Report to:

VISTA GOLD CORP.

7961 Shaffer Parkway, Suite 5, Littleton, CO 80127
Phone: (720-981-1185)

NI 43-101 Technical Report – Mt. Todd Gold Project 50,000 tpd Preliminary Feasibility Study Northern Territory, Australia

Appendix N Water Treatment Plant

PROJECT NO. 114-311285

DATE: JUNE 2013

TETRA TECH

350 Indiana Street, Suite 500, Golden, CO 80401
Phone: 303-217-5700 Fax: 303-217-5705

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133-20192-12002

MEMORANDUM

TO: Andrew Harley, Ph. D.

FROM: Ben Johnson, PE
HC Liang, Ph. D
Joel Migchelbrink

SUBJECT: Mt. Todd Project Feasibility Study – Water Treatment Plant

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Executive Summary

The Water Treatment Plant (WTP) is a key component of the water management plan at the Mt. Todd mine. The WTP will treat excess water collected at several areas of the mine so that the water can be used to satisfy process make-up water demand, manage dust on site or be discharged to the environment. The WTP is allowed to discharge to a tributary of the Edith River seasonally, and the regulations governing the uses of the Edith River will dictate the requirements of the WTP.

Waste Discharge Licence 178-2 (WDL 178-2) presents the framework for discharges from the Mt. Todd WTP. WDL 178-2 requires Vista Gold Corp (Vista) to collect background data to develop environmentally protective trigger values (TVs). Vista is currently collecting the required data, but in the meantime, interim trigger values (ITVs) have been established for the Edith River. The ITVs were used to develop effluent goals for the WTP.

Influent water quality and quantity at the WTP was established via a modeling effort. The water balance model indicates that over the life of the mine, the capacity of the WTP will need to be 500 m^3/hr. Modeling of the chemistry of the feed streams to the WTP provided the influent water quality to be treated.

The selected treatment process includes a number of steps to treat dissolved constituents of interest. The WTP begins with the addition of lime to raise the pH of influent water to pH 11 in order to precipitate dissolved constituents, specifically magnesium. Ferric chloride will also be added to assist in the co-precipitation and adsorption of other metal species, specifically cadmium. The solids generated by the addition of lime and ferric will be removed in high-rate solids contact clarifiers. Sulphuric acid will be used to reduce the pH back to neutral, which will facilitate the precipitation of aluminum. Microfilters will be used to remove the precipitated aluminum. Solids collected in the clarifiers will be disposed of at the TSF, and water used to backwash the microfilters will be recycled through the treatment plant.

The WTP will be housed in a slab on grade, pre-engineered, metal building. The process will be constructed in a two-train configuration to ensure proper redundancy, and allow for more efficient operation during periods of low influent flow. Several tanks, including a lime silo, will be located externally near the building. These tanks will be covered and otherwise protected against environmental conditions. The Microfiltration System will be housed outside of the WTP building in two metal containers. A lined earthen equalization pond will accept flows from around the site and will serve as the influent to the WTP. Submersible pumps located outside of the WTP building in below grade concrete structures will be used to transfer influent flow to the WTP.

Table ES-1 summarizes the expected influent water quality to the WTP, the effluent goals (developed for a plant flow of 500 m^3/hr) of the WTP, and the expected effluent quality.

Table ES-1 – WTP Influent Water Quality, Effluent Goals, and Expected Effluent Quality
Vista Gold Corp. – Mt. Todd Project
March 2012

Parameter	Unit	Influent Water Quality		Effluent Goal	Expected Effluent Quality
		Wet Season	Dry Season		
Magnesium	mg/L	97	195	72.4	0.49
Sulphate	mg/L	907	2,022	5,436	990
Aluminum	µg/L	20,000	28,000	119	13
Cadmium	µg/L	39	60	7.6	5.3
Cobalt	µg/L	450	680	3,757	0.53
Chromium	µg/L	0.71	1.1	97.9	1.35
Copper	µg/L	3,000	4,500	30.9	0.61
Manganese	µg/L	5.5	9.6	71.0	0.32
Nickel	µg/L	470	650	422	31.9
Lead	µg/L	24	26	102	1
Iron	µg/L	2.0	5.1	240	2.66
Mercury	µg/L	0.17	0.17	21.2	0.17
Zinc	µg/L	8,800	13,000	271	124
Total Cyanide	mg/L	10	10	3.4	4.38

The estimated capital cost of the WTP is $21.3 million AUD. The accuracy of the capital estimate is ±30%. The estimated annual cost to operate the WTP is $935,000 AUD, not including labor. The estimate does include electricity and chemical costs. It is estimated that 5.5 full time employees will be required to operate the WTP, including one supervisor.

Background

Vista Gold Corp (Vista) purchased the Mt. Todd property, which is 56 km by road northwest of Katherine and approximately 250 km southeast of Darwin in NT, Australia. The property has a history of gold mining, and Vista is examining restarting gold mining operations. The purpose of this memorandum is to develop a water treatment plant (WTP) that can treat water that is collected at the site during mine operations.

Current and historic evidence indicates that the Mt. Todd waste rock, ore, and tailings contain sulfides capable of generating acid and metal laden leachates (ARD/ML). ARD/ML currently occurs or is found in the waste rock dump and associated pond (RP1), the lean ore stockpile and associated pond (RP2), exposed pit walls and associated pit lake (RP3), the heap leach pad (HLP) and associated pond and moat, the plant runoff pond (RP5) and within the existing tailings storage facility (TSF1).

The Edith River flows near the Mt. Todd property, and several tributaries are located on the property. Discharges from the WTP will be directed toward Batman Creek, one of these tributaries. The Edith River and tributaries are protected beneficial use under the Water Act 2000 for aquatic ecosystem protection. Discharges from the site are regulated under WDL 178-2, issued by the Northern Territory Government on 5 February 2013. WDL 178-2 requires Vista to develop site specific trigger values (TVs) as a baseline against which to measure future improved environmental performance.

Effluent Water Quality Requirements

WDL 178-2 requires Vista to develop TVs using existing and new data. The WDL requires Vista to submit a plan for developing site specific trigger values that are developed in accordance with ANZECC 2000 Guidelines. To develop site specific TVs, two years of specific monitoring data is typically required by the Guidelines, providing a minimum of 24 data points. Effluent water quality requirements are necessary for the development of the WTP. Therefore, GHD has completed a study titled, "Waste Discharge Licence 178 – Interim Site Specific Trigger Values," dated October 2011, that outlines temporary requirements based on a battery of historic data available. The study outlines site specific interim trigger values (ITVs) at surface water monitoring site SW2, a location on the Edith River downstream of the mine site, based on historic data. Table 1 summarizes the ITVs.

Table 1 Site Specific Interim Trigger Values (reprinted from GHD, October 2011)
Vista Gold Corp. – Mt. Todd Project
March 2012

Analyte (Metals 0.45 µm filtered)	Edith River	Source
pH	6-8	ANZECC and ARMCANZ Table 3.3.4
Dissolved Oxygen (mg/L)	80%	ANZECC and ARMCANZ Table 8.2.10
Temperature	No Data	No ANZECC and ARMCANZ Guidelines
Conductivity (µS/cm)	20-250	ANZECC and ARMCANZ Table 3.3.5
Magnesium (µg/L)	2.5	Van Dam et al 2010 Environ Toxicol Chem 29(2):410-421
**Sulphate (mg/L)	129	Elphick et al 2011 Environ Toxicol Chem 30(1):247-253
Aluminum (µg/L)	149	Site derived 80th %ile
*Cadmium (µg/L)	0.2	High reliability TV ANZECC and ARMCANZ Table 3.4.1
Cobalt (µg/L)	90	Moderate reliability TV ANZECC and ARMCANZ pg 8.3-116
Chromium (III) (µg/L)	3.3	Low reliability TV ANZECC and ARMCANZ Table 3.4.1
Chromium (VI) (µg/L)	1	High reliability TV ANZECC and ARMCANZ Table 3.4.1
*Copper (µg/L)	2.7	ERISS (2005) No Observable Effects Concentration
Manganese (µg/L)	1900	Moderate reliability TV ANZECC and ARMCANZ Table 3.4.1
*Nickel (µg/L)	11	High reliability TV ANZECC and ARMCANZ Table 3.4.1
*Lead (µg/L)	3.4	High reliability TV ANZECC and ARMCANZ Table 3.4.1
Iron (µg/L)	300	Canadian Guideline ANZECC and ARMCANZ pg 8.3-123
Mercury (µg/L)	0.6	High reliability TV ANZECC and ARMCANZ Table 3.4.1
*Zinc (µg/L)	9.5	ERISS (2005) No Observable Effects Concentration

*These analytes have an algorithm to derive TVs based on water hardness
**SO4 has TVs based on water hardness. This TV is for soft water (Elphick et al 2011 Environ Toxicol Chem 30(1):247-253)

The ITVs must be met at monitoring location SW2, downstream of the water treatment plant discharge. A simple mass balance model was developed to determine effluent limits for the WTP for discharge into the Edith River. The model assumes that there is no reactivity, and all of the constituents are conservative in the environment. The equation used in the model is:

$$C_{WTP} = \frac{(Q_{WTP} + Q_{SW2}) \times C_{SW4} - Q_{SW2} \times C_{SW2}}{Q_{WTP}}$$

Where:
C_{WTP} is the allowable effluent concentration in the WTP effluent

Q_{WTP} is the WTP flow
Q_{SW2} is the flow of the Edith River at sampling location SW2, upstream of the Batman Creek confluence
C_{SW4} is the allowable in-stream concentration in the Edith River at sampling location SW4, downstream of the Batman Creek confluence
C_{SW2} is the historic in-stream concentration at sampling location SW2

Using data that is currently available, the model was used to determine C_{WTP} for all of the water quality parameters that will receive TVs as part of the WDL. Table 2 summarizes background water quality values that were used for C_{SW2} and Table 3 summarizes the projected flows used at Q_{SW2}.

Table 2 – Background water quality in the Edith River (C_{SW2})
Vista Gold Corp. – Mt. Todd Project
March 2012

Parameter	Unit	Median	80%ile
pH[1]		6.18	6.36
Electrical Conductivity[1]	µS/cm	18.0	21.1
Aluminum[1]	µg/L	86	149
Cadmium[1]	µg/L	0.01	0.02
Copper[1]	µg/L	0.52	0.68
Zinc[1]	µg/L	0.9	1.6
Sulphate[1]	Mg/L	0.05	0.2
Magnesium[2]	Mg/L	0.8	0.8
Cobalt[2,3]	µg/L	1	1
Chromium (III)[2,3]	µg/L	1	1
Chromium (VI)[2,3]	µg/L	1	1
Manganese[2]	µg/L	17	17
Nickel[2,3]	µg/L	1	1
Lead[2,3]	µg/L	1	1
Iron[2]	µg/L	790	790
Mercury[2,3]	µg/L	0.1	0.1

1 From GHD, October 2011, "Waste Discharge Licence 178 – Interim Site Specific Trigger Values"
2 From November 2011 sample collected by Vista Gold
3 Values that were below detection limit are listed at the detection limit in table.

Table 3 – Projected flows in the Edith River (Q_{SW2})
Vista Gold Corp. – Mt. Todd Project
March 2012

Month	Projection Based on 2007-2008 Dataset (m^3/hr)[1]	Projection Based on 2010-2011 Dataset (m^3/hr)[2]
January	80,515	128,831
February	171,141	157,587
March	94,780	146,122
April	5,012	60,545
May	1,964	694
June	1,379	0
July	1,048	0
August	686	0
September	429	0
October	15	637
November	2,070	5,875
December	42,792	121,581

1 Data obtained from NRETAS station 2007-2008 year multiplied by 0.8 to account for location of stream gauge (upstream) with respect to SW2

2 Data obtained from NRETAS station 2010-2011 year multiplied by 0.8 to account for location of stream gauge (upstream) with respect to SW2

Effluent limits were calculated for the following four scenarios:

- Scenario 1: Average flow condition, median in-stream water quality
- Scenario 2: Average flow condition, 80th percentile in-stream water quality
- Scenario 3: High flow condition, median in-stream water quality
- Scenario 4: High flow condition, 80th percentile in-stream water quality

Limits were estimated for each day, as the WDL requires samples to be collected daily during discharge. The ANZECC guidelines for developing trigger values states:

> "A trigger for further investigation will be deemed to have occurred when the median concentration of n independent samples taken at a test site exceeds the 80th percentile of the same indicator at a suitably chosen reference site."

Therefore, in order to avoid further investigation, in-stream water quality downstream of the discharge must be less than the trigger value in half of the samples collected. To calculate the effluent limits, median values for C_{WTP} were determined from daily calculations for each of the four scenarios. The minimum value from the four scenarios was selected as the effluent limit.

Two different discharge situations were considered as well. As noted in Table 3 above, the flow in the Edith River is highly seasonal. Climatic differences between the wet and dry season have an impact on river flows. The wet season, which occurs between November and April, provides more dilution in the river, allowing for higher discharge limits. Median values for effluent limits were calculated for wet season discharges only and for year round discharges. Discharging year round led to more stringent effluent goals that would be more difficult and expensive to treat for. Therefore, the decision was made to only discharge treated water during the wet season. Given the process make-up water and dust suppression needs on site, no surplus water remained for discharge to the Edith River.

Table 4 presents the calculated effluent limits and the effluent goals for the water treatment plant. The water treatment plant effluent goals were set at 80 percent of the effluent limit to provide a safety factor. Effluent limits were calculated at 500 m^3/hr. Please note that the discharges from the water treatment plant will only be allowed during the wet season. Treated water will be used for other uses at the site during the dry season.

Table 4 – Effluent Limits and Goals
Vista Gold Corp. – Mt. Todd Project
March 2012

Parameter	Unit	Effluent Limit	Effluent Goal
Electrical Conductivity	µS/cm	12,097	9,678
Magnesium	Mg/L	90.5	72.4
Sulphate	Mg/L	6,795	5,436
Aluminum	µg/L	149	119
Cadmium	µg/L	9.52	7.6
Cobalt	µg/L	4,696	3,757
Chromium (III)	µg/L	122	97.9
Chromium (VI)	µg/L	1	0.8
Copper	µg/L	38.6	30.9
Manganese	µg/L	88.8	71.0
Nickel	µg/L	528	423
Lead	µg/L	128	102
Iron	µg/L	300	240
Mercury	µg/L	26.5	21.2
Zinc	µg/L	339	271
Total Cyanide	mg/L	4.2	3.4

Influent Water Quality

To determine the type of treatment process required, and the extent of treatment necessary, the influent water quality to the water treatment plant must be estimated. Inputs to the water treatment plant come from various sources throughout the mine site. They will all be collected in an equalization pond and mixed prior to being treated. A model was built to estimate the water quality at the influent to the water treatment plant, based on various sources and water chemistry. The model was calculated semi-annually for two years of preproduction, the production period, and several years of post-production. The influent water quality, for the purposes of selecting and designing a treatment process, was assumed to be the worst case value for each parameter over the life of the mine. Table 5 summarizes the design influent water quality for the water treatment plant.

Table 5 – Design Influent Water Quality
Vista Gold Corp. – Mt. Todd Project
March 2012

Parameter	Unit	Wet Season Value	Dry Season Value	Effluent Goal
Magnesium	Mg/L	97	195	72.4
Sulphate	Mg/L	907	2,022	5,436
Aluminum	µg/L	20,000	28,000	119
Cadmium	µg/L	39	60	7.6
Cobalt	µg/L	450	680	3,757
Chromium (III)	µg/L	0.71	1.1	97.9
Chromium (VI)	µg/L			0.8
Copper	µg/L	3,000	4,500	30.9
Manganese	µg/L	5.5	9.6	71.0
Nickel	µg/L	470	650	423
Lead	µg/L	24	26	102
Iron	µg/L	2.0	5.1	240
Mercury	µg/L			21.2
Zinc	µg/L	8,800	13,000	271
Total Cyanide	mg/L			3.4

From Table 5, the constituents of concern for the water treatment plant include magnesium, aluminum, cadmium, copper, nickel (dry season only), and zinc. The treatment process will be designed with these targets in mind.

Water Quantity

A GoldSim model of water balance at the Mt. Todd site was completed. The model indicated that a water treatment plant with a capacity of 500 m^3/hr was required to balance water needs across the plant. The water balance model indicated that WTP effluent would be wholly consumed by process make-up water demand and dust suppression on site, with zero discharges to the Edith River, regardless of season.

Water Treatment Process Description

Based on the established water balance, influent water quality data and effluent limits, a treatment process involving hydrated lime precipitation and membrane filtration was selected. A process schematic is presented in Figure 1.

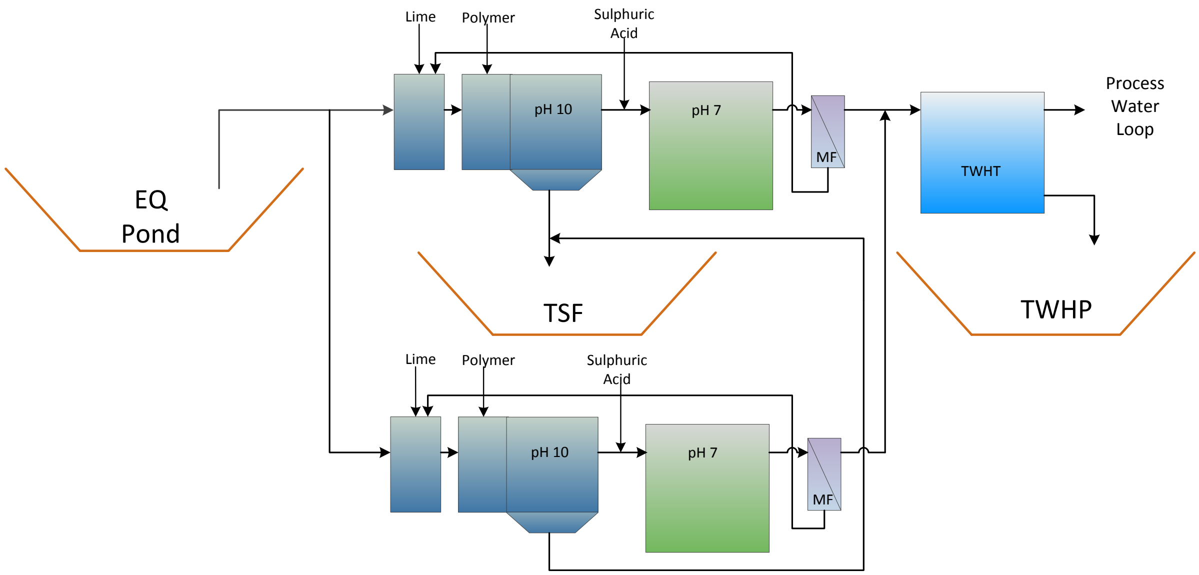


Figure 1 - WTP Process Schematic

An equalization pond (EQP) of 60,000 m^3 will be constructed northeast of the WTP building. Flows from different retention ponds around site will be mixed to allow for consistent influent water chemistry to the WTP. EQP water will be pumped into the WTP building, which will be a pre-engineered steel building 20 meters wide by 35 meters long, and located near an access road to the heap leach pad.

The influent will first flow to high rate solids contact clarifiers. In the first stage of the clarification process, lime is added to the water in rapid mix tanks to raise the pH to approximately 11. At pH 11, dissolved constituents of concern including magnesium, cadmium, copper, nickel, and zinc will precipitate. Ferric chloride is injected to promote coagulation of the constituents of concern, especially cadmium. Water then underflows to reactor vessels, where it is contacted with recycled sludge, and injected with polymer to promote rapid flocculation. An emulsion polymer skid with a blending valve system will be installed. The flocculated material overflows to clarification basins, and quickly settles. Scraper mechanisms draw the sludge to hoppers below the clarification basins. Sludge is continuously recycled back to the reactor turbines, and periodically discharged, and pumped to the TSF. Overflows from the clarification basins pass through a series of launders, and are pumped to large Neutral pH Reaction Tanks, located just outside of the building.

Lime will be supplied as quicklime (CaO), as large quantities of quicklime are needed for other areas of the site. Hydrated lime ($Ca(OH)_2$) is needed because it dissolves much faster and is a stronger base. A combination quicklime storage silo/slaking unit will be installed to produce hydrated lime from quicklime. The unit will store approximately 45 m^3 of quicklime, or about a 27 day supply of lime. The slaker will be sized to slake 1 tonne per hour of quicklime.

Ferric chloride will be shipped as 40% liquid solution by weight, and pumped to a single 24 m^3 fiberglass reinforced plastic storage tank. This tank will hold an approximate 20 day supply of ferric chloride. The ferric will be injected into the Rapid Mix tanks through peristaltic pumps.

Dilute sulphuric acid is injected into the Neutral pH Reaction Tanks to adjust the pH to approximately neutral. Sulphuric acid will be shipped to the site as a 98% solution, and pumped to a dilution tank. Other acids will be considered during the design phase of the project to prevent the addition of sulphate. The Neutral pH Reaction Tanks are sized to provide approximately 60 minutes of retention time. This step, as well as the long retention time, is necessary to precipitate aluminum, which will redissolve at pH 11. Water from the Neutral pH Reaction Tanks will be gravity fed to a skid mounted microfiltration (MF) system. The MF system will come complete with installed clean-in-place and backwash systems. The system will be installed on concrete foundations outside of the WTP building. The MF backwash will be pumped to the front of the process. The MF system is necessary to remove precipitated aluminum, as well as any other relatively large particles that do not settle in the high rate clarification system.

Filtrate from the MF system will be sent to the Treated Water Holding Tank (TWHT). The TWHT will be a 300 m^3 tank located outside of the WTP building, next to the Neutral pH Reaction Tanks. The TWHT will also act as a source of process water, as water will be pumped from it in a loop around the WTP building. The lime slaker, polymer skid, and acid dilution system will all need treated water to operate. Process water pumps will supply treated water to the loop at the pressures required by the uses of treated water. The majority of the water in the TWHT will overflow to Batman Creek. During the dry season, when treated water cannot be discharged to the environment, the Treated Water Pumps will pump water from the TWHT to other uses around the site as necessary.

Because the plant is relying on a dilution from the Edith River, off-site discharge can only occur during the wet season. This is mostly due to the sulphate concentration. Treating sulphate to the TV would require a membrane filtration system with smaller pores than MF – reverse osmosis or nanofiltration (NF). This would add significant cost to the WTP, as well as decrease throughput efficiency, as the membrane concentrate would have to be sent to the TSF. Given that treated water can be used on site, especially for process plant make up water and for site dust suppression, no surplus effluent is available and no discharges to the Edith occur. If it is found that the site cannot use treated water during the dry season, on-site storage can be explored, or modularized NF units can be brought to site.

Design Criteria Summary

The following sections present a summary of the design criteria for the components of the WTP. Drawings showing the details of the WTP design are attached to this memorandum.

Table 6 summarizes the design criteria of the equalization pond. The equalization pond will be a lined earthen pond that accepts water pumped from various parts of the mine site. Water from the equalization pond will flow by gravity to the feed water pump station.

Table 6 – Equalization Pond Design Criteria Summary
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		1
Volume	m^3	60,000
Detention Time	day	5.5

Table 7 presents the design criteria for the Feed Pump Stations. Water from the equalization pond is pumped to the WTP by the feed pumps. The Feed Pump Stations are below grade concrete structures that houses two submersible pumps each.

Table 7 – Feed Pump Design Criteria Summary
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		4
Type		Submersible
Flow Rate	L/s	101
Total Dynamic Head	m	9
Motor Horsepower	kW	22
Wetwell Volume	m^3	150

Table 8 presents the design criteria of the High pH Clarifiers. The High pH Clarifiers are a package system that will be housed in the WTP building. Water will be pumped to the clarifiers from the feed pumps, and treated water will be pumped to the Neutral pH Reaction Tanks by the High pH Pumps. Sludge collected in the clarifiers will be pumped to the TSF by the Sludge Pumps.

Table 8 – High pH Clarifier Design Criteria Summary
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		2
Overflow Rate	m^3/hr	300
Rapid Mix detention time	Min	5.5
Reactor vessel detention time	Min	16.5
Rapid Mix mixer	kW	3.0
Reactor vessel mixer	kW	5.0
Water Depth	M	5

Table 9 presents the design criteria for the High pH Pumps. The High pH Pumps pump treated water from the High pH clarifiers to the Neutral pH Reaction Tanks. The pumps are horizontally mounted centrifugal pumps located in the WTP building.

Table 9 – High pH Pumps Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		4
Type		Centrifugal
Flow Rate	m^3/hr	300
Total Dynamic Head	m	7
Motor Horsepower	kW	11

Table 10 presents the design criteria for the sludge pumps. The sludge pumps pump sludge collected in the High pH clarifier to the TSF for disposal.

Table 10 – Sludge Pump Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		4
Type		Progressive Cavity

Table 11 presents the design criteria for the Neutral pH Reaction Tanks. The Neutral pH Reaction Tanks accept water pumped by the High pH Pumps and discharges water to the MF System. The Neutral pH Reaction Tanks are located just outside the WTP Building.

Table 11 – Neutral pH Reaction Tank Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		2
Volume	m^3	300

Table 12 presents the design criteria for the MF System. The MF System is a package system that will be housed in two separate containers on concrete foundations directly outside of the WTP building. The system will accept water from the Neutral pH Reaction Tanks and discharge treated water to the TWHT. Backwash wastes generated by backwashing the filters periodically will be recycled to the High pH Clarifiers. Neutralized wastes generated by monthly clean in place activities will be discharged to the TSF. Components of the MF System include:

- Feed Tank

- Feed Pumps
- Self-cleaning strainers
- Membrane Racks
- Membrane modules
- Clean in place tank
- Filtrate Break Tank
- Reverse Filtration Pumps
- Filtrate Forwarding Pumps
- Air Compressors
- Sodium hypochlorite feed system
- Citric acid feed system
- Sodium hydroxide feed system
- Miscellaneous Instruments and Control Equipment

Table 12 summarizes some general design criteria for the MF System.

Table 12 – Microfiltration System Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number of Containers		2
Module Racks Per Container		2
Module Spaces per rack		30
Total Number of Modules		100
Total membrane area	m^2	5,000
Average flux	lmh	100
Backwash frequency	min	15
Enhanced flux maintenance frequency	day	1
Clean in place frequency	month	1

Table 13 presents the design criteria of the TWHT. The TWHT receives treated water from the MF System and stores treated water prior to disposal or other use. It is located near the WTP Building.

Table 13 – Treated Water Holding Tank Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		1
Volume	m^3	300

Table 14 presents the design criteria of the treated water pumps. The treated water pumps draw treated water from the TWHT and pump it to the process plant for use on site. They are located in the WTP Building.

Table 14 – Treated Water Pumps Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		4
Type		Horizontal centrifugal
Flow Rate	m^3/hr	300
Total Dynamic Head	m	25.5
Motor Horsepower	kW	37

Table 15 presents the design criteria for the process water pumps. The process water pumps pump treated water from the TWHT and pump it to various uses throughout the WTP, including acid dilution, polymer makeup, and lime slaking. The distribution system creates a closed loop, with a discharge back to the TWHT. The process water pumps are located in the WTP Building.

Table 15 – Process Water Pumps Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Number		4
Type		Vertical multistage centrifugal
Flow Rate	m^3/hr	4.5
Total Dynamic Head	m	28
Motor Horsepower	kW	0.75

Table 16 presents the design criteria for the lime feed system. Lime is stored in a silo as quicklime, which is trucked in from outside sources. The lime feed system consists of the silo, a slaker, a slurry tank, and metering pumps. Lime will be fed prior to the High pH clarifier to raise the pH of the influent water. The system is a self-contained package system that is located near the WTP Building.

Table 16 – Lime Feed System Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Silo Volume	m^3	46.6
Slaker capacity	tonne/day	24
Slurry tank volume	m^3	30
Slurry concentration	%	30
Typical dose	mg/L	500
Number of metering pumps		4
Metering pump capacity	L/min	18

Table 17 presents the design of the ferric chloride feed system. Ferric chloride will be stored in a bulk tank capable of receiving liquid deliveries from bulk storage trucks. Ferric chloride will be fed upstream of the High pH Clarifiers. The iron will form ferric hydroxides at high pH, which can co-precipitate cadmium and other dissolved metals, increasing the removal of several constituents. The feed system consists of the tank and metering pumps. The ferric chloride feed system will be located in the WTP Building.

Table 17 – Ferric Chloride Feed System Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Bulk Tank Capacity	m^3	24
Typical dose	mg/L	116
Solution concentration	%	40
Number of metering pumps		4
Metering pump capacity	L/min	3.5

Table 18 presents the design of the sulphuric acid feed system. Sulphuric acid will be stored in a bulk tank capable of receiving liquid deliveries from bulk storage trucks. The acid will be diluted with treated water for use. The dilute acid will be dosed upstream of the Neutral pH Reaction Tanks to decrease the pH of the water. The feed system consists of two tanks, transfer pumps, and metering pumps. The sulphuric acid feed system will be located in the WTP Building.

Table 18 – Sulphuric Acid Feed System Design Criteria
Vista Gold Corp. – Mt. Todd Project
March 2012

Item	Unit	Value
Bulk Tank Capacity	m^3	9.5
Typical dose	mg/L	35
Solution concentration	%	98
Dilute solution concentration	%	10
Number of transfer pumps		2
Transfer pump capacity	m^3/hr	0.5
Number of metering pumps		4
Metering pump capacity	L/min	3.5

Table 19 presents the design criteria of the polymer feed system. Polymer will be used in the High pH Clarifiers to promote particle agglomeration to facilitate better settling. Polymer will be delivered to the site in 1000 liter totes. A polymer blending unit with integral mixing chamber, solution tank, and metering pumps will be used to activate the polymer and prepare it for use. Treated water will be used to mix the polymer solution. The polymer feed system will be located in the WTP Building.

Table 19 – Polymer Feed System Design Criteria
Vista Gold Corp. – Mt. Todd Project

March 2012

Item	Unit	Value
Number of blending units		1
Blending Unit capacity	L/s	0.01-0.1
Typical dose	mg/L	1

Table 20 presents the expected effluent quality of the treatment process detailed above, against the effluent limits that mark the interim trigger values with an average wet season Edith River flow. The dilution ratios were established for a plant flow of 500 m^3/hr. According to the performed chemical modeling, the treatment process will meet the effluent limits for all constituents with interim trigger values.

Table 20 - Expected Effluent Quality
Vista Gold Corp. – Mt. Todd Project
March 2012

Component	Unit	Expected Influent	Effluent Limit	Expected Effluent
pH	s.u.	5.4		8
Aluminum	mg/L	18.7	0.119	0.013
Cadmium	mg/L	0.0593	0.0076	0.0053
Cobalt	mg/L	0.938	3.757	0.000531
Chromium	mg/L	0.00135	0.0979	0.00135
Copper	mg/L	4.86	0.0309	0.00061
Iron	mg/L	0.00840	0.24	0.002657
Mercury	mg/L	0.0000167	0.0211	0.0001676
Magnesium	mg/L	107.1	72.4	0.49
Manganese	µg/L	4.89	71	0.32
Nickel	mg/L	7.21	0.423	0.0319
Lead	mg/L	0.0299	0.102	0.001
Sulphate$^-$	mg/L	925	5436	990
Zinc	mg/L	14.0	0.271	0.124
WAD Cyanide$^-$	mg/L	26.3		<0.01[a]
Total Cyanide	mg/L	10		4.38[b]

a - WAD cyanide estimated based on likely reaction between the 1.67 mg/L WAD cyanide entering WTP with ferric chloride to produce SAD cyanide

b - Total cyanide estimated based on 26.3 mg/L total cyanide being diluted to 4.38 mg/L total cyanide in 5:1 mixture

Cost Estimating

Costs provided are estimates only. Data is based on vendor quotes when available, but because of the short duration of the study, some costs had to be estimated. The precision of the estimate is ±30%.

Capital Expenditures

Table 21 presents the capital costs for the Mt Todd WTP. All prices are given in $AUD unless otherwise noted.

Table 21 - WTP Capital Costs
Vista Gold Corp. – Mt. Todd Project
March 2012

Equipment	Cost	Labor	Indirect
Feed Pumps	$ 400,000.00	$ 120,000.00	
High pH Clarifiers	$ 1,446,000.00*	$ 434,000.00	
High pH Pumps	$ 124,000.00	$ 37,000.00	
Neutral pH Reaction Tanks	$ 70,000.00	$ 21,000.00	
Neutral pH Agitator	$ 150,000.00	$ 45,000.00	
Microfiltration System	$ 1,500,000.00	$ 450,000.00	
Lime Silo and Slaker	$ 692,000.00	$ 208,000.00	
Process Water Pumps	$ 10,000.00	$ 3,000.00	
Lime Metering Pumps	$ 22,000.00	$ 7,000.00	
Ferric Chloride Bulk Storage	$ 32,000.00	$ 10,000.00	
Ferric Chloride Metering Pumps	$ 24,000.00	$ 7,000.00	
Sulfuric Acid Bulk Storage	$ 4,000.00	$ 1,000.00	
Sulfuric Acid Transfer Pumps	$ 4,000.00	$ 1,000.00	
Sulfuric Acid Dilution Tank	$ 4,000.00	$ 1,000.00	
Sulfuric Acid Dilution Tank Agitator	$ 5,000.00	$ 2,000.00	
Sulfuric Acid Metering Pumps	$ 16,000.00	$ 5,000.00	
Sodium Hypochlorite Transfer Pump	$ 8,000.00	$ 2,000.00	
Polymer System	$ 7,000.00*	$ 2,000.00	
Treated Water Pumps	$ 60,000.00	$ 18,000.00	
Treated Water Holding Tanks	$ 48,000.00	$ 14,000.00	
Cyanide Probes	$ 3,000.00	$ 1,000.00	
HCN Gas Alarms	$ 6,000.00	$ 2,000.00	
Earthwork	$ 426,000.00	Included	
Concrete	$ 175,000.00	Included	
Preengineered Building	$ 1,130,000.00	Included	
Electrical and Instrumentation	$ 2,228,000.00	Included	
Piping, Pipe Supports, and Valves	$ 1,391,000.00	Included	
Site Pipelines and Pumping	$ 2,525,000.00	Included	
Engineering			$ 1,338,000.00
Construction Management			$ 2,502,000.00
Contingency			$ 3,548,000.00
Subtotals	**$ 12,510,000.00**	**$ 1,391,000.00**	**$ 7,388,000.00**
TOTAL			**$ 21,289,000.00**

GST not included
Freight not included
*Price in $US

Operating Expenditures

Chemical costs were calculated using modeled chemical data and vendor quotes. For quicklime, a cost of $90 AUD per ton was provided to Tetra Tech by Vista. The assumed chemical costs are presented in Table 22.

Table 22 - Chemical Costs
Vista Gold Corp. – Mt. Todd Project
March 2012

Estimated Unit Price	Unit	AUD$
Lime	Tonne	$ 90
Ferric Chloride	Tonne	$ 770
Sulphuric Acid	m^3	$ 820
Sodium Hypochlorite	m^3	$ 850
Caustic	kg	$ 0.540
Citric Acid	kg	$ 0.970

Chemical dosages were modeled using Phreeqc chemical modeling software. It was found that different dosages were needed in each season to meet the effluent concentration targets. The chemical consumption estimates are presented in Table 23.

Table 23 - Chemical Consumption
Vista Gold Corp. – Mt. Todd Project
March 2012

Date		Lime	Ferric Chloride	Sulfuric Acid	Sodium Hypochlorite	Caustic	Citric Acid
		tonne	tonne	m^3	m^3	kg	kg
Wet	Jan	122	52.2	7	4.8	89	305
Wet	Feb	122	52.2	7	4.8	89	305
Wet	Mar	122	52.2	7	4.8	89	305
Wet	Apr	122	52.2	7	4.8	89	305
Dry	May	232	52.2	6.2	4.8	89	305
Dry	Jun	232	52.2	6.2	4.8	89	305
Dry	Jul	232	52.2	6.2	4.8	89	305
Dry	Aug	232	52.2	6.2	4.8	89	305
Dry	Sep	232	52.2	6.2	4.8	89	305
Wet	Oct	122	52.2	7	4.8	89	305
Wet	Nov	122	52.2	7	4.8	89	305
Wet	Dec	122	52.2	7	4.8	89	305

The estimated electrical use at the site is 2,149,000 kWh annually. Based on the presented chemical data, along with a site-provided electricity cost of $0.071 AUD per kWh, the WTP will cost approximately $935,000 AUD to operate each year, not including the cost of labor. The estimated labor use at the site includes one supervisor, four operators, and a half time maintenance personnel.

Further Study

Bench and pilot scale testing should be strongly considered, as no testing has been conducted to this point. Most of the technology is tried and true, but it would be beneficial to verify that the high rate clarifiers perform as expected, and the water chemistry is as predicted. Bench and pilot scale testing can be used to confirm estimates of chemical uses, membrane cleaning frequency, and to better estimate the maintenance cost estimate presented here.

The WTP could see a great variety in influent quality through the life of the mine, as different site waters are pumped to the EQP. Great care should be taken to ensure that the design is as versatile as possible. Considerations such as adding redundancy, increasing treatment capacity, and the ability to configure the plant in different ways can aid in this versatility.

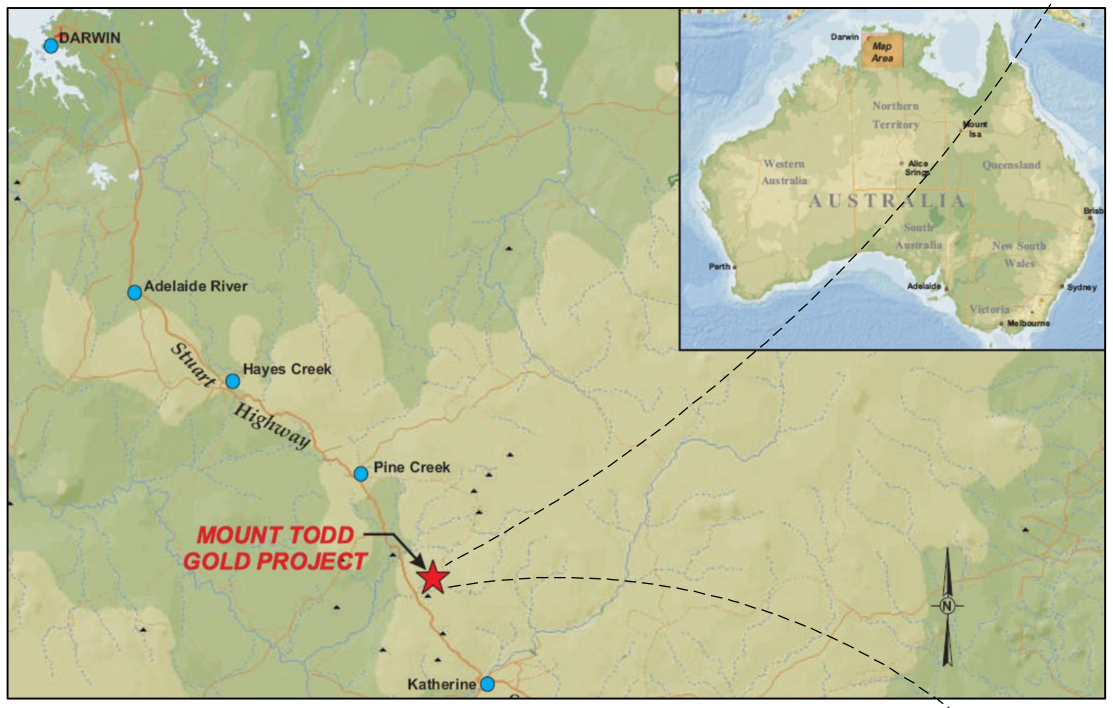
Local regulations should be studied and clarified before the final design. Final TVs must be available to produce a discharge plan. River monitoring equipment should be inspected and the minimum Edith River elevation before discharge should be established.

END

TETRA TECH

Process Flow Diagrams

MT. TODD GOLD PROJECT DEFINITIVE FEASIBILITY STUDY
NEW WATER TREATMENT PLANT (WTP)
NORTHERN TERRITORY, AUSTRALIA



REGIONAL MAP
NOT TO SCALE

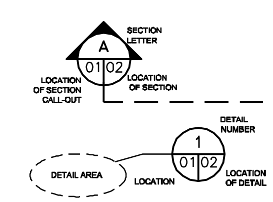
PROJECT VICINITY MAP
NOT TO SCALE

DRAWING INDEX	
SHEET	TITLE
01	LOCATION MAPS, DRAWING INDEX, AND GENERAL NOTES
02	PROCESS FLOW DIAGRAM
03	P&ID LEGEND & ABBREVIATION
04	FEED WATER P&ID
05	HIGH pH TREATMENT P&ID
06	MICROFILTRATION P&ID
07	TREATED WATER P&ID
08	CHEMICAL FEED P&ID
09	LIME FEED P&ID
10	OVERALL SITE PLAN
11	GENERAL ARRANGEMENT
12	ELECTRICAL ONE-LINE

GENERAL NOTES:

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, THE FOLLOWING GENERAL NOTES SHALL APPLY:

1. ALL DIMENSIONING, STATIONING AND SCALES ARE IN SI METRIC SYSTEM. STATIONING IS MEASURED HORIZONTALLY, NOT ALONG THE SLOPE.
2. GROUND SURFACE CONTOURS SHOWN ON THESE DRAWINGS REFLECT EXISTING (PRE-CONSTRUCTION) CONDITIONS UNLESS OTHERWISE NOTED.
3. DRAWINGS ARE FOR DEFINITIVE FEASIBILITY STUDY ONLY AND ARE NOT TO BE USED FOR CONSTRUCTION.



CROSS-SECTION CALL-OUT

DETAIL CALL-OUT

REFERENCE	ENGINEER'S SEAL	Rev	Description	BY	Date
		A	ISSUED FOR REVIEW		

REVISIONS

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Drawn by: KDK
Checked by:
Approved by:

Issued for: VISTA GOLD CORP.

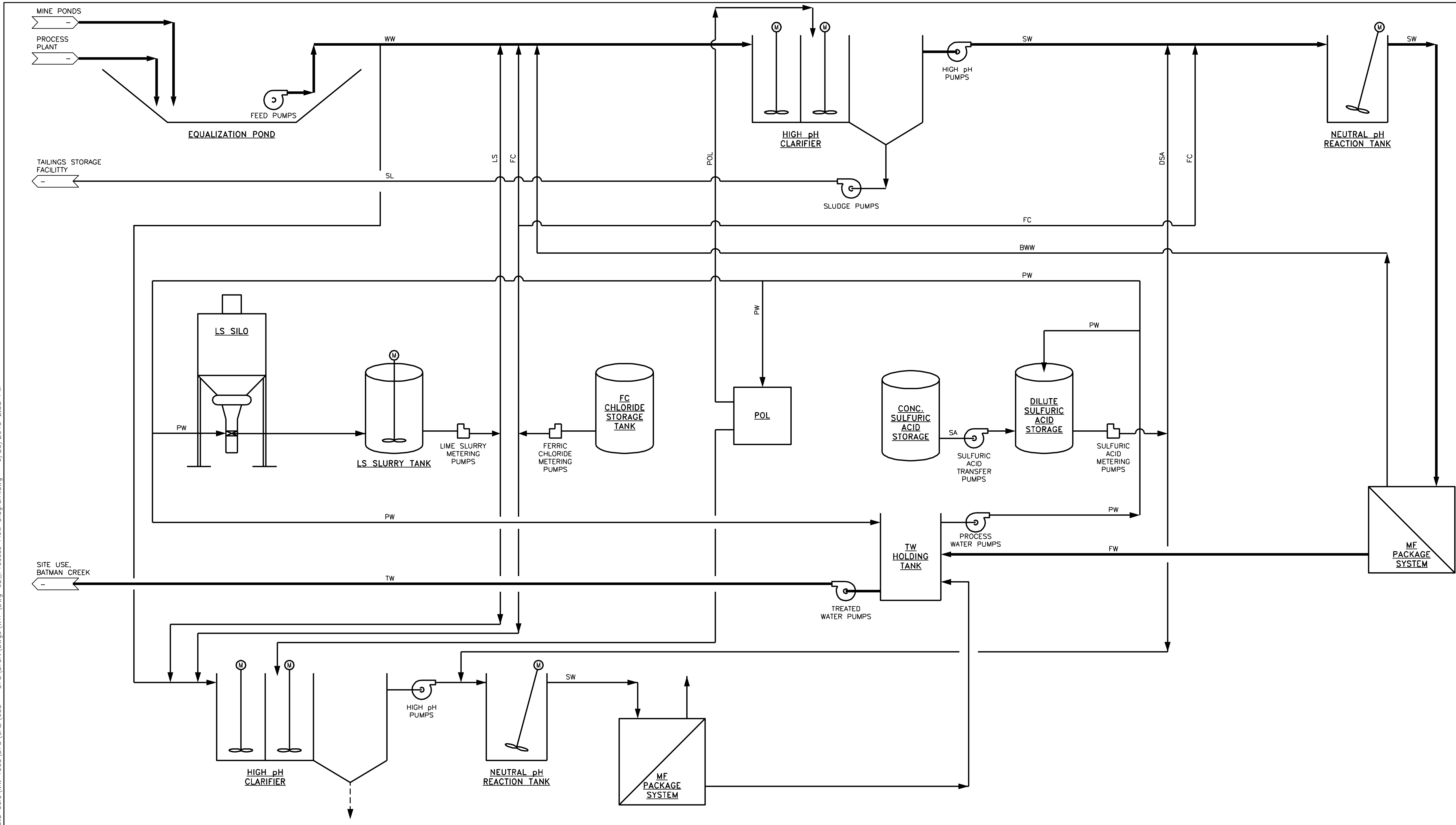
Issued by: TETRA TECH
350 Indiana Street, Suite 500
Golden, Colorado 80401
(303) 217-5700 (303) 217-5705 fax

Title: WATER TREATMENT PLANT LOCATION MAPS, DRAWING INDEX & GENERAL NOTES

A REVISION

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12
01
SHEET 01 OF 13

KRAMER, KELLY – T:\Clients\Vista Gold\Mt. Todd\DFS\C3D – DFS\Draft\Dwgs\WTP\Dwg-01_Location Maps, Drawing Index, and General Notes.dwg – 1/26/2012 1:56 PM



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Checked by:
Approved by:

Issued for: VISTA GOLD CORP.

Issued by: TETRA TECH
350 Indiana Street, Suite 500
Golden, Colorado 80401
(303) 217-5700 (303) 217-5705 fax

Title: WASTEWATER TREATMENT PLANT PROCESS FLOW DIAGRAM

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12

02
SHEET 02 OF 13

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VALVE SYMBOLS

CLOSED | OPEN

- GATE VALVE
- KNIFE GATE VALVE
- PLUG VALVE
- 3-WAY PLUG VALVE
- GLOBE VALVE
- UNION BALL VALVE
- BUTTERFLY VALVE
- NEEDLE VALVE
- SWING CHECK VALVE
- BALL CHECK VALVE
- PILOT OPERATED PRESSURE REDUCING VALVE W/ DOWN STREAM PRESSURE SETTING
- PILOT OPERATED PRESSURE REDUCING VALVE W/ UP STREAM PRESSURE SETTING
- DIAPHRAGM VALVE
- SLIDE GATE (SG)
- SLUICE GATE (SLU)
- STOP LOGS (SL)
- WEIR PLATE (WP)
- SOLENOID OR MOTOR
- STOP & WASTE VALVE
- AIR RELEASE VALVE (ARV)
- SPRING PRESSURE RELIEF W/ PRESSURE RELIEF

P&ID EQUIPMENT SYMBOLS

DRY PIT | WET PIT

- CENTRIFUGAL PUMPS
- PROGRESSING CAVITY PUMP
- SUBMERSIBLE SUMP PUMP
- GEAR PUMP OR BLOWER (POSITIVE DISPLACEMENT)
- REDUCER
- MOTOR DRIVER
- STATIC INLINE MIXER
- CALIBRATION COLUMN
- ULTRASONIC FLOW SENSOR
- SAFETY SHOWER
- EYE SHOWER
- FLOAT SWITCH
- SELF CLEANING STRAINER (SC)
- BASKET STRAINER
- FLEX CONNECTION
- STRAINER
- COMPRESSOR

XX/YY
- PROCESS IDENTIFICATION NUMBER
- NUMBER INDICATES SHEET OF PROCESS OR CONTROL CONTINUATION

- FLOW ELEMENT
- ELECTROMAGNETIC FLOW METER
- PROPELLER FLOW METER
- ANNULAR SEAL
- DIAPHRAGM SEAL
- AUTOMATIC VALVE STATION SOLENOID (AVS)
- EQUIPMENT WATER STATION SOLENOID (EWS)
- ORIFICE PLATE
- SILENCER
- PRESSURE ELEMENT
- DOUBLE DISC DIAPHRAGM PUMP (POSITIVE DISPLACEMENT)
- ULTRASONIC LEVEL INDICATOR
- DRAIN (D)
- ROTAMETER
- EXPANSION JOINT
- FLOW / SITE GLASS (FG)
- PULSATION DAMPENER (PD)
- FLANGE CONNECTION
- RUPTURE DISK

mm- XX - YY
- PIPE DIAMETER
- PIPE SERVICE
- PIPE MATERIAL

COMMON INSTRUMENT DESIGNATIONS

TAG	DESIGNATION
YL	EQUIPMENT RUNNING STATUS
YS	EQUIPMENT IN AUTO OR REMOTE STATUS
UA	EQUIPMENT FAULT STATUS
HC	HAND CONTROL
HS	HAND SWITCH
SI	SPEED INDICATION
SC	SPEED COMMAND
PSL	PRESSURE SWITCH LOW
PSH	PRESSURE SWITCH HIGH
FE	FLOW ELEMENT
FIT	FLOW INDICATOR/TRANSMITTER
FIQ	FLOW TOTALIZER
YA	ALARM EVENT
ZSO	VALVE POSITION FULL OPEN
ZSC	VALVE POSITION FULL CLOSE
ZSI	VALVE POSITION INDICATOR
ZC	VALVE POSITION CONTROL

P&ID INSTRUMENT SYMBOLS

DISCRETE INSTRUMENTS | PROGRAMMABLE LOGIC CONTROL | DATA NETWORK

(XXXX / 0000)

- AT MCC INACCESSIBLE TO OPERATOR
- AT MCC ACCESSIBLE TO OPERATOR
- AT CONTROL PANEL INACCESSIBLE TO OPERATOR
- AT CONTROL PANEL ACCESSIBLE TO OPERATOR
- FIELD VERIFY

EQUIPMENT PREFIX LIST

AHU	AIR HANDLING UNIT
AVS	AUTOMATIC VALVE STATION
BFP	BACKFLOW PREVENTOR
BLR	BLOWER
CIP	CLEAN-IN-PLACE
COL	CALIBRATION COLUMN
CPR	COMPRESSOR
CRW	CLEAR WELL
CSP	CAST-IN-PLACE
EFM	ENHANCED FLUX MAINTENANCE
EVP	EVAPORATOR
EWS	EQUIPMENT WATER SUPPLY STATION
FAN	FAN
FP	FEED PUMP
FIL	FILTER
FRP	FILTER PRESS
GEN	GENERATOR
HWP	HOUSE WATER PUMP
MFS	MICRO FILTRATION SYSTEM
MTR	MOTOR
MXR	MIXER
OPL	ORIFICE PLATE
PMP	PUMP
ROS	REVERSE OSMOSIS SYSTEM
SCN	SCREEN
SGT	SLIDE GATE
SKM	SKIMMER
SLU	SLUICE GATE
STR	STRAINER
SWF	SCREW FEEDER
TNK	TANK
TXP	TRANSFER PUMP
VFD	VARIABLE FREQUENCY DRIVE
WPT	WEIR PLATE
WSR	WATER SOFTENER

ACTUATOR SYMBOLS

- E XX — ELECTRIC MOTOR
- MANUAL OR CHAIN WHEEL
- S — SOLENOID
- HS 0000 — HAND SWITCH

NOTE:
ON LOSS OF PRIMARY POWER (PNEUMATIC OR ELECTRIC)
FO = FAIL OPEN
FC = FAIL CLOSED
FLP= FAIL TO LAST POSITION
OCA= OPEN CLOSE AUTO

INSTRUMENT IDENTIFICATION LETTERS

(INSTRUMENT SOCIETY OF AMERICA)

	FIRST - LETTER		SUCCEEDING - LETTERS		
	MEASURED OR INITIATING VARIABLE		READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	CONTROL			CONTROL SWITCH	CLOSED
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N	TORQUE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	FAILURE		MULTI FUNCTION	MULTI FUNCTION	MULTI FUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	COMMAND
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

PIPING SCHEDULE

ABBREVIATION	SERVICE
BWW	BACKWASH WASTE
DSA	DILUTE SULPHURIC ACID
FC	FERRIC CHLORIDE
FW	FILTERED WATER
LS	LIME SLURRY
POL	POLYMER
SA	SULPHURIC ACID
SL	SLUDGE
SW	SETTLED WATER
TW	TREATED WATER
WW	WASTEWATER

PIPE MATERIALS

PE	POLYETHYLENE
PVC	POLYVINYL CHLORIDE
DI	DUCTILE IRON
STL	STEEL
SS	STAINLESS STEEL
CU	COPPER

VALVING PREFIX LIST

BPV	BACK PRESSURE VALVE
CKV	CHECK VALVE
CV	CONTROL VALVE
FCV	FLOW CONTROL VALVE
HV	HAND VALVE
KV	KNIFE-GATE VALVE
PRV	PRESSURE REDUCING VALVE
SV	SOLENOID VALVE

INSTRUMENTATION LEGEND

- 1 — EQUIPMENT LOCATION TAG
- DATA LINK OR SOFTWARE SIGNAL
- ELECTRICAL ANALOG SIGNAL
- ELECTRICAL DISCRETE SIGNAL

PANEL NOMENCLATURE

CP-XXX:	CONTROL PANEL (AREA CONTROL)
LCP-XXXA:	LOCAL CONTROL PANEL (SPECIFICATION PROCESS CONTROL) LETTERS A, B, C DENOTES VENDER SUPPLIED EQUIPMENT
MCC-XX:	MOTOR CONTROL CENTER
LP-X:	LIGHTING PANEL

GENERAL NOTES

1. THIS IS A STANDARD LEGEND, THEREFORE NOT ALL OF THIS INFORMATION MAY BE USED ON THIS PROJECT.
2. P & I D INSTRUMENTATION DETAILS DO NOT REPRESENT INSTRUMENTS AND CONTROLS INTEGRAL TO VENDOR SUPPLIED CONTROL PANELS OR EQUIPMENT. SEE EQUIPMENT SPECIFICATIONS FOR THIS INFORMATION.
3. P & I D DOES NOT REPRESENT CONTROL STRATEGIES OR INTERACTIONS. REFERENCE SECTION 16905, CONTROL NARRATIVES, FOR THIS INFORMATION.
4. P & I D DOES NOT REPRESENT EQUIPMENT HARDWIRED INTERLOCK AND ENABLE CIRCUITRY. REFERENCE MCC ELECTRICAL ELEMENTARY SCHEMATICS FOR THIS INFORMATION.
5. ** DENOTES VENDOR SUPPLIED EQUIPMENT

REFERENCE

ENGINEER'S SEAL

Rev	Description	BY	Date
A	ISSUED FOR REVIEW		

REVISIONS

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Approved by:

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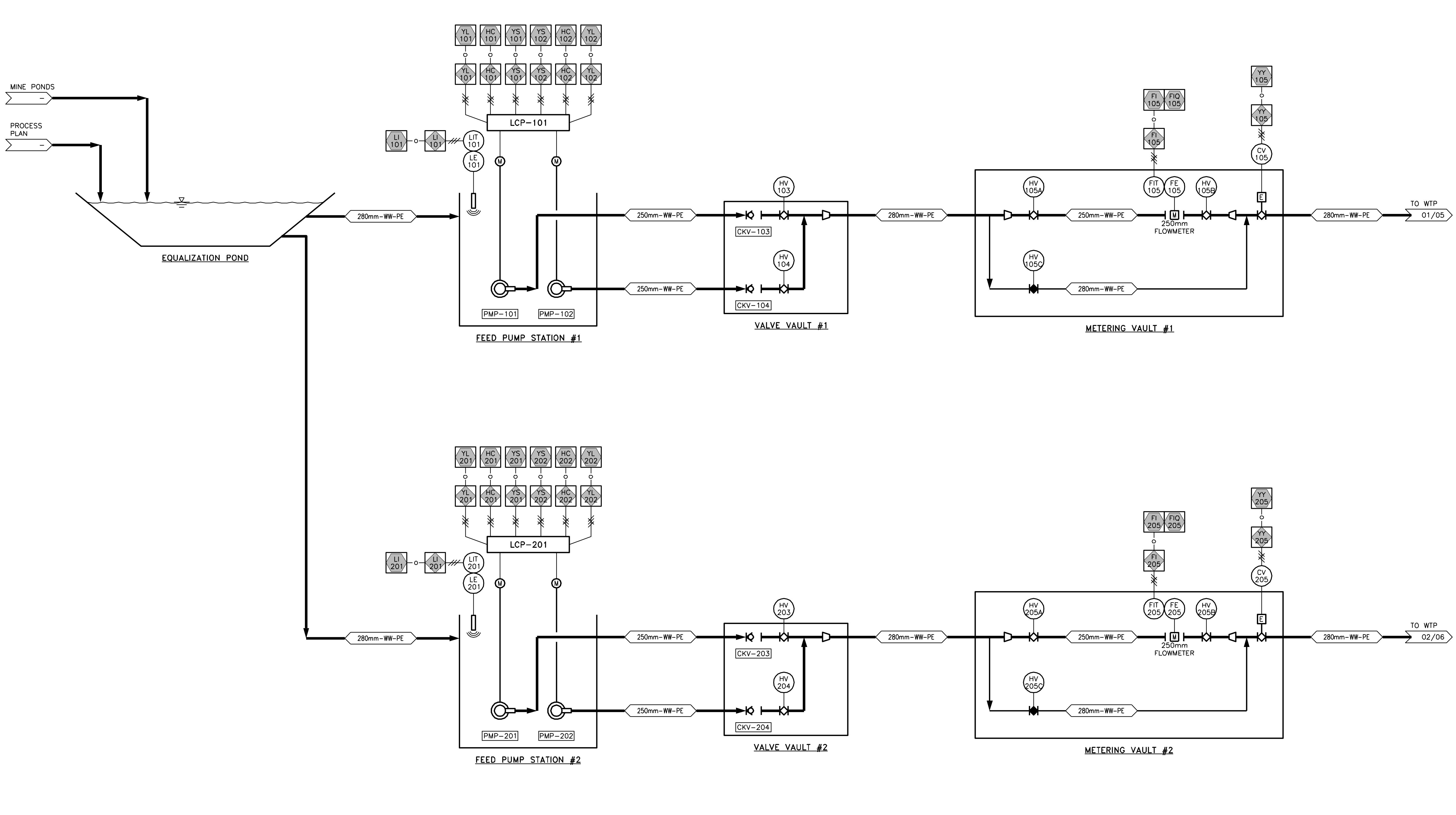
Issued by: TETRA TECH
350 Indiana Street, Suite 500
Golden, Colorado 80401
(303) 217-5700 (303) 217-5705 fax

Title: WATER TREATMENT PLANT P&ID LEGEND & ABBREVIATIONS

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12



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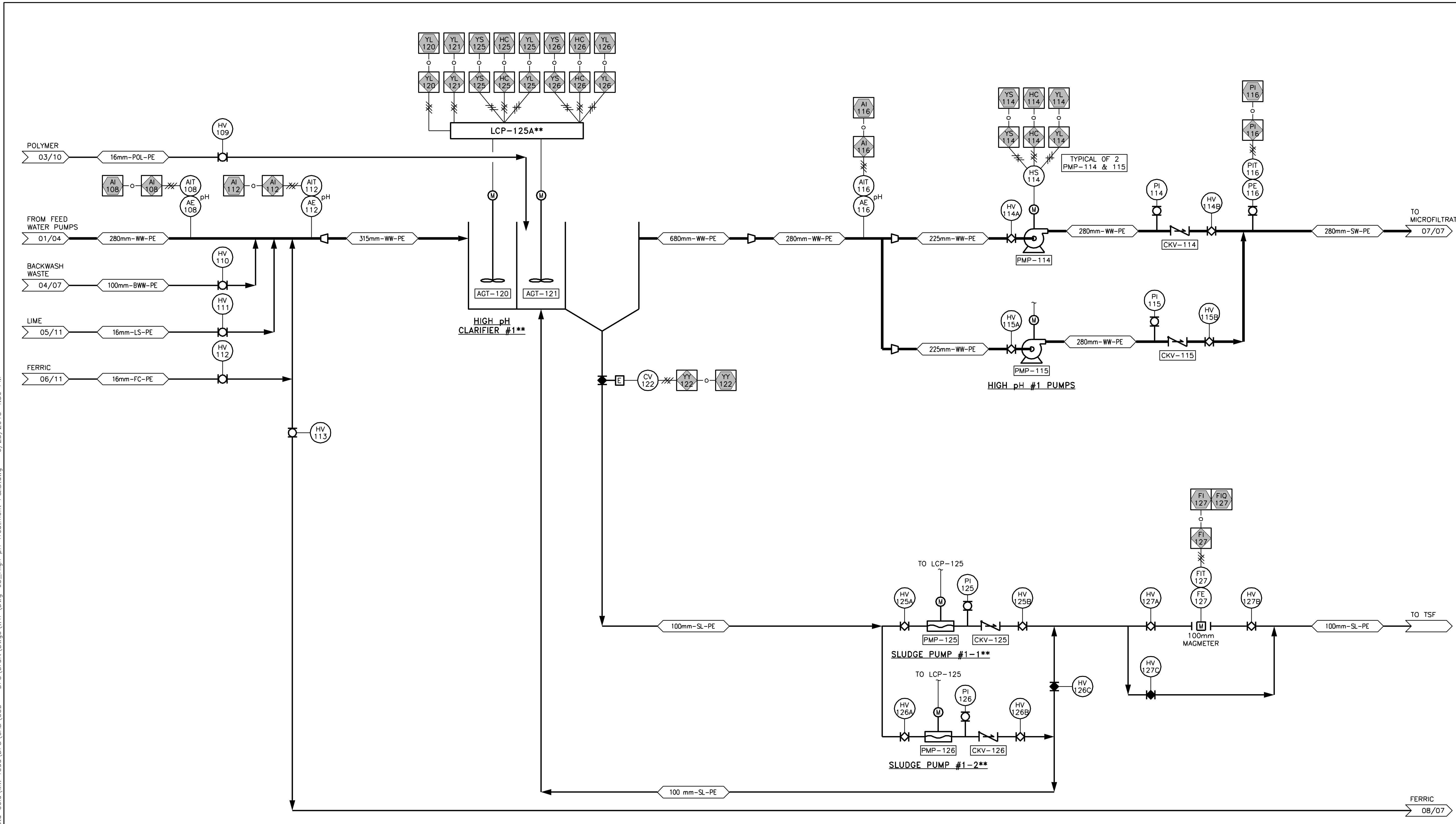
Issued by: TETRA TECH
350 Indiana Street, Suite 500
Golden, Colorado 80401
(303) 217-5700 (303) 217-5705 fax

Title: WATER TREATMENT PLANT FEED WATER P&ID

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12
SHEET 04 OF 13



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		A	ISSUED FOR REVIEW		

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350 Indiana Street, Suite 500
Golden, Colorado 80401
(303) 217-5700 (303) 217-5705 fax

Title: WATER TREATMENT PLANT
HIGH pH #1 TREATMENT P&ID

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12
05
SHEET 05 OF 13

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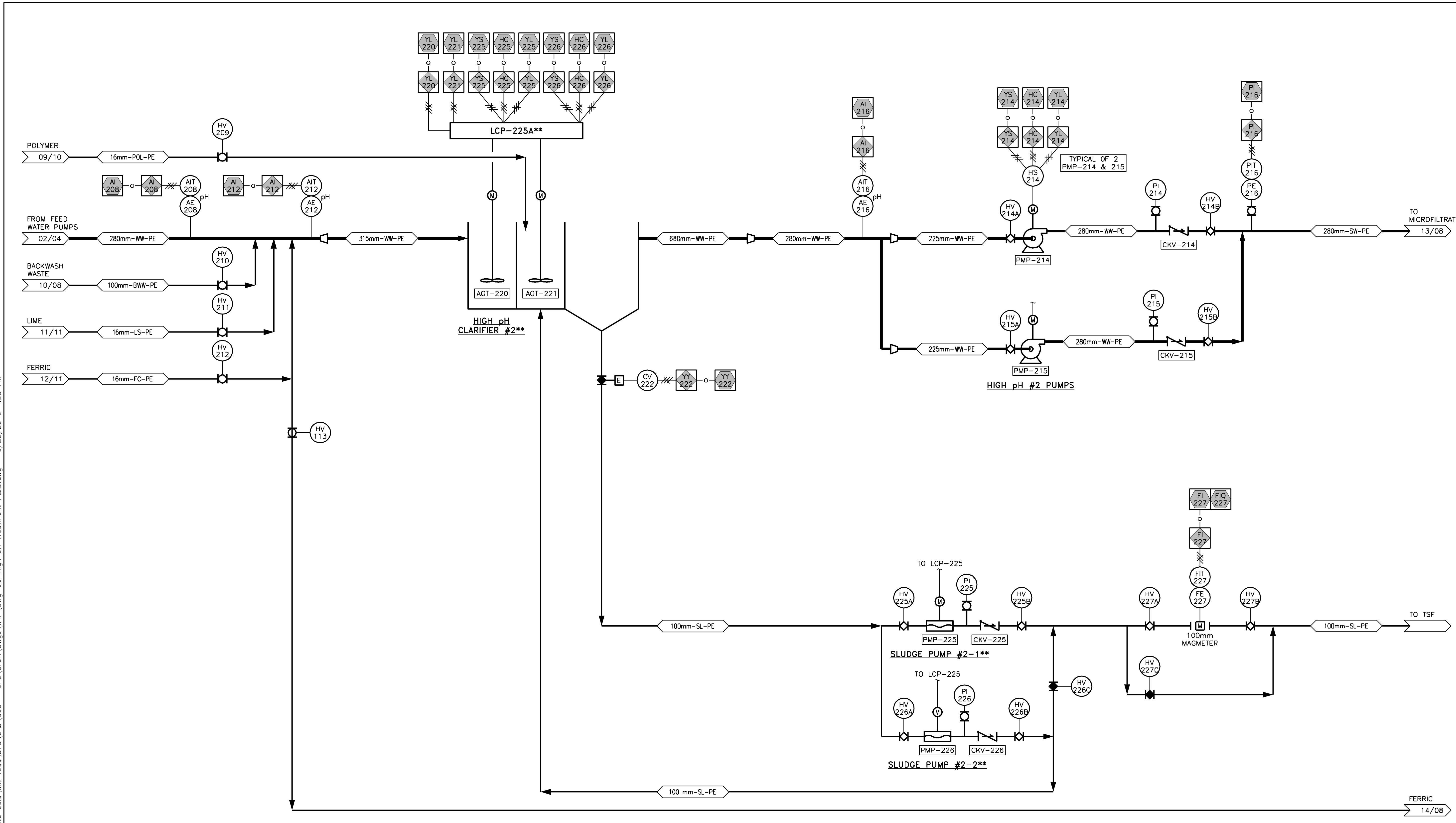

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350 Indiana Street, Suite 500
Golden, Colorado 80401
(303) 217-5700 (303) 217-5705 fax

Title:
WATER TREATMENT PLANT HIGH pH #2 TREATMENT P&ID

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12

06
SHEET 06 OF 13

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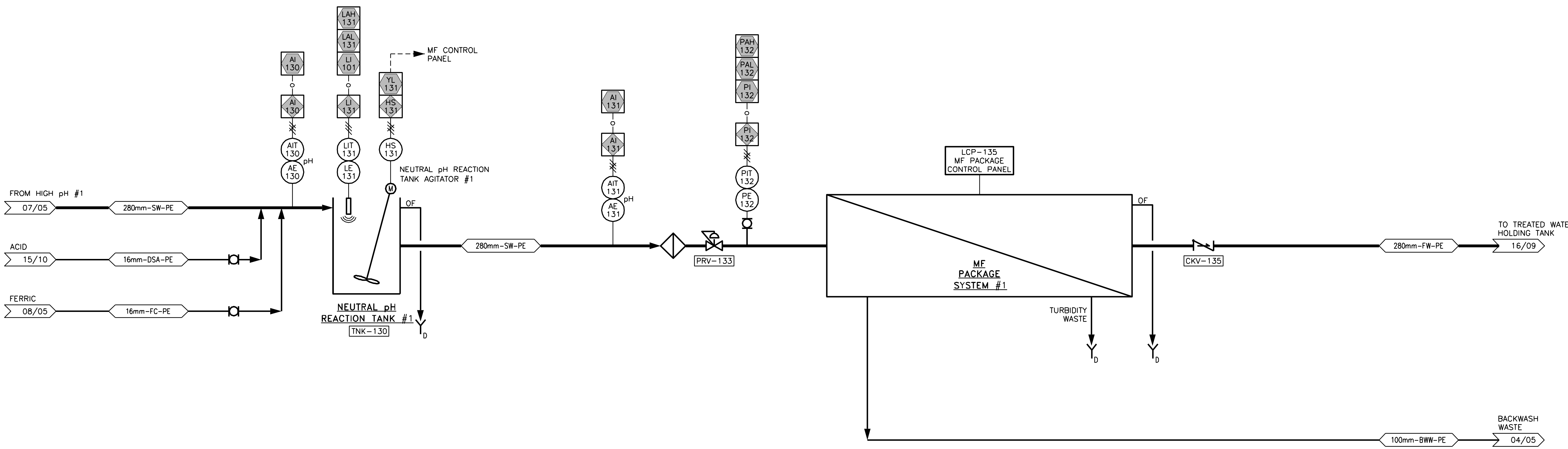

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Title: WATER TREATMENT PLANT MICROFILTRATION #1 P&ID

A REVISION

Project: MT. TODD GOLD PROJECT DFS WTP

Project no.: 114-311116

Location: NORTHERN TERRITORY, AUSTRALIA

Date: 01/12

07

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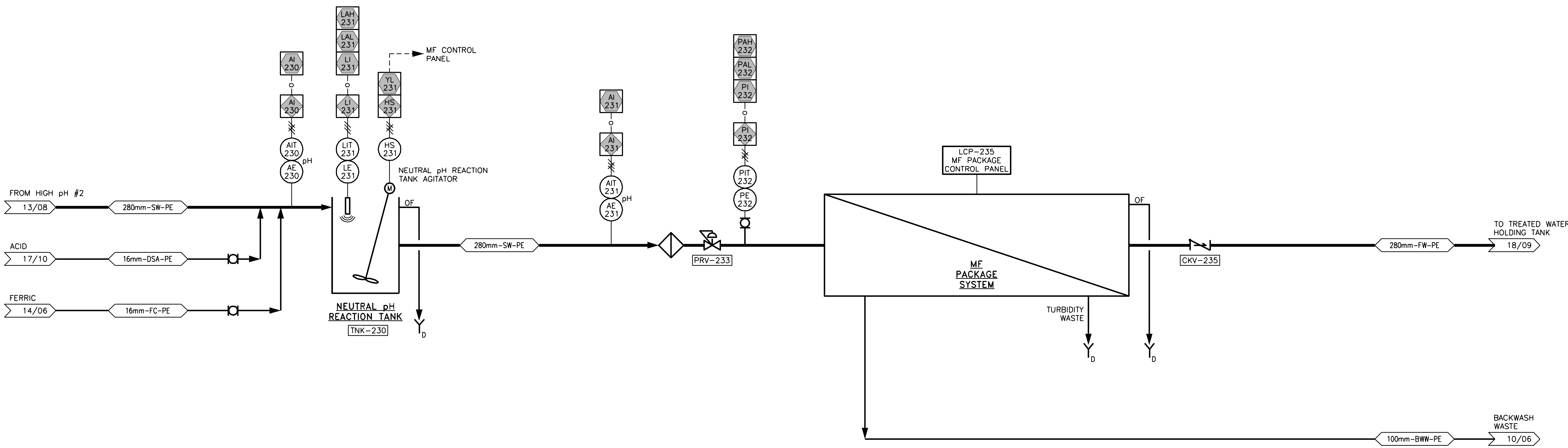

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Title: WATER TREATMENT PLANT MICROFILTRATION #2 P&ID

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12

08
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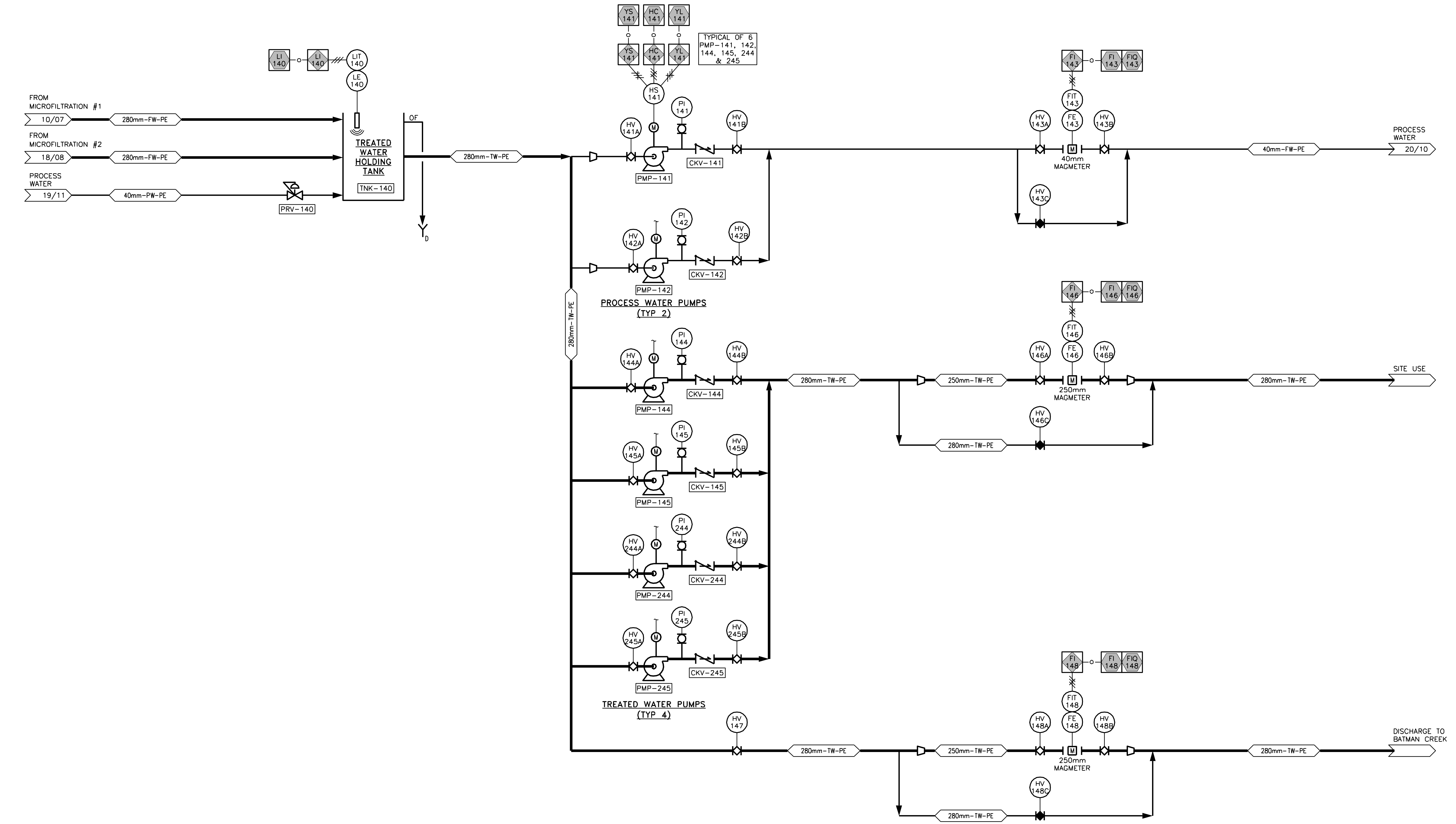

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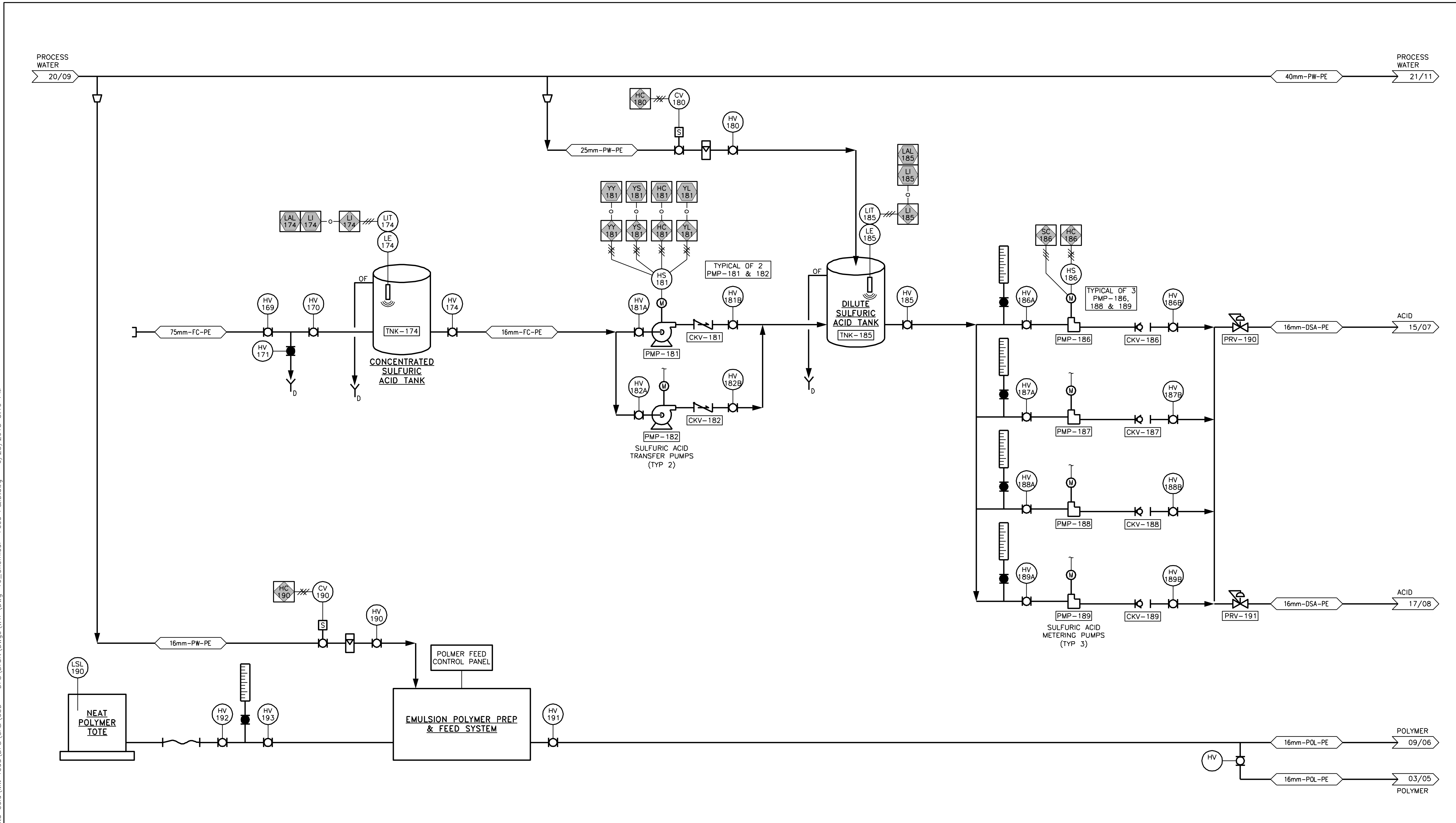
Title:
WATER TREATMENT PLANT
TREATED WATER P&ID

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12
09
SHEET 09 OF 13



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Title: WATER TREATMENT PLANT CHEMICAL FEED P&ID

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12
SHEET 10
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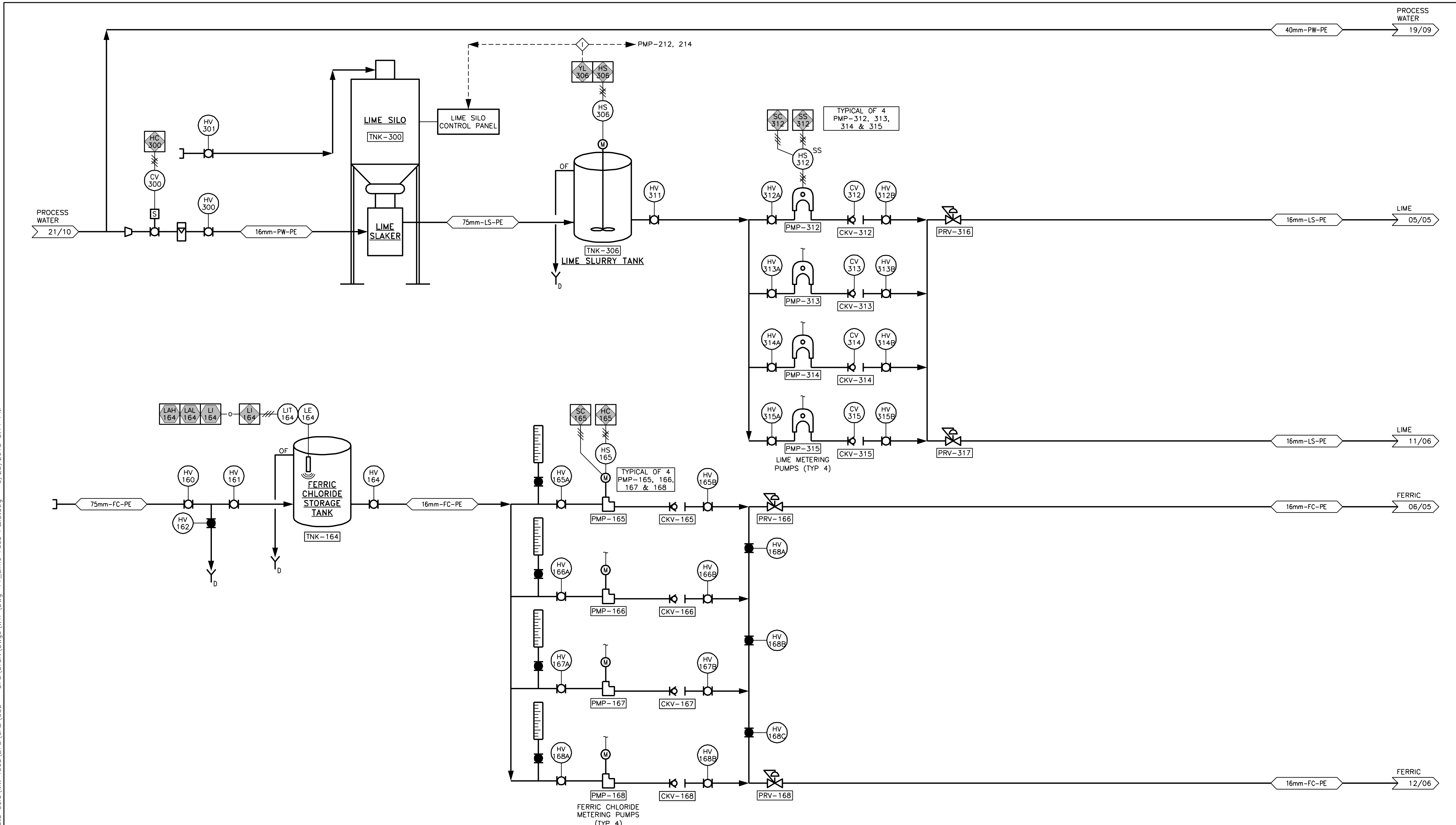

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Title: WATER TREATMENT PLANT LIME & CHEMICAL FEED P&ID

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
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11 OF 13

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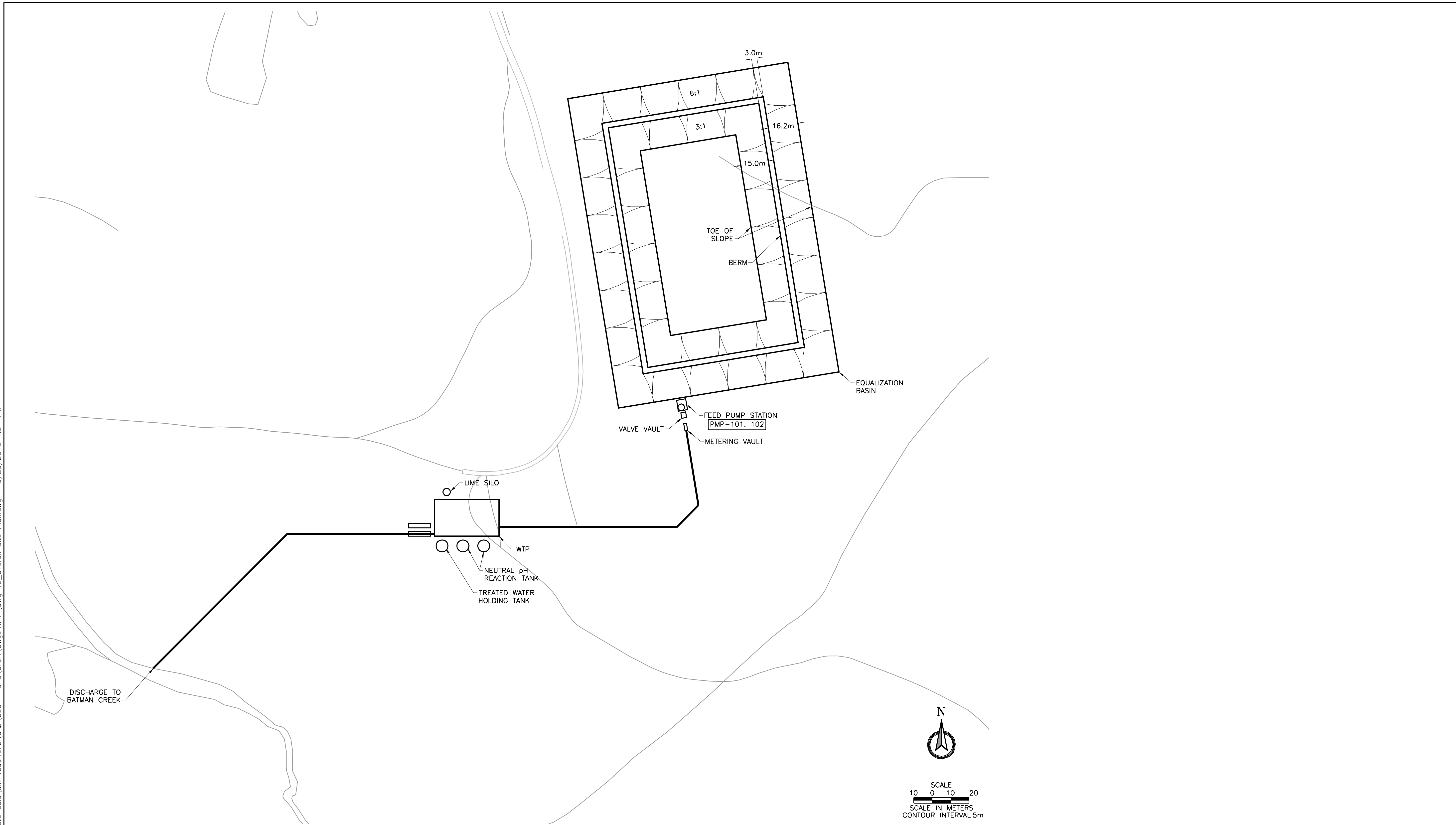

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(303) 217-5700 (303) 217-5705 fax

Title:
WATER TREATMENT PLANT OVERALL SITE PLAN

A REVISION

Project: MT. TODD GOLD PROJECT DFS WTP
Project no.: 114-311116
Location: NORTHERN TERRITORY, AUSTRALIA
Date: 01/12

12
SHEET 12 OF 13

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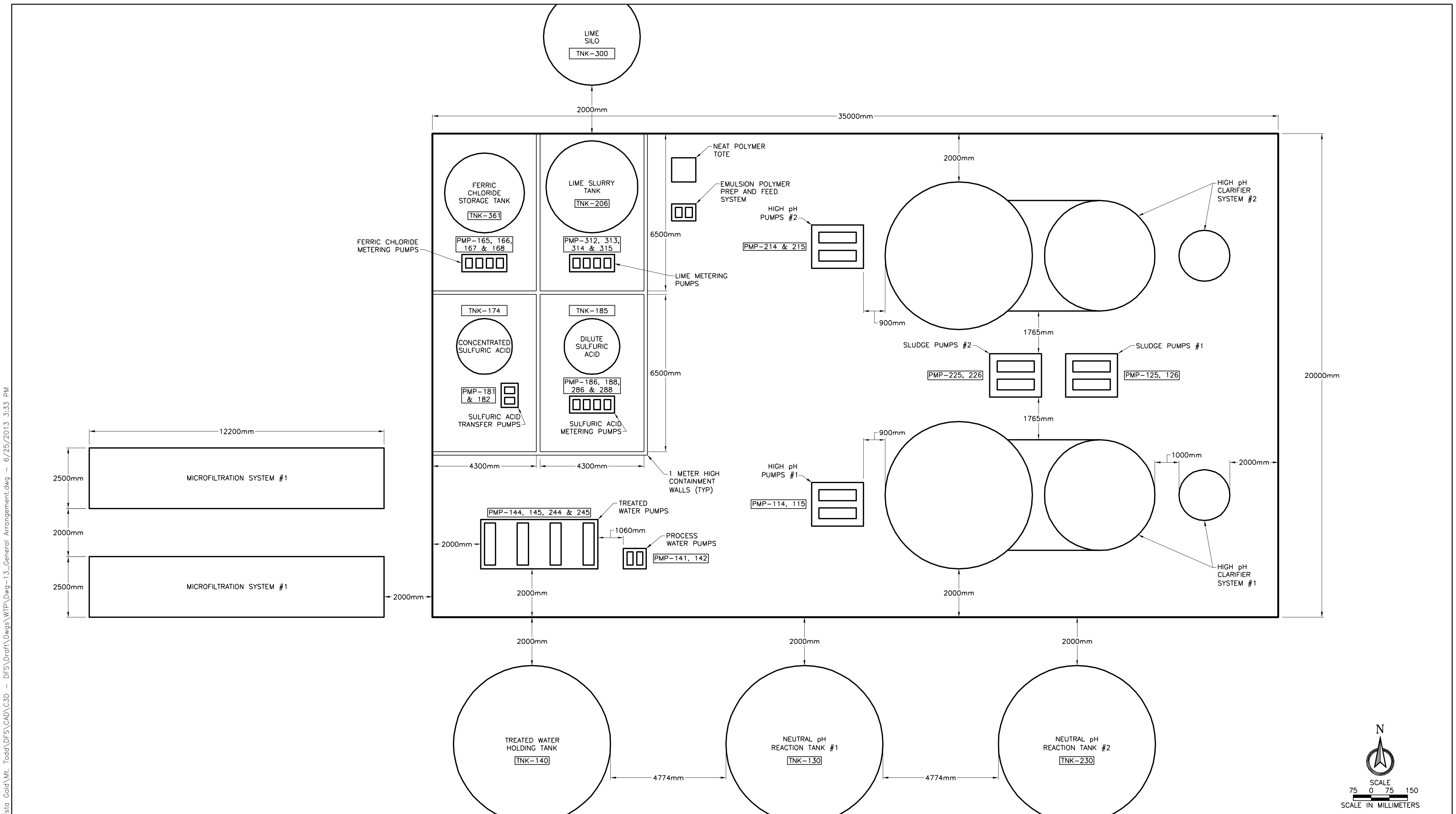

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Title: WATER TREATMENT PLANT GENERAL ARRANGEMENT

REVISION A

Project: MT. TODD GOLD PROJECT DFS WTP

Project no.: 114-311116

Location: NORTHERN TERRITORY, AUSTRALIA

Date: 01/12

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