVAILABLE.
TERATOGENICITY & EMBRYOTOXICITY:..	NOT AVAILABLE.
SYNERGISTIC MATERIALS:.....	NOT AVAILABLE.
MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:	MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE TO THIS PRODUCT HAVE NOT BEEN ESTABLISHED. UNNECESSARY EXPOSURE TO THIS PRODUCT OR ANY OTHER CHEMICAL SHOULD BE AVOIDED.

Section 12: ECOLOGICAL INFORMATION

BIODEGRADABILITY.....	NOT AVAILABLE.
ENVIRONMENTAL.....	NOT AVAILABLE.

Section 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL, METHOD AND EQUIPMENT:	ALL WASTE FROM THIS PRODUCT INCLUDING ALL EMPTY CONTAINERS MUST BE DISPOSED OF IN ACCORDANCE WITH MUNICIPAL, PROVINCIAL AND FEDERAL REGULATIONS.

Section 14: TRANSPORT INFORMATION

T.D.G. CLASSIFICATION:.....	NOT REGULATED.
T.D.G. SHIPPING NAME:.....	NOT APPLICABLE.
T.D.G. SHIPPING INFORMATION:.....	NOT APPLICABLE.

Section 15: REGULATORY INFORMATION

WHMIS CLASSIFICATION:.....	CLASS B DIV. 3. CLASS D DIV. 2 SUB. B.
CPR COMPLIANCE.....	THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CPR AND THE MSDS CONTAINS ALL OF THE INFORMATION REQUIRED BY THE CPR.

Section 16: OTHER INFORMATION

MANUFACTURERS MSDS DATE:.....	JUNE 21, 2004.
MSDS REVISION DATE:.....	APRIL 5, 2010.
NOTES:.....	The information on this Material Safety Data Sheet has been obtained from the manufacturer, and where applicable, from other reliable sources such as CCOHS and RTECS. However, CHARLES TENNANT & COMPANY (CANADA) LTD. makes no warranties, expressed or implied, as to the accuracy, completeness or accuracy of the information contained herein, and shall not held liable (regardless of fault) to anyone directly or indirectly for damages or injuries in the use of this product arising out of or in connection with the accuracy, completeness or adequacy of such information. To promote safe handling, each customer or recipient should: (1) notify its employees, agents, contractors and others whom it knows or believes will use this material of the information in this MSDS and any other information regarding hazards or safety, (2) furnish this same information to each of its customers for the product; and (3) requests its customers to notify their employees, customers, and other users of the product of this information.
NOTE (EMPTY):	
PREPARED BY	Regulatory Affairs
PREPARATION DATE	Apr05/10

Quadra

Material Safety Data Sheet

alidated and verified by: Regulatory Affairs / Affaires réglementaires

Validation date 5/25/2007.

WHMIS



Protective Clothing



TDG Road / Rail



Section 1. Chemical product and company identification

Zinc sulphate monohydrate (C)

Code : Q00932 / M01179

Synonym : Not available.

Manufacturer : Not available.

Supplier : QUADRA CHEMICALS LTD.
370, boul. Joseph-Carrier
Vaudreuil-Dorion QC J7V 5V5
Tel: (450) 424-0161

Burlington ON Tel: (905) 336-9133
Delta BC Tel: (604) 940-2313
Edmonton AB Tel: (780) 451-9222
Calgary AB Tel: (403) 232-8130

Material uses : Industrial applications.

TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK
IN CANADA - CALL 1-800-567-7455

Section 2. Composition, Information on Ingredients

Name	CAS #	% by weight	Exposure limits
zinc sulphate monohydrate	7446-19-7	100	Not available.

Consult local authorities for acceptable exposure limits.

Section 3. Hazards identification

Emergency overview : MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION.
HARMFUL IF SWALLOWED.

Routes of entry : Eye contact. Inhalation. Ingestion.

Potential acute health effects

Eyes : Can cause permanent eye injury. Symptoms of exposure include tearing, redness and swelling. Can injure the cornea and can cause blindness.

Skin : Can cause severe skin irritation. Symptoms may include redness and burning of the skin and other skin damage.

Inhalation : Symptoms of exposure may include severe irritation and burns to the nose, throat and respiratory tract.

Ingestion : Ingestion of large amounts may be harmful. May cause severe irritation and burns to the mouth, throat and the entire gastrointestinal tract.

Potential chronic health effects : CARCINOGENIC EFFECTS Not available.
MUTAGENIC EFFECTS Not available.
TERATOGENIC EFFECTS Not available.
DEVELOPMENTAL TOXICITY Not available.

Medical conditions aggravated by overexposure : Pre-existing skin and lung disorders (e.g. asthma).

Continued on next page

Over-exposure signs/symptoms : May include nausea, vomiting and diarrhea.

See toxicological Information (section 11)

Section 4. First aid measures

Eye Contact : IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. COLD water may be used. Seek immediate medical attention.

Skin Contact : Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention.

Inhalation : Allow the victim to rest in a well ventilated area. If breathing is difficult, administer oxygen. If the victim is not breathing, perform artificial respiration. Seek immediate medical attention.

Ingestion : DO NOT induce vomiting. If the victim is conscious, give a little water or milk. NEVER give an unconscious person anything to ingest. Seek immediate medical attention.

Notes to Physician : No additional information.

Section 5. Fire fighting measures

Flammability of the product : Non-flammable.

Auto-ignition Temperature : Not applicable.

Flash Points : Not applicable.

Flammable limits : Not applicable.

Products of combustion : Not applicable.

Fire hazards in presence of various substances : Not applicable.

Explosion hazards in presence of various substances : Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.

Fire fighting media and instructions : Use extinguishing media suitable for surrounding fire. Wear NIOSH approved self-contained breathing apparatus (SCBA) when either in confined areas or exposed to combustion products.

Section 6. Accidental release measures

Spill or leak : Use appropriate tools to put the spilled material in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to federal, provincial and municipal environmental control regulations.

Section 7. Handling and storage

Handling : Follow routine safe handling procedures. Avoid dust generation.

Storage : Keep container tightly closed. Keep in a cool, dry and well ventilated place. Avoid dust generation. Store away from incompatible materials.

Section 8. Exposure Controls, Personal Protection

Engineering controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of dust below their respective threshold limit value. Ensure that eye stations and safety showers are proximal to the work-station location.

Personal protection

Eyes : Splash goggles.

Body : Lab coat.

Respiratory : If user operations generate dust, fume, mist or if workplace contaminant level is above threshold limit, ensure to use a MSHA/NIOSH approved respirator or equivalent.

Hands : Chemical resistant gloves.

Feet : Safety shoes.

Continued on next page

Section 9. Physical and chemical properties

ıysical State and Appearance	: Solid. (Powder or granules.)
Color	: White.
Odor	: Odourless.
Molecular Weight	: 179.43 g/mole
Molecular formula	: ZnSO4.H2O
pH	: 5 (Conc. 10%)
Boiling/condensation point	: Decomposition temperature: >500°C (932°F)
Melting/freezing point	: Loses water above 238°C.
Specific Gravity	: 3.28 (Water = 1)
Evaporation rate	: <1
Solubility	: Soluble in cold water.

Section 10. Stability and reactivity

Stability and Reactivity	: The product is stable.
Conditions of instability	: Avoid extreme heat.
Incompatibility with various substances	: Reactive with acids and water.
Hazardous Decomposition Products	: May liberate toxic fumes of zinc oxides and oxides of sulphur.
Hazardous polymerization	: Will not occur.

Section 11. Toxicological information

˜oxicity data	: Acute oral toxicity (LD50): 2200 mg/kg [Mouse].
Chronic effects on humans	: No additional information.
Other toxic effects on humans	: No additional information.
Remarks on toxicity to animals	: No additional information.

Section 12. Ecological information

Ecotoxicity data	: Not available.
Remarks on the products of biodegradation	: No additional remark.

Section 13. Disposal considerations

Waste information	: Waste must be disposed of in accordance with federal, provincial and municipal environmental control regulations.
Waste stream	: Avoid entry of product into the sewage system or water streams.

Consult your local or regional authorities.

Section 14. Transport information

Regulatory Information	Shipping name and Class	UN number	Packing group
TDG Classification	Not regulated under TDG (Canada).	Not available.	Not available.

Continued on next page

Section 15. Regulatory information

HMIS (Canada) : MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. HARMFUL IF SWALLOWED.
Class D-2B: Material causing other toxic effects (TOXIC).

DSL (CEPA) : CEPA DSL: All ingredients are listed or exempted.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.

Section 16. Other information

References : Canadian Guide of the Law and Regulations of the Transportation of the Dangerous Goods.
Manufacturer's Material Safety Data Sheet.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Other special considerations : No additional remark.

Regulatory Affairs Department : (450) 424-0161

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Quadra

Quadra Chemicals Ltd.

1100 Blair Road Burlington, ON L7M 1K9

SPECIFICATION SHEET

ZINC SULPHATE MONOHYDRATE (C)

GENERAL INFORMATION

Product Code	Q00932;M01179
Chemical Name	Zinc sulphate monohydrate
Chemical Formula	$ZnSO_4.H_2O$ - CAS # 7446-19-7
Appearance	White small crystals
Manufacturer	NA

CHEMICAL ANALYSIS

	TYPICAL VALUES	*GUARANTEED MINIMUM*	*VALUES MAXIMUM*
Zinc sulphate [$ZnSO_4.H_2O$]	---	98 %	---
Zinc content	---	35.5 %	---
Iron [Fe]	---	---	0.005 %
Manganese [Mn]	---	---	0.005 %
Heavy metals [as Pb]	---	---	0.005 %
Arsenic [As]	---	---	0.005 %

SCREEN ANALYSIS

Mesh 80 to 100	Min. 80 % (for reference only)

MISCELLANEOUS

No data

PREPARATION DATE (MM/DD/YY)	
Original	12/08/1993
Revision	06/05/2003

PLEASE REFER TO MATERIAL SAFETY DATA SHEET FOR HEALTH & SAFETY AND REGULATORY INFORMATION ON THIS PRODUCT.

THE CHEMICAL DATA PRESENT HEREIN IS A TYPICAL SPECIFICATION ONLY AS PROVIDED BY THE MANUFACTURER. GUARANTEED ANALYSIS IS AVAILABLE ON SPECIFIC CERTIFICATE OF ANALYSIS OR COMPLIANCE AS SUBMITTED BY THE MANUFACTURER.

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