

APPENDIX A

Design drawings



LAKE COWAL LAKE PROTECTION BUND

DETAILED DESIGN

GENERAL

- G1

ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES RELATIVE TO AUSTRALIAN HEIGHT DATUM (AHD) UNLESS NOTED OTHERWISE. CO-ORDINATE SYSTEM LOCAL MINE GRID.
- G2

ALL DIMENSIONS AND SETTING OUT SHALL BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING WORK. DO NOT OBTAIN DIMENSIONS BY SCALING FROM THE DRAWINGS.
- G3

ANY DETAILS OF EXISTING SERVICES SHOWN ON THE DRAWINGS ARE NOT TO BE TAKEN AS INDICATING ALL EXISTING SERVICES OR LOCATIONS. IT IS THE CONTRACTORS RESPONSIBILITY TO ADEQUATELY INFORM THEMSELVES AS TO THE LOCATION OF ANY AND ALL SERVICES. THE CONTRACTOR SHALL EXERCISE DUE CARE WHEN UNDERTAKING ANY EXCAVATION. WHERE AN EXISTING SERVICE IS DAMAGED BY THE CONTRACTOR FOR ANY REASON WHATSOEVER, THE CONTRACTOR SHALL BEAR ALL COSTS AND ANY DELAYS FOR REPAIRING AND/OR DISCONNECTING THE SERVICES AS WELL AS ANY ASSOCIATED COSTS (E.G. DAMAGES, CLEAN UP, ETC.).
- G4

SOURCE DATA FOR DESIGN PROVIDED BY EVOLUTION MINING.

ENVIRONMENTAL

- EN1

TEMPORARY EROSION AND SEDIMENT CONTROL (ESC) MEASURES SHALL BE PROVIDED IN ACCORDANCE WITH THE 'BLUE BOOK' (MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION VOL 1, 4th EDITION AND VOL 2E MINES AND QUARRIES (LANDCOM, 2004 AND DECC 2008)) AND BE MAINTAINED IN OPERATIVE CONDITION AT ALL TIMES AND SHALL REMAIN IN PLACE FOR THE DURATION OF THE WORK.
- EN2

THE CONTRACTOR SHALL ENSURE THAT ALL ESC MEASURES ARE LOCATED AS INSTRUCTED.
- EN3

THE CONTRACTOR AND ANY SUB-CONTRACTORS SHALL BE INFORMED OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION OF DOWNSLOPE LANDS AND WATERWAYS.
- EN4

THE CONTRACTOR IS TO MAINTAIN AT ALL TIMES A CONTINUOUS SILT CURTAIN BETWEEN THE CONSTRUCTION AREA WHERE MATERIALS ARE BEING PLACED, AND ANY INUNDATED PARTS OF LAKE COWAL.
- EN5

ALL WATER PUMPED FROM INSIDE THE TEMPORARY LPB ALIGNMENT TO DEWATER THIS ZONE MUST BE EITHER:

A) PUMPED TO THE MINE WATER SYSTEM (DAM D5), OR

B) TREATED TO ACHIEVE AN EQUIVALENT OR BETTER WATER QUALITY TO LAKE COWAL.

WET CONSTRUCTION

- WET1

CONSTRUCT A TEMPORARY LPB (ROCK GROUYNE AND SHEET PILE WALL) OVER LENGTHS OF THE LPB ALIGNMENT WHICH ARE INUNDATED BY LAKE COWAL.
- WET2

FOR PERMANENT LPB CONSTRUCTION IT IS THE CONTRACTORS RESPONSIBILITY FOR TEMPORARY WORKS AND ACTIONS TO MANAGE LEAKAGE WATER AND/OR STRIP UNSUITABLE (OVERWET) MATERIALS.

DRY CONSTRUCTION (TEMPORARY LPB)

- DRY1

CLEAR AND GRUB THE FOOTPRINT FOR THE TEMPORARY LPB PRIOR TO EARTHWORKS.
- DRY2

STRIP TOPSOIL AND DELETERIOUS MATERIAL FROM THE TEMPORARY LPB FOOTPRINT.

EARTHWORKS (PERMANENT LPB - WET AND/OR DRY CONSTRUCTION)

- E1

CLEAR AND GRUB THE WORK AREA TO REMOVE EXISTING TREES AND SHRUBS, GRASS AND FENCES.
- E2

STRIP TOPSOIL ACROSS THE WORK AREA TO A MINIMUM DEPTH SHOWN ON THE TYPICAL CROSS-SECTION AND AS FURTHER REQUIRED TO REMOVE ALL GRASS, VEGETATIVE MATTER, FIBROUS ROOTS AND LOOSE MATERIAL. PROOF ROLL AND REMOVE ANY UNSUITABLE MATERIAL FROM EMBANKMENT FOUNDATION. BASE OF KEY MUST BE INSPECTED BY GEOTECHNICAL ENGINEER AND APPROVED PRIOR TO COMMENCING KEY BACKFILL.
- E3

ESTABLISH TOPSOIL STOCKPILES AT LOCATIONS DIRECTED BY THE PRINCIPAL.
- E4

DO NOT ALLOW TRAFFIC ON TOPSOIL STOCKPILES.
- E5

ALL FINAL SURFACES SHALL BE CONSTRUCTED TO LEVEL TOLERANCES OF +50mm/-0mm OF THE DESIGN LEVELS MEASURED AT PROACTICAL COMPLETION.

EARTHWORKS (PERMANENT LPB - WET AND/OR DRY CONSTRUCTION) (CONTD)

- E6

THE EMBANKMENT SHALL BE CONSTRUCTED FROM SITE SELECT MATERIALS COMPRISING SANDY CLAYS, WON BY THE CONTRACTOR AT LOCATIONS DIRECTED BY THE PRINCIPAL. MATERIALS USED FOR EMBANKMENT CONSTRUCTION MUST BE TESTED FOR DISPERSIVITY USING THE EMERSON CRUMB TEST, AND ALL MATERIALS USED FOR EMBANKMENT CONSTRUCTION MUST BE CLASS 4 OR BETTER.
- E7

FILL SHALL BE PLACED IN NEAR HORIZONTAL LAYERS NOT EXCEEDING 250mm THICKNESS, AND COMPACTED TO 98% STANDARD DENSITY. MATERIALS MUST BE PLACED AT OMC +/- 2%. ALL EARTH FILL SHALL BE PLACED UNDER LEVEL 1 GEOTECHNICAL SUPERVISION, WITH DENSITY TESTING AT A RATE OF 1 TEST PER 500m².
- E8

COMPACTED SURFACES SHALL BE SCARIFIED AND WETTED AT THE START OF EACH DAY AND AFTER ANY CONSTRUCTION HIATUS, PRIOR TO THE PLACEMENT OF ADDITIONAL LAYERS

MATERIAL SPECIFICATIONS

GEOFABRIC

- MS1

USE BIDIM A44 (MINIMUM) NON-WOVEN GEOTEXTILE FILTER CLOTH (GEOFABRIC)(OR SIMILAR) BETWEEN THE RIP RAP AND THE PARENT MATERIAL. MAXIMUM RESISTANCE BETWEEN THE RIP-RAP AND THE CLOTH IS REQUIRED. THIS CAN BE ACHIEVED BY:

- ENSURING PREPARATION OF THE BANK TO BE FREE OF STONE WITH A ROUGH SURFACE TEXTURE BEFORE PLACING THE CLOTH.

- NOT STRETCHING CLOTH TIGHTLY OVER THE UNDERLYING BANK.

- AVOIDING CLOTHS WITH LOW FRICTION SURFACES.

- LAY GEOFABRIC IN "SHINGLE-FASHION", WITH THE END OF EACH UPSTREAM ROLL OVERLAPPING THOSE DOWNSTREAM. ENSURE EACH ROLL IS ANCHORED PROPERLY AT ITS UPSLOPE END.
- MS2

GEOFABRIC SHALL BE INSTALLED BELOW ALL RIP-RAP PLACEMENT AREAS.

ROCK RIP-RAP:

- MS3

USE GRADED DURABLE RIP-RAP (ROCK) OVERLYING A SINGLE 300mm DEEP BASE OF STABILISED WELL COMPACTED MATERIAL . RIP RAP SHOULD NOT BE SINGLE SIZED, BUT SHOULD BE A WELL-GRADED MIXTURE DESIGNED TO ENSURE THAT ALL GAP BETWEEN LARGE ROCKS ARE FILLED WITH ROCK OF PROGRESSIVELY SMALLER SIZE SO THAT NO SIGNIFICANT VOIDS OCCUR IN THE RIP-RAP BLANKET. GRADING RECOMMENDATIONS ARE PROVIDED IN TABLE 1 BELOW.
- MS4

ROCK FOR RIP RAP SHOULD BE HARD, TOUGH AND DURABLE WITH A CRUSHING STRENGTH OF AT LEAST 25MPA. THE ROCK SHOULD BE FREE OF DEFINED CLEAVAGE PLANES AND SHOULD NOT BE ADVERSELY AFFECTED BY REPEATED WETTING AND DRYING. ROCK SHOULD PREFERABLY BE PREDOMINANTLY ANGULAR IN SHAPE WITH NOT MORE THAN 25% OF ROCKS, DISTRIBUTED THROUGH THE GRADATION, HAVING A LENGTH MORE THAN TWICE THE BREADTH AND THICKNESS.

TABLE 1 - RIP-RAP GRADING RECOMMENDATIONS

EQUIVALENT SPHERICAL DIAMETER ¹	PERCENT (BY WEIGHT) OF RIP RAP OF SMALLER SIZE
1.5 -2.0 TIMES D ₅₀ ²	100%
D ₅₀	50%
0.3 D ₅₀	15 - 25%
0.1 D ₅₀	5 - 10%
¹ THE DIAMETER OF A SPHERE WITH AN EQUIVALENT VOLUME TO THE INDIVIDUAL ROCK. ² D ₅₀ IS THE MEDIUM RIP-RAP DIAMETER OF THE ROCK MIX. (I.E. 50% BY WEIGHT IS SMALLER THAN THIS SIZE).	
SOURCE : DEPARTMENT OF LAND AND WATER CONSERVATION (1999)	

NOTE:
MAXIMUM ROCK SIZE SHALL NOT EXCEED THE ROCK DEPTH SPECIFIED

DRAWING SCHEDULE

LPB-SCH-1001	GENERAL NOTES AND DRAWINGS SCHEDULE
LPB-SCH-1002	SITE GENERAL ARRANGEMENT PLAN
LPB-SCH-2001	LAKE PROTECTION BUND NORTH GENERAL ARRANGEMENT
LPB-SCH-2002	LAKE PROTECTION BUND SOUTH GENERAL ARRANGEMENT
LPB-SCH-3001	LAKE PROTECTION BUND LONGITUDINAL SECTION
LPB-SCH-3002	ACCESS ROAD LONGITUDINAL SECTION
LPB-SCH-4001	TYPICAL SECTIONS - WET CONSTRUCTION
LPB-SCH-4002	TYPICAL SECTIONS - DRY CONSTRUCTION
LPB-SCH-5001	MATERIAL SPECIFICATIONS

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REVISIONS				
	B	14-11-2022	LAKE PROTECTION BUND DETAILED DESIGN - FOR REVIEW	PD
	A	08-09-2022	LAKE PROTECTION BUND SCHEMATIC DESIGN - FOR REVIEW	PD
		DATE	DESCRIPTION	APPROVED

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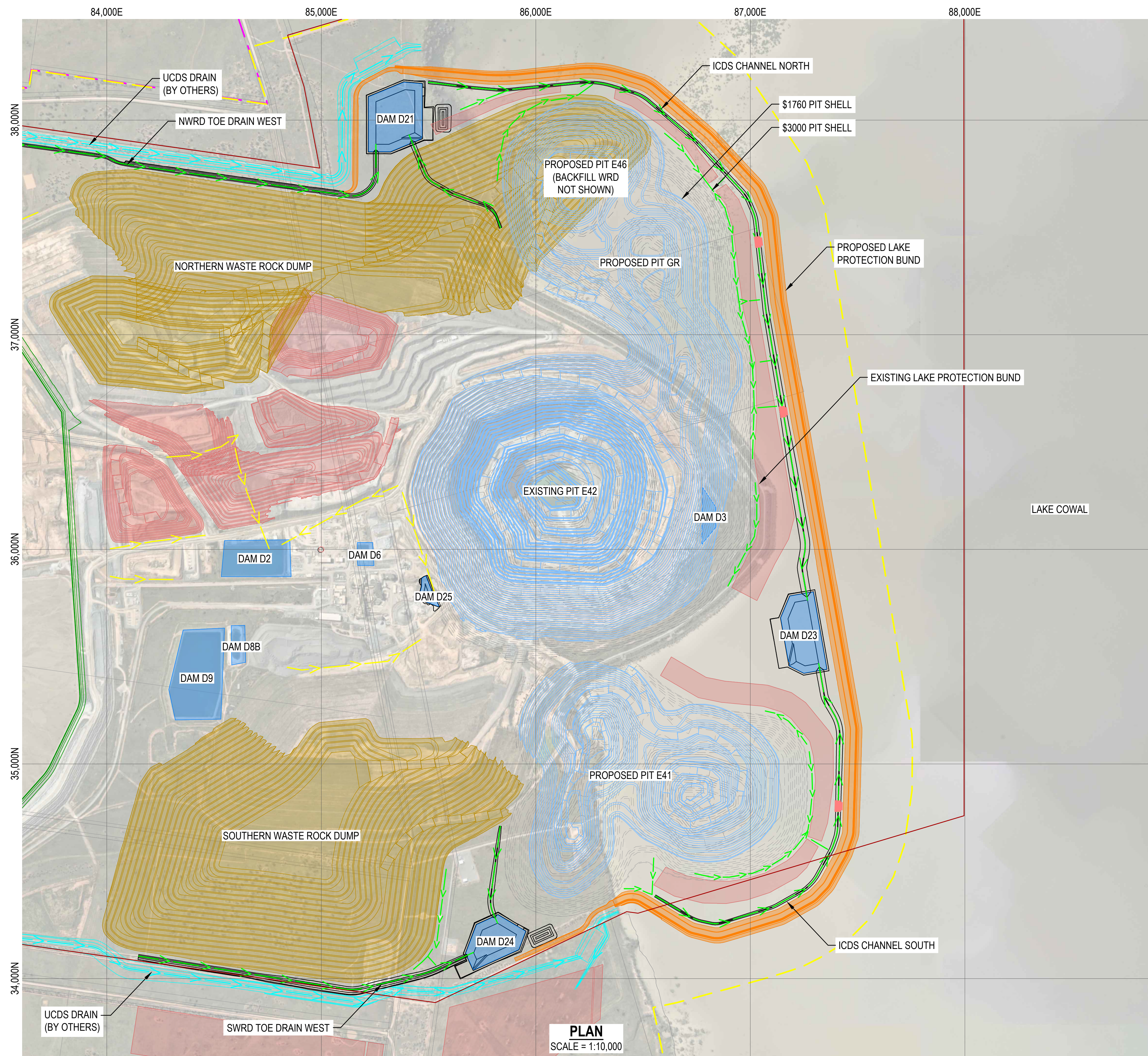
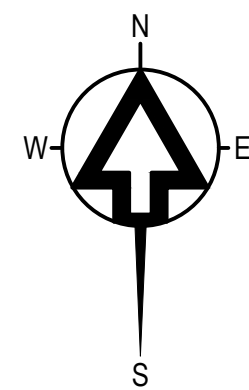


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CLIENT: COWAL GOLD OPERATIONS (CGO)			
PROJECT: LAKE COWAL LAKE PROTECTION BUND DETAILED DESIGN		DRAWING TITLE: GENERAL NOTES AND DRAWING SCHEDULE	SIZE A1
STATUS: FOR EXTERNAL ISSUE NOT TO BE USED FOR CONSTRUCTION PURPOSES		SCALE: N.T.S. DATUM: MINE GRID	DRAWING NUMBER: LPB-SCH-1001 REVISION B

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NOTES
1. REFER TO DWG. LPB-SCH-1001 FOR GENERAL NOTES.

LEGEND

- ML1535 AND ML1791 BOUNDARY
- BUTTENSHAW CONSTRAINTS BOUNDARY
- CONSTRAINTS STUDY BOUNDARY
- LANDHOLDER BOUNDARY
- \$1760 PIT SHELL
- \$3000 PIT SHELL
- EXISTING CONVEYANCE CHANNEL
- UPPER CATCHMENT DRAINAGE SYSTEM (UCDS)
- INTERNAL CATCHMENT DRAINAGE SYSTEM (ICDS)
- DAMS
- STOCKPILES
- WASTE ROCK DUMPS
- LAKE PROTECTION BUND

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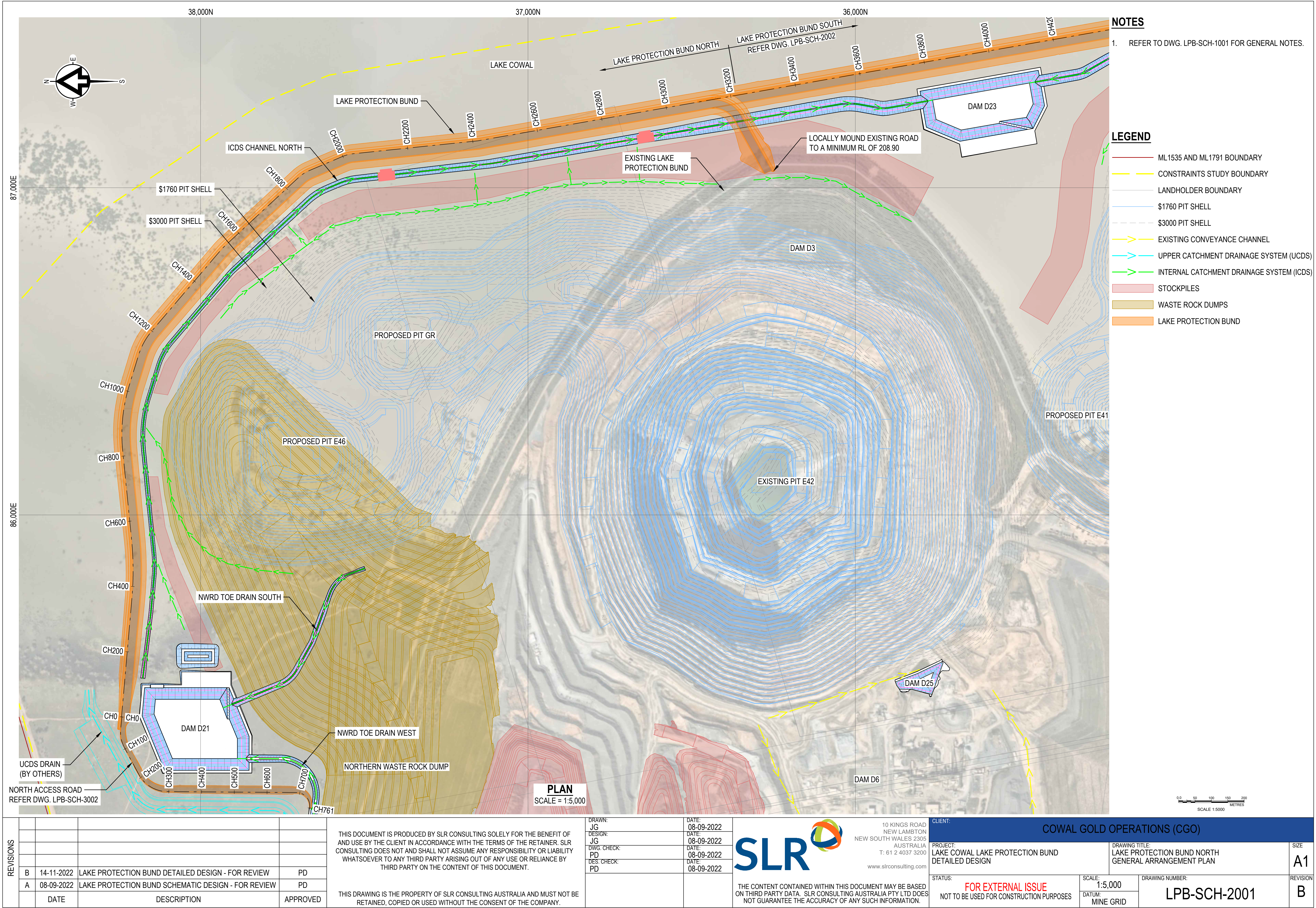


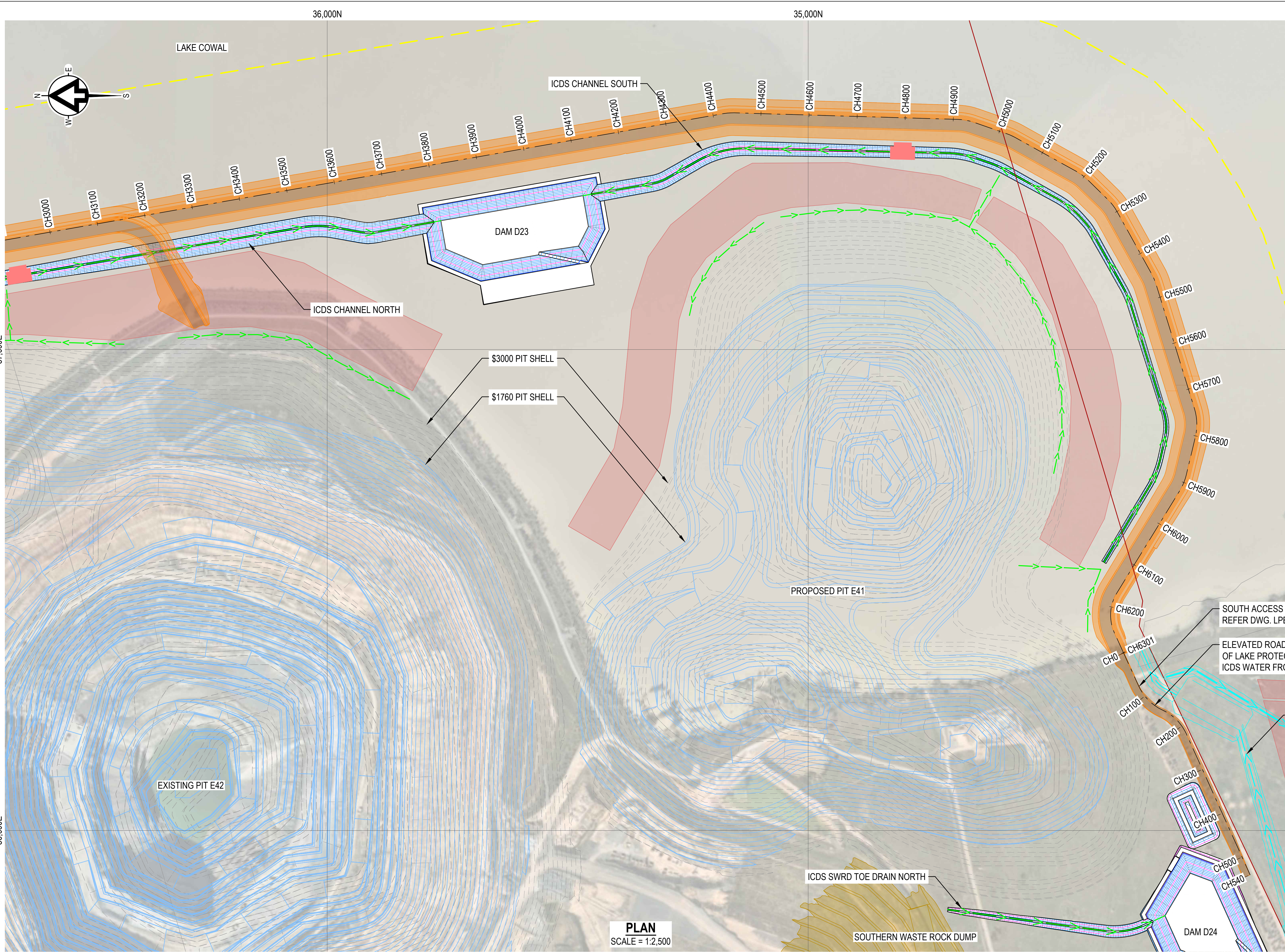
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COWAL GOLD OPERATIONS (CGO)			
CLIENT:	COWAL GOLD OPERATIONS (CGO)		
PROJECT:	LAKE COWAL LAKE PROTECTION BUND DETAILED DESIGN	DRAWING TITLE:	SITE GENERAL ARRANGEMENT PLAN
STATUS:	FOR EXTERNAL ISSUE NOT TO BE USED FOR CONSTRUCTION PURPOSES	SCALE:	1:10,000
		DATUM:	MINE GRID
		DRAWING NUMBER:	LPB-SCH-1002
		SIZE:	A1
		REVISION:	B

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NOTES

1. REFER TO DWG. LPB-SCH-1001 FOR GENERAL NOTES.

LEGEND

ML1535 AND ML1791 BOUNDARY

LANDHOLDER BOUNDARY

\$1760 PIT SHELL

\$3000 PIT SHELL

UPPER CATCHMENT DRAINAGE SYSTEM (UCDS)

INTERNAL CATCHMENT DRAINAGE SYSTEM (ICDS)

STOCKPILES

LAKE PROTECTION BUND

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CLIENT: COWAL GOLD OPERATIONS (CGO)

PROJECT: LAKE COWAL LAKE PROTECTION BUND DETAILED DESIGN

DRAWING TITLE: LAKE PROTECTION BUND SOUTH GENERAL ARRANGEMENT PLAN

STATUS: FOR EXTERNAL ISSUE
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SCALE: 1:4,000
DATUM: MINE GRID

DRAWING NUMBER: LPB-SCH-2002

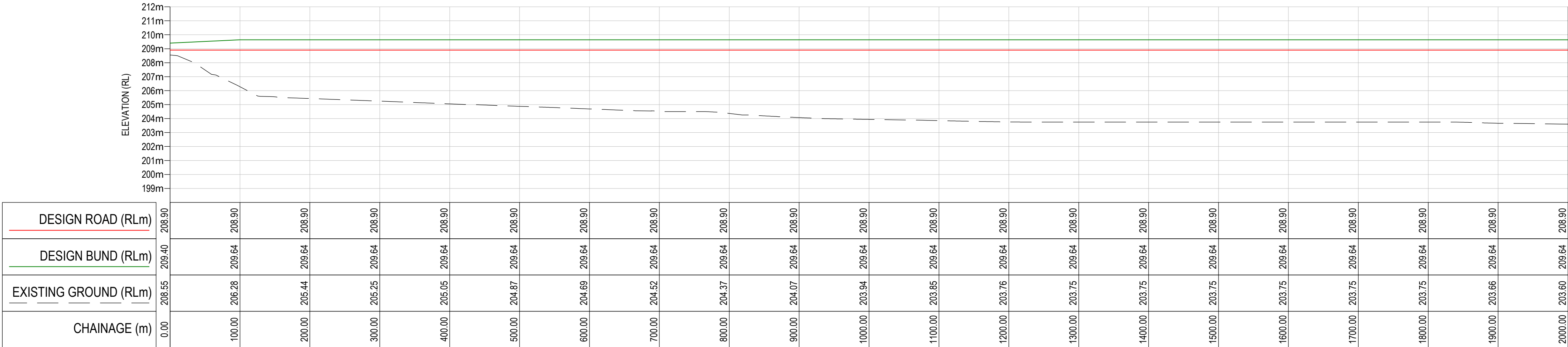
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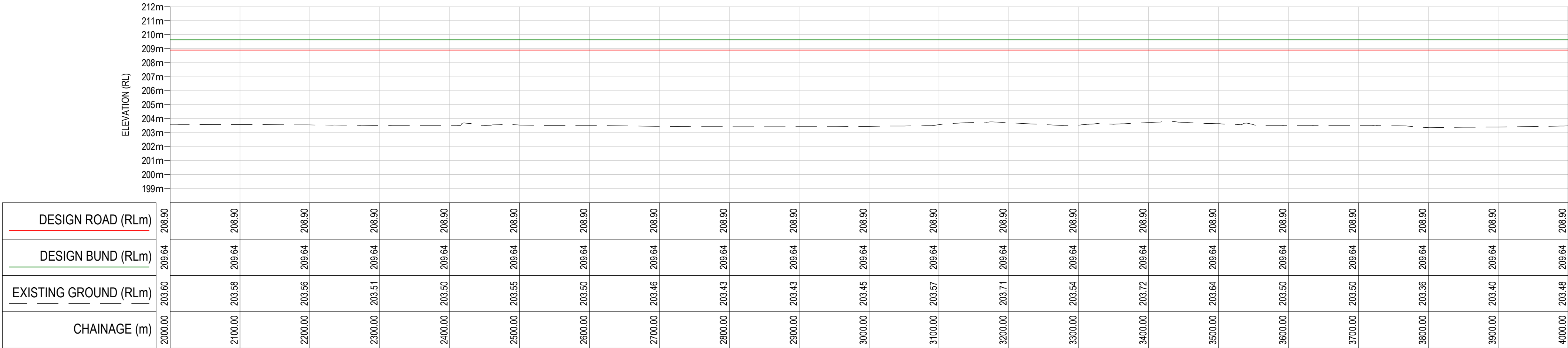
1. REFER TO DWG. LPB-SCH-1001 FOR GENERAL NOTES.

LEGEND

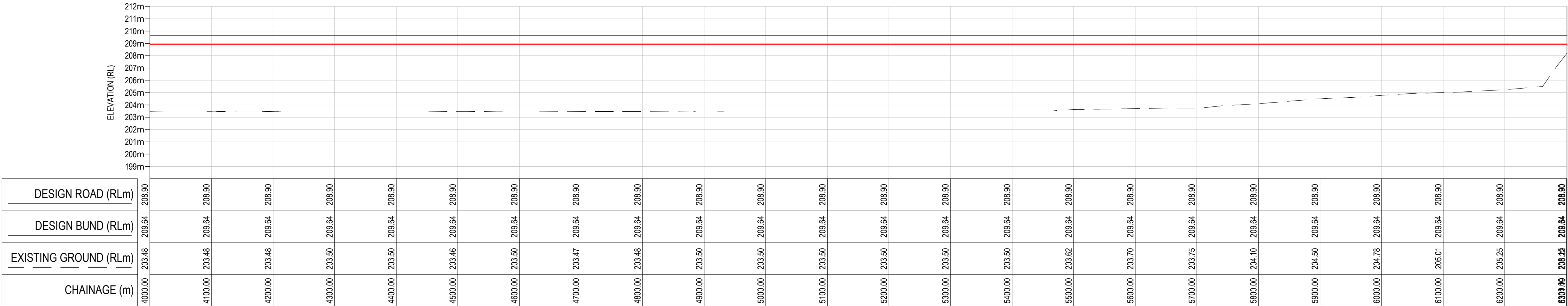
- EXISTING GROUND
--- DESIGN ROAD
--- DESIGN BUND



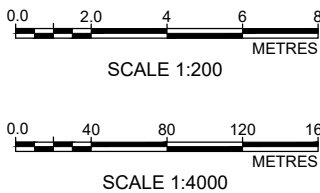
LAKE PROTECTION BUND - LONGITUDINAL SECTION
CHAINAGE 0 TO 2000
SCALE = HOR 1:4,000
VER 1:200



LAKE PROTECTION BUND - LONGITUDINAL SECTION
CHAINAGE 2000 TO 4000
SCALE = HOR 1:4,000
VER 1:200



LAKE PROTECTION BUND - LONGITUDINAL SECTION
CHAINAGE 4000 TO END
SCALE = HOR 1:4,000
VER 1:200



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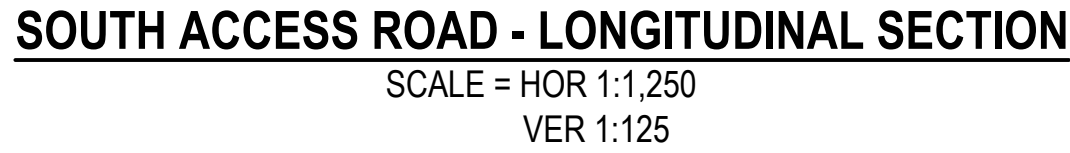
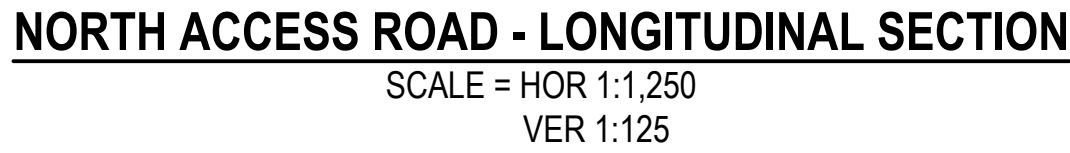
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CLIENT: COWAL GOLD OPERATIONS (CGO)			
PROJECT: LAKE COWAL LAKE PROTECTION BUND DETAILED DESIGN		DRAWING TITLE: LAKE PROTECTION BUND LONGITUDINAL SECTION	SIZE: A1
STATUS: FOR EXTERNAL ISSUE NOT TO BE USED FOR CONSTRUCTION PURPOSES		SCALE: AS SHOWN DATUM: MINE GRID	REVISION: B
		DRAWING NUMBER: LPB-SCH-3001	

1. REFER TO DWG. LPB-SCH-1001 FOR GENERAL NOTES.
2. THE LEVELS SHOWN ARE MINIMUM LEVELS REQUIRED FOR THE ROAD SURFACE WHICH FORMS PART OF THE FLOOD PROTECTION SCHEME FOR THE MINE.

— — — EXISTING GROUND
— DESIGN ROAD

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1. REFER TO DWG. LPB-SCH-1001 FOR GENERAL NOTES.

DISTURBANCE / WORKS
BOUNDARY

OVERALL WIDTH REQUIRED FOR 24m ROAD ON TOP AND LAKE BED LEVEL OF 10204.0 = 72.2m



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CLIENT:

COWAL GOLD OPERATIONS (CGO)

PROJECT:
LAKE COWAL LAKE PROTECTION BUND
DETAILED DESIGN

DRAWING TITLE:
TYPICAL SECTIONS - WET CONSTRUCTION

SIZE	A1
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STATUS: **FOR EXTERNAL ISSUE**
NOT TO BE USED FOR CONSTRUCTION PURPOSES

SCALE:	1:100
DATUM:	

DRAWING NUMBER:
LPB-SCH-4001

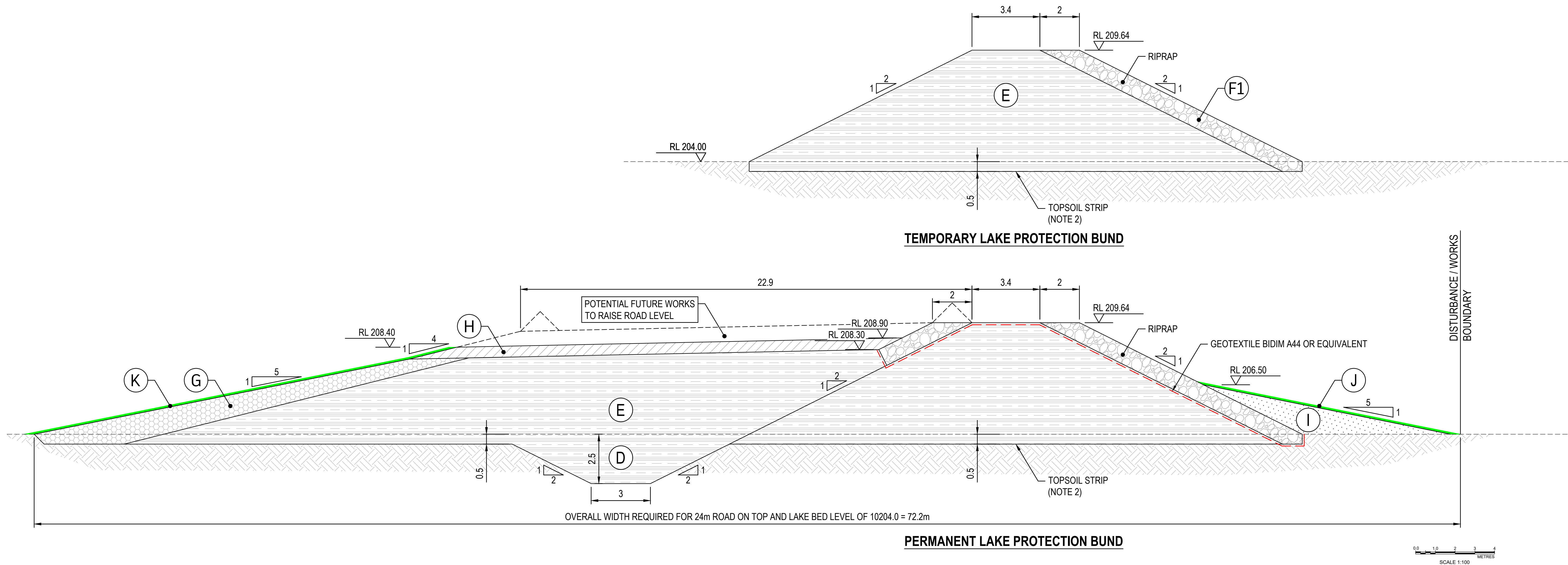
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NOTES

1. REFER TO DWG. LPB-SCH-1001 FOR GENERAL NOTES.
2. STRIP TOPSOIL TO NOMINAL 250mm THICKNESS, AND STRIP OVER-WET ALLUVIAL MATERIALS (NOMINAL AVERAGE 250mm). TOPSOIL TO BE DISPOSED TO TOPSOIL STOCKPILE WITHIN 500m. UNSUITABLES TO BE STOCKPILES AT A LOCATION AGREED WITH PRINCIPALS REPRESENTATIVE.



REVISIONS				
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COWAL GOLD OPERATIONS (CGO)			
PROJECT: LAKE COWAL LAKE PROTECTION BUND SCHEMATIC DESIGN	DRAWING TITLE: TYPICAL SECTIONS - DRY CONSTRUCTION	SIZE: A1	REVISION: B
STATUS: FOR EXTERNAL ISSUE NOT TO BE USED FOR CONSTRUCTION PURPOSES	SCALE: 1:100 DATUM: MINE GRID	DRAWING NUMBER: LPB-SCH-4002	



TAG	DESCRIPTION	MATERIAL	PLACEMENT / COMPACTION	ENVIRONMENTAL CONTROLS
TEMPORARY LAKE PROTECTION BUND - WET CONSTRUCTION				
A	ROCK GROUYNE - COARSE MATERIAL	WELL GRADED HARD ROCK WITH A LOW VOID RATIO, LOW FINES CONTENT. MUST BE NON-PAF MATERIAL.	END DUMP	FLOATING SILT BARRIER
A1	ROCK GROUYNE - FINE MATERIAL	50MM MINUS CRUSHED STONE OR SIMILAR	SELCTIVELY END DUMP INTO CENTRAL ZONE	FLOATING SILT BARRIER
B	INTERLOCKING STEEL PILES. MIN 6MM THICK. NOMINAL SHEET PILE WALL	LENGTH 6.0M	PROVIDE A LOW PERMEABILITY BARRIER	FLOATING SILT BARRIER
C	PUMP-OUT	-	-	REMOVE INTERNAL SILT BARRIER AT COMMENCEMENT OF PUMPING. REMOVE EXTERNAL SILT BARRIER WHEN INTERNAL WATER LEVEL IS 1m LOWER
TEMPORARY LAKE PROTECTION BUND - DRY CONSTRUCTION				
E	TEMPORARY LPB TO ISOLATE LAKE WATER	LOW PERMEABILITY MATERIAL WITH PERMEABILITY LESS THAN K=10 -8 M/S EMERSON CLASS 4 OR GREATER	PLACE IN HORIZONTAL LAYERS 300 THICK AND COMPACT TO A STANDARD DENSITY OF NOT LESS THAN 95%	SEDIMENT FENCE ON OUTSIDE
F1	RIPRAP	WELL GRADED RIPRAP , UNDERLAIN WITH GEOTEXTILE d50 = 300mm	PLACE LOOSE	MAINTAIN SEDIMENT FENCE
PERMANENT LAKE PROTECTION BUND				
D	CUT-OFF TRENCH MINIMUM 2.5m. DEPTH TO BE REVIEWED AT TIME OF EXCAVATION SUBJECT TO SUBGRADE CONDITIONS ENCOUNTERED AND ADVICE FROM PROJECT GEOTECHNICAL ENGINEER	MOISTURE CONDITIONED (+2% TO -3% OMC) LOW PERMEABILITY MATERIAL WITH PERMEABILITY LESS THAN K=10 -9 M/S	PLACE IN HORIZONTAL LAYERS 300 THICK AND COMPACT TO A STANDARD DENSITY OF NOT LESS THAN 98%	-
E	PERMANENT LPB EMBANKMENT	MOISTURE CONDITIONED (+2% TO -3% OMC) LOW PERMEABILITY MATERIAL WITH PERMEABILITY LESS THAN K=10 -9 M/S	PLACE IN HORIZONTAL LAYERS 300 THICK AND COMPACT TO A STANDARD DENSITY OF NOT LESS THAN 98%	-
F	BUND ON TOP OF TEMPORARY LPB (AS APPLICABLE)	LOW PERMEABILITY WELL GRADED ROCK WITH PERMEABILITY LESS THAN K=10 -8 M/S. RIPRAP AS ABOVE.	PLACE IN HORIZONTAL LAYERS 300 THICK AND COMPACT TO A STANDARD DENSITY OF NOT LESS THAN 98%	-
F1	RIPRAP	WELL GRADED RIPRAP UNDERLAIN WITH BIDDUM A44 GEOTEXTILE	PLACE LOOSE	MAINTAIN SEDIMENT FENCE
G	"SECONDARY STONE (TO PREVENT SCOUR)"	WELL GRADED DURABLE ROCK MATERIAL, MINIMUM D ₅₀ OF 300mm	PROVIDE COMPACTION TO ACHIEVE DENSITY OF 90% STANDARD	-
H	ROAD PAVEMENT	WELL GRADED DURABLE ROCK MATERIAL, D50 OF 40mm TO 100mm	PLACE IN HORIZONTAL LAYERS 250 THICK AND COMPACT TO A STANDARD DENSITY OF NOT LESS THAN 98%	MAINTAIN CROSS FALL AWAY FROM LAKE
I	EXTERNAL BATTER	SILTY CLAY ENDEMIC TO FORESHORE, OVERLAIN WITH 150mm THICKNESS OF TOPSOIL	END TIP AND TRACK ROLL SILTY CLAY	SILT FENCE
J	EXTERNAL BATTER	SILTY CLAY ENDEMIC TO FORESHORE, OVERLAIN WITH 150mm THICKNESS OF TOPSOIL	END TIP AND TRACK ROLL SILTY CLAY	SILT FENCE
K	TOPSOIL INTERNAL BATTER	TOPSOIL	-	-

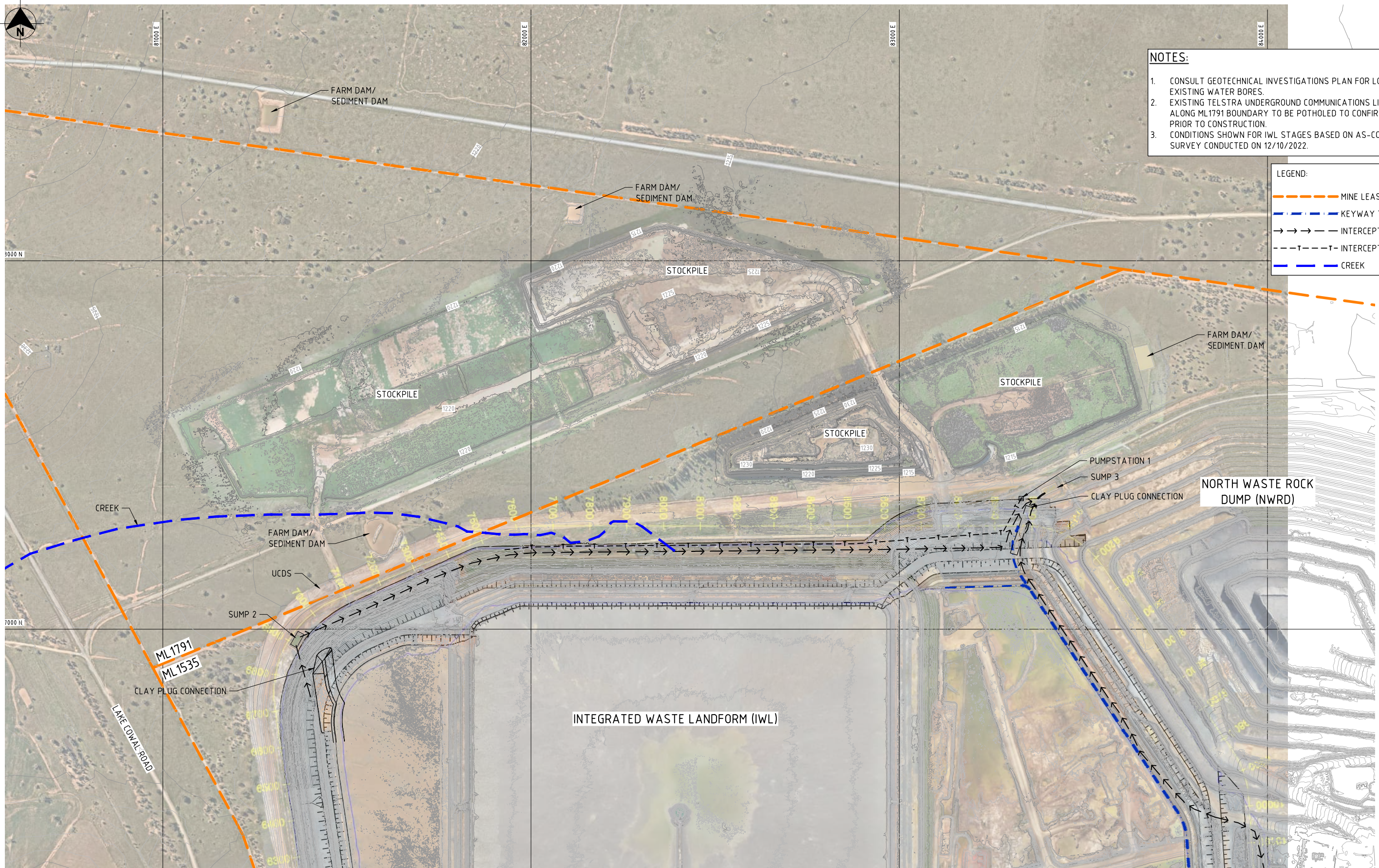
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						DESIGN: JG		DATE: 08-09-2022	PROJECT: LAKE COWAL LAKE PROTECTION BUND DETAILED DESIGN			DRAWING TITLE: MATERIAL SPECIFICATIONS		
	B	14-11-2022	LAKE PROTECTION BUND DETAILED DESIGN - FOR REVIEW		PD	DWG. CHECK: PD		DATE: 08-09-2022	STATUS: FOR EXTERNAL ISSUE NOT TO BE USED FOR CONSTRUCTION PURPOSES			SCALE: N.T.S.	DRAWING NUMBER: LPB-SCH-5001	REVISION B
	A	08-09-2022	LAKE PROTECTION BUND SCHEMATIC DESIGN - FOR REVIEW		PD	DES. CHECK: PD		DATE: 08-09-2022	DATUM: MINE GRID					
		DATE	DESCRIPTION		APPROVED	THIS DRAWING IS THE PROPERTY OF SLR CONSULTING AUSTRALIA AND MUST NOT BE RETAINED, COPIED OR USED WITHOUT THE CONSENT OF THE COMPANY.		THE CONTENT CONTAINED WITHIN THIS DOCUMENT MAY BE BASED ON THIRD PARTY DATA. SLR CONSULTING AUSTRALIA PTY LTD DOES NOT GUARANTEE THE ACCURACY OF ANY SUCH INFORMATION.						

COWAL OPEN PIT CONTINUATION INTEGRATED WASTE LANDFORM - NORTHERN EXPANSION

[illegible]

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N.T.S.										DESIGNED TA CHECKED NM				IWL NORTHERN EXPANSION LOCALITY PLAN AND DRAWING INDEX						
										DRAWN STT CHECKED TA										
										APPROVED TA DATE 15.12.2022										
0 STT FINAL										RPEQ No. AECOM Australia Pty Ltd A.B.N. 20 093 846 925				Status FINAL		Drg No. 60686720-001		Rev. 0		
No. BY DATE DESCRIPTION APPD																				



- NOTES:
1. CONSULT GEOTECHNICAL INVESTIGATIONS PLAN FOR LOCATIONS OF EXISTING WATER BORES.
 2. EXISTING TELSTRA UNDERGROUND COMMUNICATIONS LINE LOCATED ALONG ML1791 BOUNDARY TO BE POTHOLED TO CONFIRM LOCATION PRIOR TO CONSTRUCTION.
 3. CONDITIONS SHOWN FOR IWL STAGES BASED ON AS-CONSTRUCTED SURVEY CONDUCTED ON 12/10/2022.

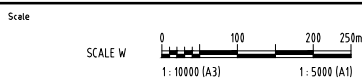
- LEGEND:
- MINE LEASE BOUNDARY
 - KEYWAY TRENCH
 - INTERCEPTOR DRAIN
 - INTERCEPTOR TRENCH
 - CREEK

NOT FOR CONSTRUCTION

PLAN
SCALE W

CAD REF: L:\SECURE\PROJECTS\60686720\900_CAD_051\900_CAD\3D_SHEETS\60686720-002.DWG
LAST MODIFIED: 11/12/2022 9:32 AM

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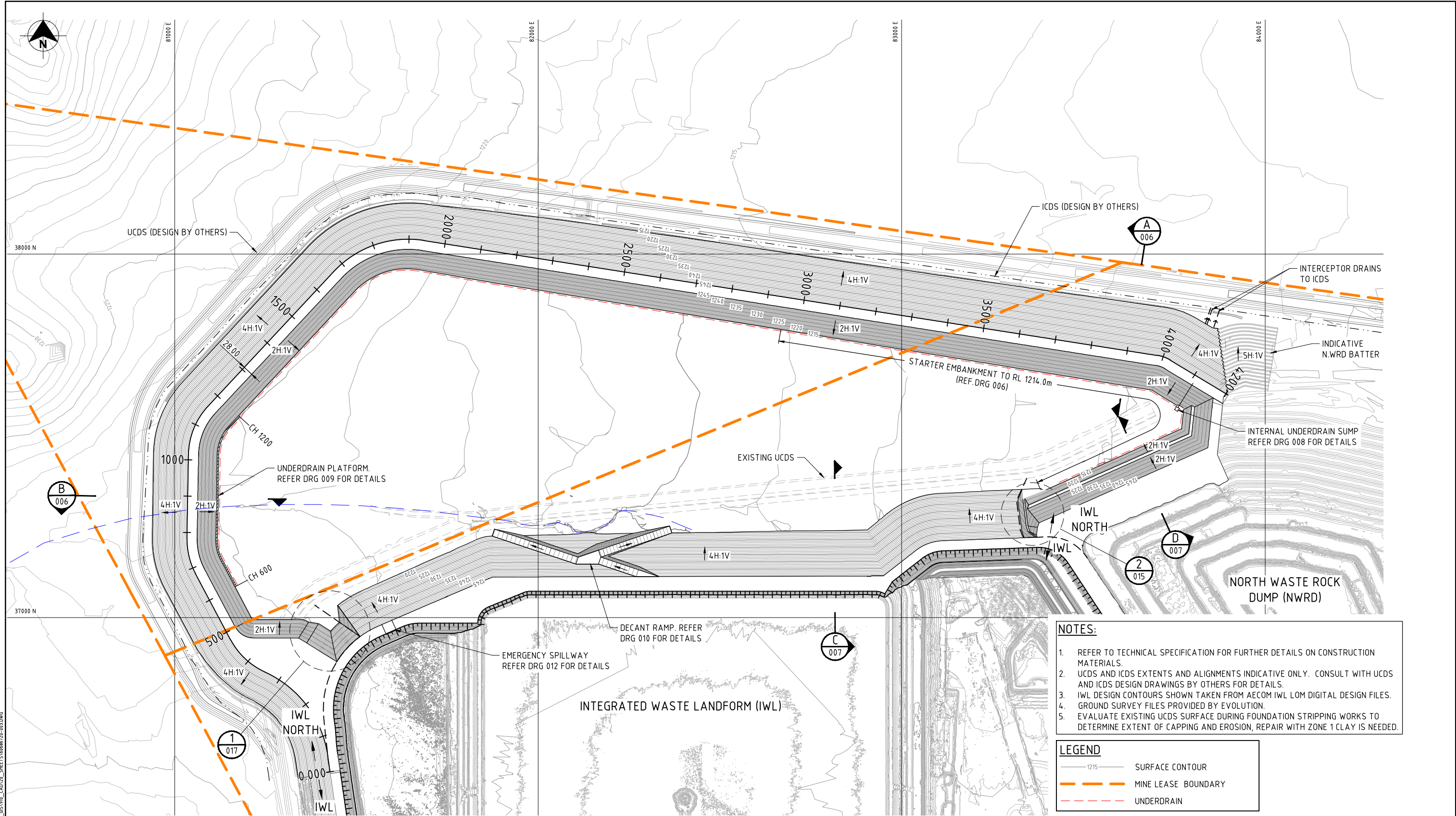
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Evolution
MINING

COWAL OPEN PIT CONTINUATION		
IWL NORTHERN EXPANSION EXISTING CONDITIONS PLAN		
Status	FINAL	Rev. 0
Org No.	60686720-002	



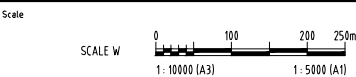
- NOTES:**
1. REFER TO TECHNICAL SPECIFICATION FOR FURTHER DETAILS ON CONSTRUCTION MATERIALS.
 2. UCDS AND ICDS EXTENTS AND ALIGNMENTS INDICATIVE ONLY. CONSULT WITH UCDS AND ICDS DESIGN DRAWINGS BY OTHERS FOR DETAILS.
 3. IWL DESIGN CONTOURS SHOWN TAKEN FROM AECOM IWL LOM DIGITAL DESIGN FILES.
 4. GROUND SURVEY FILES PROVIDED BY EVOLUTION.
 5. EVALUATE EXISTING UCDS SURFACE DURING FOUNDATION STRIPPING WORKS TO DETERMINE EXTENT OF CAPPING AND EROSION, REPAIR WITH ZONE 1 CLAY IS NEEDED.

LEGEND	
	SURFACE CONTOUR
	MINE LEASE BOUNDARY
	UNDERDRAIN

PLAN
SCALE W

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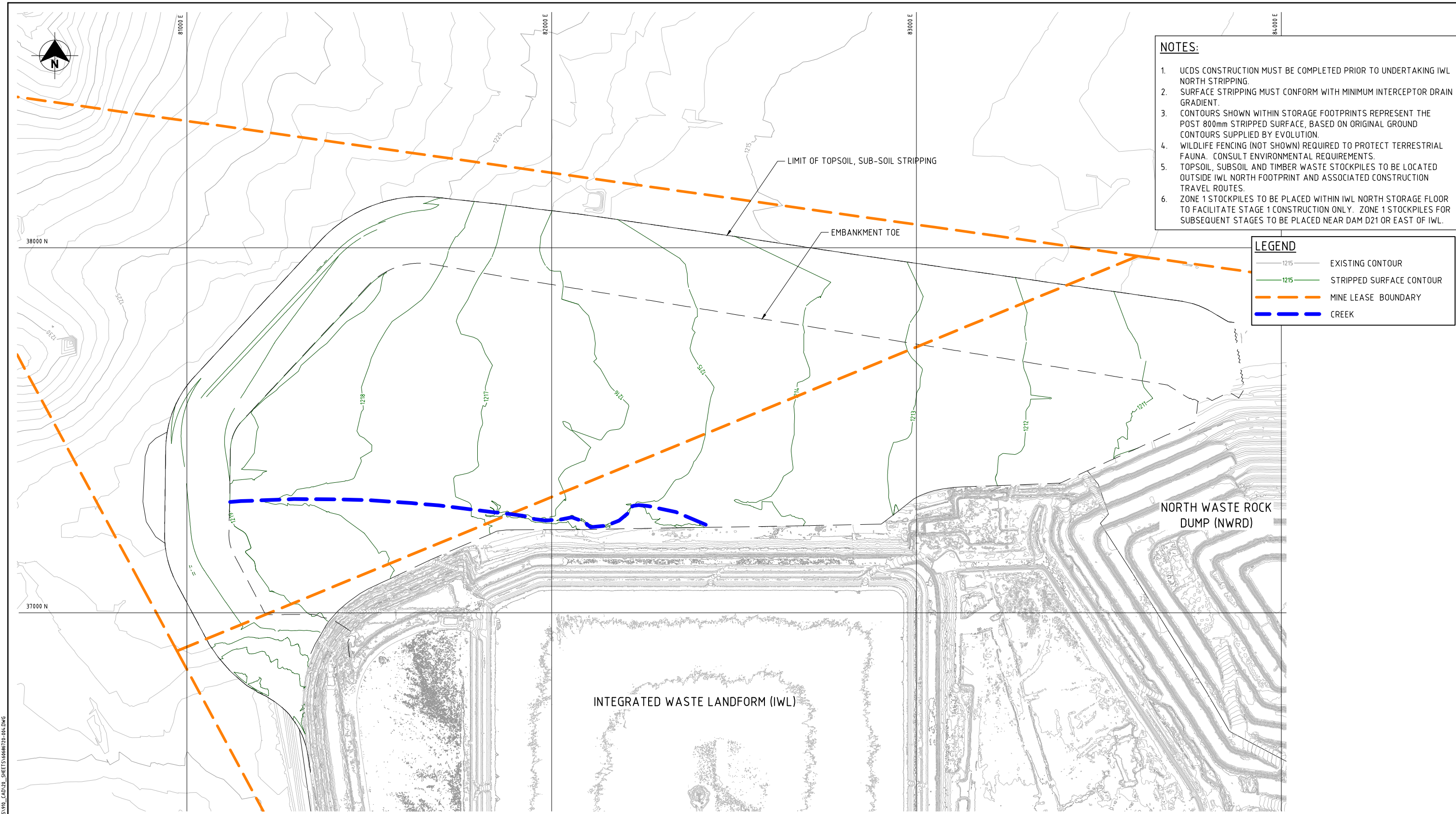
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COWAL OPEN PIT CONTINUATION
IWL NORTHERN EXPANSION
GENERAL ARRANGEMENT

Status	FINAL	Drng No.	60686720-003	Rev.	0
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- NOTES:**
1. UCDS CONSTRUCTION MUST BE COMPLETED PRIOR TO UNDERTAKING IWL NORTH STRIPPING.
 2. SURFACE STRIPPING MUST CONFORM WITH MINIMUM INTERCEPTOR DRAIN GRADIENT.
 3. CONTOURS SHOWN WITHIN STORAGE FOOTPRINTS REPRESENT THE POST 800mm STRIPPED SURFACE, BASED ON ORIGINAL GROUND CONTOURS SUPPLIED BY EVOLUTION.
 4. WILDLIFE FENCING (NOT SHOWN) REQUIRED TO PROTECT TERRESTRIAL FAUNA. CONSULT ENVIRONMENTAL REQUIREMENTS.
 5. TOPSOIL, SUBSOIL AND TIMBER WASTE STOCKPILES TO BE LOCATED OUTSIDE IWL NORTH FOOTPRINT AND ASSOCIATED CONSTRUCTION TRAVEL ROUTES.
 6. ZONE 1 STOCKPILES TO BE PLACED WITHIN IWL NORTH STORAGE FLOOR TO FACILITATE STAGE 1 CONSTRUCTION ONLY. ZONE 1 STOCKPILES FOR SUBSEQUENT STAGES TO BE PLACED NEAR DAM D21 OR EAST OF IWL.

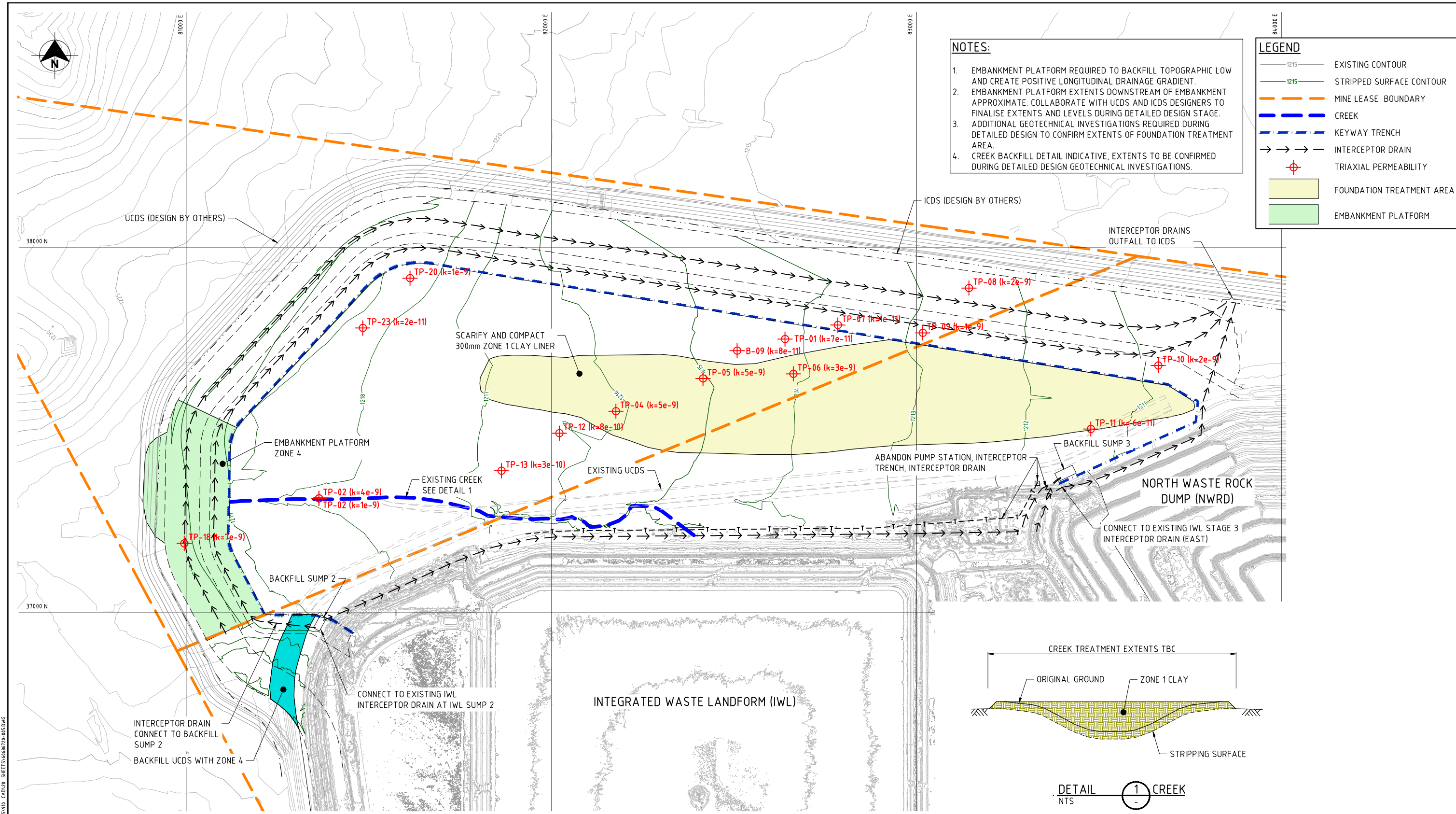
LEGEND	
	EXISTING CONTOUR
	STRIPPED SURFACE CONTOUR
	MINE LEASE BOUNDARY
	CREEK

PLAN
SCALE W

NOT FOR CONSTRUCTION

CAD REF: L:\SECURE\PROJECTS\60686720\IWL_CAD_GS\IWL_CAD\3D_SHEETS\60686720-IWL.DWG
LAST MODIFIED: 11/01/2023 9:37 AM

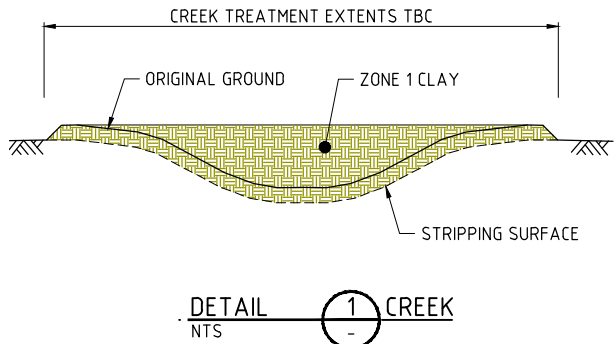
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DESIGNED TA				CHECKED NM		DRAWN STT		CHECKED TA		APPROVED TA		DATE 15.12.2022		IWL NORTHERN EXPANSION FOUNDATION LAYOUT PLAN SHEET 1	
No.				BY		DATE		DESCRIPTION		APPD		Status FINAL		Dwg No. 60686720-004	
0				STT		FINAL						Rev. 0			



- NOTES:**
1. EMBANKMENT PLATFORM REQUIRED TO BACKFILL TOPOGRAPHIC LOW AND CREATE POSITIVE LONGITUDINAL DRAINAGE GRADIENT.
 2. EMBANKMENT PLATFORM EXTENTS DOWNSTREAM OF EMBANKMENT APPROXIMATE. COLLABORATE WITH UCDS AND ICDS DESIGNERS TO FINALISE EXTENTS AND LEVELS DURING DETAILED DESIGN STAGE.
 3. ADDITIONAL GEOTECHNICAL INVESTIGATIONS REQUIRED DURING DETAILED DESIGN TO CONFIRM EXTENTS OF FOUNDATION TREATMENT AREA.
 4. CREEK BACKFILL DETAIL INDICATIVE, EXTENTS TO BE CONFIRMED DURING DETAILED DESIGN GEOTECHNICAL INVESTIGATIONS.

LEGEND

- 1215 EXISTING CONTOUR
- 1215 STRIPPED SURFACE CONTOUR
- MINE LEASE BOUNDARY
- CREEK
- KEYWAY TRENCH
- INTERCEPTOR DRAIN
- TRIAXIAL PERMEABILITY
- FOUNDATION TREATMENT AREA
- EMBANKMENT PLATFORM

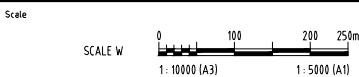


PLAN
SCALE W

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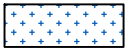
COWAL OPEN PIT CONTINUATION		
IWL NORTHERN EXPANSION FOUNDATION LAYOUT PLAN SHEET 2		
Status	FINAL	Rev. 0
Org No.	60686720-005	

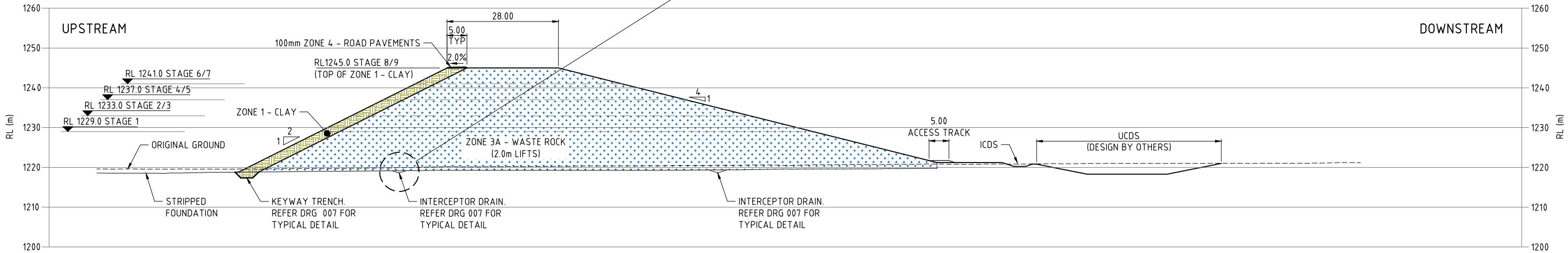
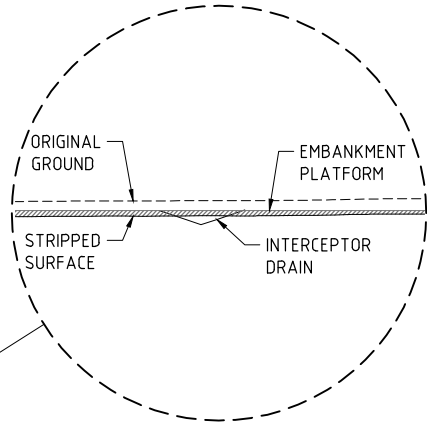
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CONSTRUCTION MATERIALS AND METHODOLOGY	
ZONE 1 - CLAY	WELL GRADED COHESIVE MATERIAL (CLASS CL, CI, CH, ML, MH OR SC) FREE FROM ORGANICS AND OTHER DELETERIOUS SUBSTANCES, COMPACTED TO DRY DENSITY RATIO OF AT LEAST 98% (STANDARD) AT MOISTURE CONTENT IN RANGE (OMC \pm 2%). LAYER THICKNESS 250mm MAX AFTER COMPACTION, USING TAMPING FOOT ROLLER WITH STATIC WEIGHT ON DRUM(S) OF AT LEAST 4 TONNE/METRE.
ZONE 3 - WASTE ROCK	WELL GRADED WASTE ROCK, UP TO 1m MAXIMUM SIZE, NOT SUBJECT TO LONG TERM DEGRADATION. PREFERRED SOURCE IS 'PRIMARY ORE WASTE' OR 'HARD OXIDE WASTE (HOX)'. 5.0m MAX. LAYERS. COMPACTION NOT REQUIRED.
ZONE 3A - WASTE ROCK	WELL GRADED WASTE ROCK, UP TO 1m MAXIMUM SIZE, NOT SUBJECT TO LONG TERM DEGRADATION. PREFERRED SOURCE IS 'PRIMARY ORE WASTE' OR 'HARD OXIDE WASTE (HOX)'. 2.0m MAX. COMPACTED LAYERS.
ZONE 4 - RANDOM FILL	ZONE 1 MATERIAL COMPACTED 4 PASSES WITH 4 TONNE/METRE TAMPING FOOT ROLLER. TESTING NOT REQUIRED, MAX. LAYER THICKNESS: 500mm
ROAD PAVEMENTS	PAVEMENT GRAVEL TO BE CRUSHED ROCK DEEMED SUITABLE BY THE SUPERINTENDENT.
DRAINAGE GRAVEL	DRAINAGE GRAVEL SAG MILL SCATS, ROUNDED, FREE DRAINING. THE MATERIAL SHALL BE RESISTANT TO DEGRADATION WHEN SUBJECT TO CHEMICAL EXPOSURE.

- NOTES:**
- REFER CONSTRUCTION MATERIALS AND METHODOLOGY TABLE ON DRAWING 003 FOR EMBANKMENT ZONE SPECIFICATIONS.
 - NOTIONAL IWL NORTH CONSTRUCTION STAGES SHOWN. REFER TO ASSOCIATED AECOM FEASIBILITY DESIGN REPORT FOR SEQUENCING.
 - DESIGN AS SHOWN ASSUMES EACH IWL NORTH CONSTRUCTION STAGE WILL BE BUILT TO THE FULL EMBANKMENT FOOTPRINT AVAILABLE.
 - IWL NORTH CONSTRUCTION STAGES 2 THROUGH 9 REQUIRE REMOVAL OF PREVIOUS ROAD PAVEMENT ON OPERATING CREST AND BOXING OUT OF AFFECTED CLAY FACING UNDERNEATH PRIOR TO PLACING NEW ZONE 1 CLAY.
 - PROVIDE 1.0m GAPS IN SAFETY BUND AT 20.0m INTERVALS TO FACILITATE SURFACE DRAINAGE OF RAINFALL RUNOFF.

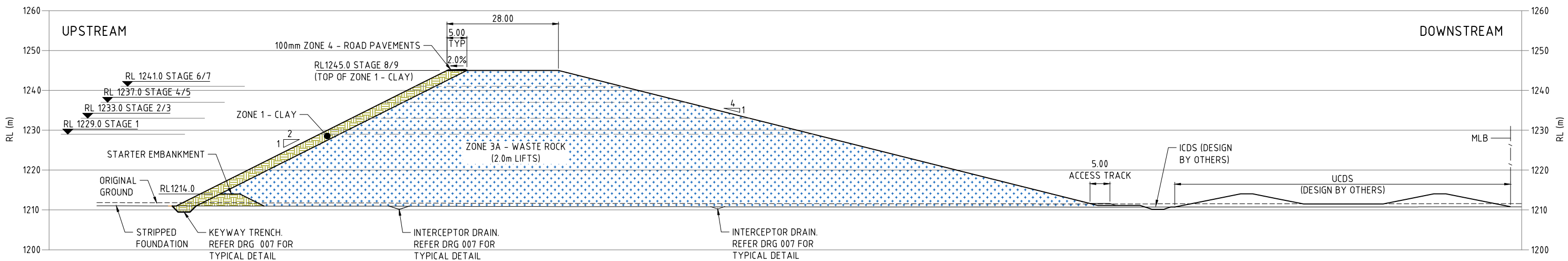
LEGEND

-  ZONE 1 - CLAY
0.25m THICK COMPACTED LAYERS
-  ZONE 3A - WASTE ROCK
2.0m THICK COMPACTED LAYERS



SECTION B
SCALE B

003

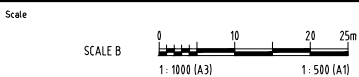


SECTION A
SCALE B

003

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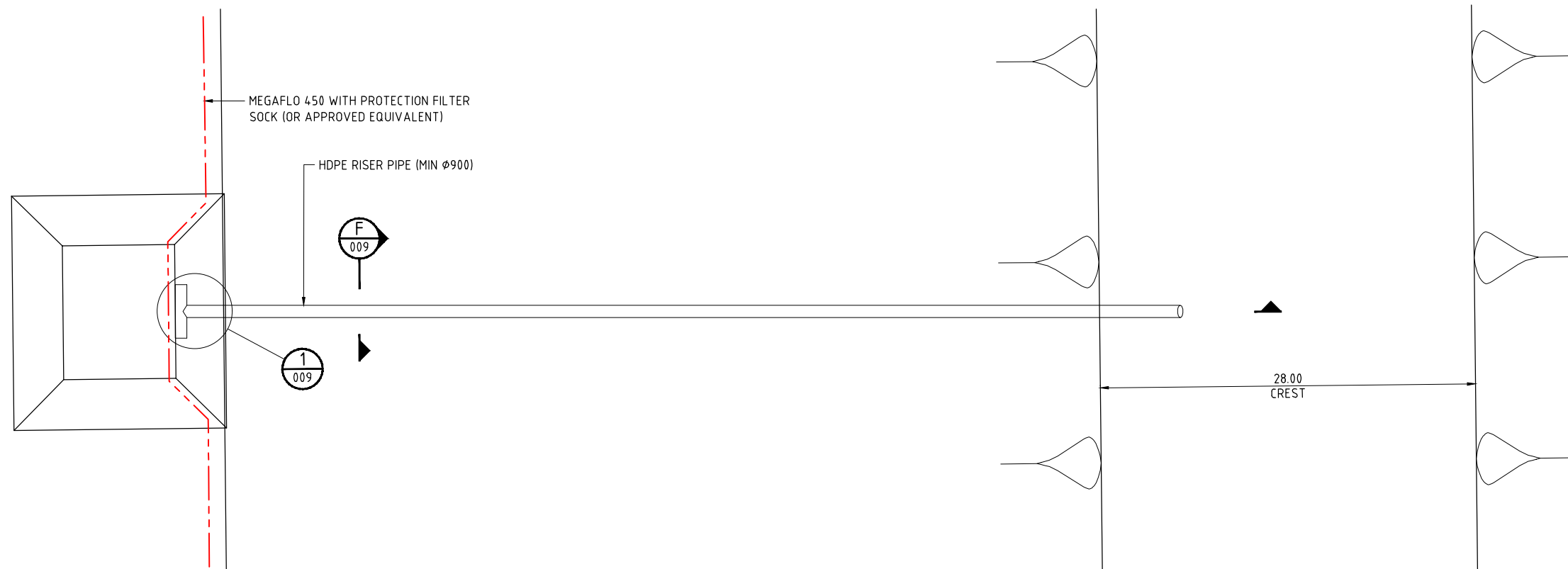
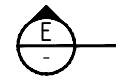
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COWAL OPEN PIT CONTINUATION

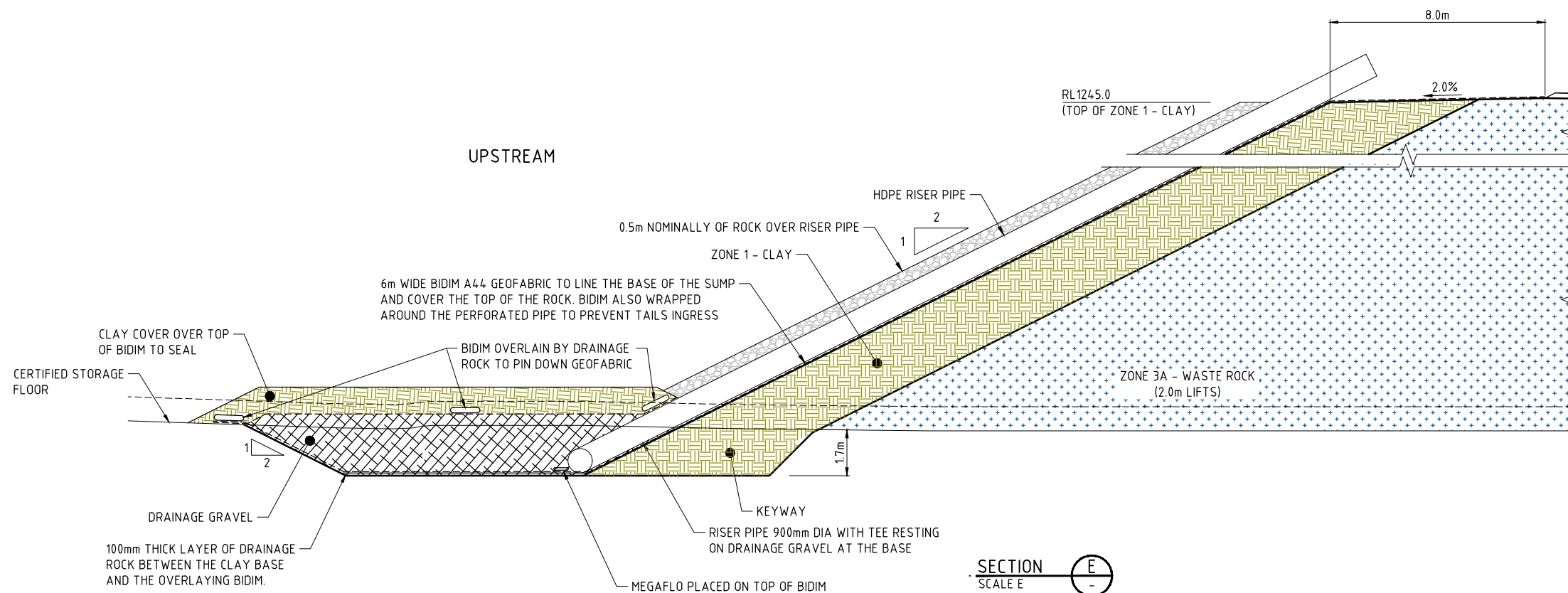
IWL NORTHERN EXPANSION
TYPICAL SECTIONS
SHEET 1

Status	FINAL	Dwg No.	60686720-006	Rev.	0
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INTERNAL UNDERDRAIN SUMP AND RISER - PLAN
SCALE D

- NOTES:
1. UNDERDRAIN SUMP LOCATION TO BE DETERMINED AFTER FOUNDATION STRIPPING COMPLETED. LOCATION TO BE SET AT LOWEST POINT ALONG UPSTREAM EMBANKMENT TOE.
 2. ONLY USE AUSTRALIA MADE GEOSYNTHETIC MATERIALS AND DRAINAGE MATERIALS PER THE TECHNICAL SPECIFICATIONS.
 3. GEOFABRIC PLACED ON CLAY TO BE FIXED TO THE SURFACE WITH GEOFABRICS AUSTRALIA APPROVED PINS.
 4. ADJACENT GEOFABRIC PANELS TO OVERLAP BY 0.5m MINIMUM.
 5. PLACEMENT OF BALLAST MATERIAL TO SECURE 900mm RISER PIPE TO OCCUR PRIOR TO COMMENCING TAILINGS DISCHARGE OPERATIONS.
 6. CLAY COVER PLACED ON UNDERDRAIN SUMP TO BE TRACK-ROLLED ONLY. TAKE CARE NOT TO DAMAGE 900mm RISER PIPE.



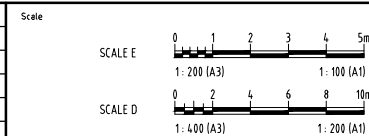
SECTION
SCALE E

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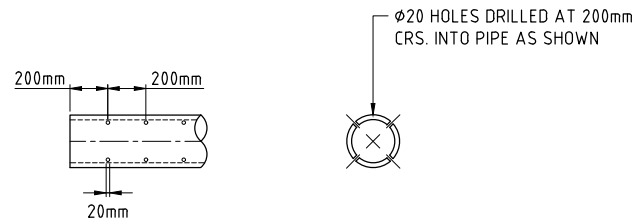
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APPROVED	TA	DATE	15.12.2022

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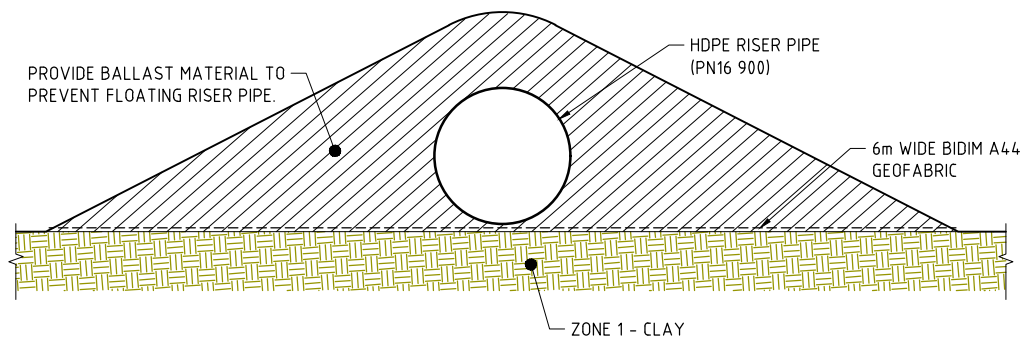
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COWAL OPEN PIT CONTINUATION		
IWL NORTHERN EXPANSION UNDERDRAIN SYSTEM DETAILS SHEET 1		
Status	FINAL	Rev. 0
Org No.	60686720-008	

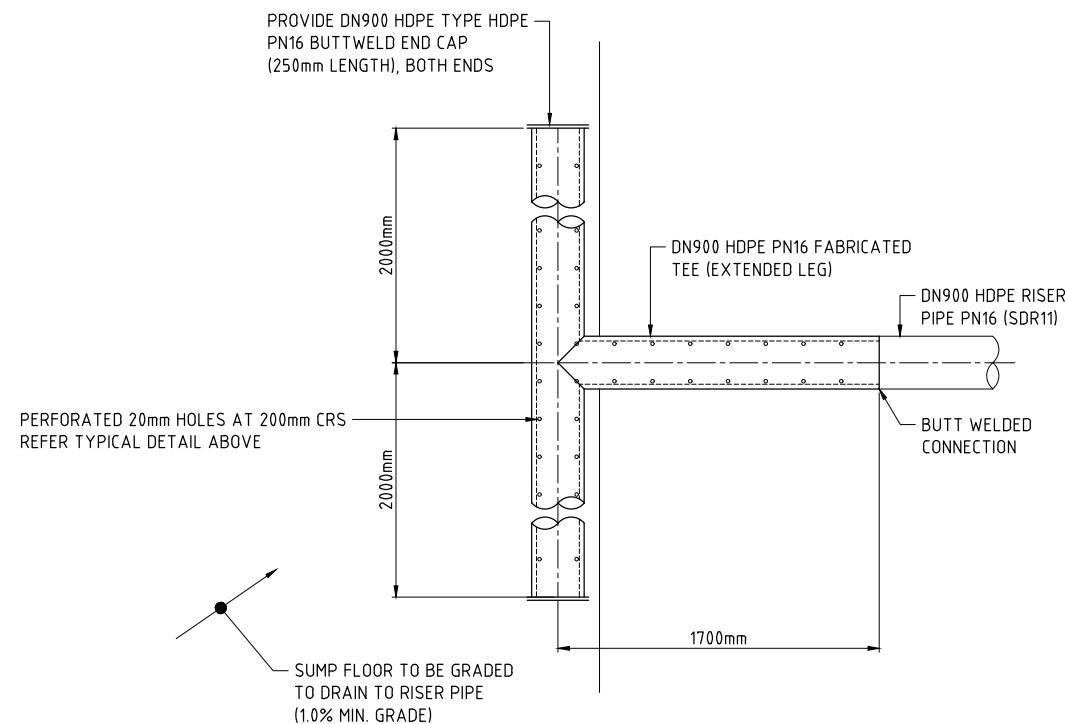


TYPICAL PERFORATION DETAIL
SCALE H



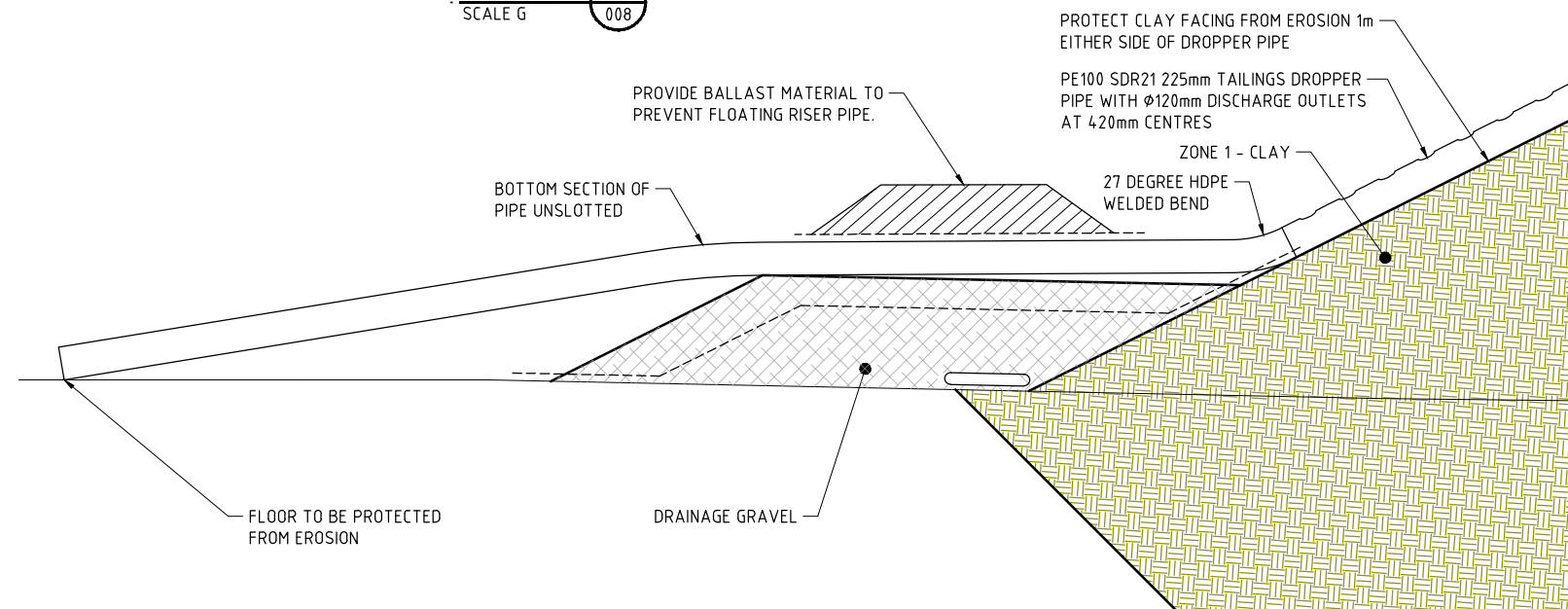
SECTION F
SCALE G

- NOTES:**
1. UNDERDRAIN SUMP LOCATION TO BE DETERMINED AFTER FOUNDATION STRIPPING COMPLETED. LOCATION TO BE SET AT LOWEST POINT ALONG UPSTREAM EMBANKMENT TOE.
 2. ONLY USE AUSTRALIA MADE GEOSYNTHETIC MATERIALS AND DRAINAGE MATERIALS PER THE TECHNICAL SPECIFICATIONS.
 3. GEOFABRIC PLACED ON CLAY TO BE FIXED TO THE SURFACE WITH GEOFABRICS AUSTRALIA APPROVED PINS.
 4. ADJACENT GEOFABRIC PANELS TO OVERLAP BY 0.5m MINIMUM.
 5. UPPER LAYER OF ZONE 2 DRAINAGE GRAVEL INTENDED TO SECURE GEOTEXTILE IN PLACE.
 6. 1x2m STRIP OF BIDIM A44 LAID OVER THE SPIGOT OUTLET AND COVERED WITH APPROX. 0.5m OF DRAINAGE GRAVEL TO BALLAST IN PLACE.
 7. TAILINGS DISTRIBUTION INFRASTRUCTURE (PIPES, PUMPS, VALVES) DESIGNED BY OTHERS.

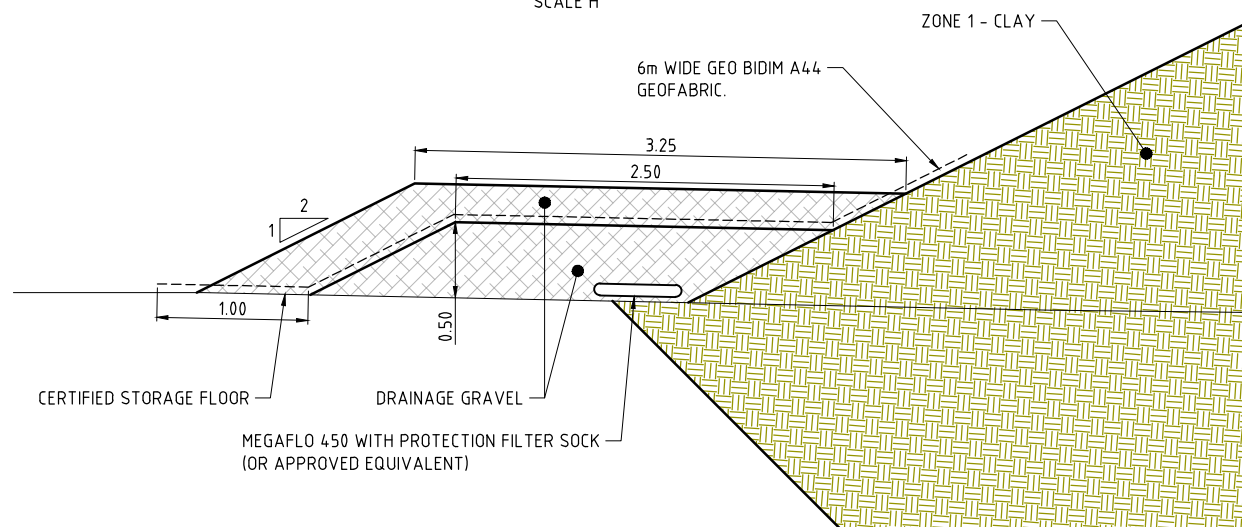


DETAIL 1
SCALE H

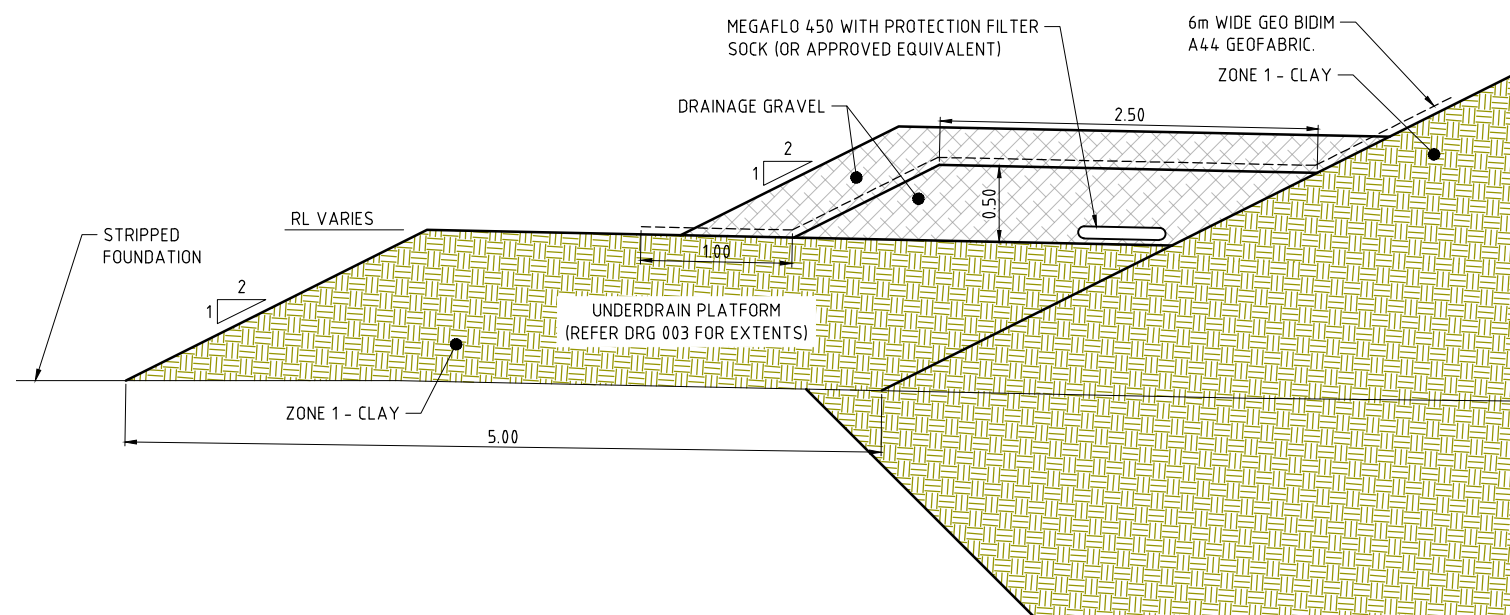
TYPICAL COLLECTION RISER TEE DETAIL
SCALE H



TAILINGS DISCHARGE POINT (@ 60m CENTRES)
TYPICAL DETAIL
SCALE G



INTERNAL UNDERDRAIN - TYPICAL DETAIL
SCALE G

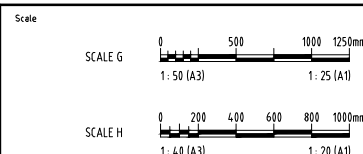


INTERNAL UNDERDRAIN WITH PLATFORM - CH 0600 TO CH 1200
TYPICAL DETAIL
SCALE G

NOT FOR CONSTRUCTION

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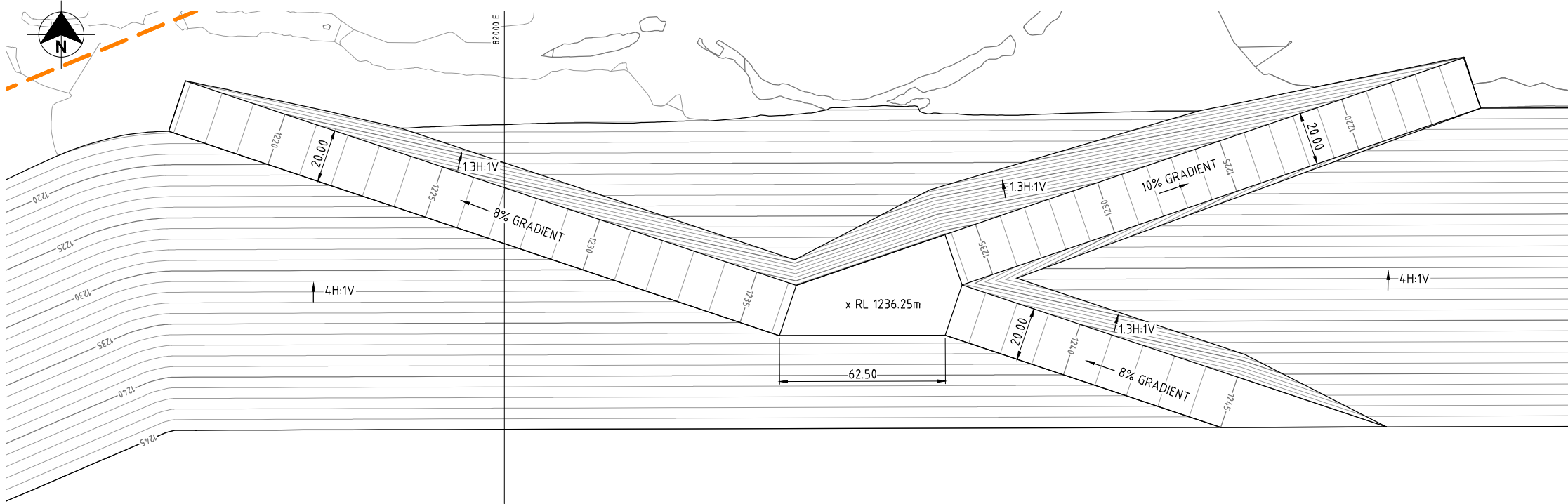
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DRAWN	STT	CHECKED	TA
APPROVED	TA	DATE	15.12.2022

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COWAL OPEN PIT CONTINUATION		
IWL NORTHERN EXPANSION UNDERDRAIN SYSTEM DETAILS SHEET 2		
Status	FINAL	Rev. 0
Org No.	60686720-009	



PLAN
SCALE W

- NOTES:
- 1. DECANT ARRANGEMENT ASSUMES MOBILE PUMP WITH TURRET INTAKE IN USE SIMILAR TO CURRENT IWL DECANT OPERATIONS, INCLUDING PROVISION OF LEVELING PADS TO SUPPORT PUMP ON SKIDS.
 - 2. DECANT ACCESS RAMP, COMPRISING OF ZONE 3 ROCKFILL, TO BE FOUNDED ON EXISTING IWL EMBANKMENT BATTER. CUTS INTO EMBANKMENT NOT PERMITTED.
 - 3. EAST RAMP INTENDED FOR DECANT PUMP ACCESS FOR STAGES 1, 2, 4, 6, 8.
 - 4. WEST RAMP INTENDED FOR DECANT PUMP ACCESS FOR STAGES 1, 3, 5, 7, 9.
 - 5. DECANT PUMP LOCATIONS TO BE SELECTED TO MATCH PERIMETER OPERATING LEVELS.
 - 6. PROVIDE SAFETY BUNDS ON RAMP EDGES TO SUIT EXPECTED VEHICLE USAGE.

NOT FOR CONSTRUCTION

CAD REF: L:\SECURE\PROJECTS\60686720\940_CAD_GS\940_CAD\3D_SHEETS\60686720-10.DWG
LAST MODIFIED: 09/12/2022 2:02 PM

REVISIONS				
No.	BY	DATE	DESCRIPTION	APPD
0	STT		FINAL	

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Scale	SCALE A
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	1: 2000 (A3) 1: 1000 (A1)

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COWAL OPEN PIT CONTINUATION		
IWL NORTHERN EXPANSION CENTRAL DECANT RAMPS DETAILS / SECTIONS - SHEET 1		
Status	FINAL	Rev. 0
Dwg No.	60686720-010	

CAD REF: L:\SECURE\PROJECTS\60686720\900_CAD_05\900_CAD\30_SHEETS\60686720-012.DWG
LAST MODIFIED: 05/12/2022 4:44 PM

REVISIONS

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0	STT		FINAL	
No.	BY	DATE	DESCRIPTION	APPD

Scale



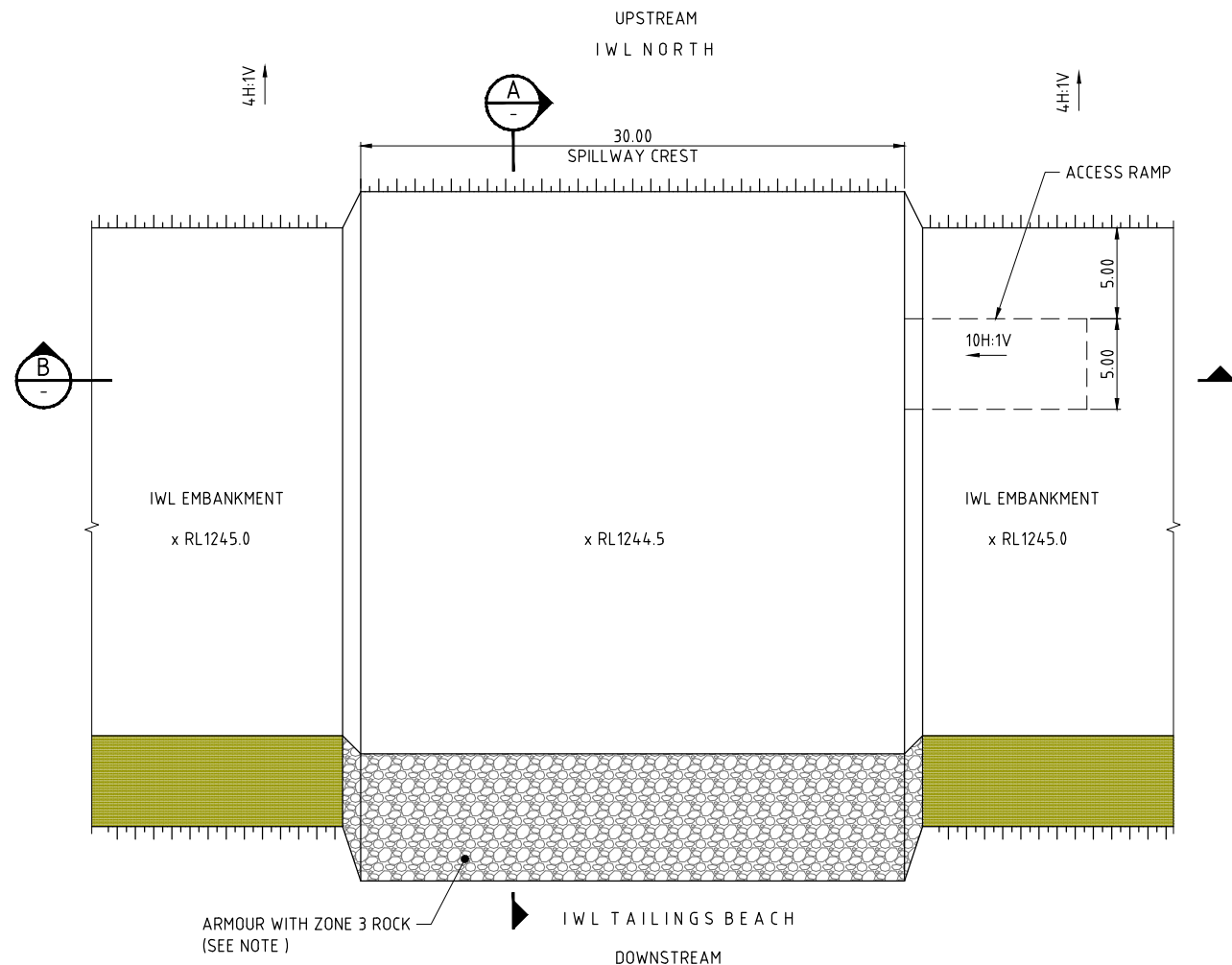
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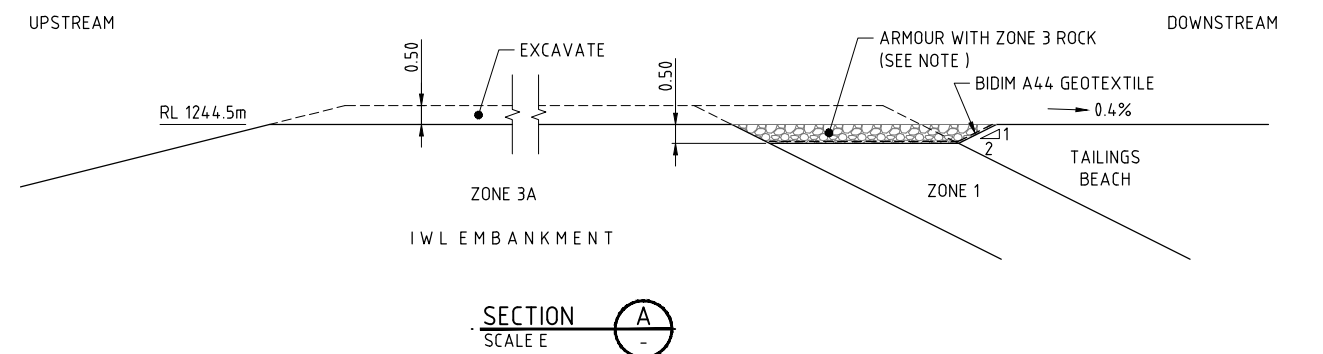
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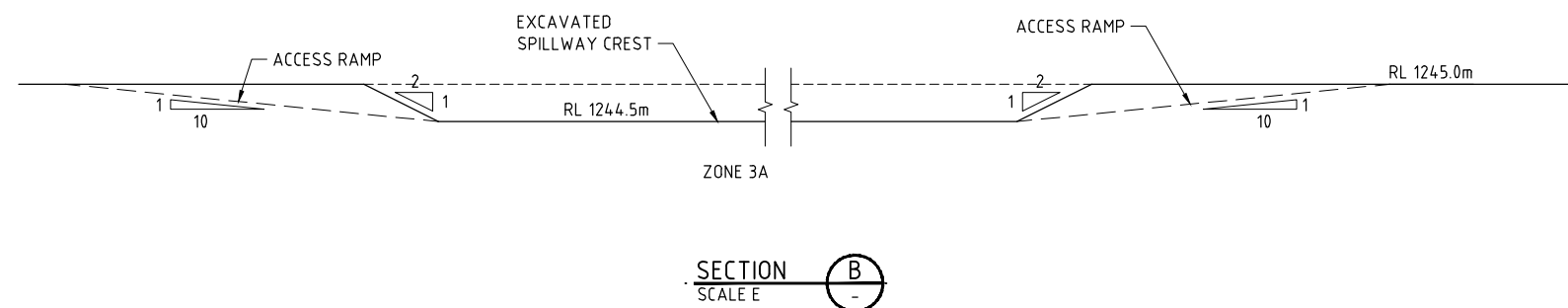
COWAL OPEN PIT CONTINUATION		
IWL NORTHERN EXPANSION EMERGENCY SPILLWAY PLAN AND SECTIONS		
Status	FINAL	Rev. 0
Org No.	60686720-012	



PLAN
SCALE D



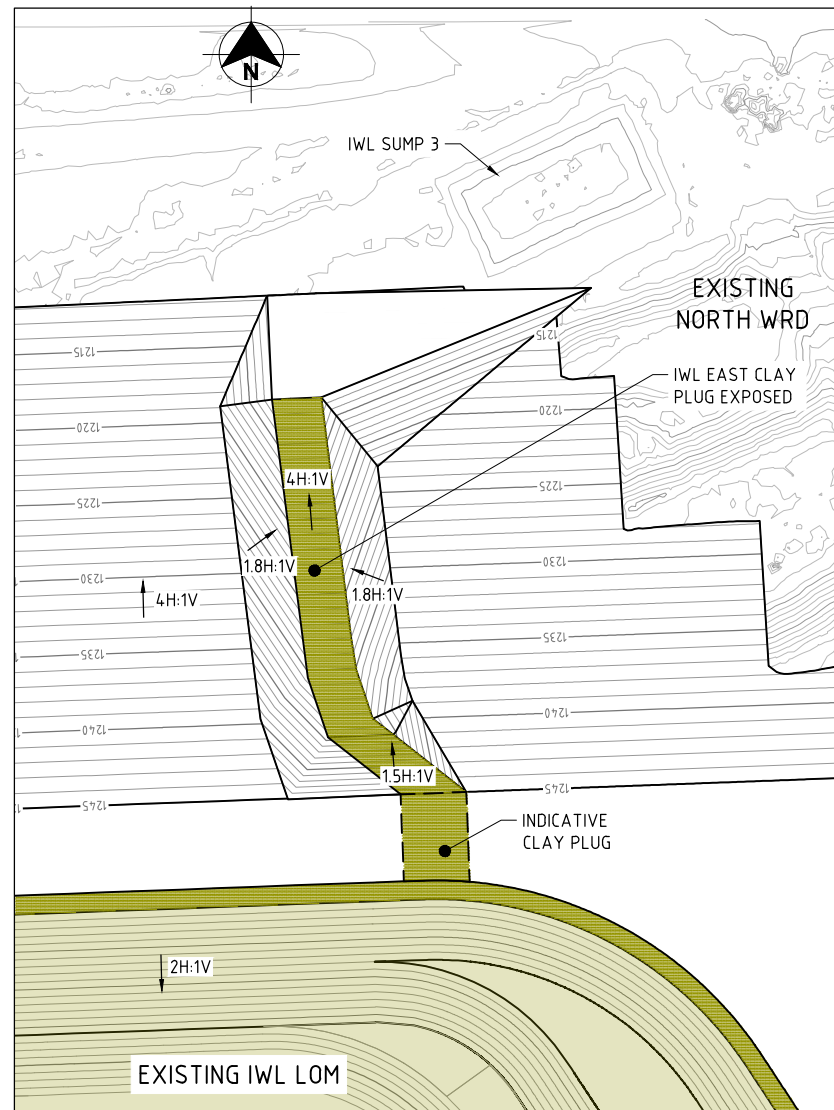
SECTION A-A
SCALE E



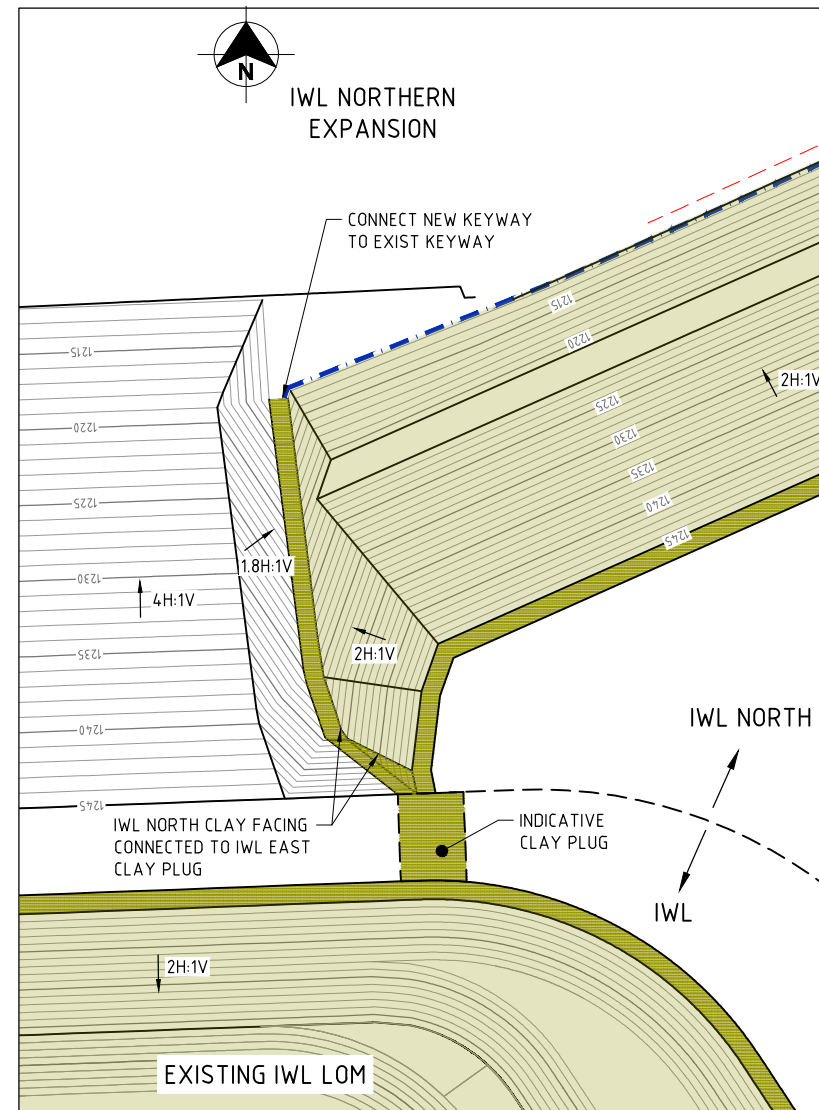
SECTION B-B
SCALE E

- NOTES:
1. PROTECT ALL EXPOSED CLAY AREAS WITH BIDIM A44 GEOTEXTILE LINER.
 2. SETOUT POINTS TO BE CONFIRMED AT DETAILED DESIGN PHASE.
 3. SPILLWAY CREST DIMENSIONS REPRESENT THE INVERT LEVEL OF THE WET SPILLWAY SURFACE.
 4. SPILLWAY ARMOURING: D50=100MM MIN. ROCK SIZE
 5. BIDIM A44 GEOTEXTILE TO BE PROTECTED FROM WIND UPLIFT DURING CONSTRUCTION USING SAND BAGS OR ROCK BALLAST.

NOT FOR CONSTRUCTION



PLAN - EXCAVATION
SCALE A



PLAN - FINAL
SCALE A

LEGEND

- 1215 SURFACE CONTOUR
- MINE LEASE BOUNDARY
- KEYWAY TRENCH

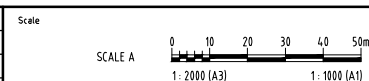
NOTES:

- IWL EAST CLAY PLUG EXTRAPOLATED TO RL1245 IN MANNER FAVOURABLE TO FACILITATE IWL NORTH CONNECTION WITH IWL. COORDINATION BETWEEN IWL CONSTRUCTION TEAM AND IWL NORTH PROJECT TEAM NEEDED TO ENSURE FEASIBILITY OF FUTURE CONNECTIONS.
- CONNECT NEW KEYWAY TO EXISTING IWL EAST CLAY PLUG KEYWAY.
- UNCOVERED IWL EAST CLAY PLUG TO BE VERIFIED PRIOR TO PLACEMENT OF NEW CLAY, AND IF NECESSARY, BOXED OUT TO REMOVE DELETERIOUS AND OVER-SIZED MATERIALS.
- CONNECTION BETWEEN IWL EAST CLAY PLUG AND IWL NORTH CLAY FACING MAY BE COMPLETED PROGRESSIVELY AS IWL NORTH EMBANKMENT RISES. TAKE CARE TO PROTECT FROM EROSION THE EXPOSED IWL EAST CLAY PLUG.

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REVISIONS

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No.	BY	DATE	DESCRIPTION	APPD



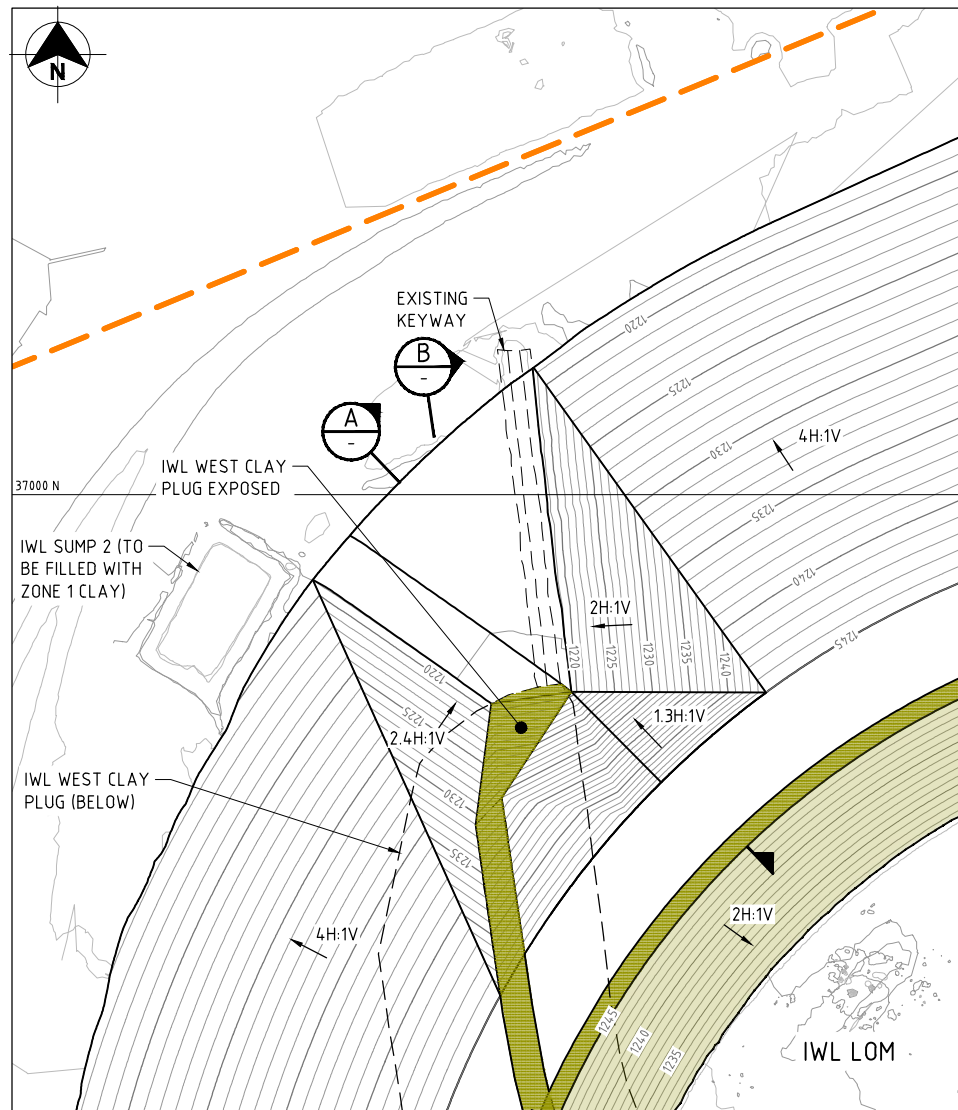
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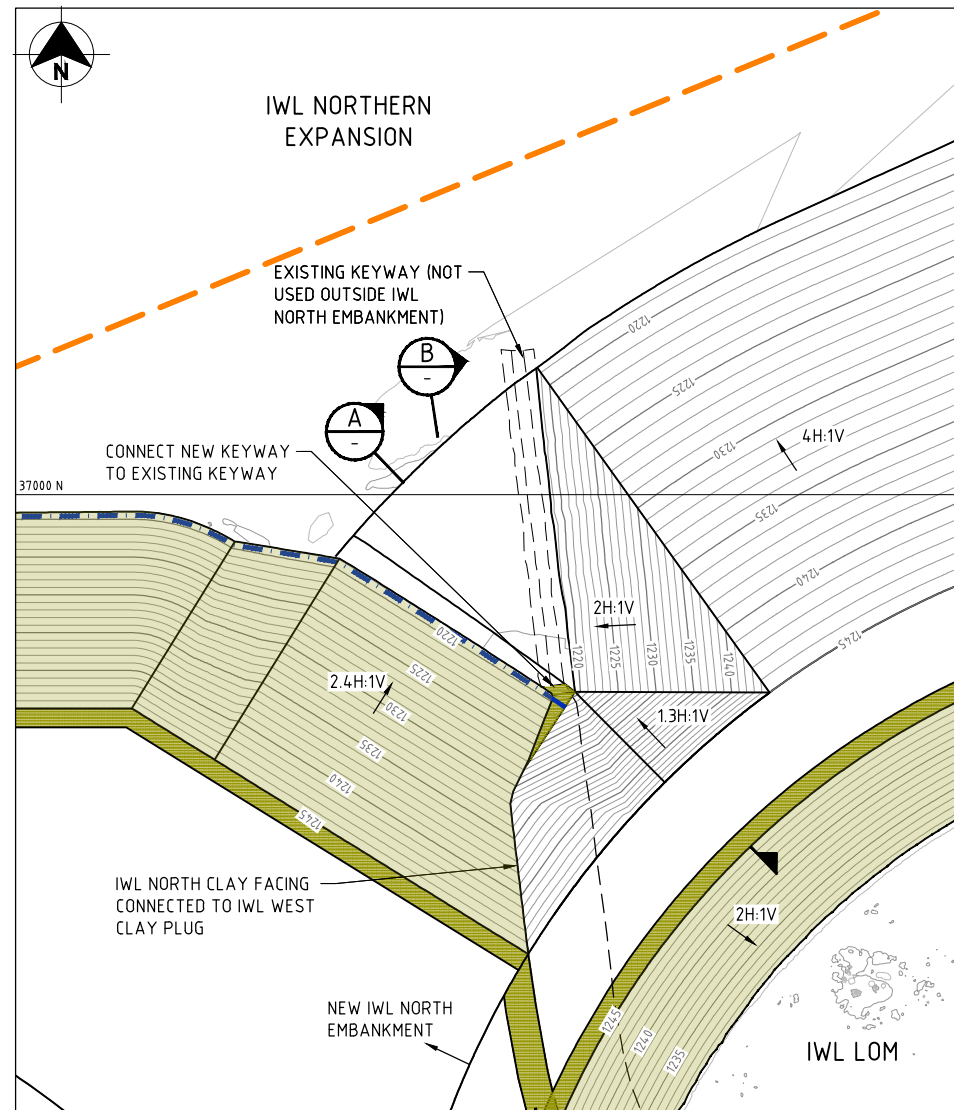
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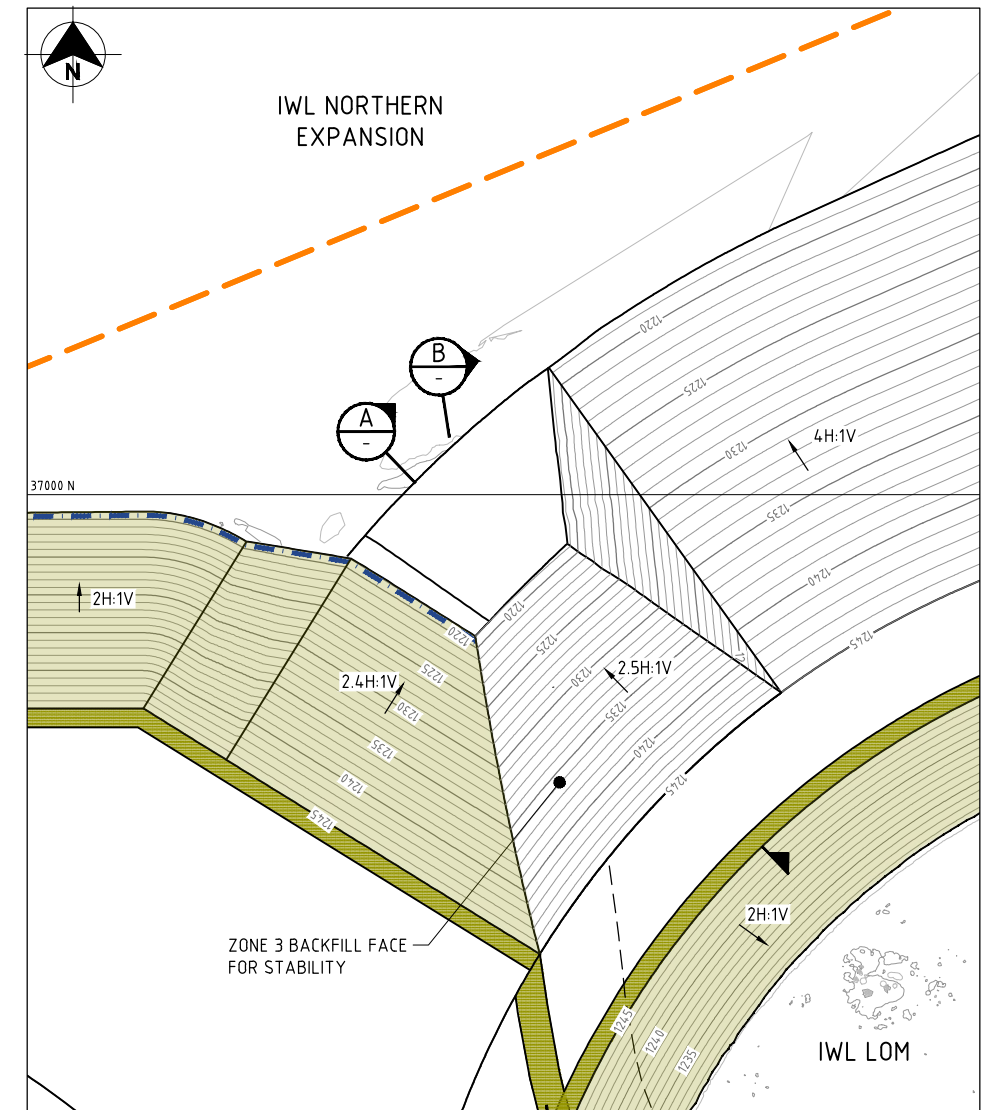
COWAL OPEN PIT CONTINUATION		
IWL NORTHERN EXPANSION EMBANKMENT INTERFACE EAST: PLAN AND SECTIONS		
Status	FINAL	Rev. 0
Org No.	60686720-015	



PLAN - EXCAVATION
SCALE A
STEP 1 - EXCAVATE CONNECTION



PLAN - NORTH EXPANSION CONNECTION
SCALE A
STEP 2 - CONSTRUCT NEW IWL NORTHERN EXPANSION

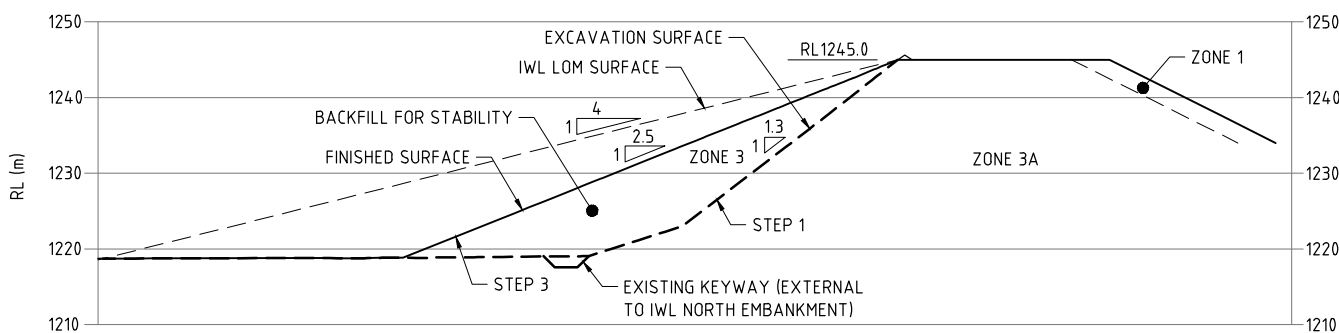


PLAN - FINAL
SCALE A
STEP 3 - ADD STABILITY BACKFILL

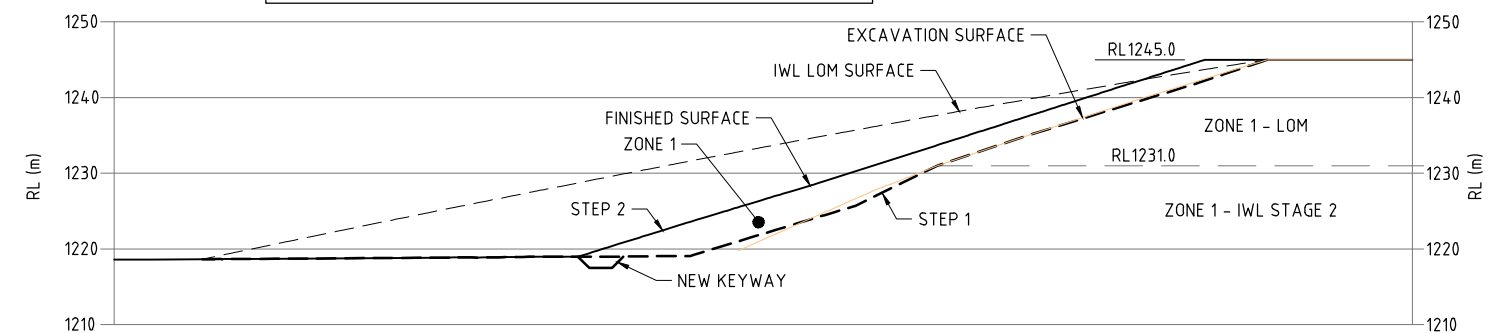
- NOTES:**
1. IWL WEST CLAY PLUG EXTRAPOLATED TO RL1245 IN MANNER FAVOURABLE TO FACILITATE IWL NORTH CONNECTION WITH IWL. COORDINATION BETWEEN IWL CONSTRUCTION TEAM AND IWL NORTH PROJECT TEAM NEEDED TO ENSURE FEASIBILITY OF FUTURE CONNECTIONS.
 2. CONNECT NEW KEYWAY TO EXISTING IWL WEST CLAY PLUG KEYWAY.
 3. UNCOVERED IWL WEST CLAY PLUG TO BE VERIFIED PRIOR TO PLACEMENT OF NEW CLAY, AND IF NECESSARY, BOXED OUT TO REMOVE DELETERIOUS AND OVER-SIZED MATERIALS.
 4. CONNECTION BETWEEN IWL WEST CLAY PLUG AND IWL NORTH CLAY FACING MAY BE COMPLETED PROGRESSIVELY AS IWL NORTH EMBANKMENT RISES. TAKE CARE TO PROTECT FROM EROSION THE EXPOSED IWL WEST CLAY PLUG.
 5. PARTIAL BACKFILLING OF EXCAVATION TO CREATE 2.5H:1V BATTER NEEDED TO IMPROVE EMBANKMENT STABILITY.

LEGEND	
	SURFACE CONTOUR
	MINE LEASE BOUNDARY
	KEYWAY TRENCH

NOT FOR CONSTRUCTION



SECTION A
SCALE B



SECTION B
SCALE B

LAST MODIFIED: 15/12/2022 8:49 AM
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REVISIONS				
No.	BY	DATE	DESCRIPTION	APPROVED
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Scale	
SCALE A	
SCALE B	

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Evolution MINING

COWAL OPEN PIT CONTINUATION		
IWL NORTHERN EXPANSION EMBANKMENT INTERFACE WEST: PLAN AND SECTIONS		
Status	FINAL	Rev. 0
Org No.	60686720-017	