

# **KABANGA NICKEL PROJECT DFS**

---

## **1.7Mtpa and 3.4Mtpa**

### **PROCESS FLOW DIAGRAMS**

**PROJECT CODE : JTZEGR6902**

**CONCENTRATOR PLANT:**

**AREA 3100 (PHASE 1)**

**and**

**AREA 3200 (PHASE 2)**

**REV A**

REV No. : A  
DATE : 21/07/2023

DRA DRG NUMBER	TITLE	REV
0000	COVER SHEET	A
0001	INDEX SHEET	A
0002	LEGENDS & SYMBOL LIST	A
0003-01	BLOCK FLOW DIAGRAM - SHEET 1	A
0003-02	BLOCK FLOW DIAGRAM - SHEET 2	A
3110	CRUSHING & STOCKPILING	A
3120-01	MILLING (PHASE 1) - SHEET 1	A
3120-02	MILLING (PHASE 1) - SHEET 2	A
3130-01	AERATION CIRCUIT #1 - SHEET 1	A
3130-02	AERATION CIRCUIT #1 - SHEET 2	A
3130-03	CLEANER FLOTATION #1 - SHEET 3	A
3130-04	PYRRHOTITE FLOTATION - SHEET 4	A
3140-01	INTERMEDIATE THICKENER - SHEET 1	A
3140-02	TAILINGS HANDLING (NON-SULPHIDE TAILINGS) - SHEET 2	A
3140-03	TAILINGS HANDLING (PYRRHOTITE CONCENTRATE) - SHEET 3	A
3150-01	CONCENTRATE HANDLING - SHEET 1	A
3150-02	CONCENTRATE HANDLING - SHEET 2	A
3160-01	WATER SERVICES - SHEET 1	A
3160-02	AIR SERVICES - SHEET 2	A
3170-01	COLLECTOR - SHEET 1	A
3170-02	REAGENTS FLOCCULANT & DEPRESSANT MAKE-UP & DOSING - SHEET 2	A
3170-03	REAGENTS IBC DOSING TANKS - SHEET 3	A
3170-04	LIME - SHEET 4	A
3170-05	SULPHURIC ACID - SHEET 5	A
3170-06	COPPER SULPHATE - SHEET 6	A
3220-01	MILLING (PHASE 2) - SHEET 1	A
3220-02	CONCENTRATE REGRIND #2 - SHEET 2	A
3230-01	AERATION CURCUT #2 - SHEET 1	A
3230-02	ROUGHER FLOTATION #2 - SHEET 2	A
3230-03	CLEANER FLOTATION #1 - SHEET 3	A
3230-04	ROUGHER FLOTATION - SHEET 4	A
3270	REAGENTS IBC DOSING TANKS (PHASE 2)	A
6156	SAND WASHING PLANT	A

Update.  
Include additional PFDs

Non-Pyrrhotite Tailings

A	MMK	27/07/23	ISSUED FOR COMMENT	WW	27/07/23	VML	27/07/23
REV.	BY	DATE	REVISIONS		CHK.	DATE	S.L.
 <b>KABANGA NICKEL</b>							
<b>DRA</b> <small>Building 33 / The Woodlands Office Park 20 Woodlands Drive, Woodlands Sandton / South Africa 21900 draglobal.com</small>							
<b>TITLE</b> KABANGA NICKEL PROJECT DFS CONCENTRATOR							
<b>INDEX SHEET</b> <b>PROCESS FLOW DIAGRAM</b>							
<b>A1</b> PROJECT DWG No. 06902 PFD		<b>SHEET</b> - 0001		<b>REVISION</b> 1 OF 1		<b>SCALE</b> A NTS U.O.S.	

DRA PROJECTS			DRAWING OFFICE		
APPROVAL	SIGNATURE	DATE	D.O. MANAGER		
PROJECT MANAGER	M. Townsend	July 2023	SECTION LEADER		
PROJECT ENGINEER			DRAWN	M. Kok	Jul 2023
PROJECT ENGINEER			DRC. CHECKED	W. Mulder	Jul 2023
DISCIPLINE ENGINEER			ENG. CHECKED		
DISCIPLINE ENGINEER				PR. ENG. / PR. TECH.	
DISCIPLINE ENGINEER			NAME:		
DESIGN ENGINEER			REG. NUMBER:		
			SIGNATURE:		

DRAWINGS & CONTENTS PROTECTED IN TERMS OF COPYRIGHT ACT,  
NOT TO BE COPIED, REPRODUCED OR USED WITHOUT PERMISSION OF DRA.

TYPICAL EQUIPMENT SYMBOLS					
SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION	SYMBOLS	DESCRIPTION
	AGITATOR		FILTER		ROTARY DIVERTER
	AIR RECEIVER		FILTER - PLATE & FRAME		RADIAL DOOR
	APRON FEEDER		FLOTATION CELL		ROCK HOISTING SKIP
	ATTRITIONER		FROTH PUMP		RELINING MACHINE
	AUGER SAMPLER		GATE		SAMPLER
	BAG FILTER		GREASE STATION		SAND FILTER
	BELT FEEDER		GRIZZLY		SAFETY SHOWER WITH EYEBATH
	BELT FILTER		GRIZZLY FEEDER		SCREEN
	BIN		HOIST		SCREW CONVEYOR
	BLOWER		HPRC		SEPARATOR
	BULK BAG		JAW CRUSHER		SIEVE BEND
	CASSETTES		JET SUCTION		SHEAVE WHEEL
	CENTRIFUGAL PUMP		JAMESON CELL		SHUTTLE CONVEYOR
	CENTRIFUGE		JOJO/IBC		SILO
	CHUTE		LINEAR SCREEN		STOCKPILE
	COMPRESSOR		LAROX		SUBMERSIBLE PUMP
	CONE CRUSHER		LHD		TANK
	CONVEYOR		MAGNET		TANKER
	CRANE		METAL DETECTOR		THICKENER
	CROSS-BELT TRAMP IRON MAGNET		MILL		TROLLEY
	CYCLONE		MULTI STAGE PUMP		TURNSTILE
	DAM		MOBILE ROCK BREAKER		VERTICAL SPINDLE PUMP
	DEGRIITTER		ORE PASS		VIBRATING FEEDER
	DEMAG COIL		PERISTALTIC PUMP		WATER PUMP
	DISTRIBUTOR		PIPE SAMPLER (IN-LINE)		WINCH
	DIVERTER CHUTE		PLATE FILTER		BLOWER
	DMS DENSIFIER CYCLONE		POSITIVE DISPLACEMENT PUMP		TRough/BOX CELL
	DUMP TRUCK		BOREHOLE PUMP		DISK FILTER
	DUST COLLECTOR				WEIGHBRIDGE
	DRYER		AUGER SAMPLER		SPILL BAR
	EDUCTOR		ROLL CRUSHER		
	EARTH DAM		ROLL FEEDER		
	FAN		ROCK BREAKER		
	FEL				

Equipment Code	Equipment Type	Equipment Code	Equipment Type
AB	Air Blower	KN	Kiln
AC	Air Conditioner	LA	Launder
AG	Agitator	LD	Ladle
AH	Air Handling Unit	LH	Liner handler
AR	Arrestors	MA	Magnet
AT	Actuator	ML	Mill
BH	Baghouse	MO	Mobile equipment
BN	BIN	MD	Metal Detector
BO	Boiler	MX	Mixer/Settler
BR	Burner	OV	Oven
BW	Belt Weigher/Scale	OP	Ore Pass
BX	Box	PP	Pump
CO	Conveyance – Shaft	PE	Precipitator
CV	Conveyor	PV	Pressure vessel
CM	Compactor	RA	Rock Attachment
CR	Crusher	RB	Rock Breaker
CL	Classifier/Clarifier	RC	Reclaimer
CT	Cooling Tower	RG	Radial Gate/Door
CY	Cyclone	RH	Rope Handling
CH	Chute/diverter	RL	Re-lining Machine
CA	Calciner	RO	Rope (Wire Rope)
CE	Centrifuge	RR	Reactor
CN	Crane	SA	Sampler
CP	Compressor	SW	Scale
DA	Damper - Duct	SC	Screen
DC	Dust collector	SF	Silencer
DI	Distributor	SE	Separator
DM	Dam	SH	Sheave Wheel
DR	Dryer	SI	Silo
DS	Dust suppression	SR	Scrubber
DZ	Drizit	ST	Stacker/Stockpile
EL	Elevator	SU	Sump
EN	Engine	TB	Trolley
FA	Fan	TH	Thickener
FE	Feeder	TK	Tank
FL	Filter	TM	Thunderbolt
FS	Fire services	TR	Turbine
FT	Flotation cell	VB	Vibrator
FU	Furnace	VN	Venturi
GE	Generator	WA	Water Treatment
GS	Rock Breaker Greasing Station	WE	Weigh Bridge
HE	Heater	WI	Winch
HO	Hoist	WT	Weightometer
HP	Hopper	WN	Winder
HX	Heat exchanger	XE	Miscellaneous
HY	Hydraulic Unit		



DRA PROJECTS			DRAWING OFFICE		
APPROVAL	SIGNATURE	DATE	D.O. MANAGER		
PROJECT MANAGER	M. Townsend	July 2023	SECTION LEADER		
PROJECT ENGINEER			DRAWN	M. Kok	Jul 2023
PROJECT ENGINEER			DRG. CHECKED	W. Mulder	Jul 2023
DISCIPLINE ENGINEER			ENG. CHECKED		
DISCIPLINE ENGINEER			PR. ENG. / PR. TECH.		
DISCIPLINE ENGINEER			NAME:		
DESIGN ENGINEER			REG. NUMBER:		
SIGNATURE:					

DRAWINGS & CONTENTS PROTECTED IN TERMS OF COPYRIGHT ACT,  
NOT TO BE COPIED, REPRODUCED OR USED WITHOUT PERMISSION OF DRA.

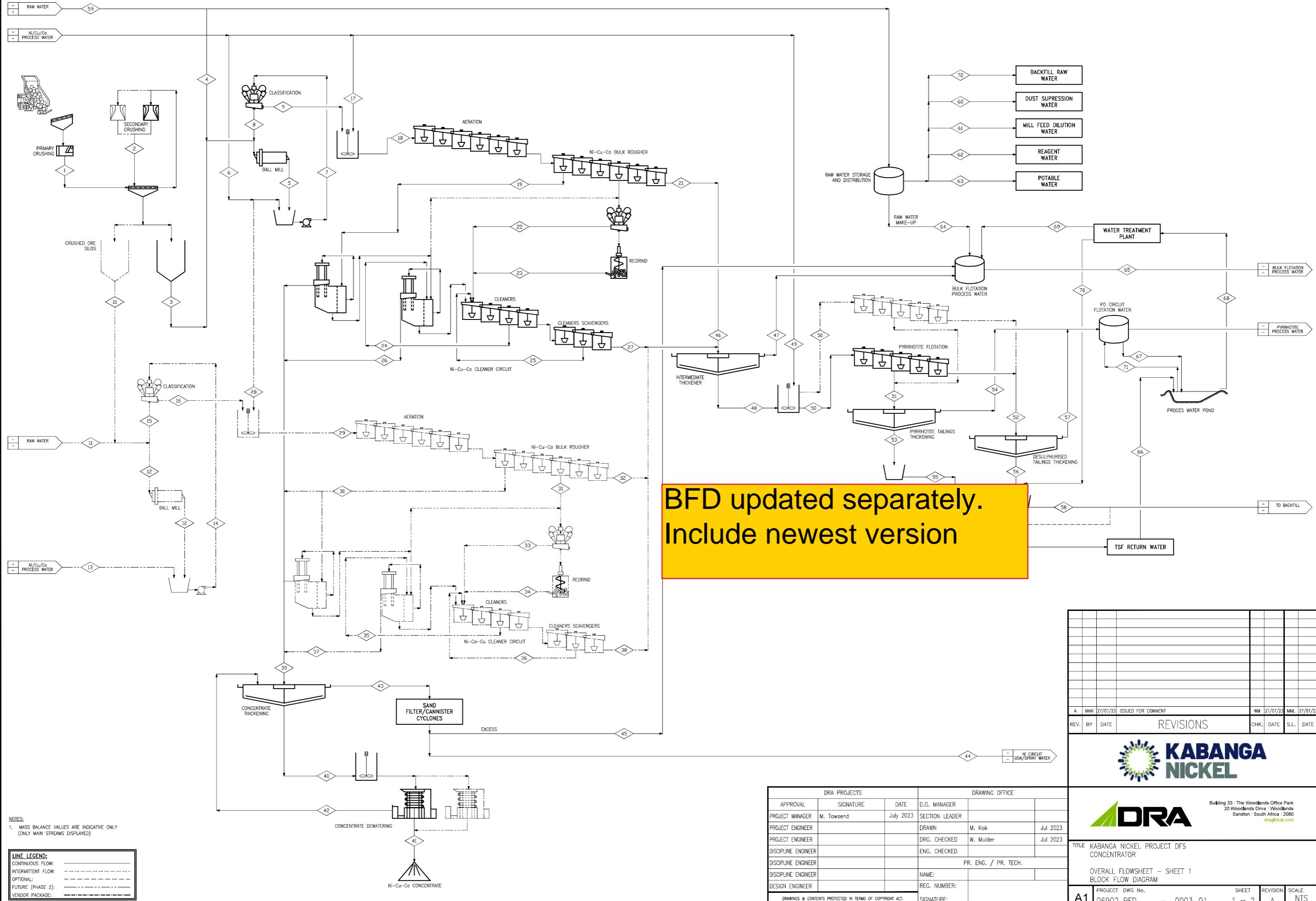


Building 33, The Woodlands Office Park  
20 Woodlands Drive / Woodlands  
Sandton / South Africa / 2080  
[draglobal.com](http://draglobal.com)

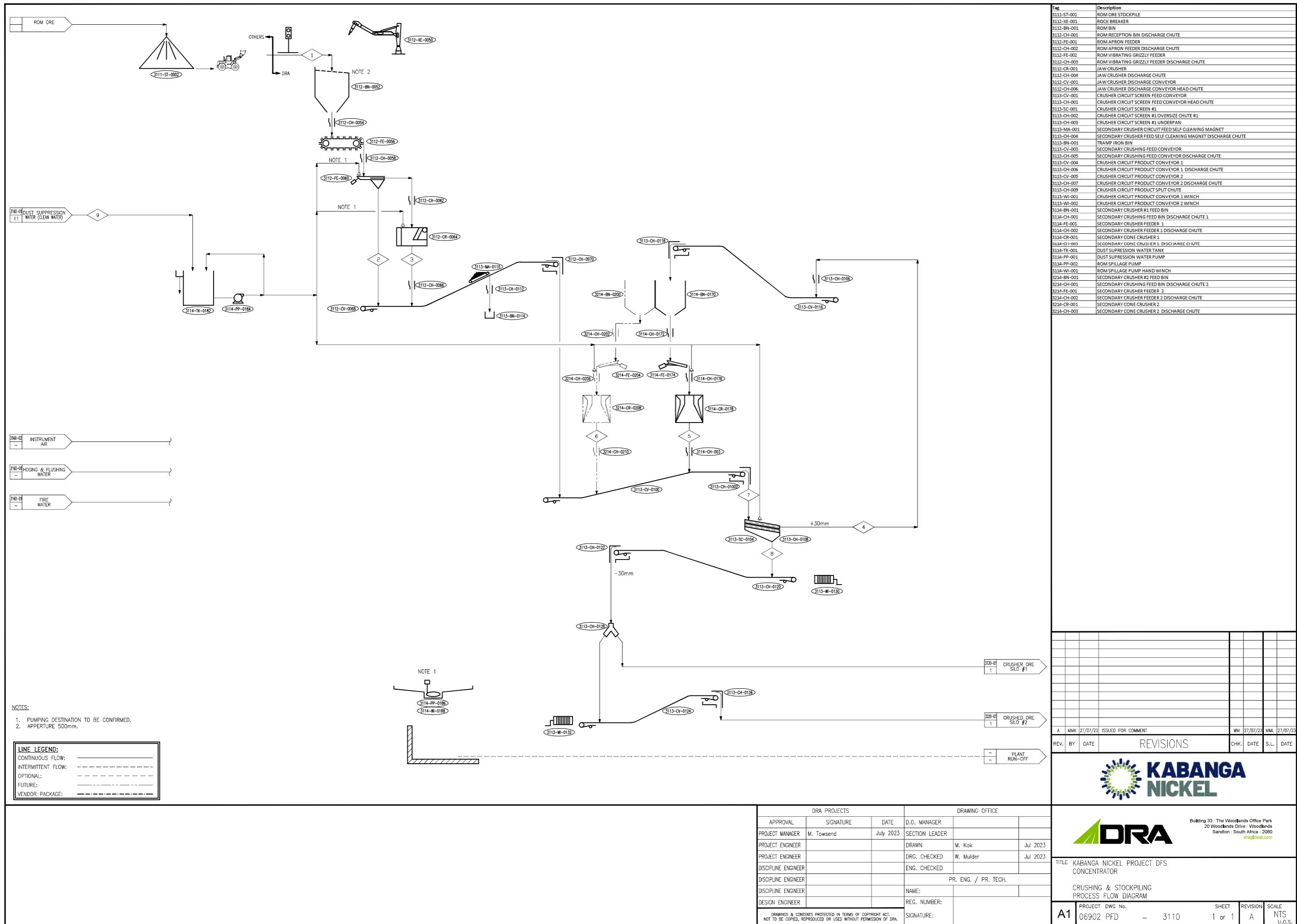
TITLE KABANGA NICKEL PROJECT DFS  
CONCENTRATOR

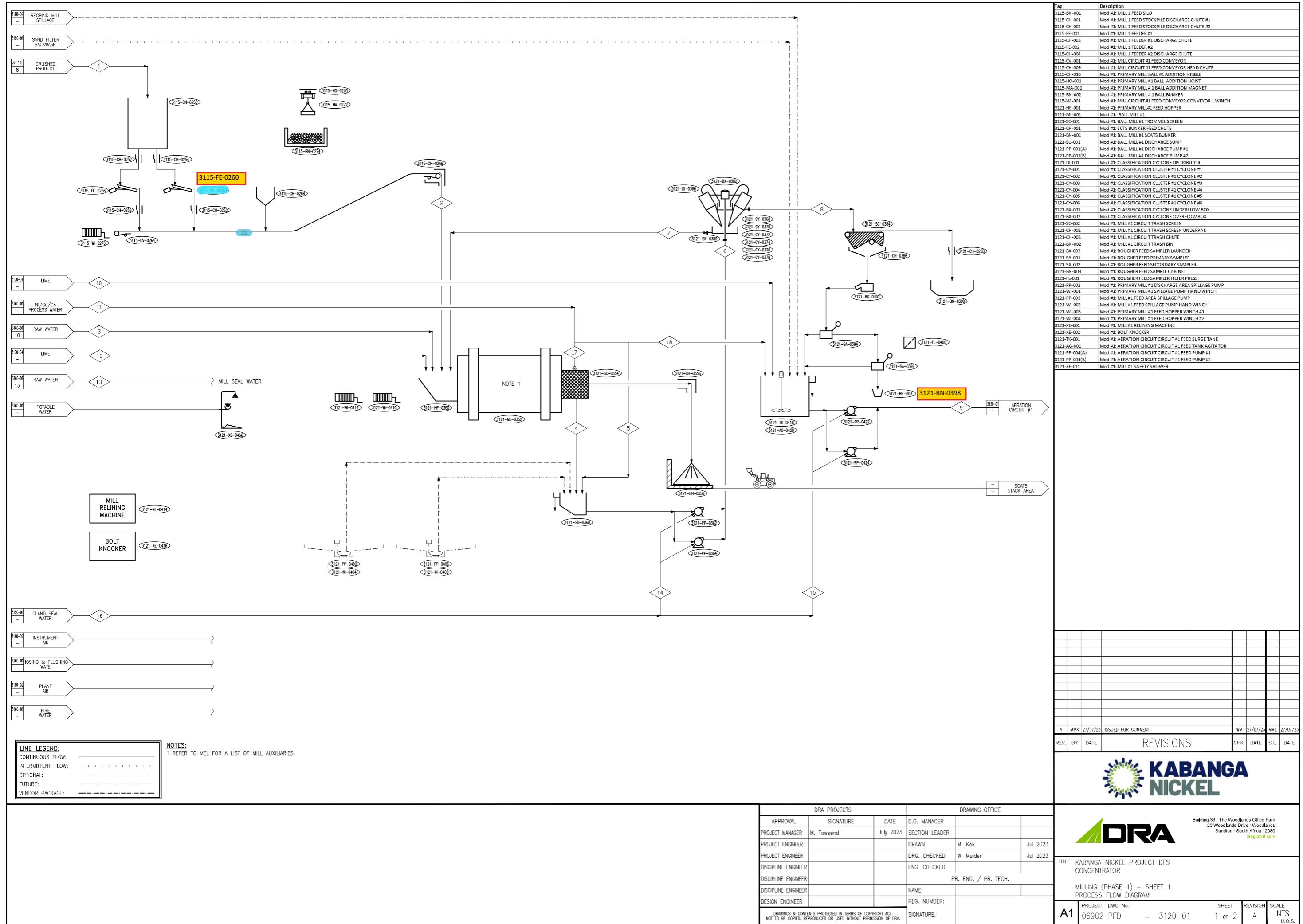
LEGEND & SYMBOLS LIST  
PROCESS FLOW DIAGRAM

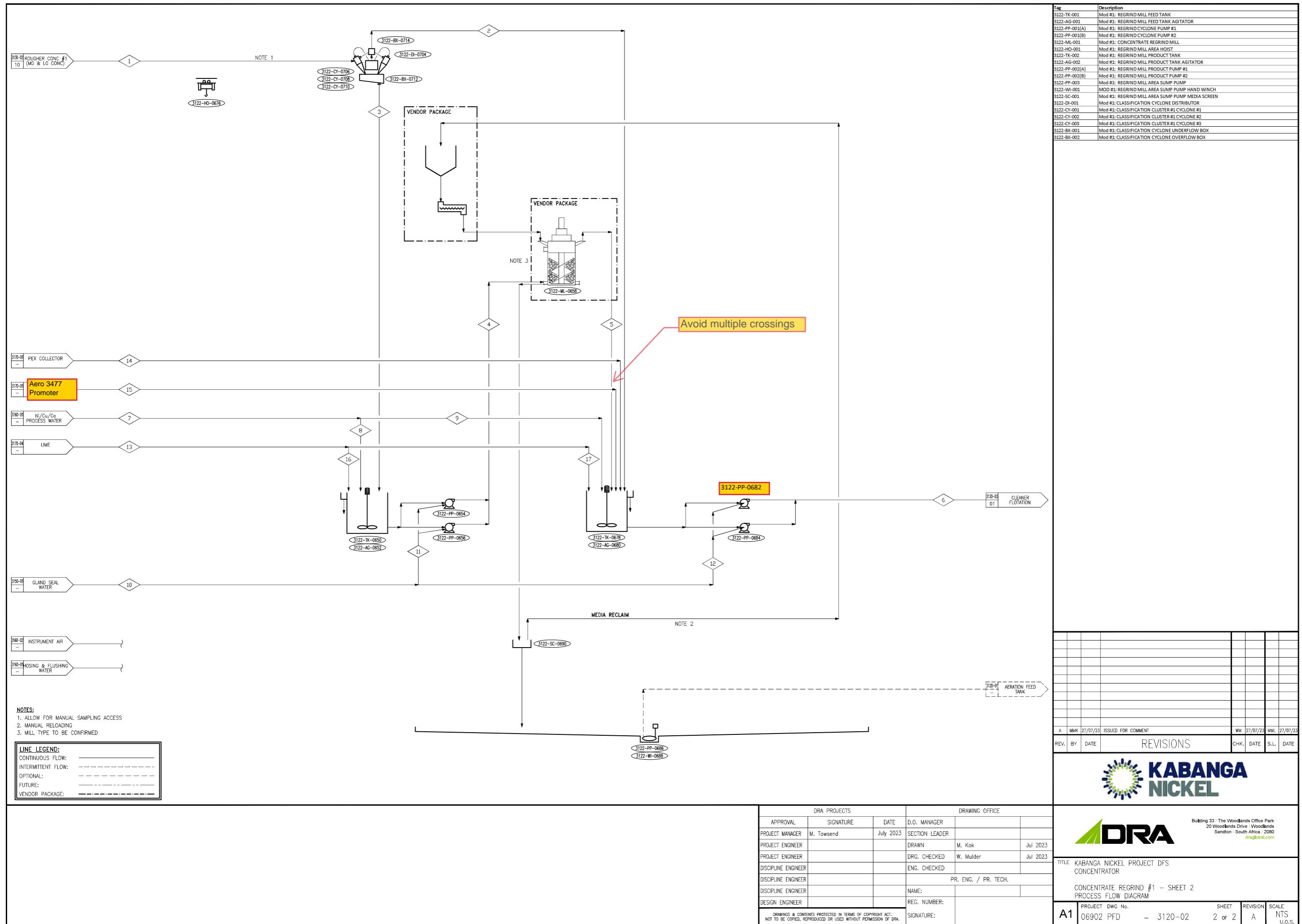
A1	PROJECT DWG No. 06902 PFD	SHEET — 0002	REVISION 1 of 1	SCALE A U.S.O.S.
----	------------------------------	-----------------	--------------------	---------------------

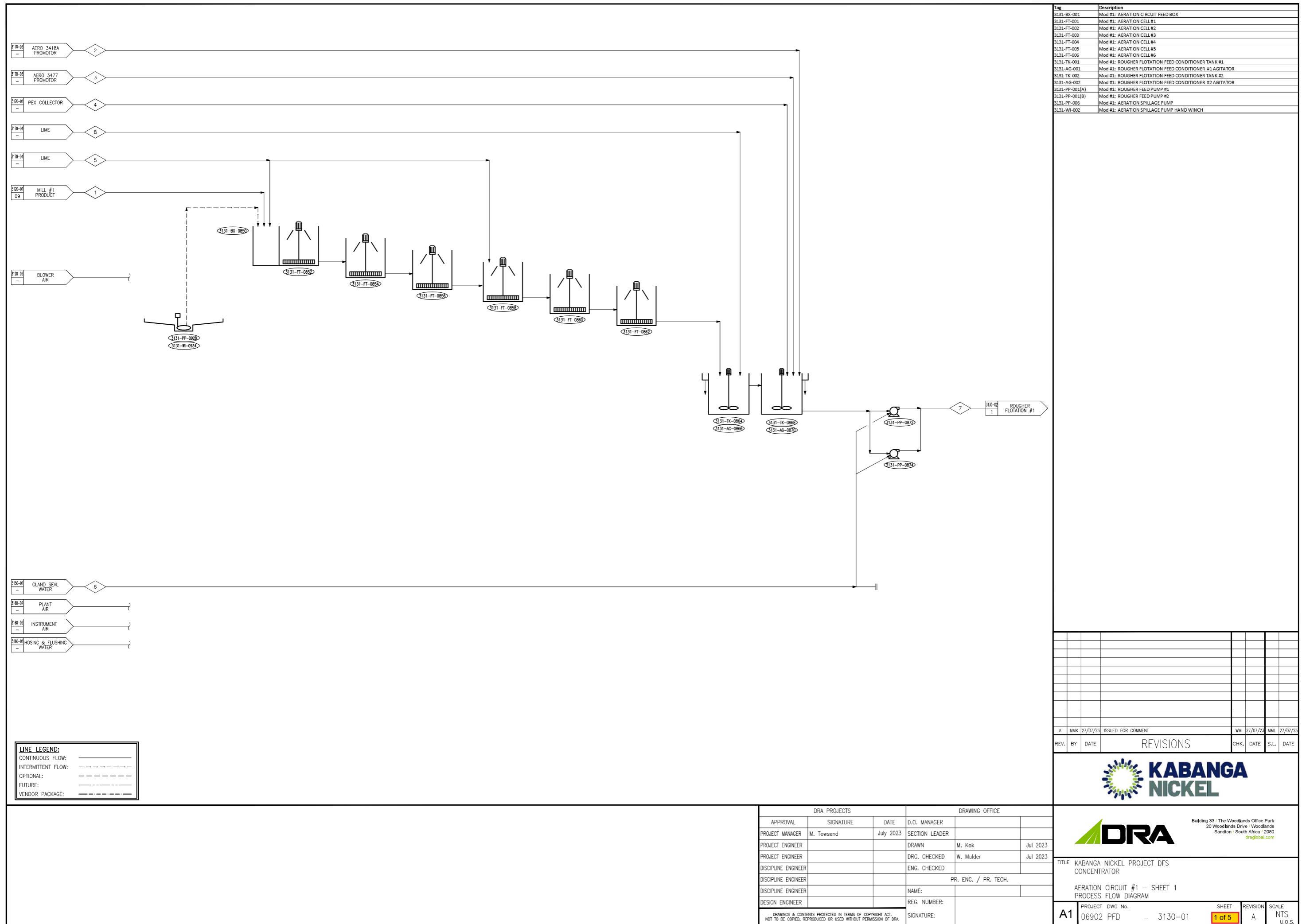


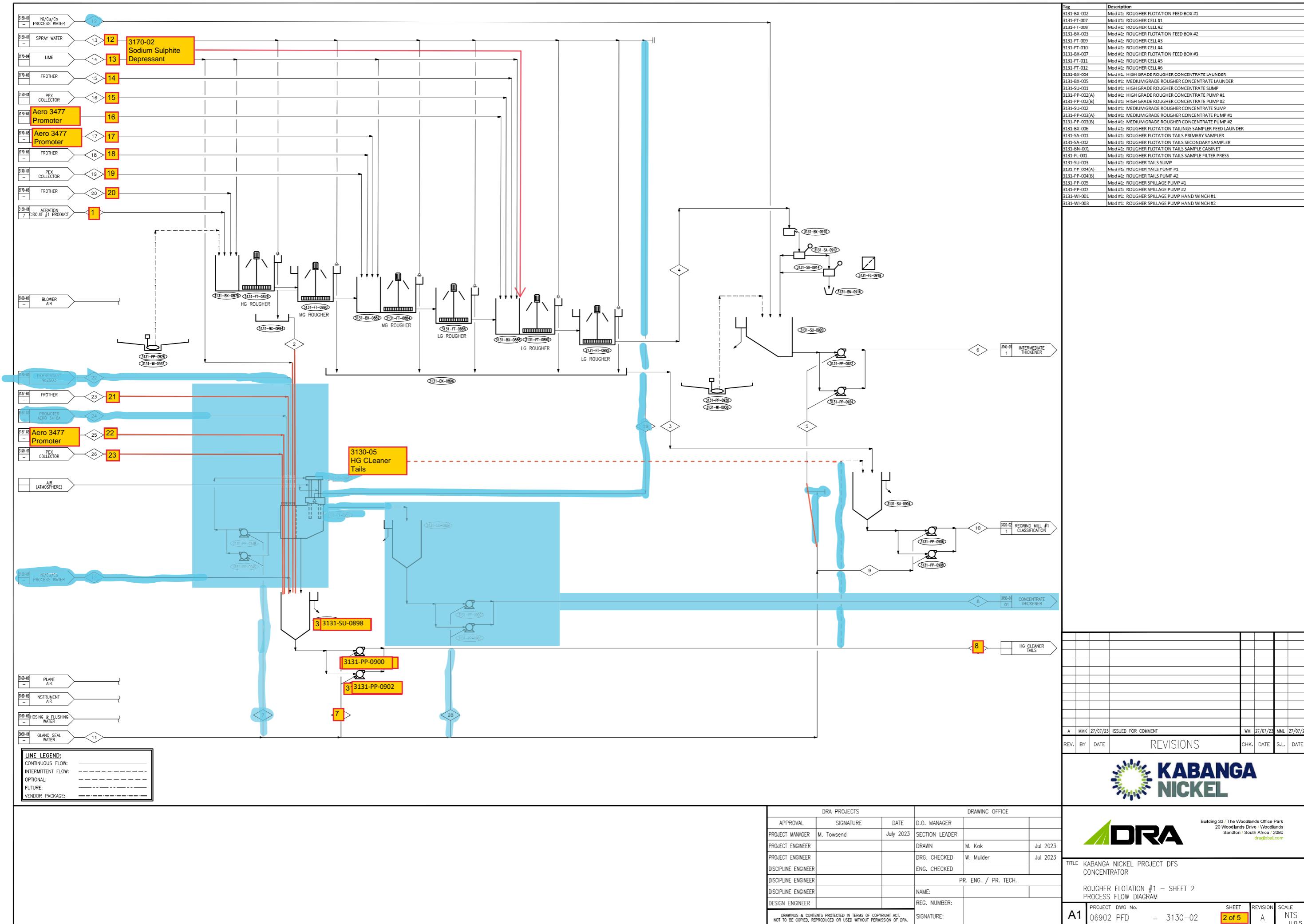


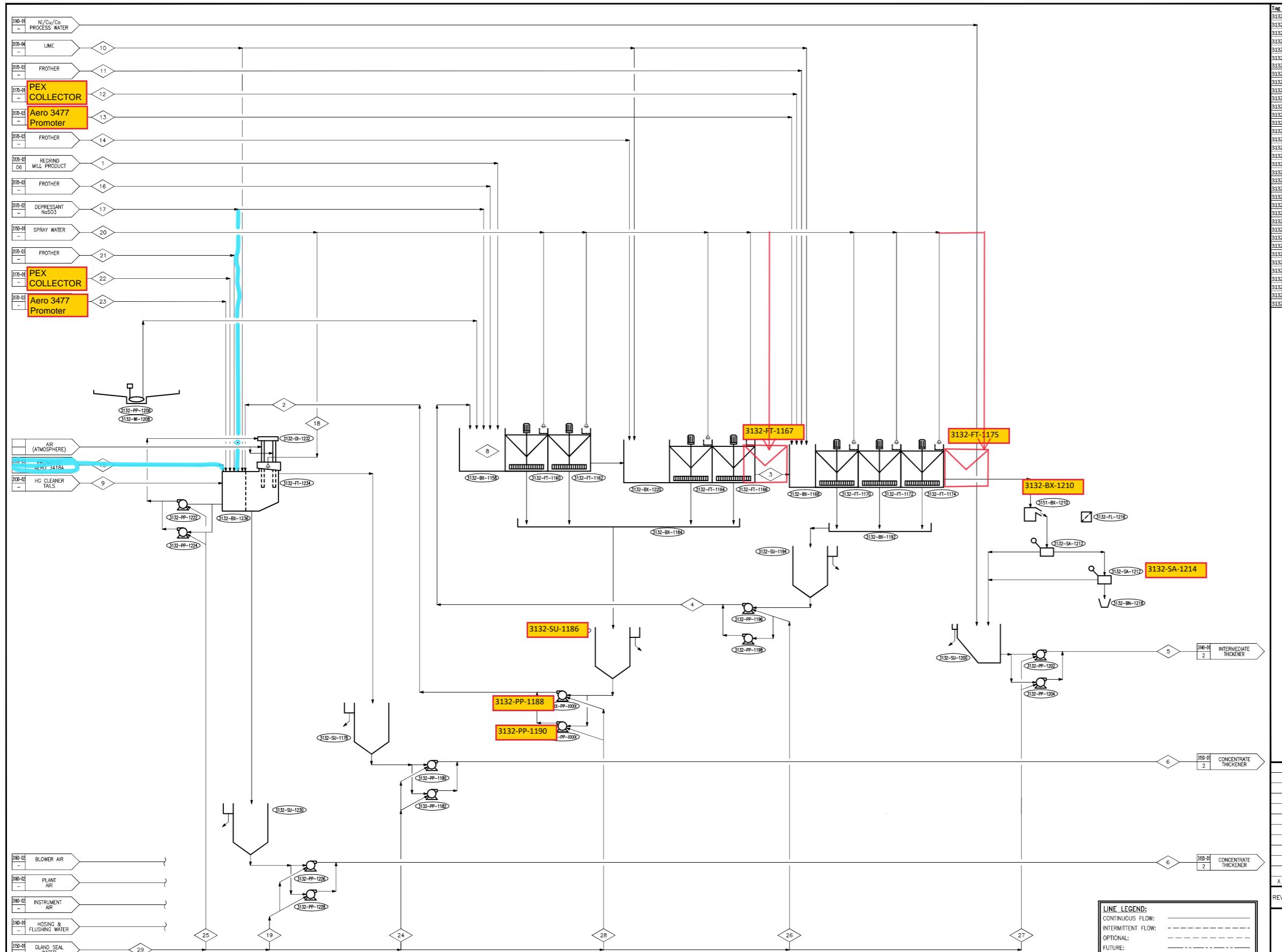












	Description
-BX-001	Mod #1: RE-CLEANER FLOTATION FEED BOX
-FT-001	Mod #1: RE-CLEANER CELL #1
-FT-002	Mod #1: RE-CLEANER CELL #2
-FT-003	Mod #1: RE-CLEANER CELL #3
-BX-002	Mod #1: CLEANER FLOTATION FEED BOX #1
-FT-004	Mod #1: CLEANER CELL #1
-FT-005	Mod #1: CLEANER CELL #2
-FT-006	Mod #1: CLEANER CELL #3
-FT-007	Mod #1: CLEANER CELL #4
-BX-003	Mod #1: CLEANER SCAVENGER FLOTATION FEED BOX
-FT-009	Mod #1: CLEANER SCAVENGER CELL #1
-FT-010	Mod #1: CLEANER SCAVENGER CELL #2
-FT-011	Mod #1: CLEANER SCAVENGER CELL #3
-BX-004	Mod #1: RE-CLEANER CONCENTRATE LAUNDER
-SU-001	Mod #1: RE-CLEANER CONCENTRATE SUMP
-PP-001(A)	Mod #1: RE-CLEANER CONCENTRATE PUMP #1
-PP-001(B)	Mod #1: RE-CLEANER CONCENTRATE PUMP #2
-BX-005	Mod #1: CLEANER CONCENTRATE LAUNDER
-SU-002	Mod #1: CLEANER CONCENTRATE SUMP
-PP-002(A)	Mod #1: CLEANER CONCENTRATE PUMP #1
-PP-002(B)	Mod #1: CLEANER CONCENTRATE PUMP #2
-BX-006	Mod #1: SCAVENGER CLEANER CONCENTRATE LAUNDER#1
-SU-003	Mod #1: SCAVENGER CLEANER CONCENTRATE SUMP
-PP-003(A)	Mod #1: SCAVENGER CLEANER CONCENTRATE PUMP #1
-PP-003(B)	Mod #1: SCAVENGER CLEANER CONCENTRATE PUMP #2
-SU-004	Mod #1: SCAVENGER CLEANER TAILS SUMP
-PP-004(A)	Mod #1: SCAVENGER CLEANER TAILS PUMP #1
-PP-004(B)	Mod #1: SCAVENGER CLEANER TAILS PUMP #2
-PP-005	Mod #1: SCAVENGER CLEANER AREA SPILLAGE PUMP
-WI-001	Mod #1: SCAVENGER CLEANER AREA SPILLAGE PUMP HAND WINCH
-BX-007	Mod #1: SCAVENGER CLEANER TAILS SAMPLER FEED LAUNDER
-SA-001	Mod #1: SCAVENGER CLEANER TAILS PRIMARY SAMPLER
-SA-002	Mod #1: SCAVENGER CLEANER TAILS SECONDARY SAMPLER
-FI-001	Mod #1: SCAVENGER CLEANER TAILS SAMPLE FILTER PRESS
-BN-003	Mod #1: SCAVENGER CLEANER TAILS SAMPLE CABINET
-BX-008	Mod #1: CLEANER FLOTATION FEED BOX #2

MMK	27/07/23	ISSUED FOR COMMENT	WM	27/07/23	MLL	27/07/23
PK	DATE	REVISIONS	CLK	DATE	CA	DATE



Building 33 / The Woodlands Office Park  
20 Woodlands Drive / Woodlands  
Sandton / South Africa / 2080  
[draglobal.com](http://draglobal.com)

TITLE		KABANGA NICKEL PROJECT DFS	
		CONCENTRATOR	
MEDIUM Grade Recleaner, Cleaner and Scavenger Flotation - Sheet 3			
A1	PROJECT DWG No.	SHEET	REVISION
	06902 PFD	- 3130-03	3 of 5
		SCALE	NTS U.S.

