

ANKER COAL (PTY) LTD



CONCEPTUAL DESIGN OF ELANDSFONTEIN STORM WATER MANAGEMENT INFRASTRUCTURE BOOK OF DRAWINGS



OFFICE: PRETORIA

**TIJGERVALLEI OFFICE PARK BUILDING 98
UNIT 9/10 SILVERLAKES RD HAZELDEAN**

**Tel. (012) 809 4383
Fax. (086) 537 5828**

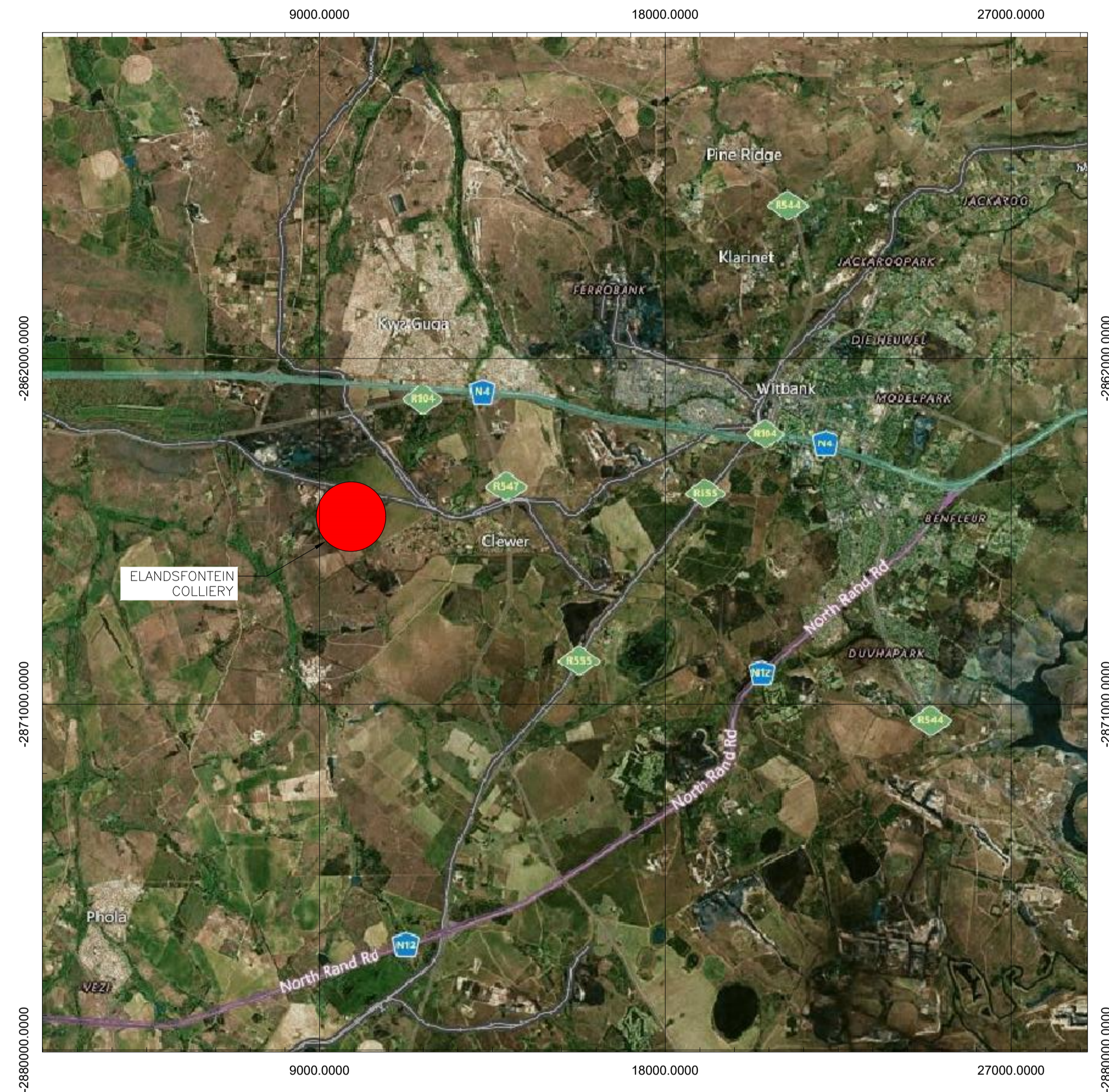
Project No : B599

MAR 2020



ANKER COAL (PTY) LTD CONCEPTUAL DESIGN OF ELANDSFONTEIN STORM WATER MANAGEMENT INFRASTRUCTURE

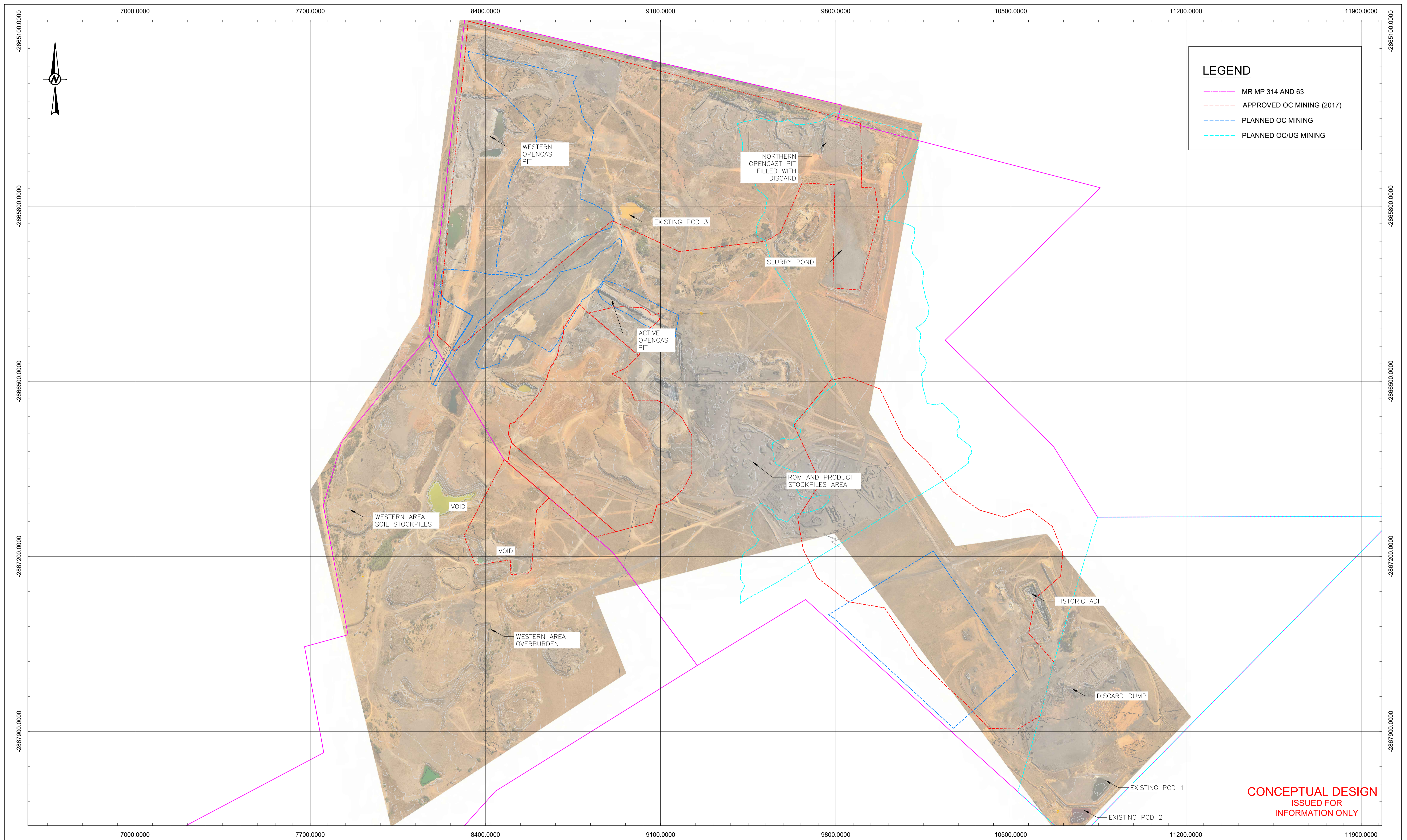
LOCALITY MAP



LIST OF DRAWINGS	
SHEET NUMBER	SHEET TITLE
B599-001	EXISTING INFRASTRUCTURE
B599-002	PROPOSED SWMP INFRASTRUCTURE LAYOUT - SCENARIO 1
B599-003	PROPOSED SWMP INFRASTRUCTURE LAYOUT - SCENARIO 2
B599-004	PCD 1 LAYOUT AND DETAILS
B599-005	PCD 2 LAYOUT AND DETAILS
B599-006	PCD 3 LAYOUT AND DETAILS
B599-007	PCD 4 LAYOUT AND DETAILS
B599-008	PCD 5 LAYOUT AND DETAILS
B599-009	PCD 6 LAYOUT AND DETAILS
B599-010	PCD 7 LAYOUT AND DETAILS
B599-011	PCD 8 LAYOUT AND DETAILS
B599-012	DIRTY WATER CULVERTS - SCENARIO 1
B599-013	CLEAN WATER DIVERSION INFRASTRUCTURE - SCENARIO 1
B599-014	ROM AND PRODUCT STOCKPILE BARRIER ALTERNATIVES

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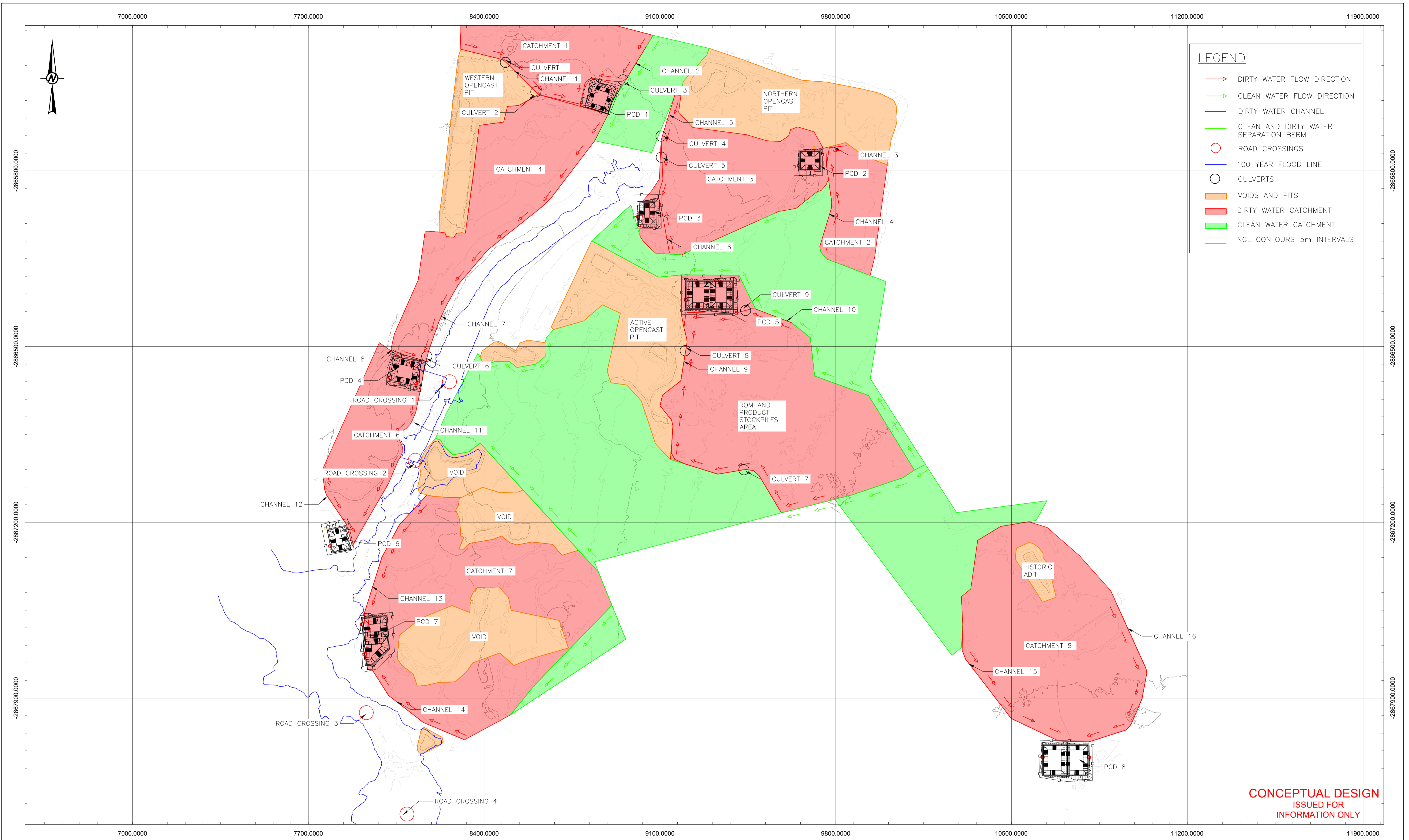
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										PROJECT CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE		DRAWING TITLE LIST OF DRAWINGS										
00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY							MVDW	DR	MVDW	DR	AVDM	03/03	LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE	PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
REVISION	DESCRIPTION							DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE	MVDW	MVDW	NTS	A1	B599	001	CON	000	00



LEGEND	
	MR MP 314 AND 63
	APPROVED OC MINING (2017)
	PLANNED OC MINING
	PLANNED OC/UG MINING

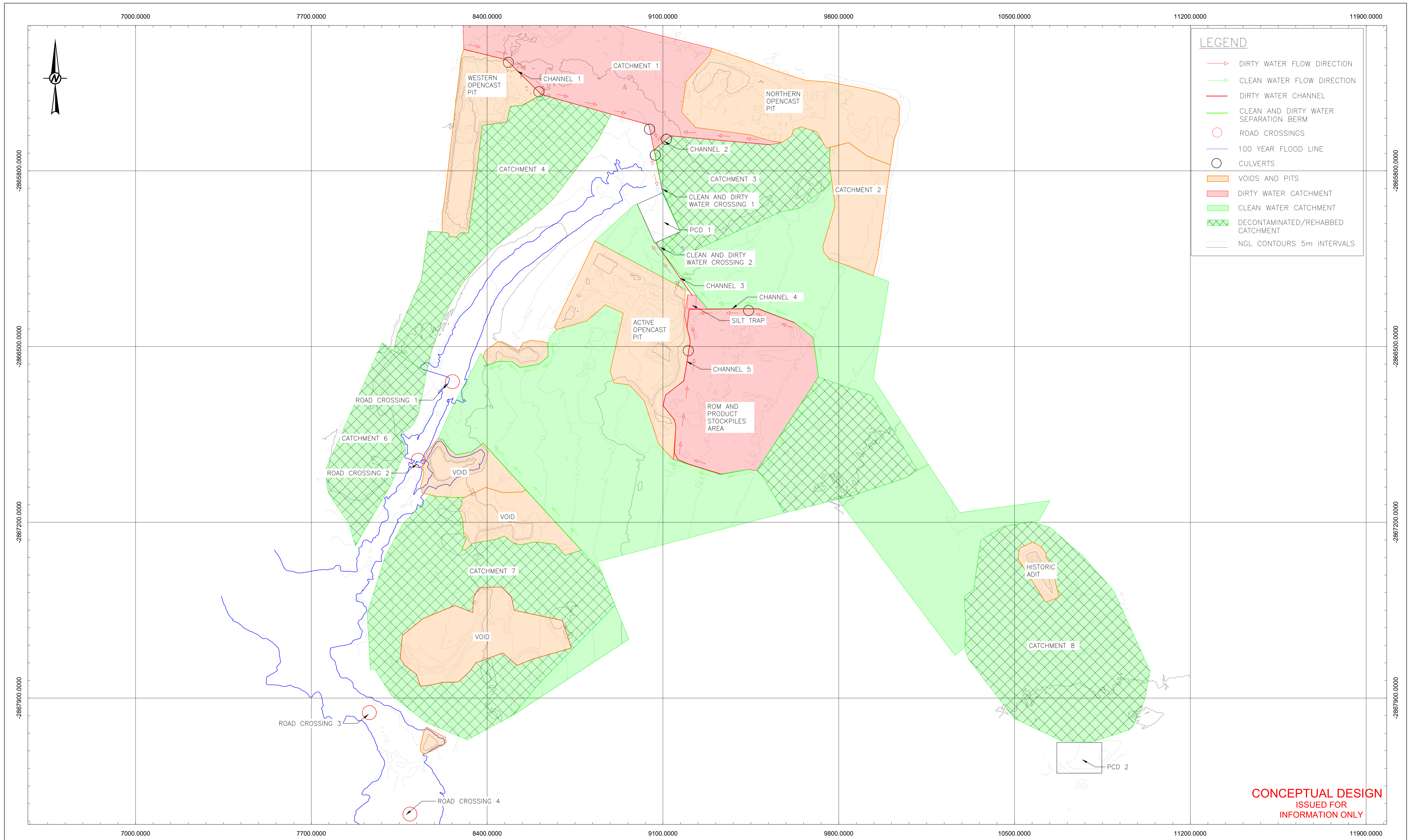
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												PROJECT CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE					
												DRAWING TITLE EXISTING INFRASTRUCTURE					
00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY	MVDW	DR	MVDW	DR	AVDM	03/03	LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE	PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION	
REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE	MVDW	MVDW	1:7000	A1	B599	001	CON	001	00	



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														PROJECT CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE					
														DRAWING TITLE PROPOSED SWMP INFRASTRUCTURE LAYOUT - SCENARIO 1					
00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY	MVDW	DR	MVDW	DR	AVDM	03/03			LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE	PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION	
REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE			MVDW	MVDW	1:7000	A1	B599	001	CON	002	00	



00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY	MVDW	DR	MVDW	DR	AVDM	03/03
REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE

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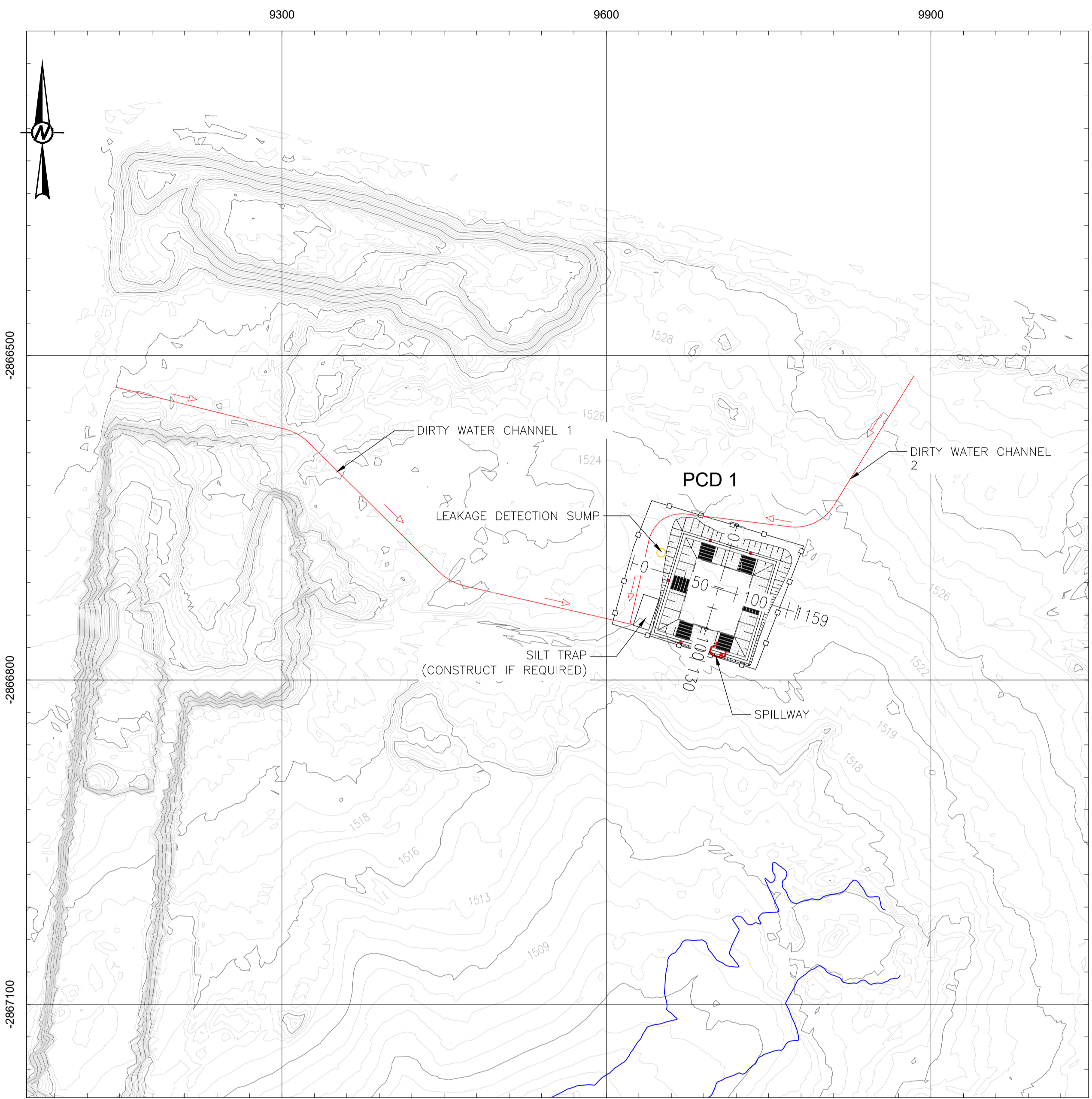
BEAL
 CONSULTING ENGINEERS & PROJECT MANAGEMENT

BEAL CONSULTING ENGINEERS & PROJECT MANAGEMENT (PTY) LTD
 PRETORIA OFFICE

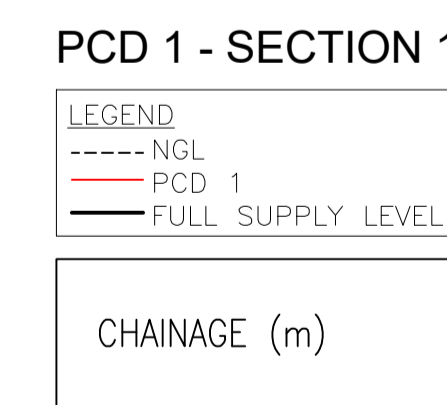
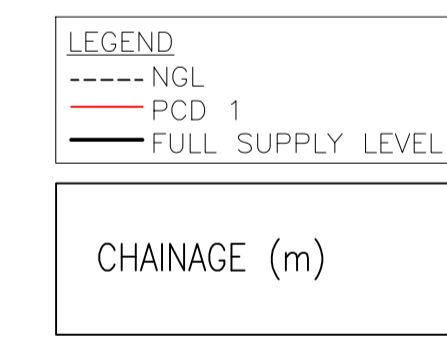
Tijgervallei office park
 Building 98 unit 9/10
 Silverlakes rd
 Hazeldean
 Pretoria
<http://www.beal.co.za>

LEAD PROJECT DRAFTER: MVDW
 PROJECT MANAGER: MVDW
 SCALE: 1:7000
 SHEET SIZE: A1

CLIENT	ANKER COAL (PTY) LTD			
PROJECT	CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE			
DRAWING TITLE	PROPOSED SWMP INFRASTRUCTURE LAYOUT - SCENARIO 2			
PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
B599	001	CON	003	00

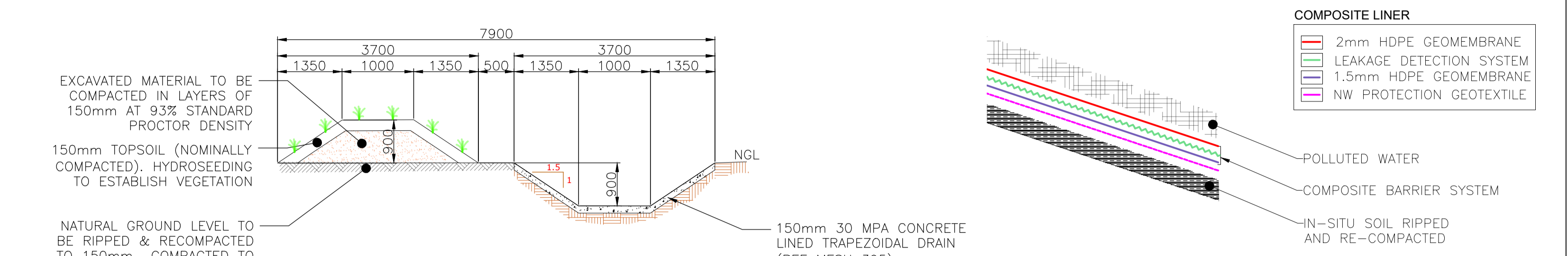


DIRTY WATER SYSTEM - KEY PLAN

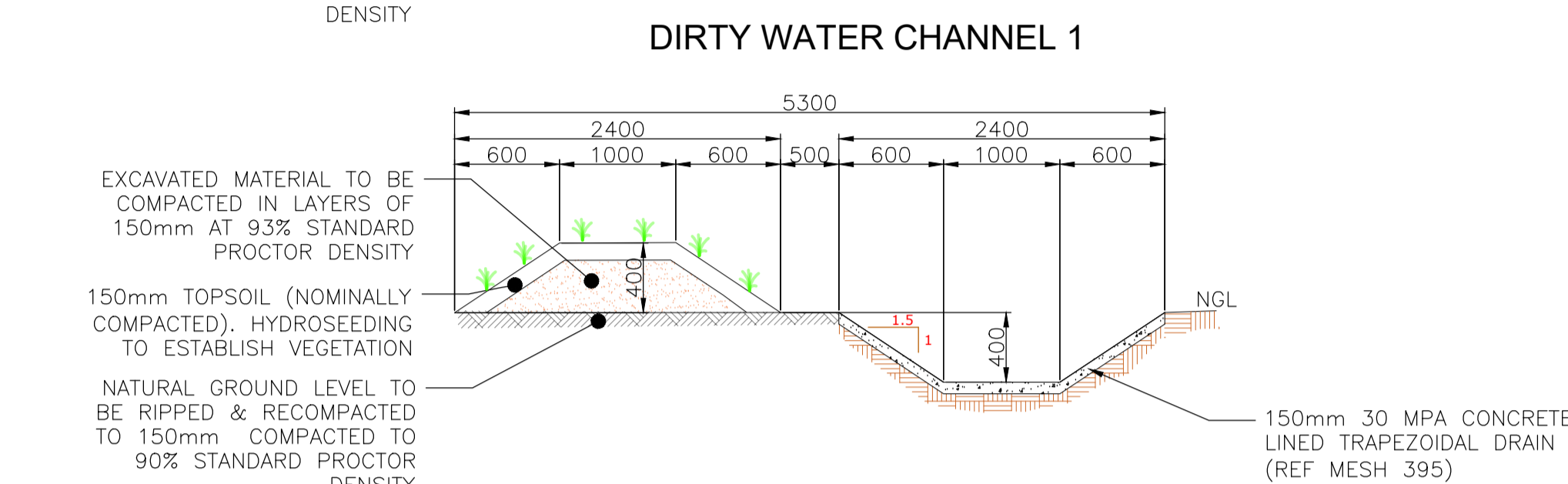


PCD 1 - SECTION 2

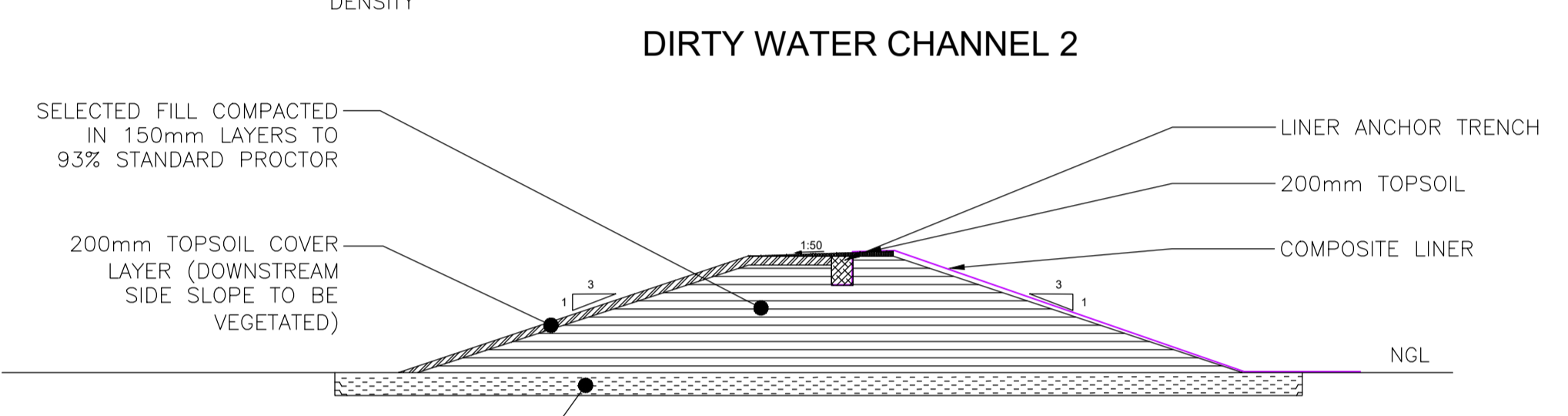
- NOTES:**
1. ALL WORKS TO BE DONE TO SANS STANDARD.
 2. 70KG SAND FILLED UV RESISTANT BALLAST BAGS PLACED ON 5M GRID SPACING ON PCD FLOORS.
 3. THE PCD HAS A NORMAL OPERATING STORAGE OF 13293M³.
 4. THE PCD HAS A NORMAL OPERATING STORAGE + 50 YEAR STORM VOLUME OF 21518M³.
 5. THE PCD HAS A 0.8M FREEBOARD AND A CREST WIDTH OF 5M.



PCD BARRIER CONFIGURATION



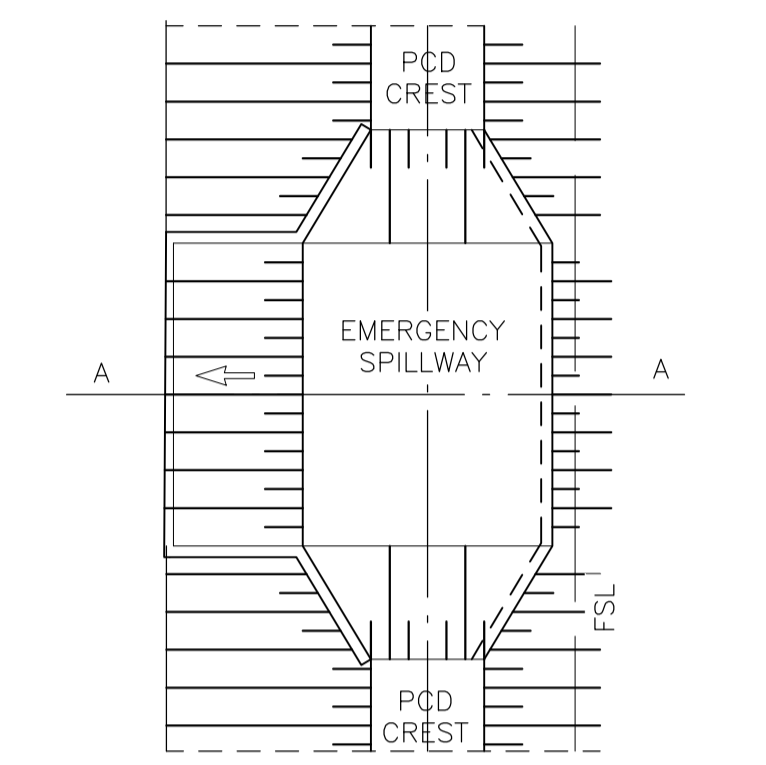
DIRTY WATER CHANNEL 1



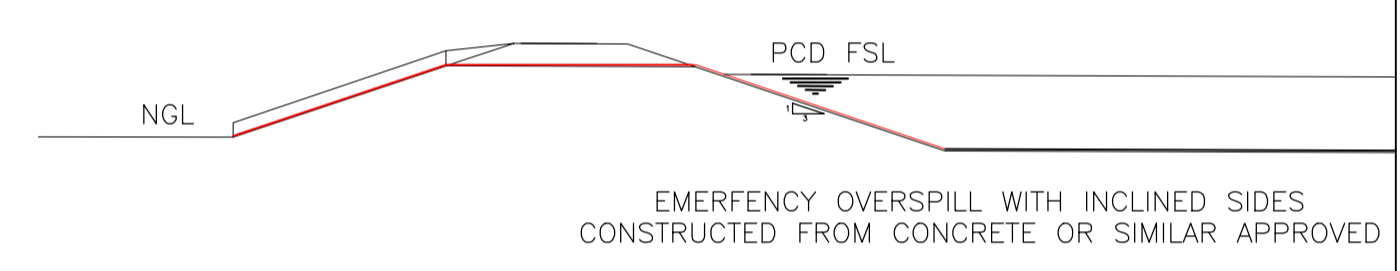
DIRTY WATER CHANNEL 2



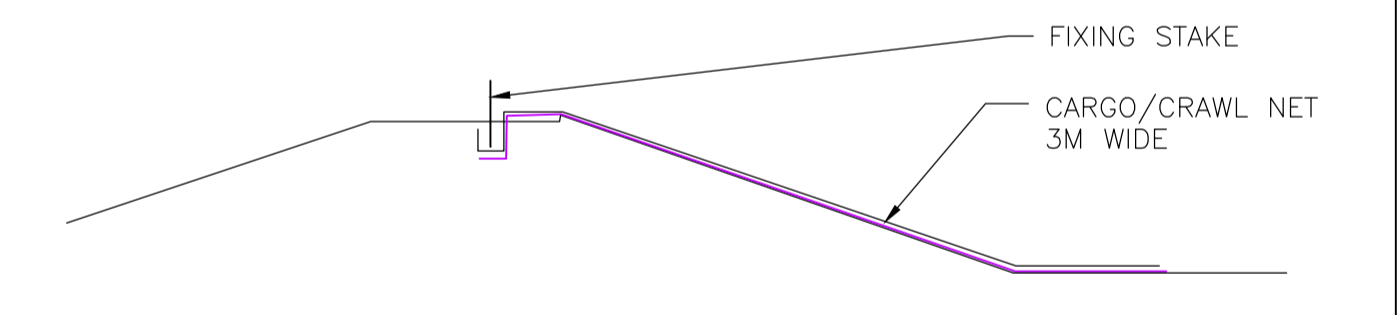
PCD EMBANKMENT CONFIGURATION



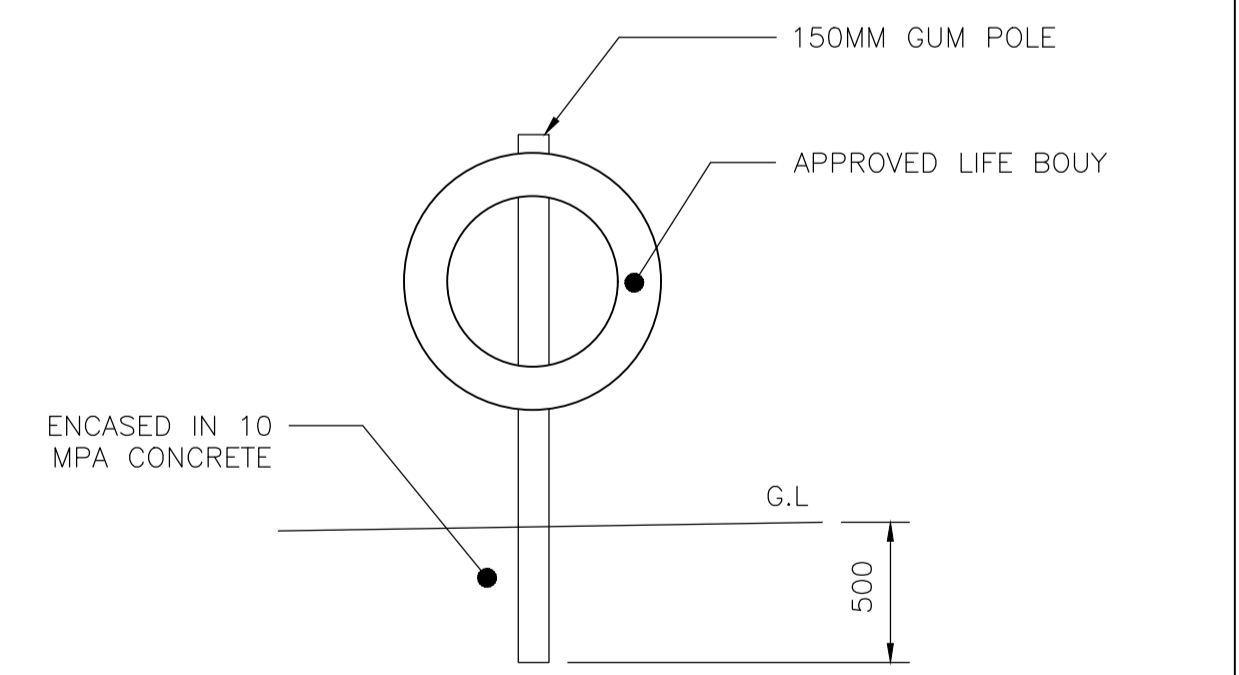
PCD EMERGENCY SPILLWAY PLAN VIEW



PCD EMERGENCY SPILLWAY - SECTION



CRAWL NET DETAIL



LIFE BOUY DETAIL



PCD 1 LAYOUT

CONCEPTUAL DESIGN
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00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY	RN	DR	MVDW	DR	AVDM	03/03
REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE

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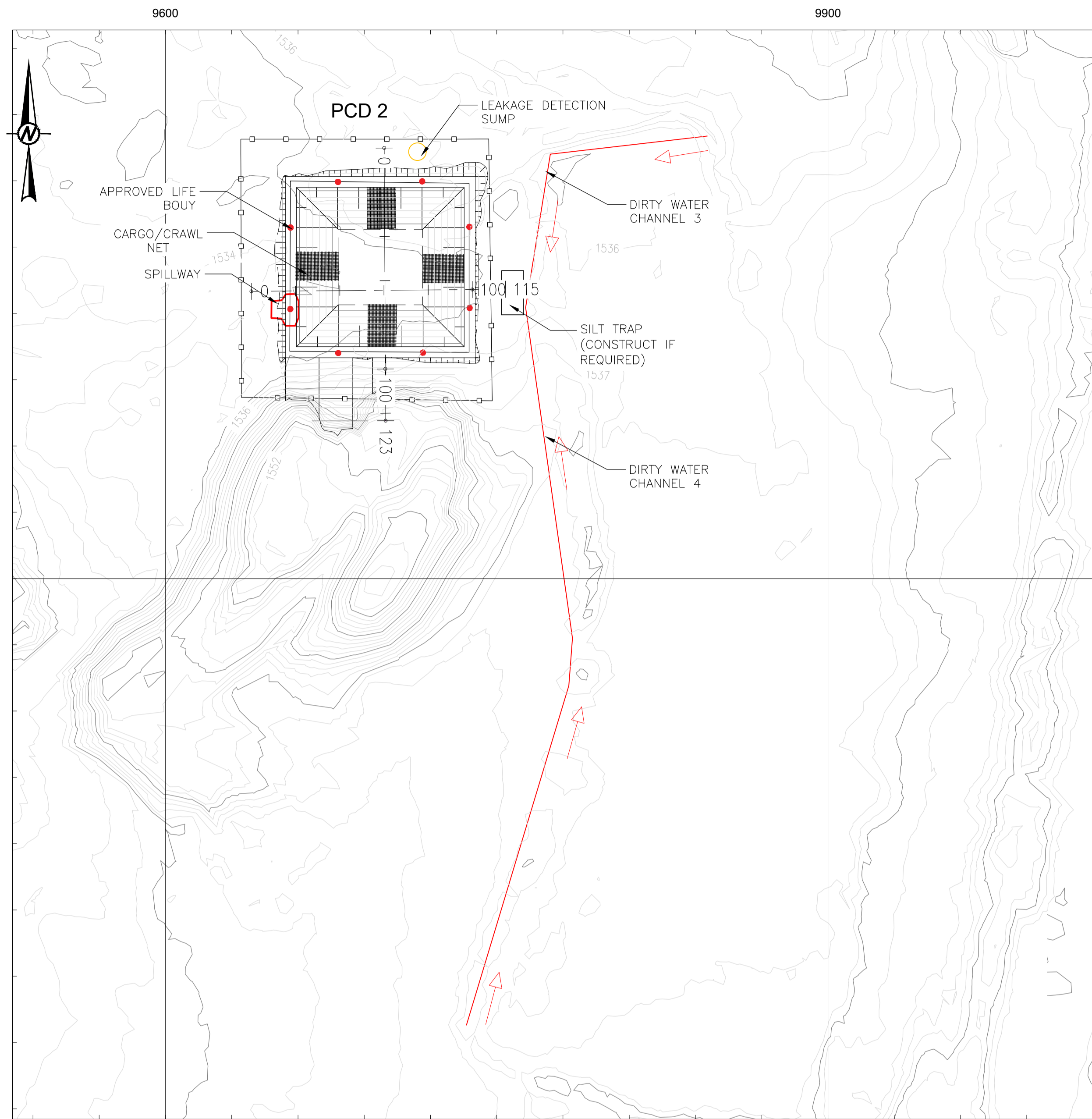
Tijgervallei office park
 Building 98 unit 9/10
 Silverlakes rd
 Hazeldean
 Pretoria
 http://www.beal.co.za

CLIENT: ANKER COAL (PTY) LTD

PROJECT: CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE

DRAWING TITLE: PCD 1 LAYOUT AND DETAILS

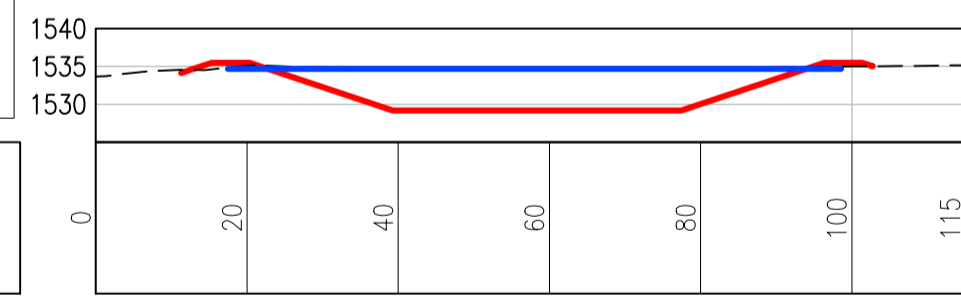
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MVDW	MVDW	NTS	A1	B599	001	CON	004	00



DIRTY WATER SYSTEM - KEY PLAN

LEGEND
 - - - - NGL
 - - - - PCD 2
 - - - - FULL SUPPLY LEVEL

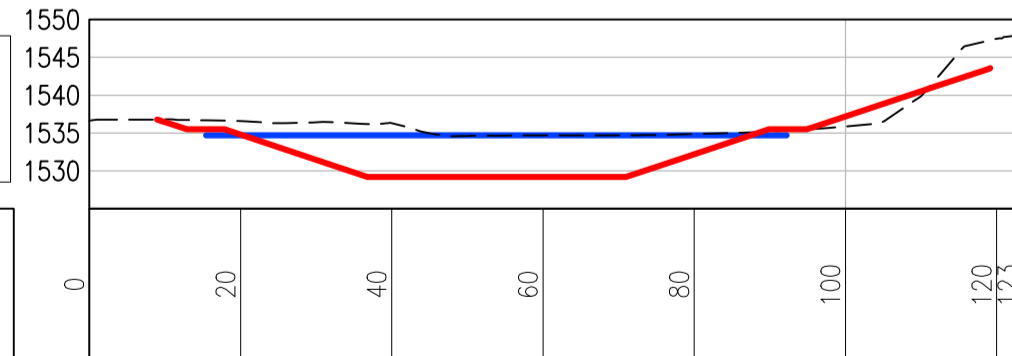
CHAINAGE (m)



PCD 2 - SECTION 1

LEGEND
 - - - - NGL
 - - - - PCD 2
 - - - - FULL SUPPLY LEVEL

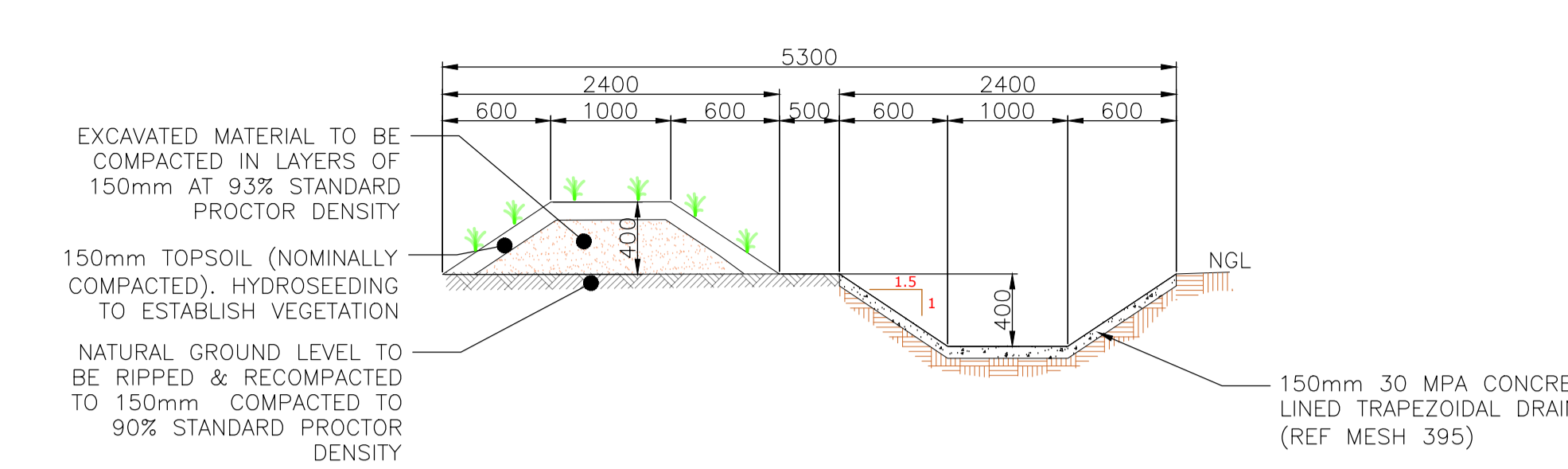
CHAINAGE (m)



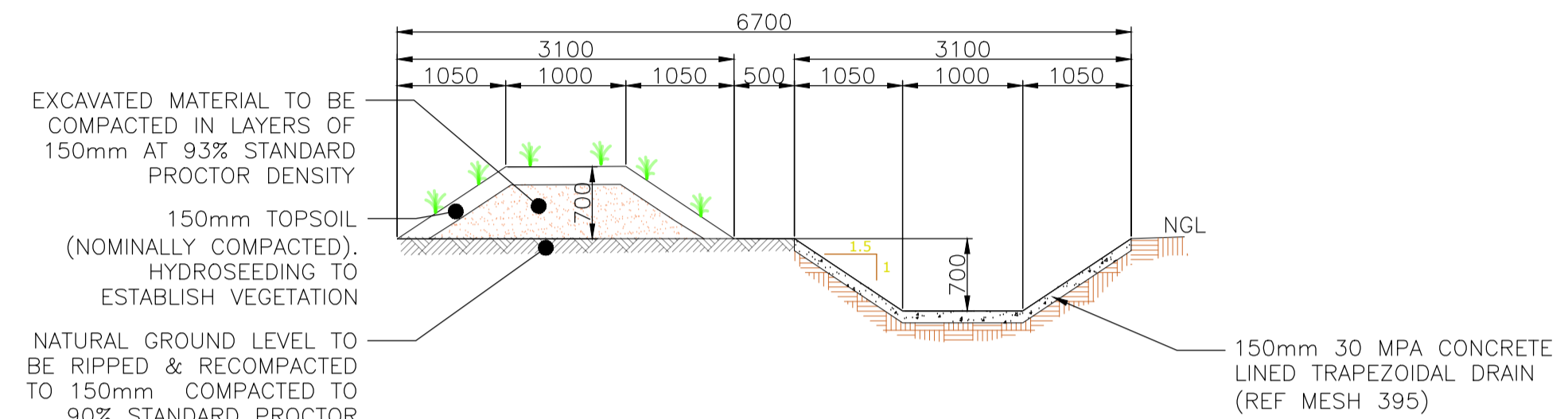
PCD 2 - SECTION 2

NOTES:

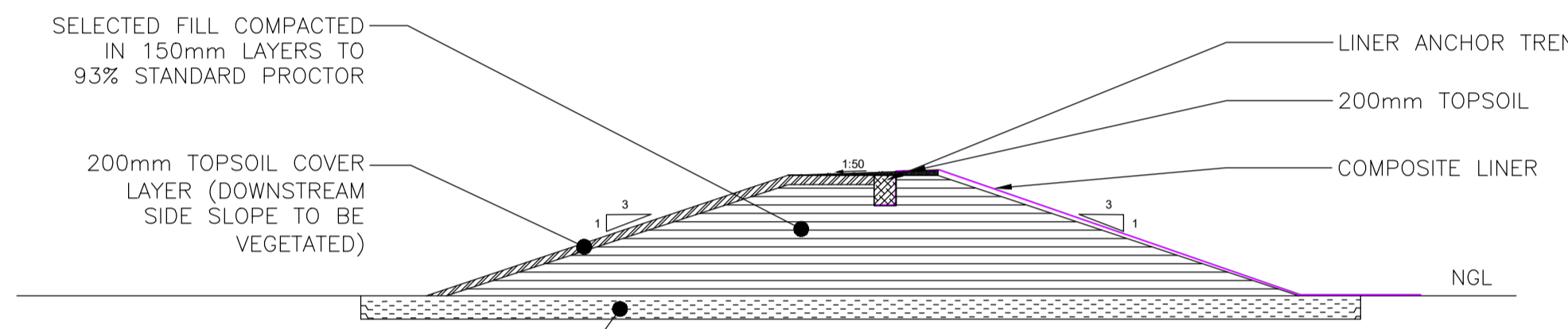
1. ALL WORKS TO BE DONE TO SANS STANDARD.
2. 70KG SAND FILLED UV RESISTANT BALLAST BAGS PLACED ON 5M GRID SPACING ON PCD FLOORS. THE PCD HAS A NORMAL OPERATING STORAGE OF 10 567M³.
3. THE PCD HAS A NORMAL OPERATING STORAGE + 50 YEAR STORM VOLUME OF 15 354M³.
4. THE PCD HAS A NORMAL OPERATING STORAGE + 50 YEAR STORM VOLUME OF 15 354M³.
5. THE PCD HAS A 0.8M FREEBOARD AND A CREST WIDTH OF 5M.



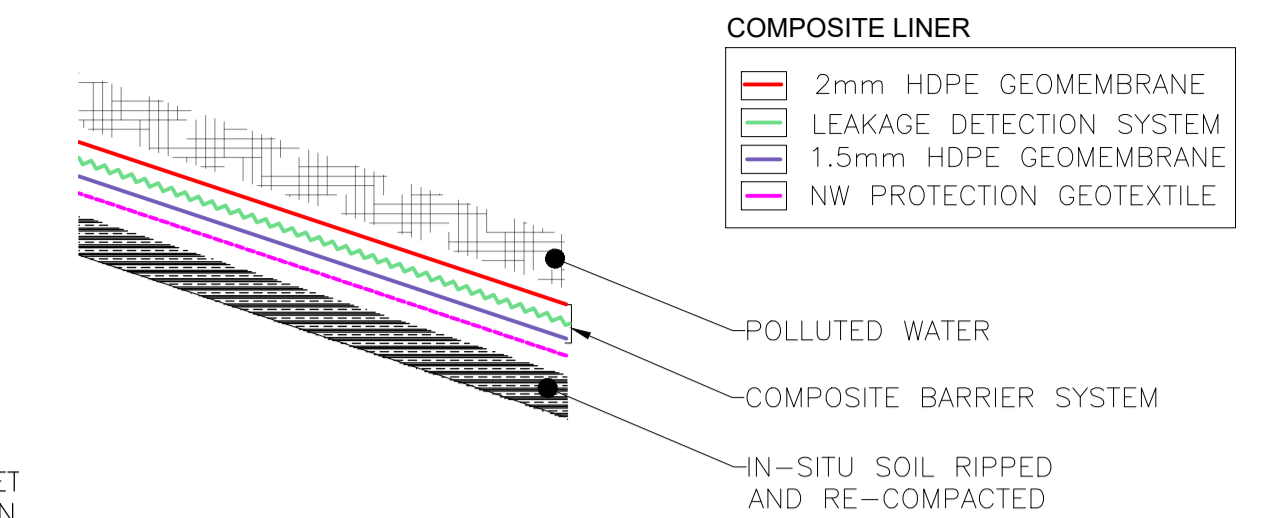
DIRTY WATER CHANNEL 3



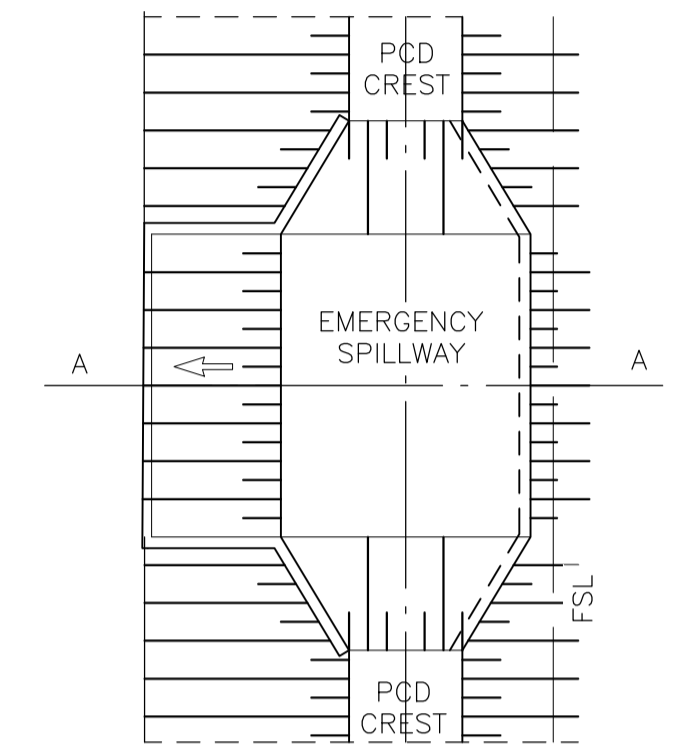
DIRTY WATER CHANNEL 4



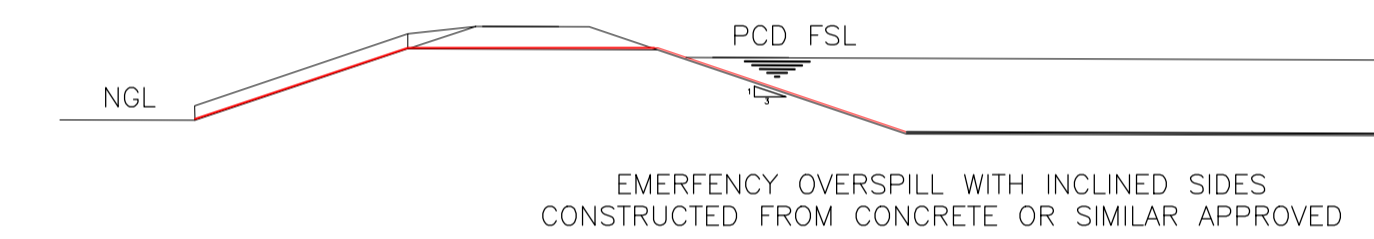
PCD EMBANKMENT CONFIGURATION



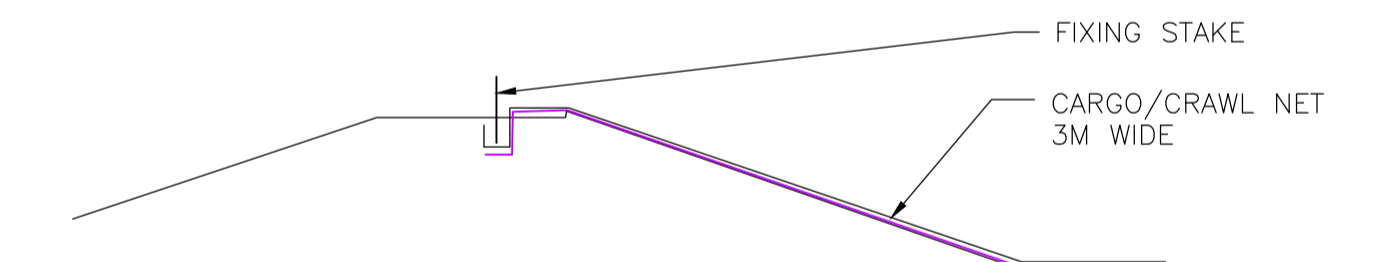
PCD BARRIER CONFIGURATION



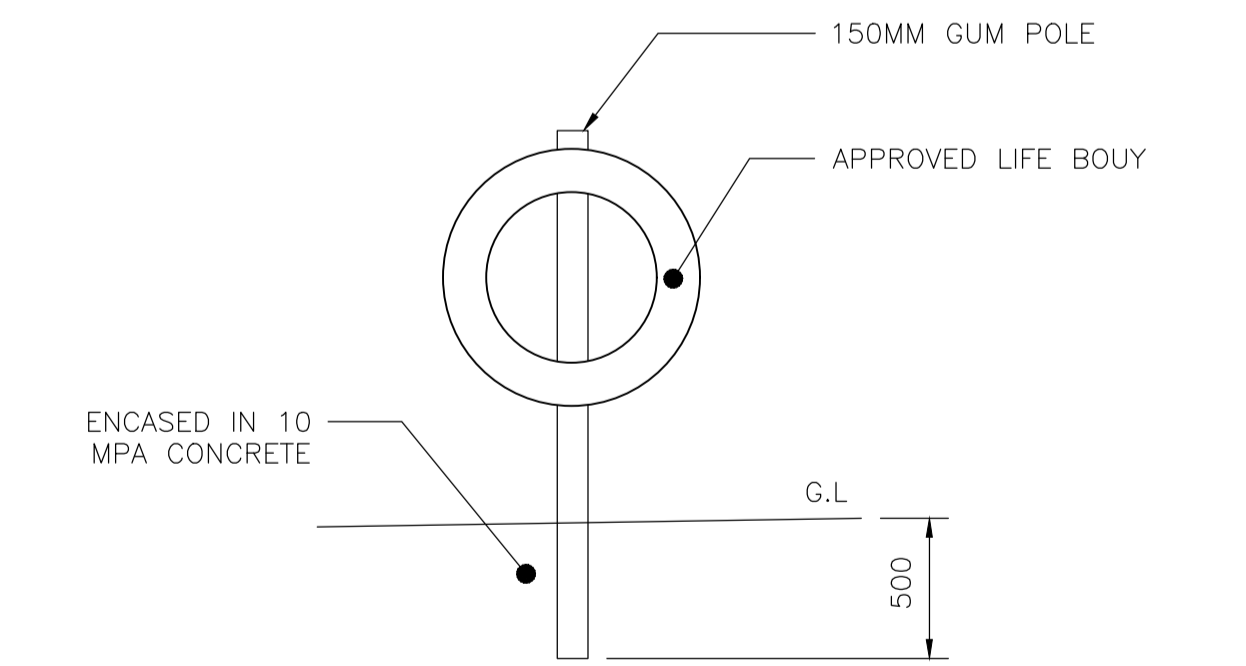
PCD EMERGENCY SPILLWAY PLAN VIEW



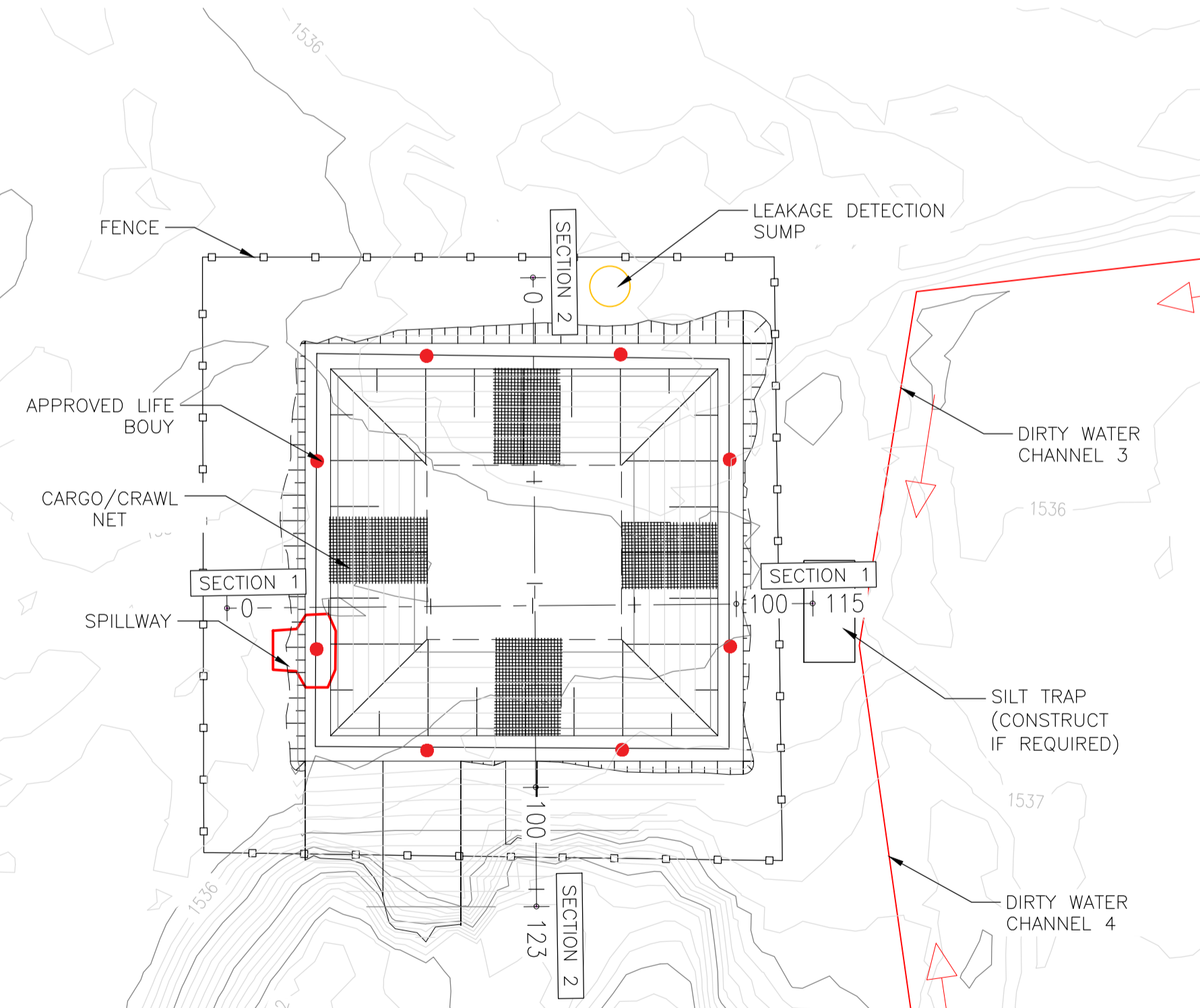
PCD EMERGENCY SPILLWAY - SECTION



CRAWL NET DETAIL



LIFE BOUY DETAIL



PCD 2 LAYOUT

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REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE

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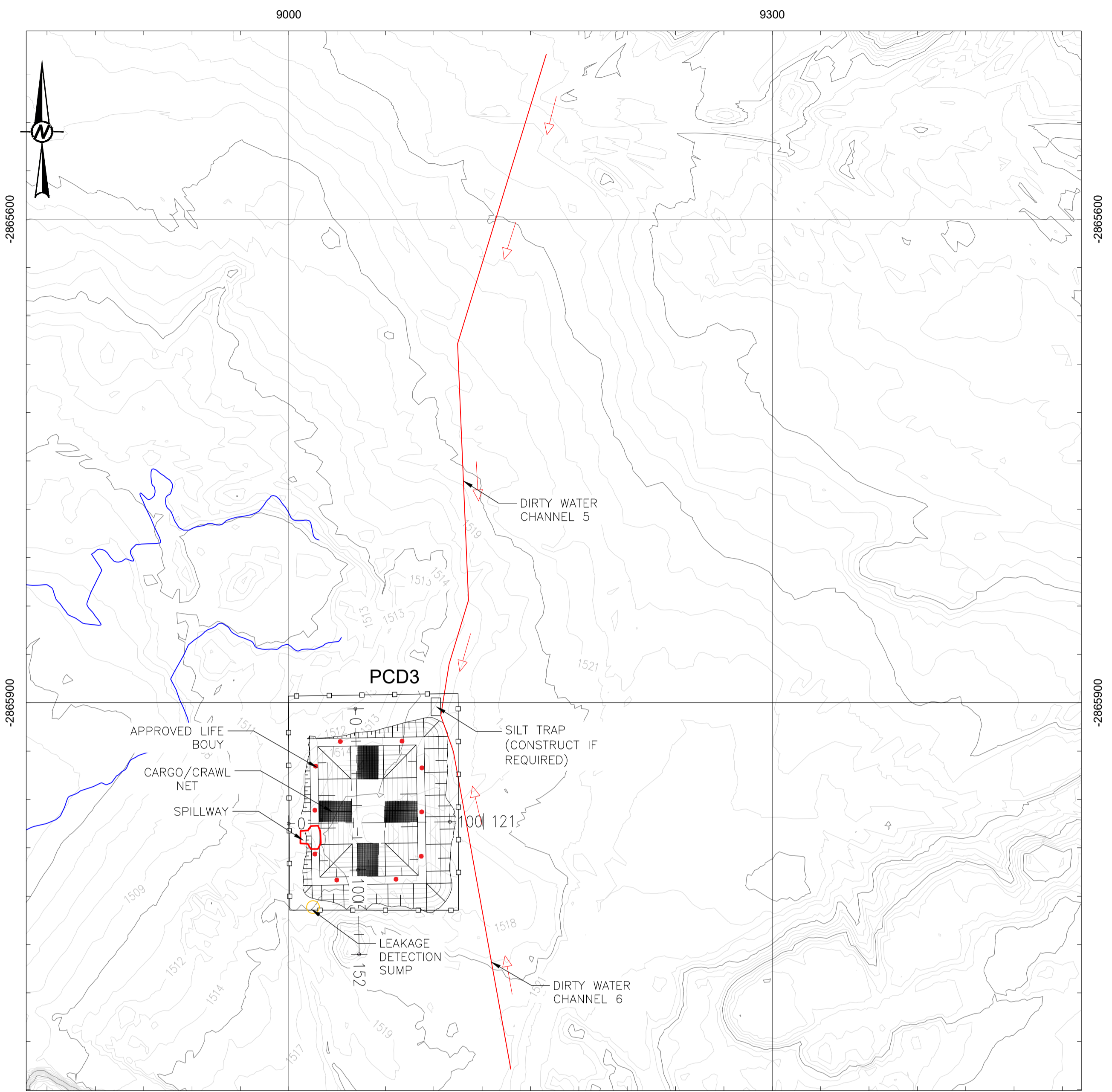


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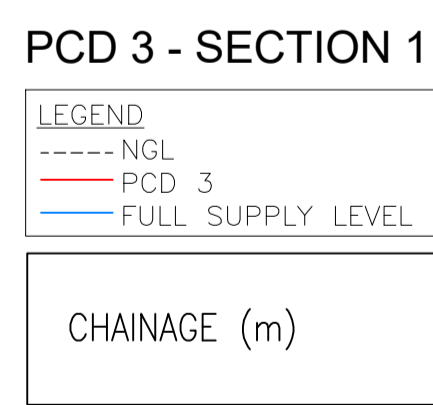
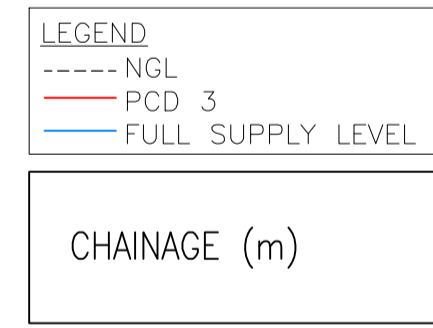
Tijgervallei office park
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 Hazeldean
 Pretoria
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CLIENT	ANKER COAL (PTY) LTD			
PROJECT	CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE			
DRAWING TITLE	PCD 2 LAYOUT AND DETAILS			
PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
B599	001	CON	005	00

LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE
MVDW	MVDW	NTS	A1

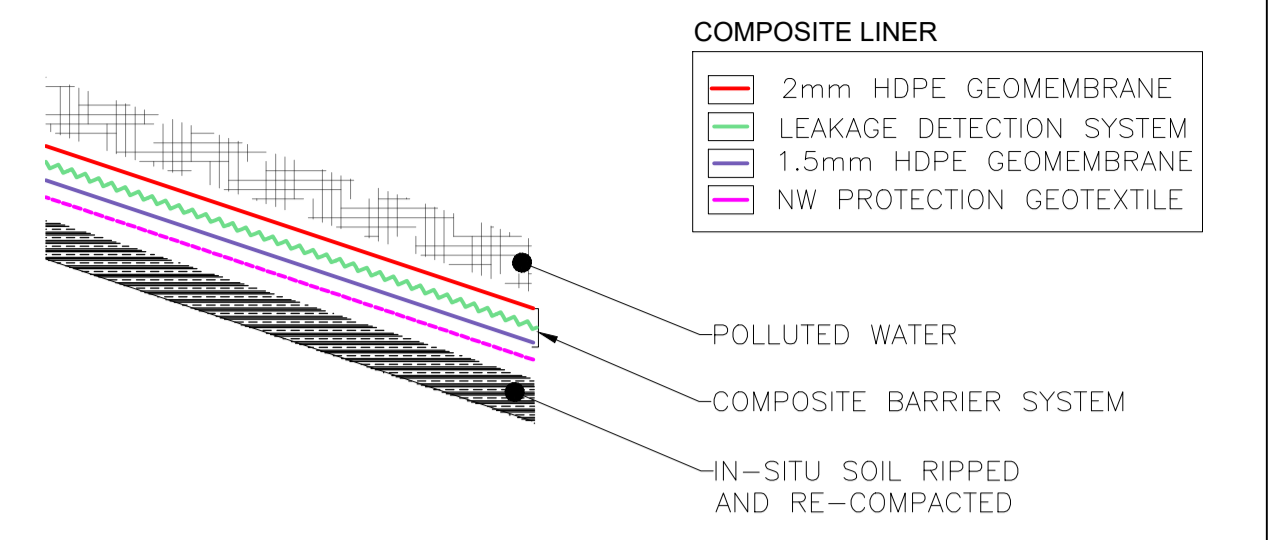
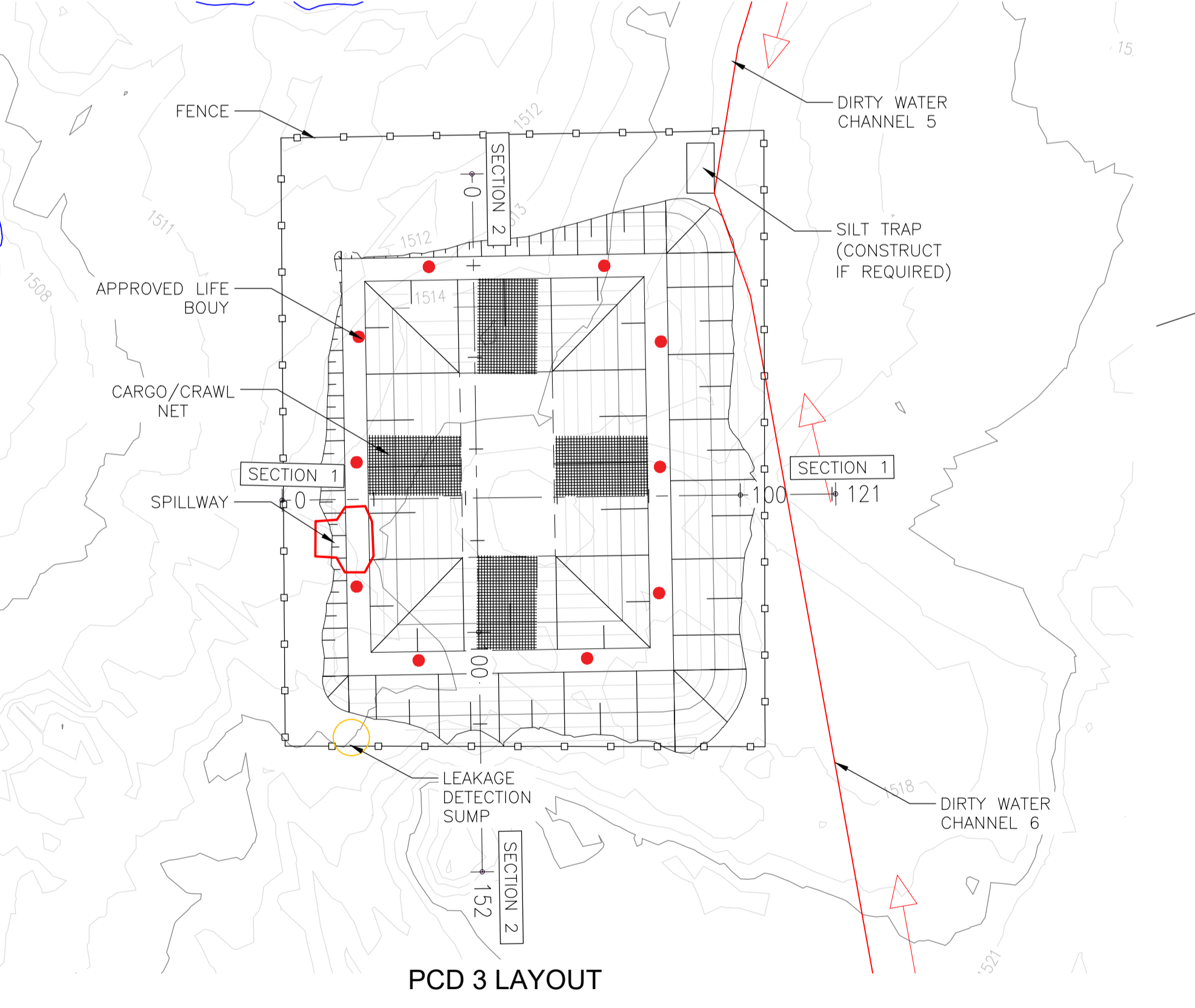
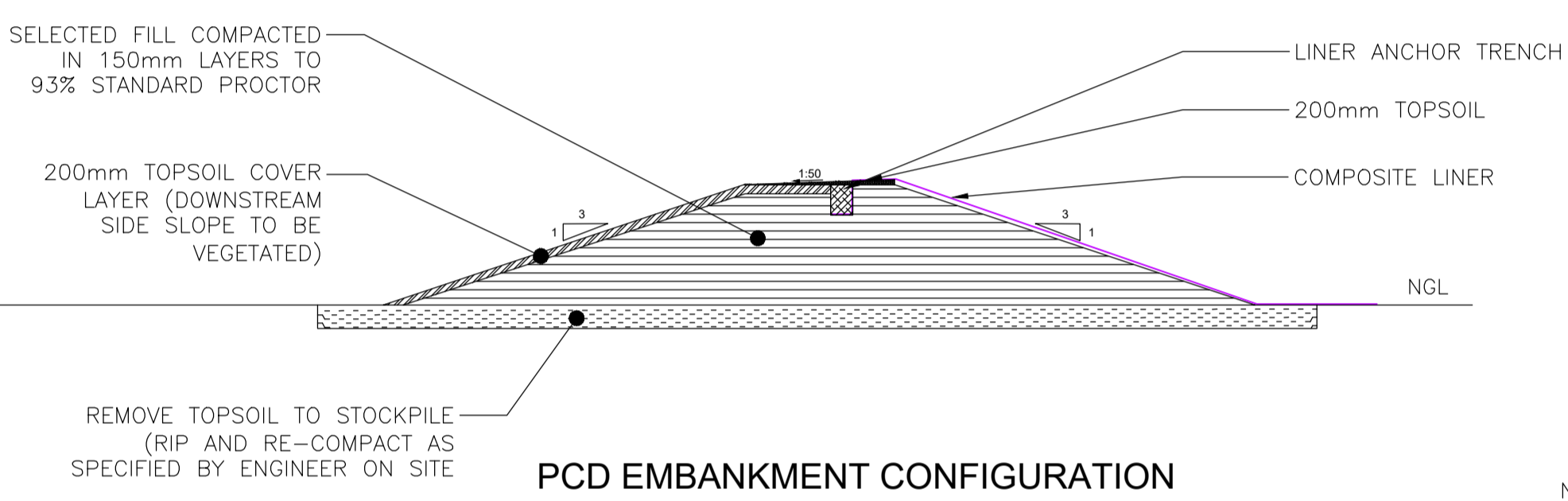
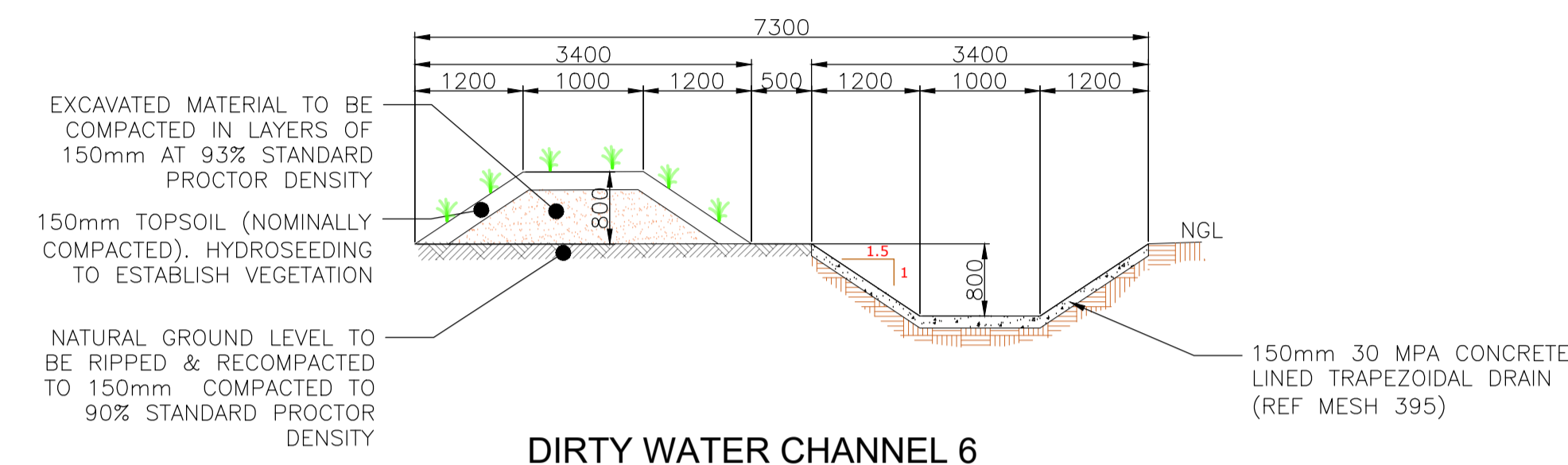
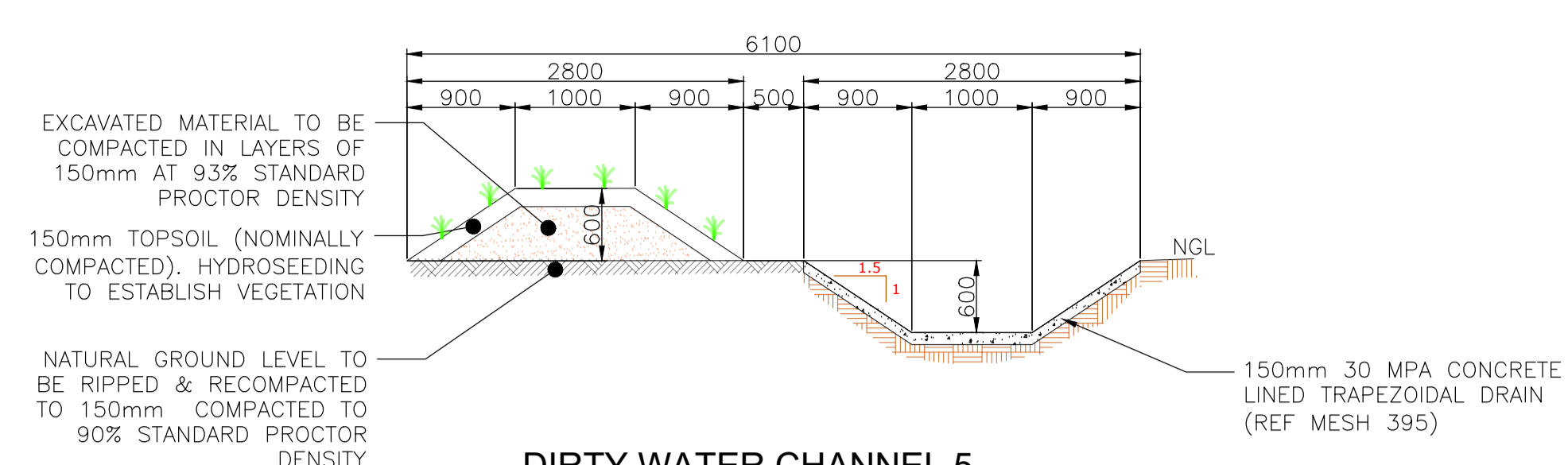


DIRTY WATER SYSTEM - KEY PLAN

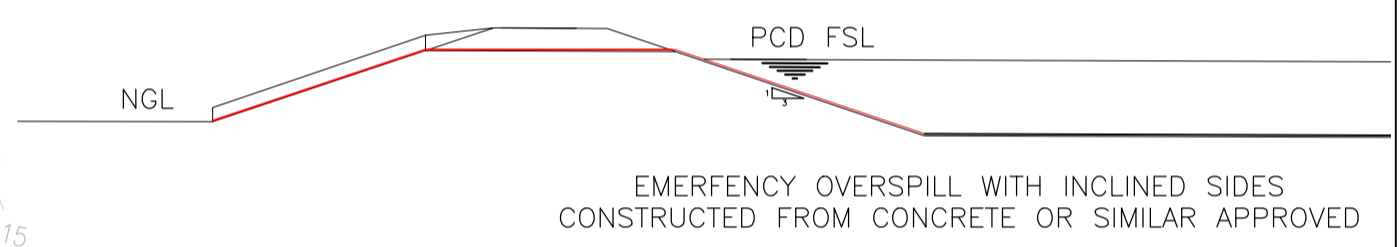
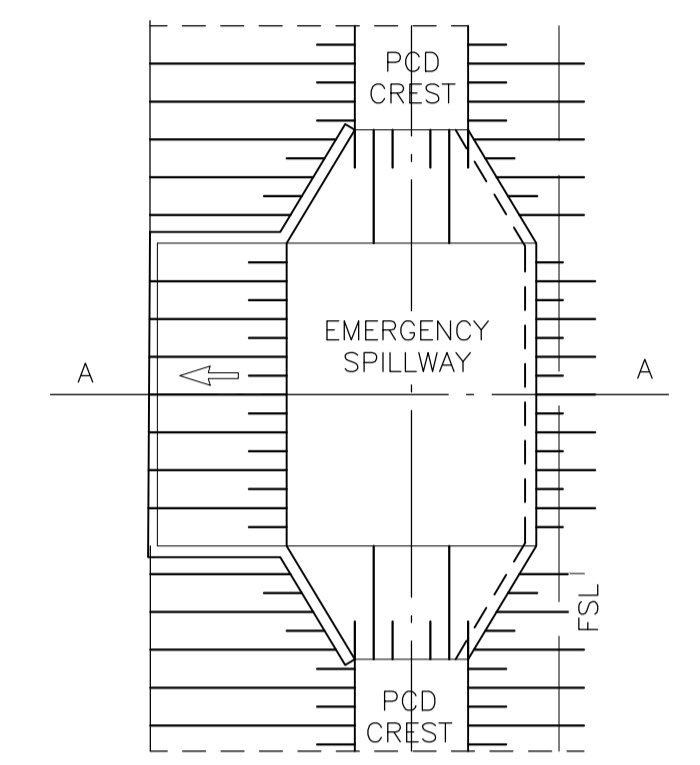


PCD 3 - SECTION 2

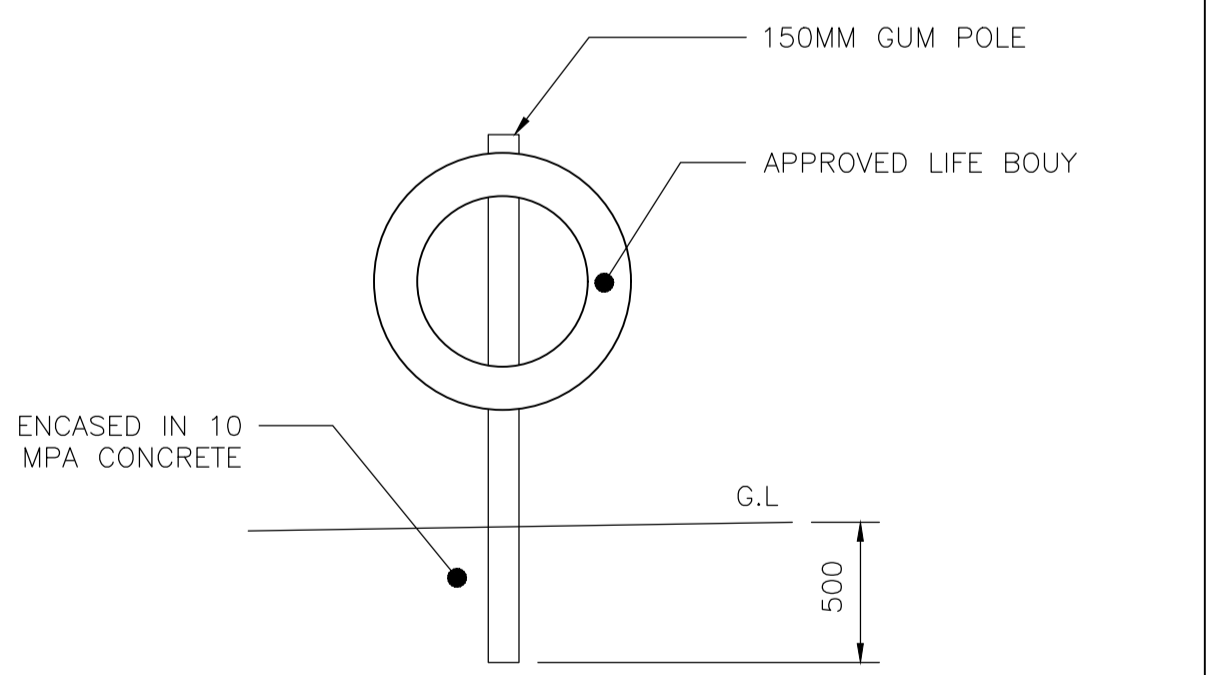
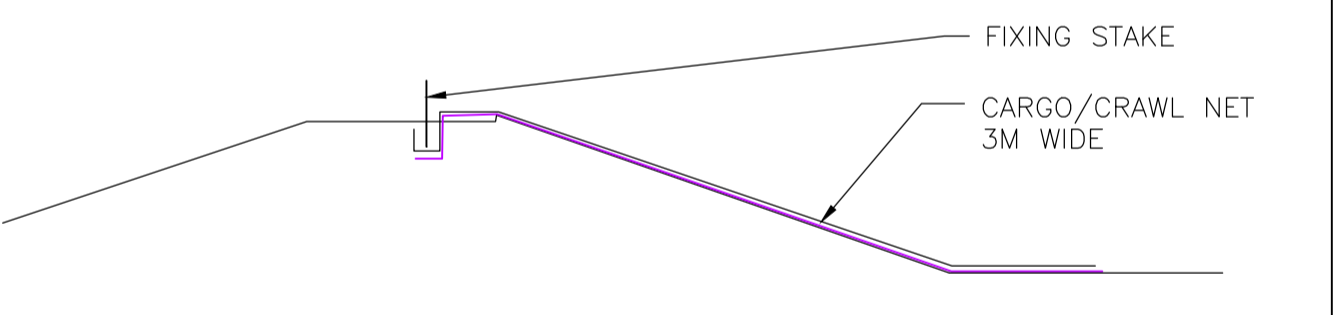
- NOTES:
1. ALL WORKS TO BE DONE TO SANS STANDARD.
 2. 70KG SAND FILLED UV RESISTANT BALLAST BAGS PLACED ON 5M GRID SPACING ON PCD FLOORS.
 3. THE PCD HAS A NORMAL OPERATING STORAGE OF 824M³.
 4. THE PCD HAS A NORMAL OPERATING STORAGE + 50 YEAR STORM VOLUME OF 13 658M³.
 5. THE PCD HAS A 0.8M FREEBOARD AND A CREST WIDTH OF 5M.



PCD BARRIER CONFIGURATION



PCD EMERGENCY SPILLWAY - SECTION



CONCEPTUAL DESIGN
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INFORMATION ONLY

00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY	MVDW	DR	MVDW	DR	AVDM	03/03
REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE

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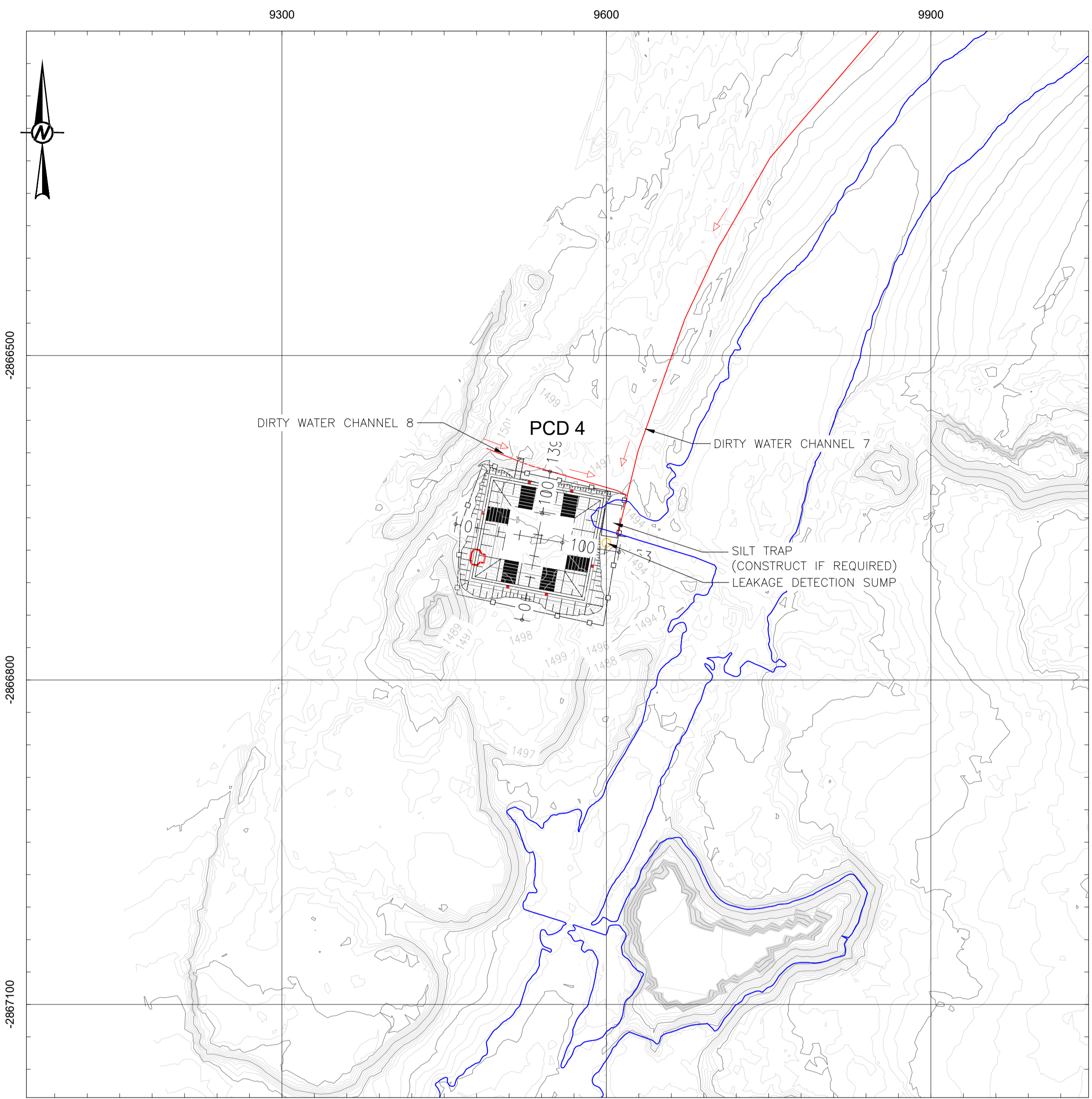
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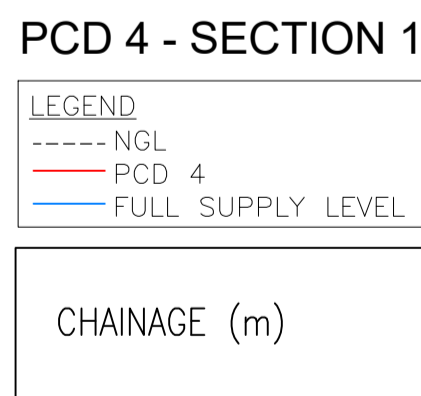
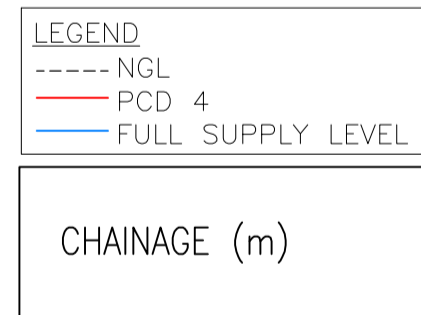
Tijgervallei office park
Building 98 unit 9/10
Silverlakes rd
Hazelden
Pretoria
<http://www.beal.co.za>

CLIENT: ANKER COAL (PTY) LTD
PROJECT: CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE
DRAWING TITLE: PCD 3 LAYOUT AND DETAILS

LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE	PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
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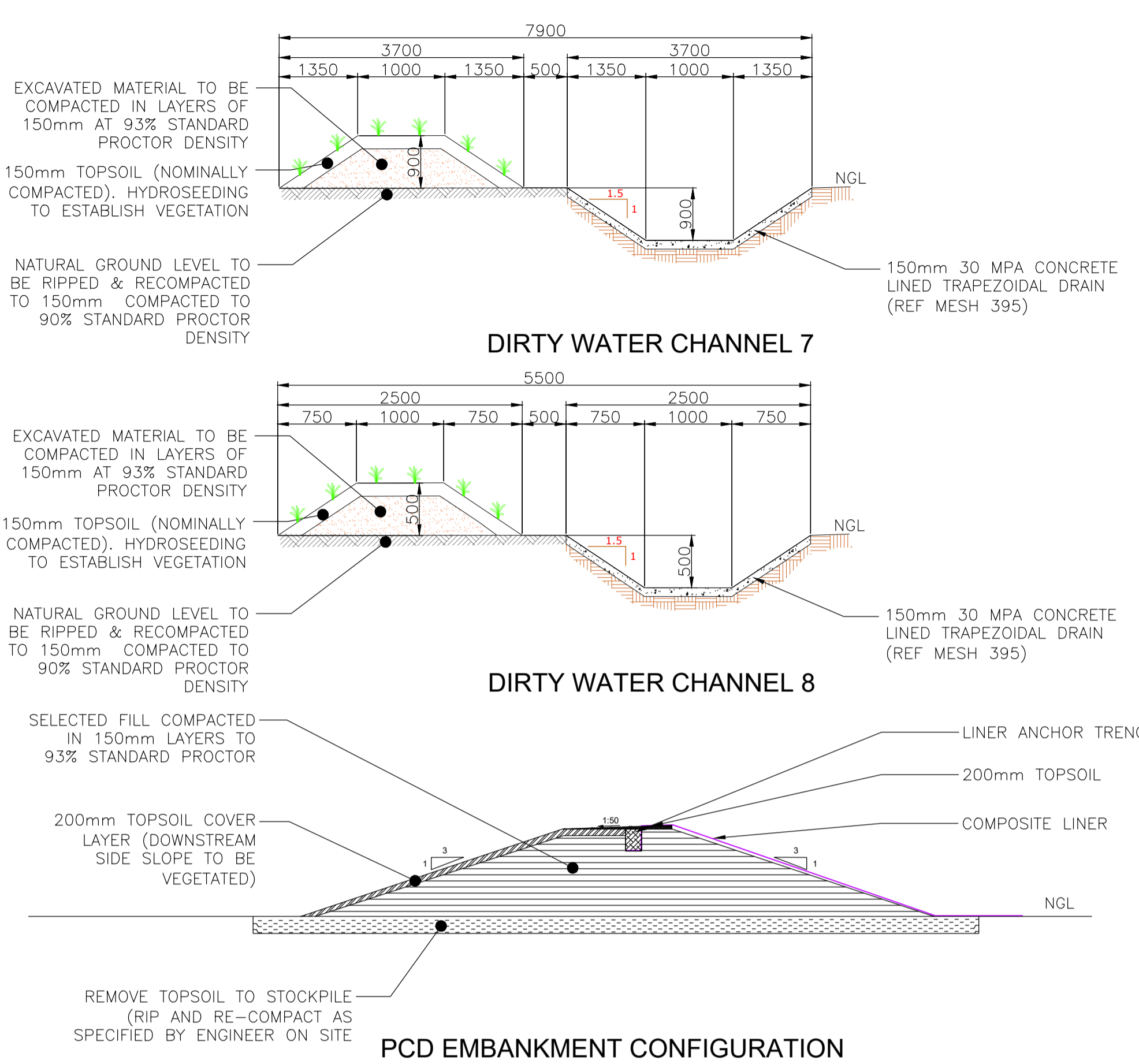
DIRTY WATER SYSTEM - KEY PLAN



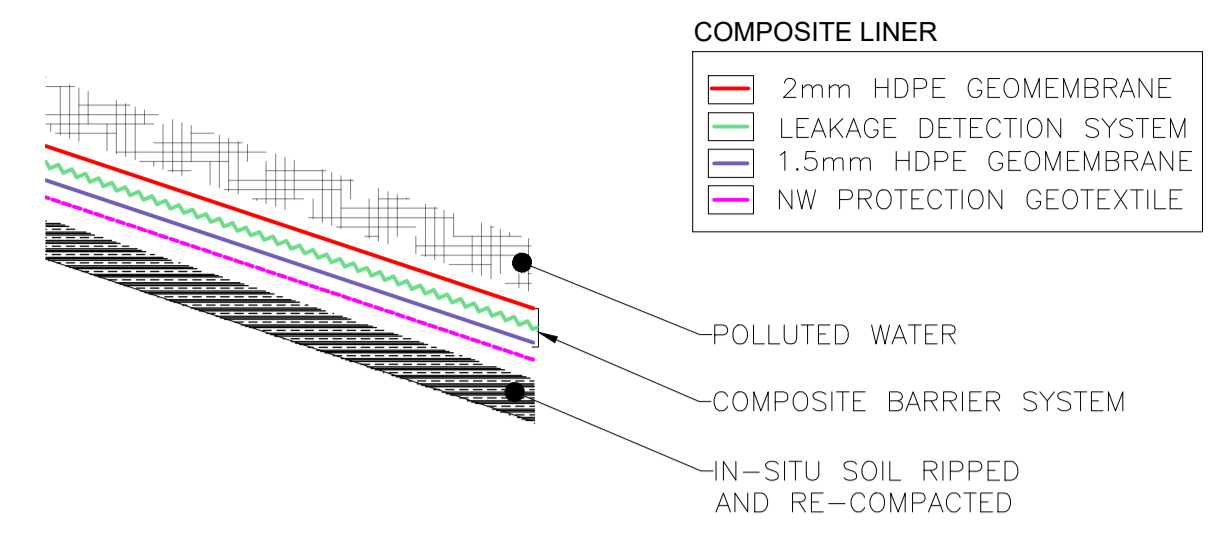
PCD 4 - SECTION 2

NOTES:

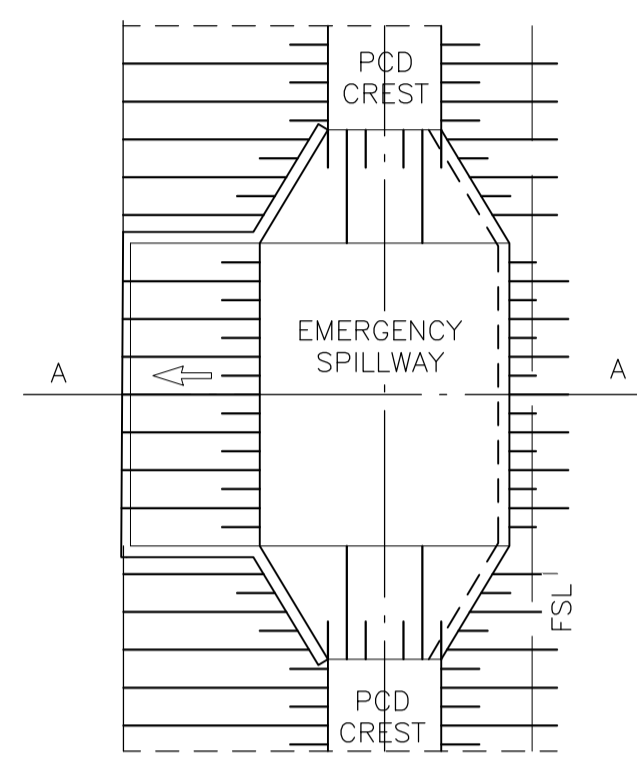
- ALL WORKS TO BE DONE TO SANS STANDARD.
- 70KG SAND FILLED UV RESISTANT BALLAST BAGS PLACED ON 5M GRID SPACING ON PCD FLOORS.
- THE PCD HAS A NORMAL OPERATING STORAGE OF 19111M³.
- THE PCD HAS A NORMAL OPERATING STORAGE + 50 YEAR STORM VOLUME OF 32036M³.
- THE PCD HAS A 0,8M FREEBOARD AND A CREST WIDTH OF 5M.



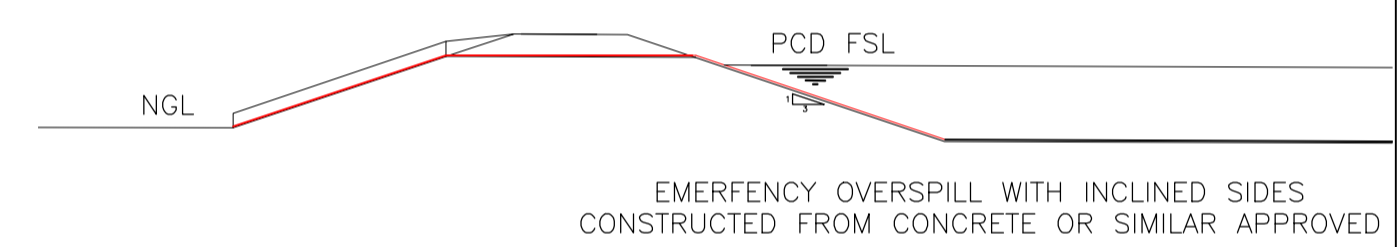
PCD EMBANKMENT CONFIGURATION



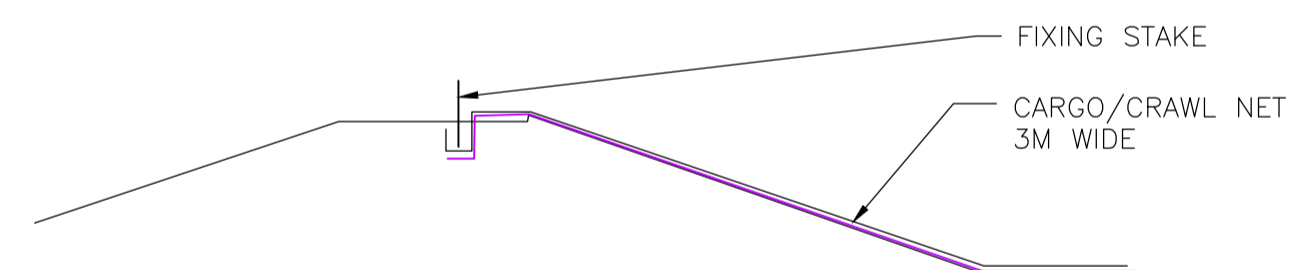
PCD BARRIER CONFIGURATION



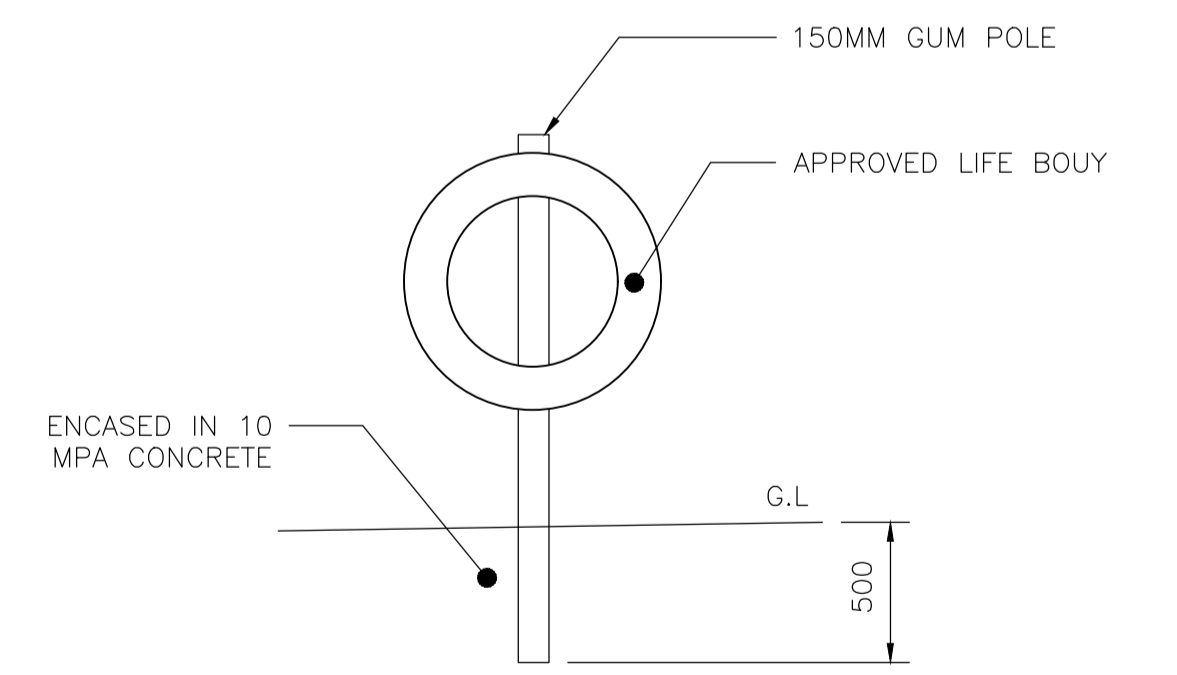
PCD EMERGENCY SPILLWAY PLAN VIEW



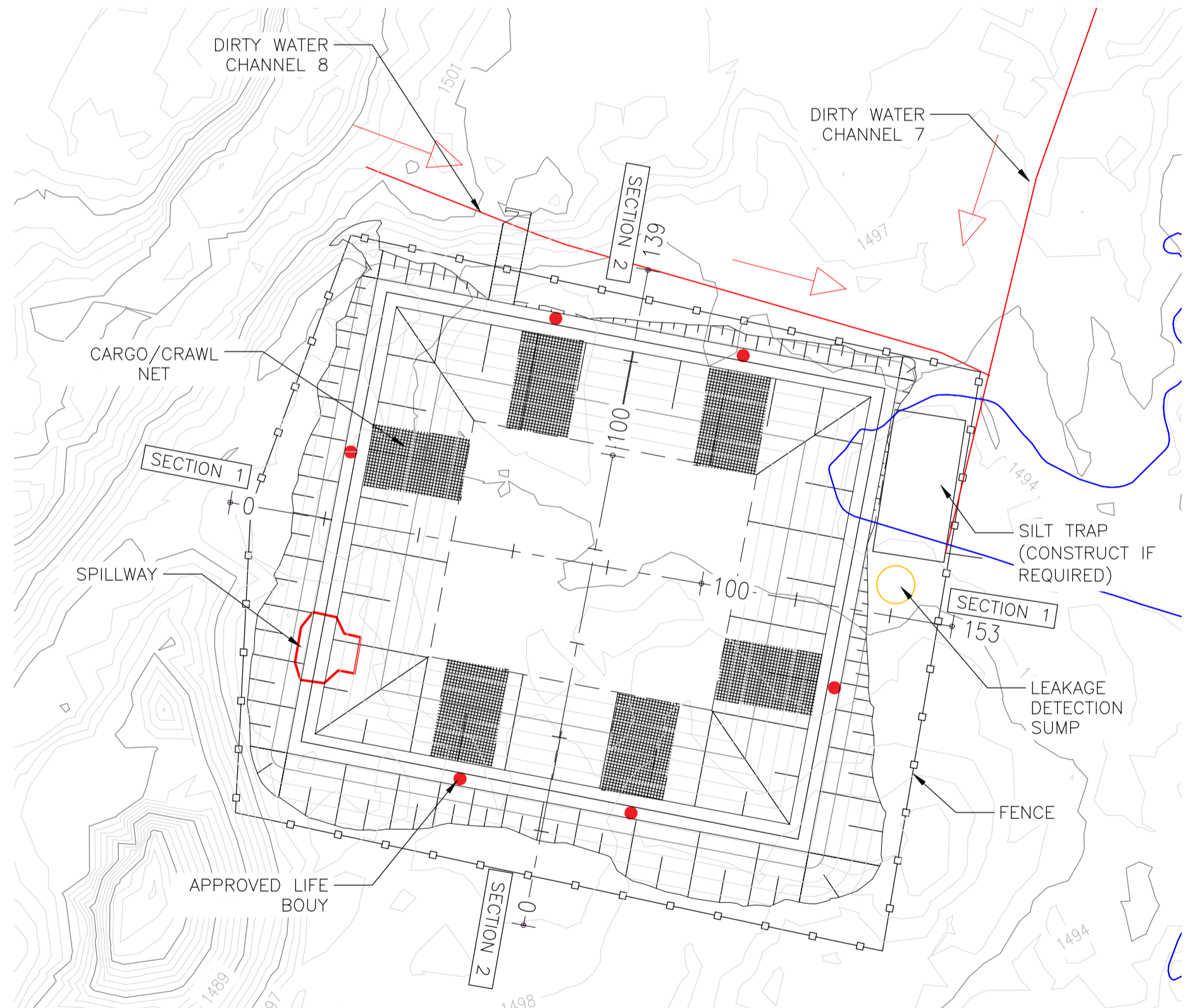
PCD EMERGENCY SPILLWAY - SECTION



CRAWL NET DETAIL



LIFE BOUY DETAIL



PCD 4 LAYOUT

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REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE

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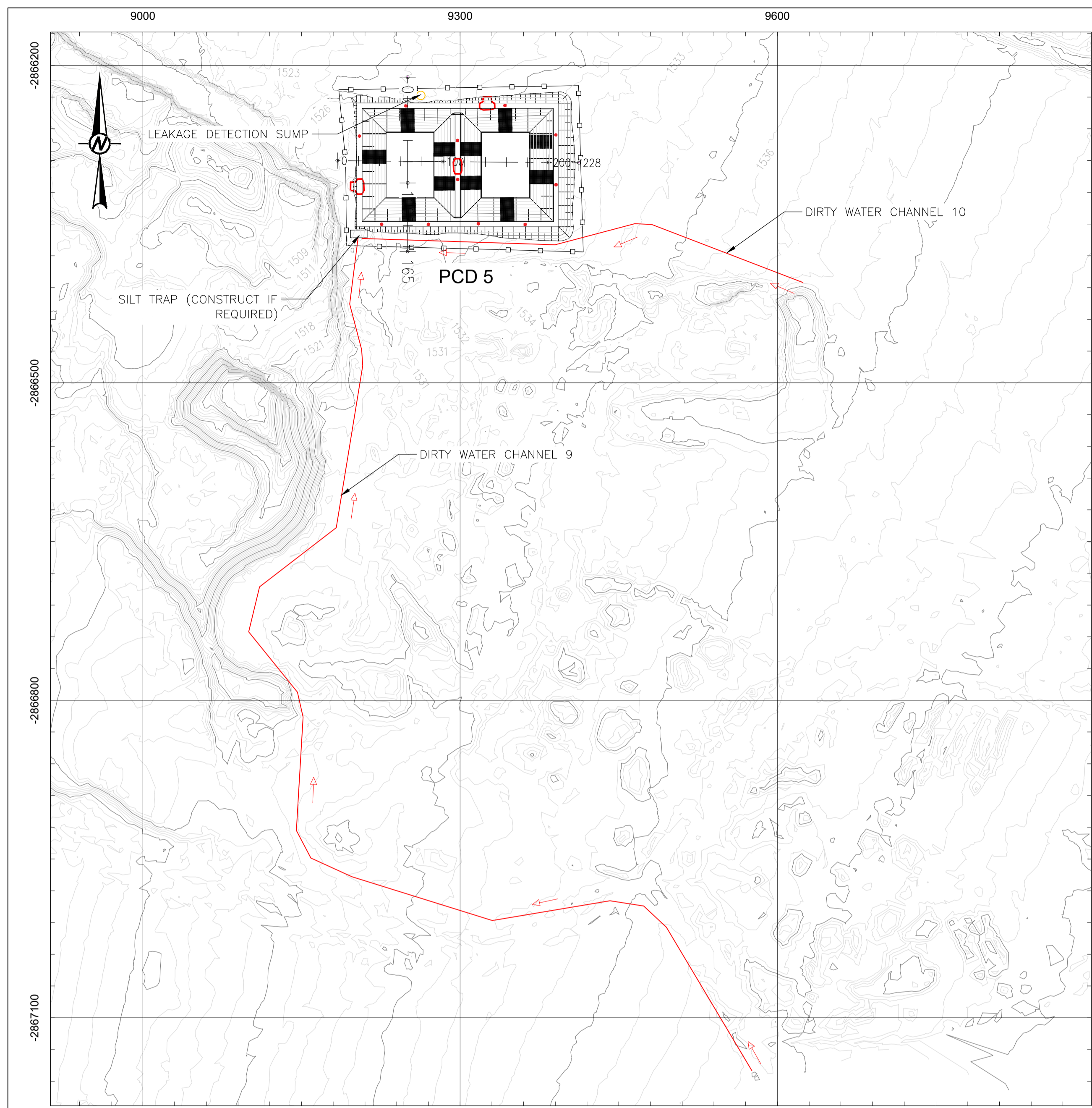
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Pretoria
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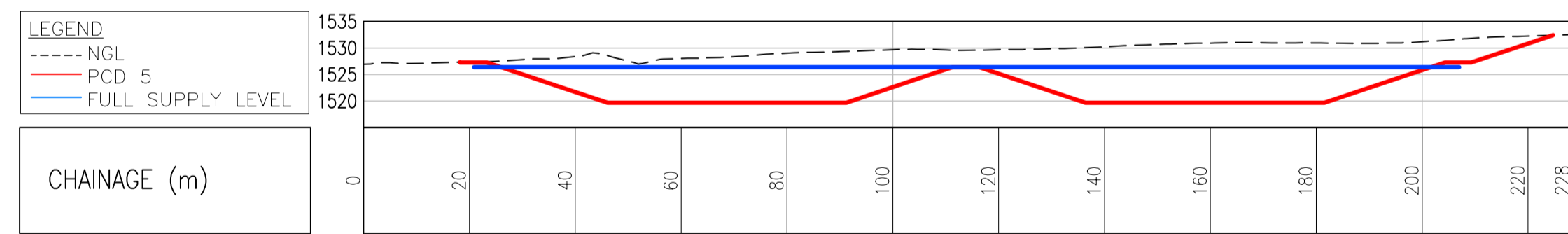
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LEAD PROJECT DRAFTER: MVDW
PROJECT MANAGER: MVDW
SCALE: NTS
SHEET SIZE: A1

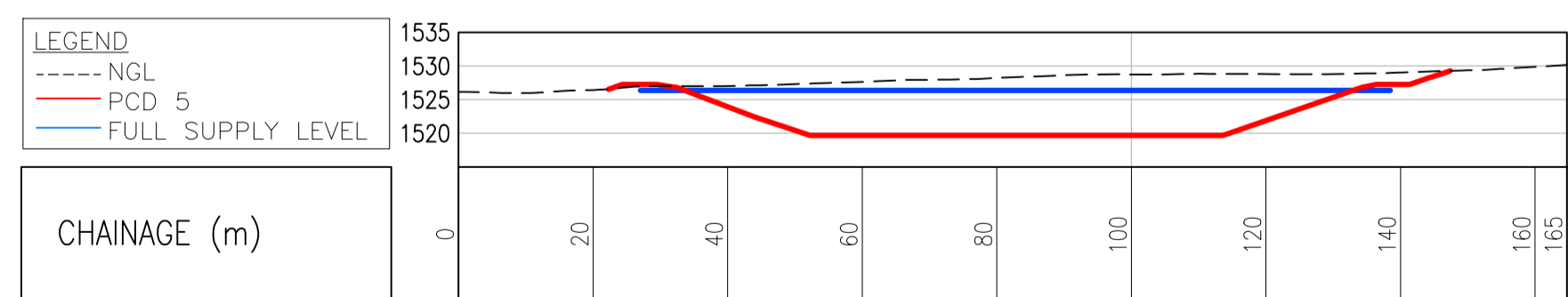
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PROJECT	CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE			
DRAWING TITLE	PCD 4 LAYOUT AND DETAILS			
PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
B599	001	CON	007	00



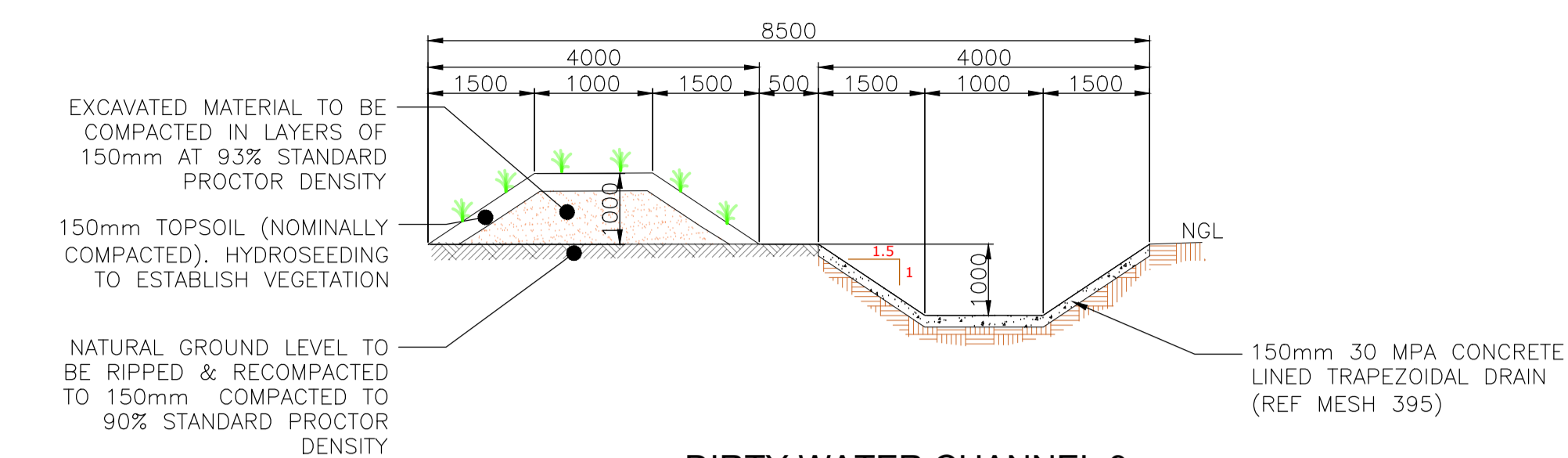
DIRTY WATER SYSTEM - KEY PLAN



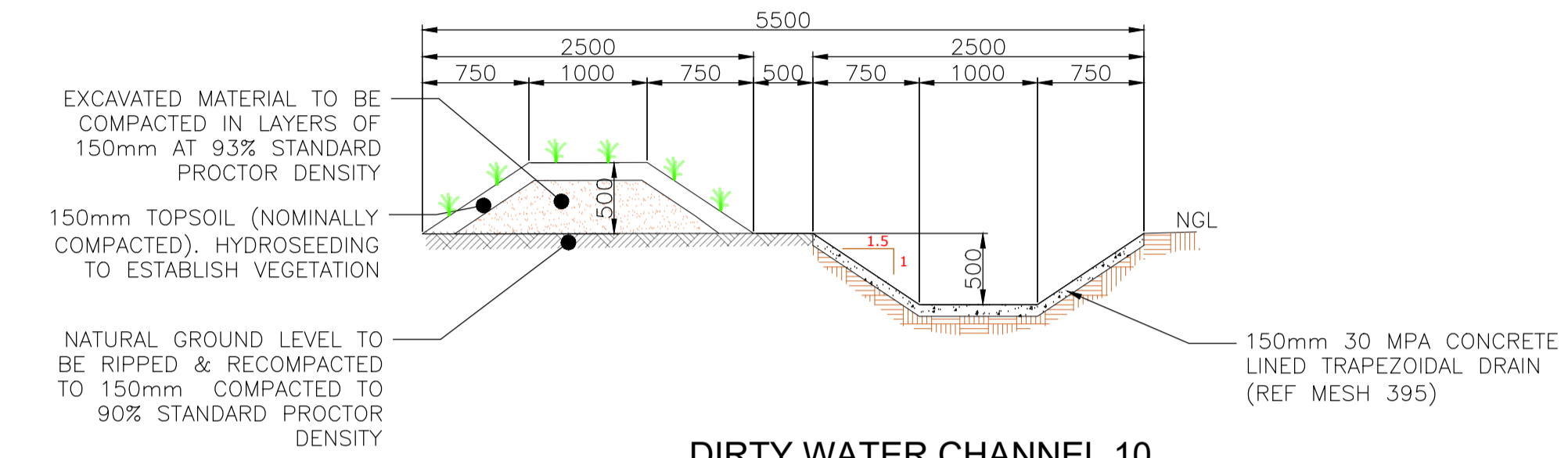
PCD 5 - SECTION 1



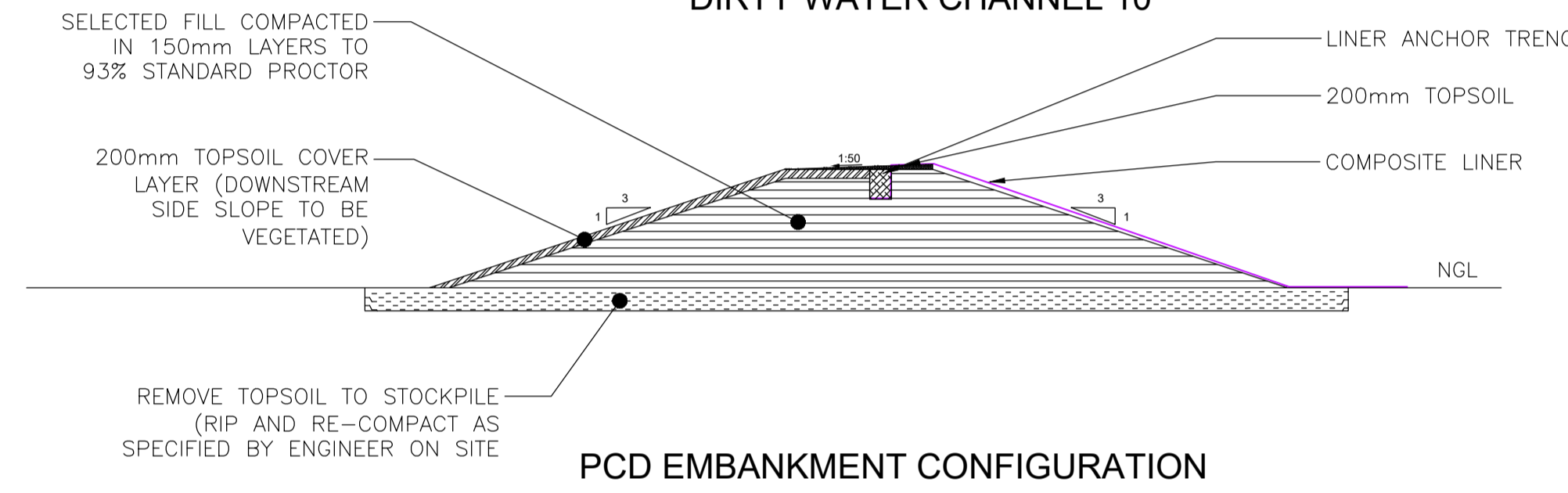
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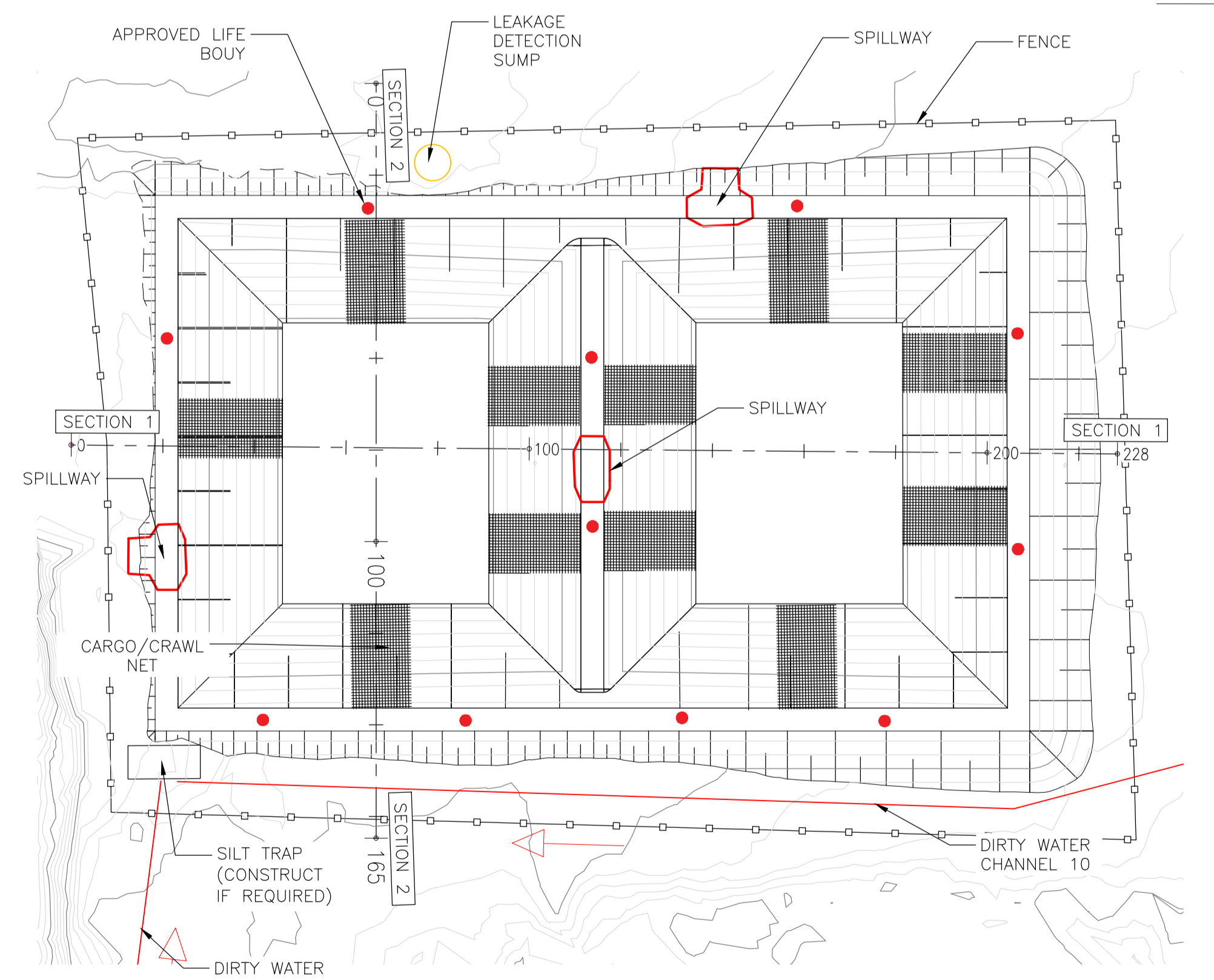
DIRTY WATER CHANNEL 9



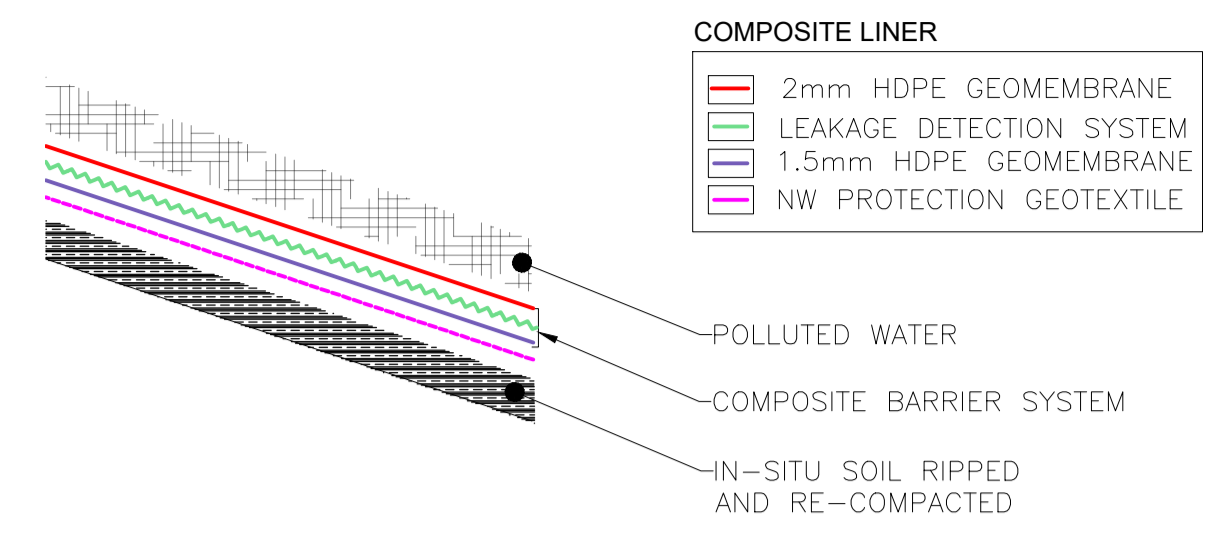
DIRTY WATER CHANNEL 10



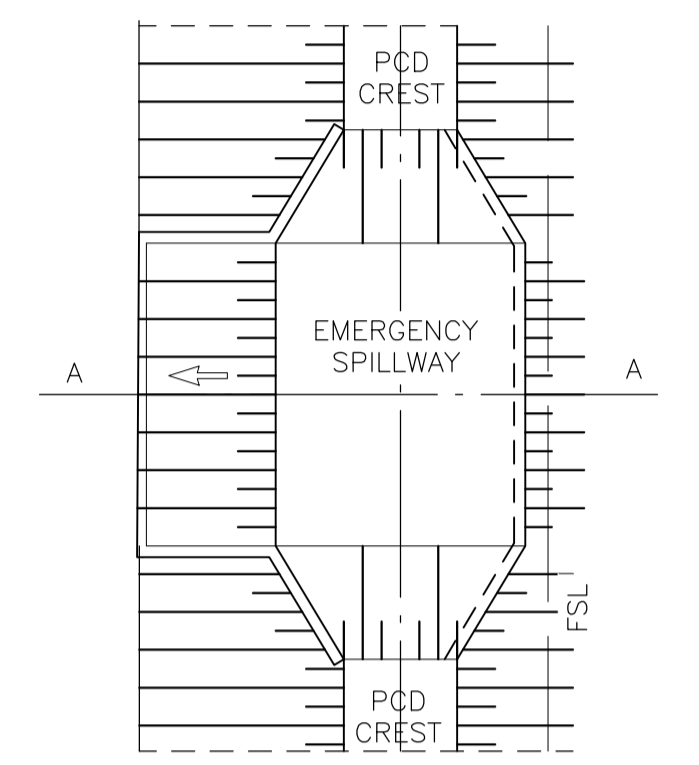
PCD EMBANKMENT CONFIGURATION



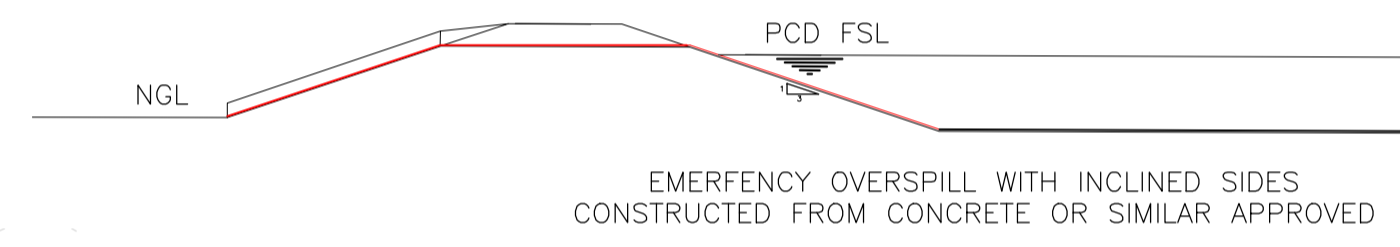
PCD 5 LAYOUT



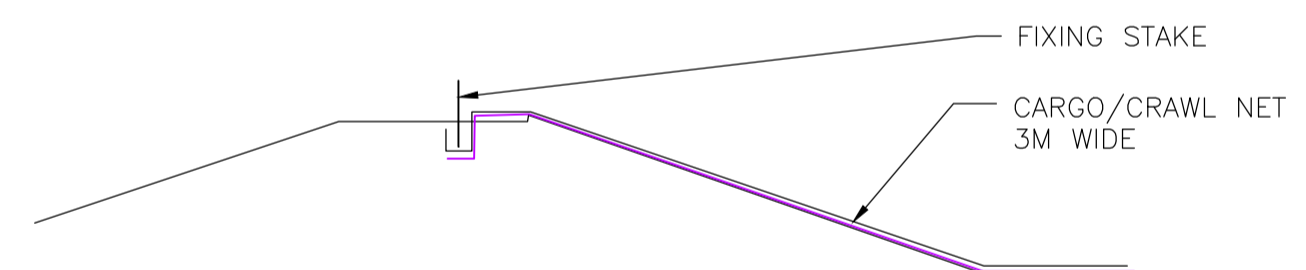
PCD BARRIER CONFIGURATION



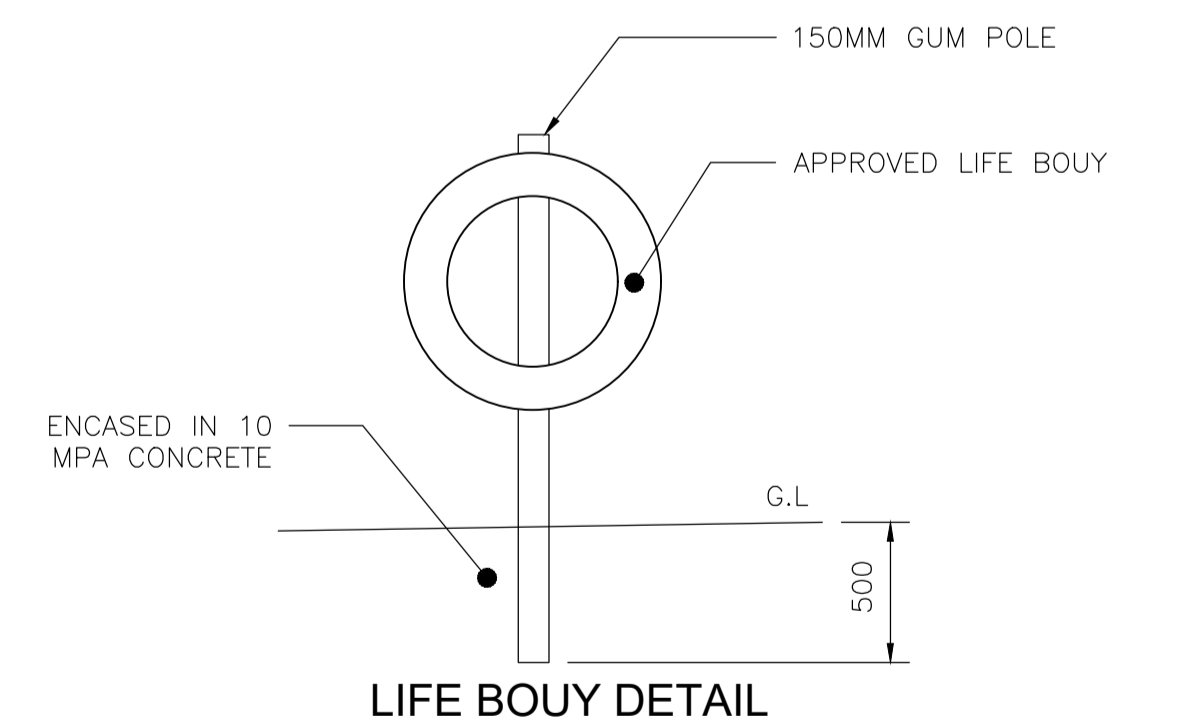
PCD EMERGENCY SPILLWAY PLAN VIEW



PCD EMERGENCY SPILLWAY - SECTION



CRAWL NET DETAIL



LIFE BOUY DETAIL

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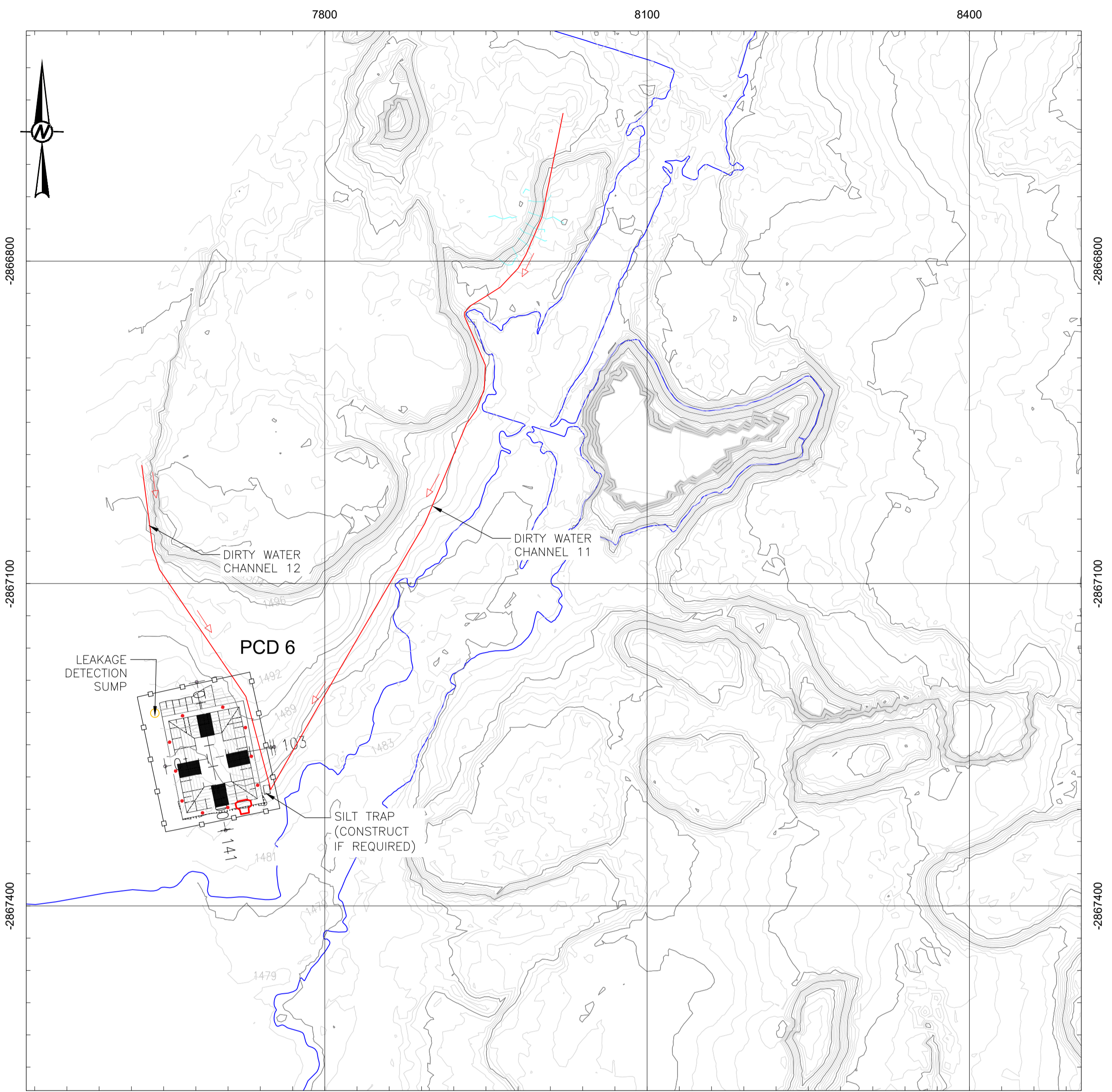
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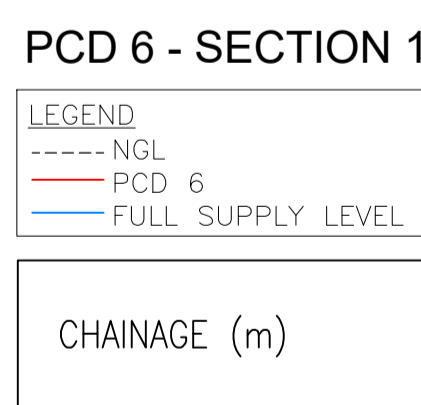
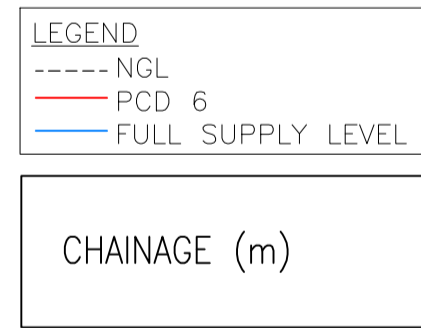
Lead Project Drafter: MVDW
Project Manager: MVDW
Scale: NTS
Sheet Size: A1

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DRAWING TITLE	PCD 5 LAYOUT AND DETAILS				
PROJECT No	B599	DOC No	001	DOC TYPE	CON
DRAWING No	008	REVISION	00		

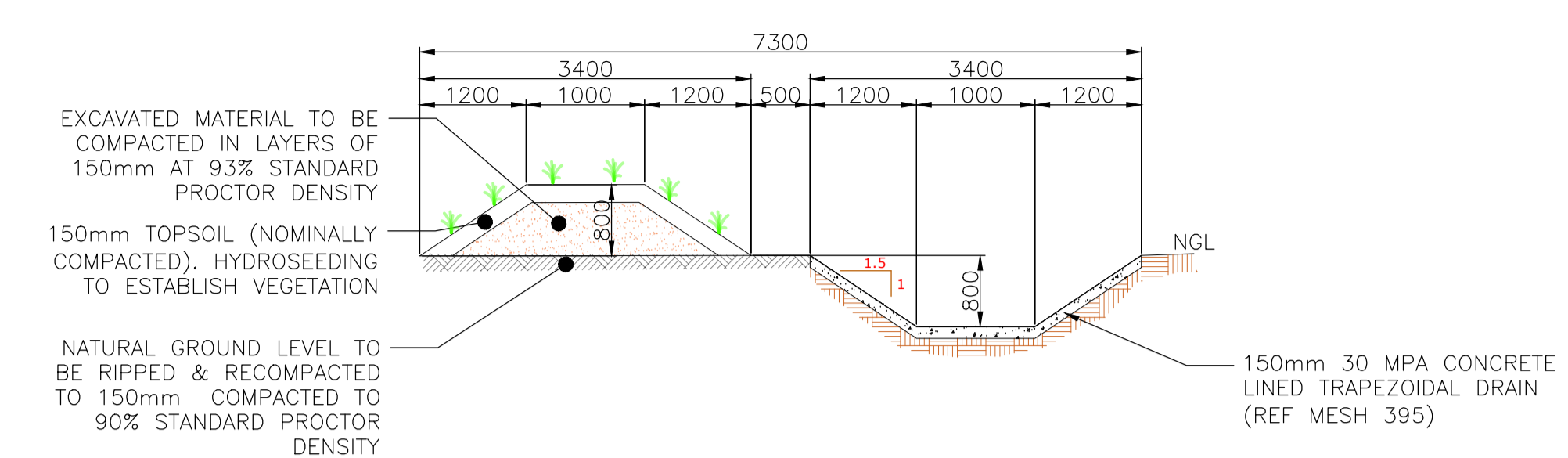


DIRTY WATER SYSTEM - KEY PLAN

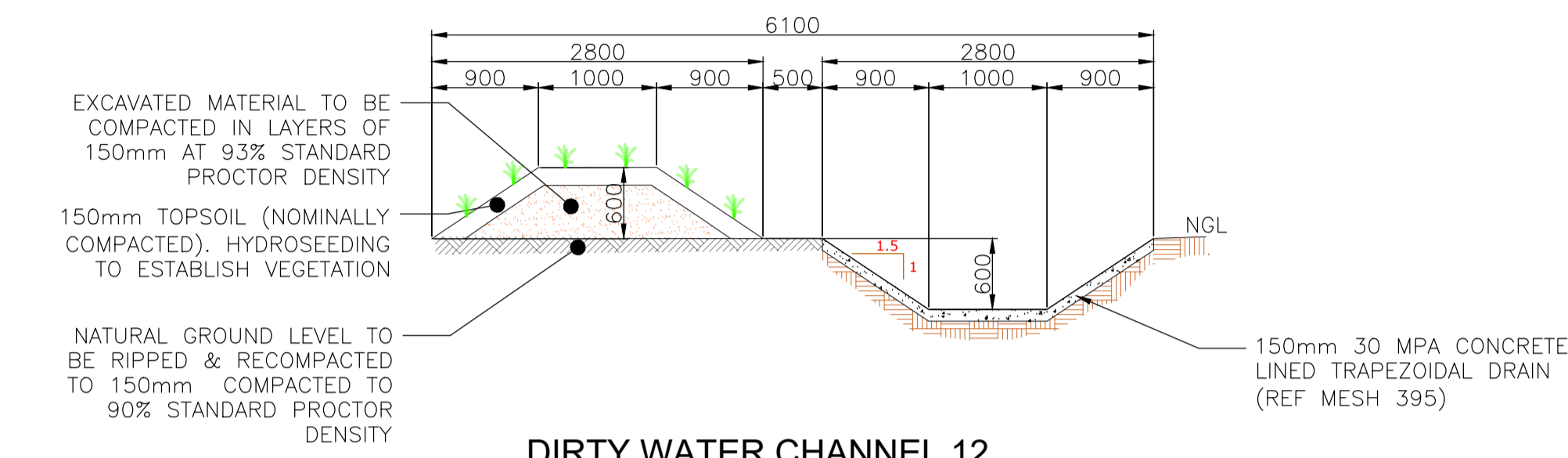


PCD 6 - SECTION 2

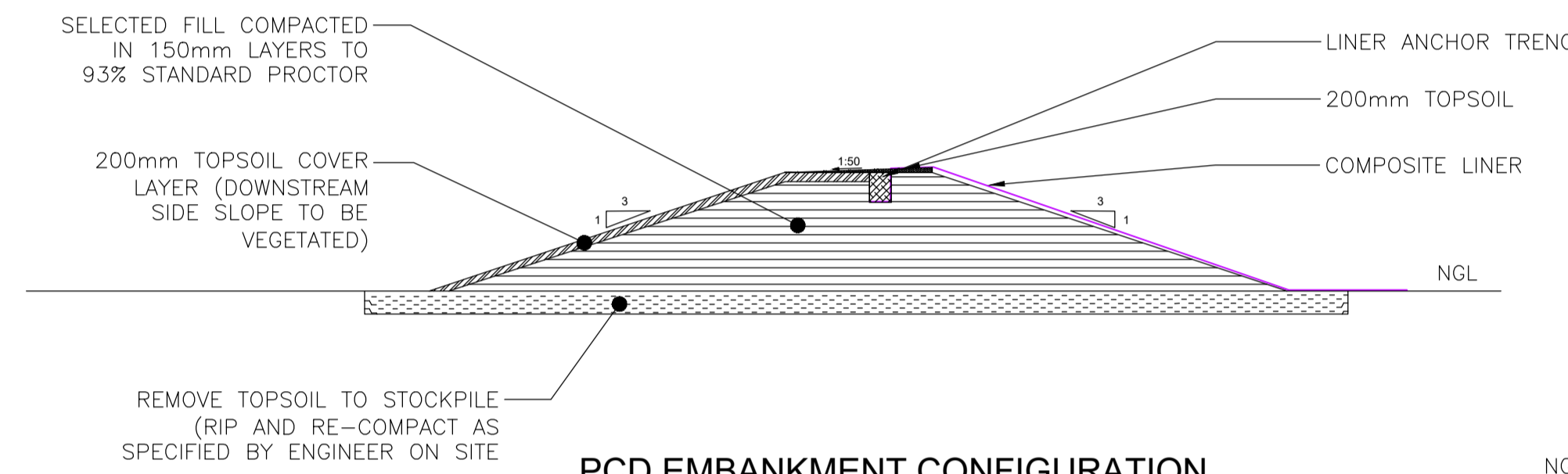
- NOTES:**
1. ALL WORKS TO BE DONE TO SANS STANDARD.
 2. 70KG SAND FILLED UV RESISTANT BALLAST BAGS PLACED ON 5M GRID SPACING ON PCD FLOORS.
 3. THE PCD HAS A NORMAL OPERATING STORAGE OF 11 728M³.
 4. THE PCD HAS A NORMAL OPERATING STORAGE + 50 YEAR STORM VOLUME OF 17 068M³.
 5. THE PCD HAS A 0.8M FREEBOARD AND A CREST WIDTH OF 5M.



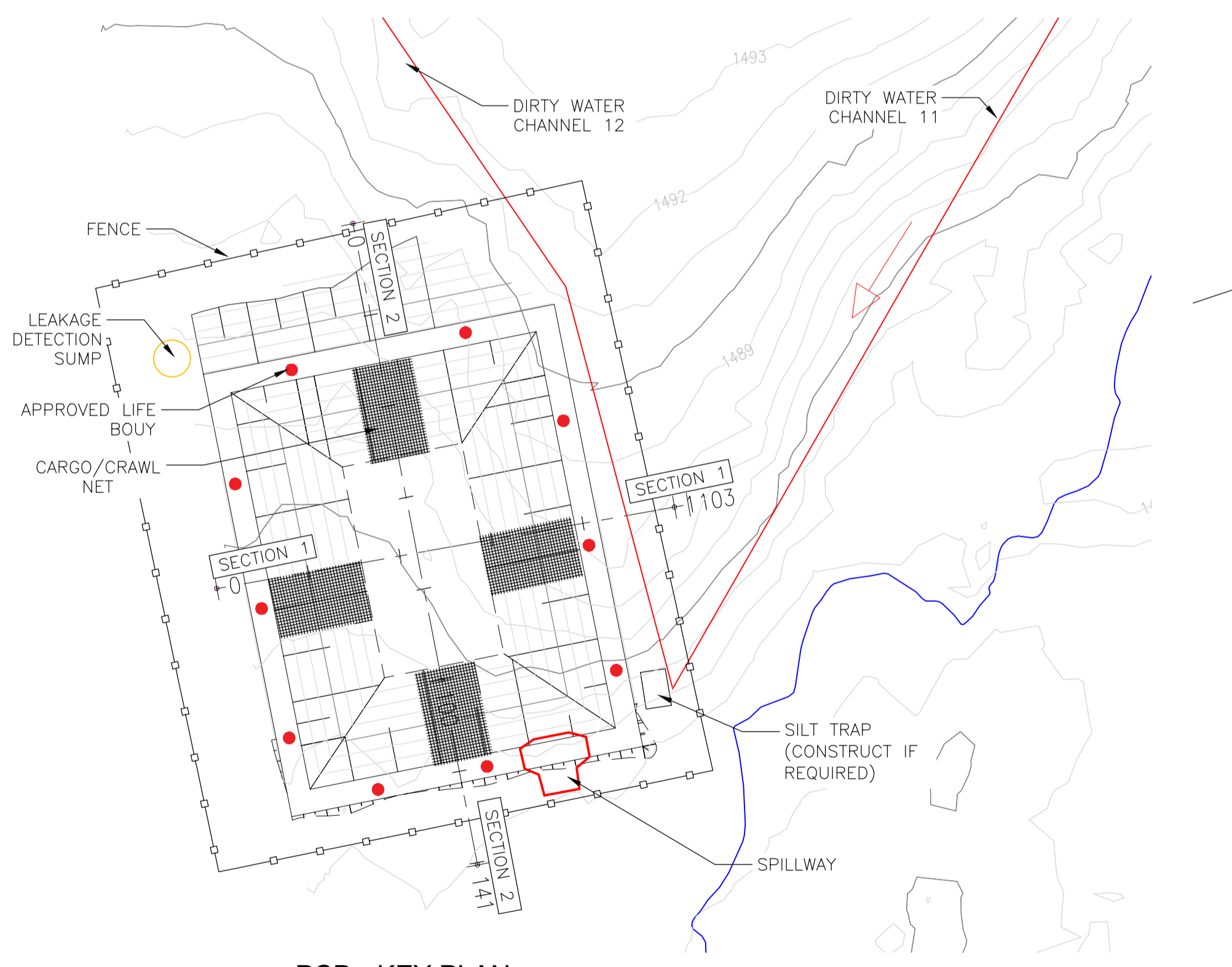
DIRTY WATER CHANNEL 11



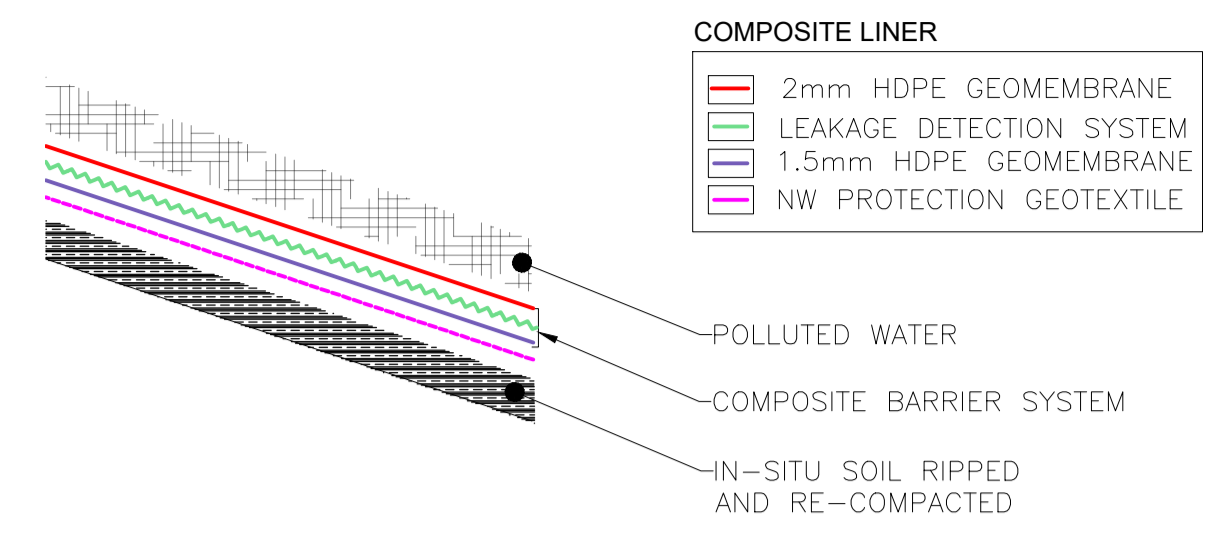
DIRTY WATER CHANNEL 12



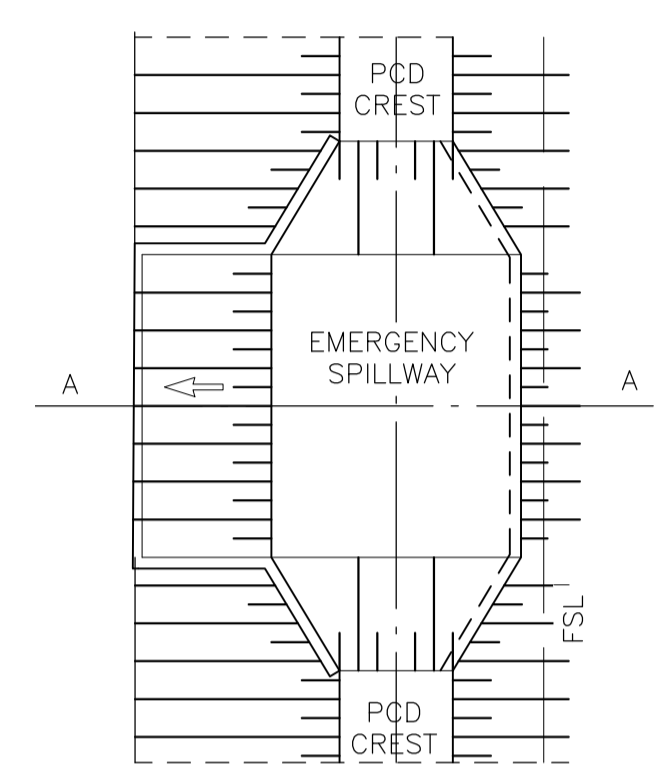
PCD EMBANKMENT CONFIGURATION



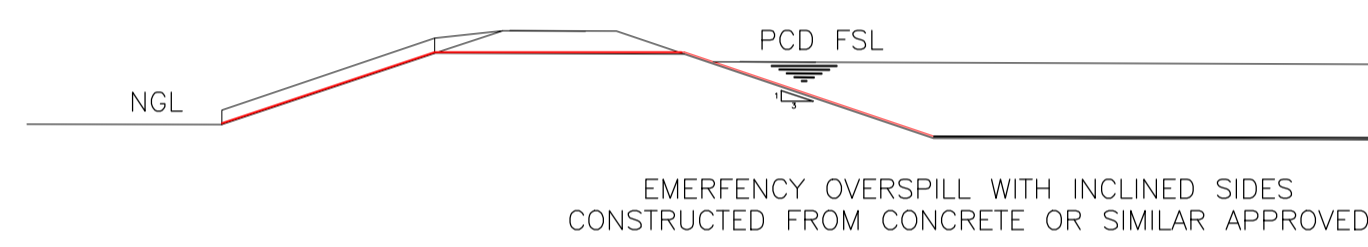
PCD - KEY PLAN



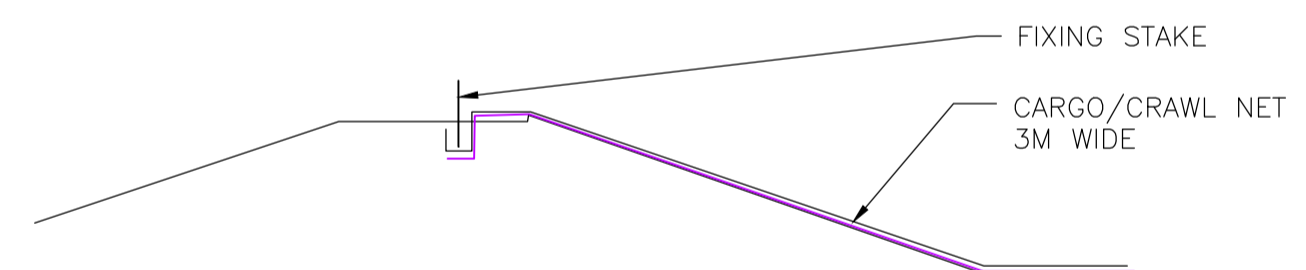
PCD BARRIER CONFIGURATION



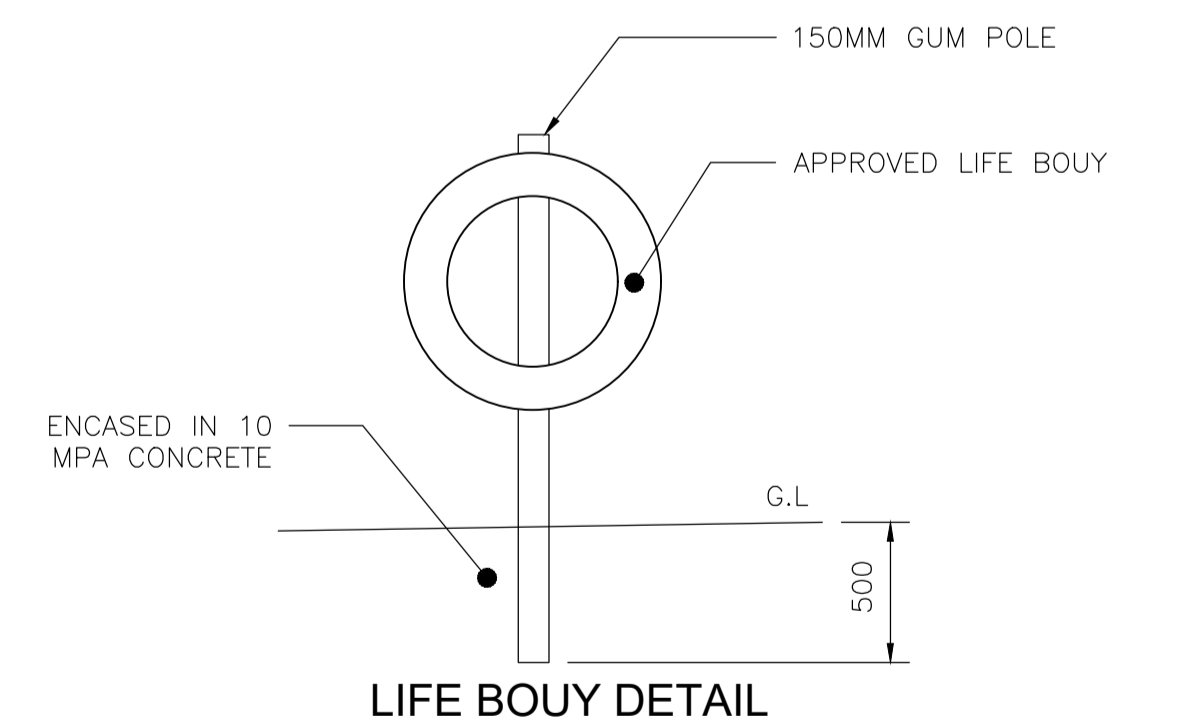
PCD EMERGENCY SPILLWAY PLAN VIEW



PCD EMERGENCY SPILLWAY - SECTION



CRAWL NET DETAIL



LIFE BOUY DETAIL

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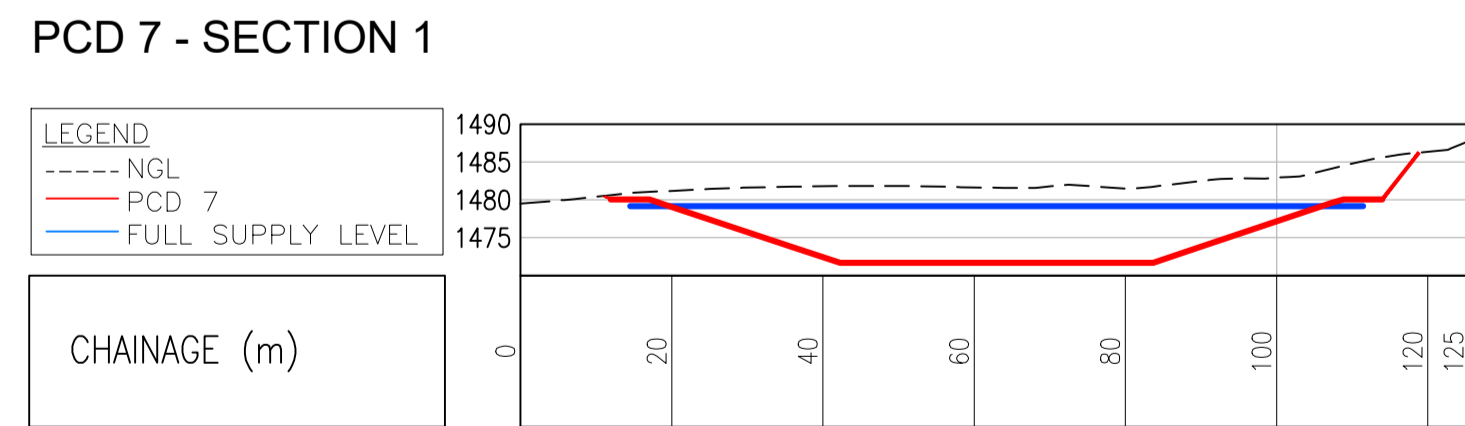
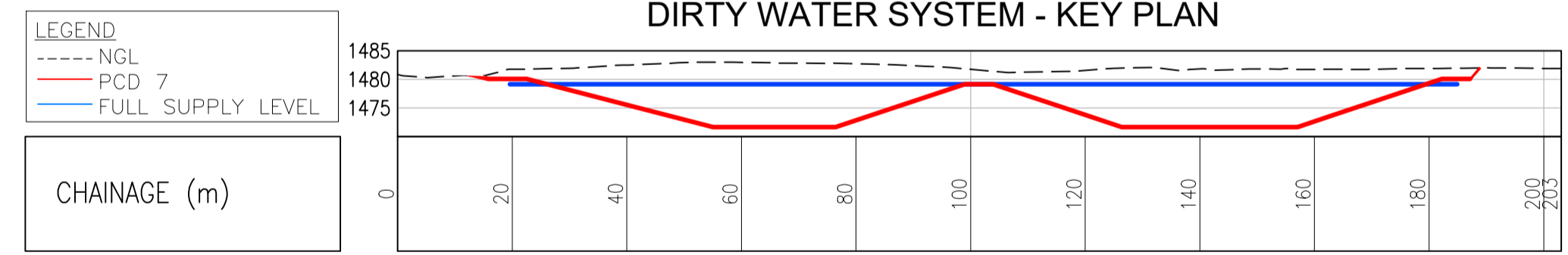
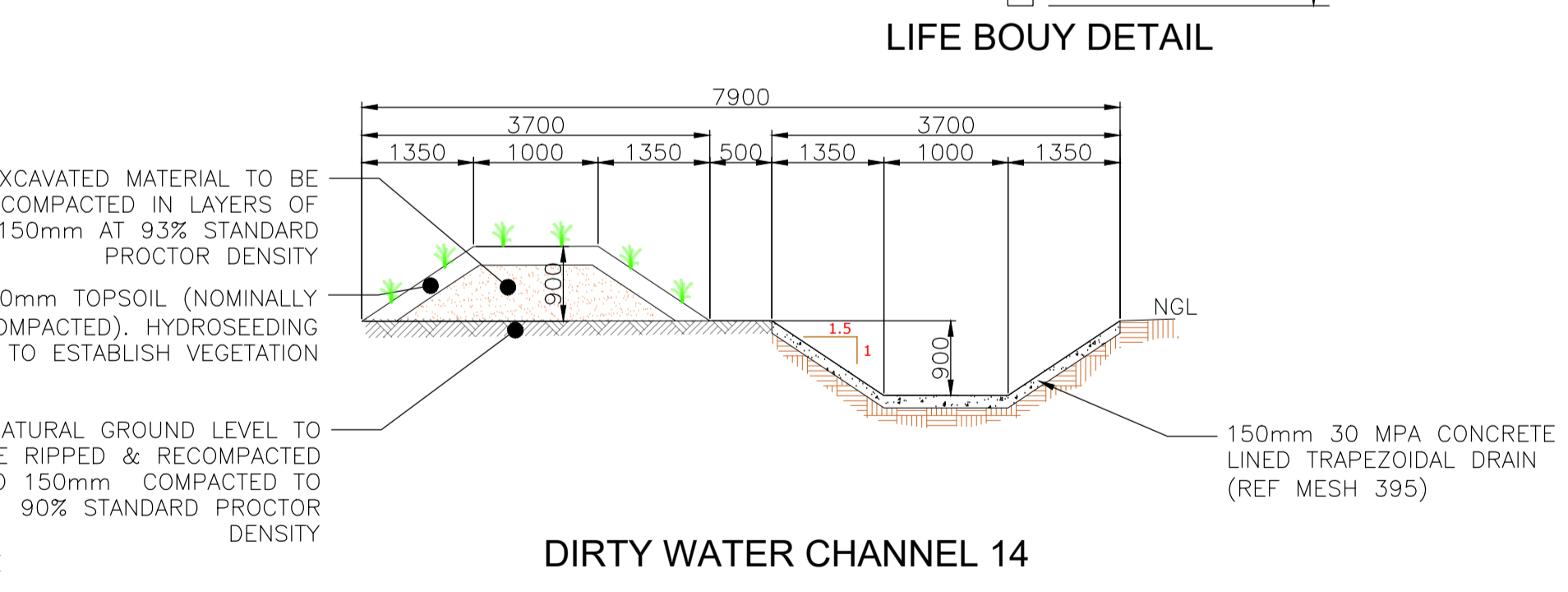
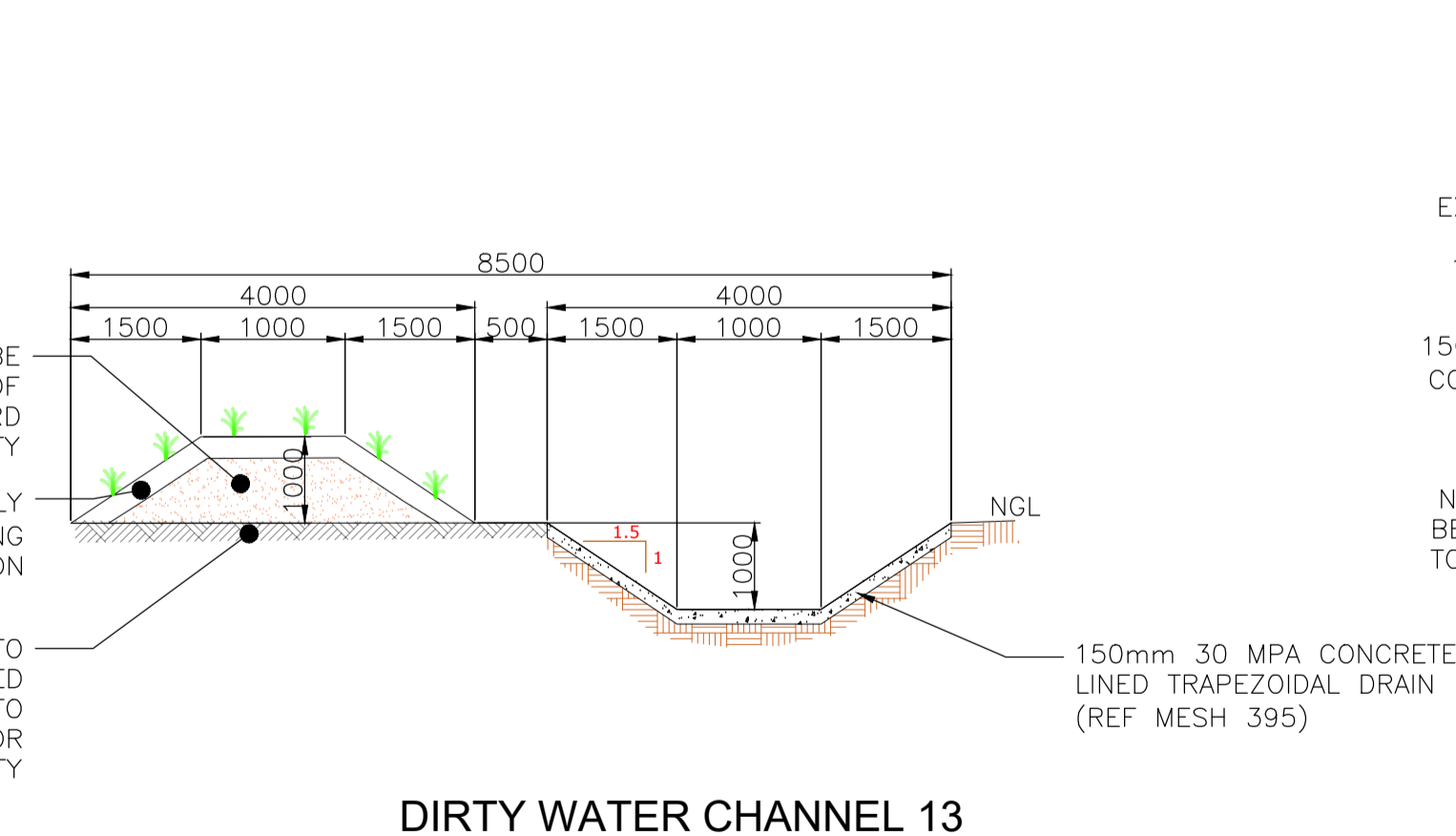
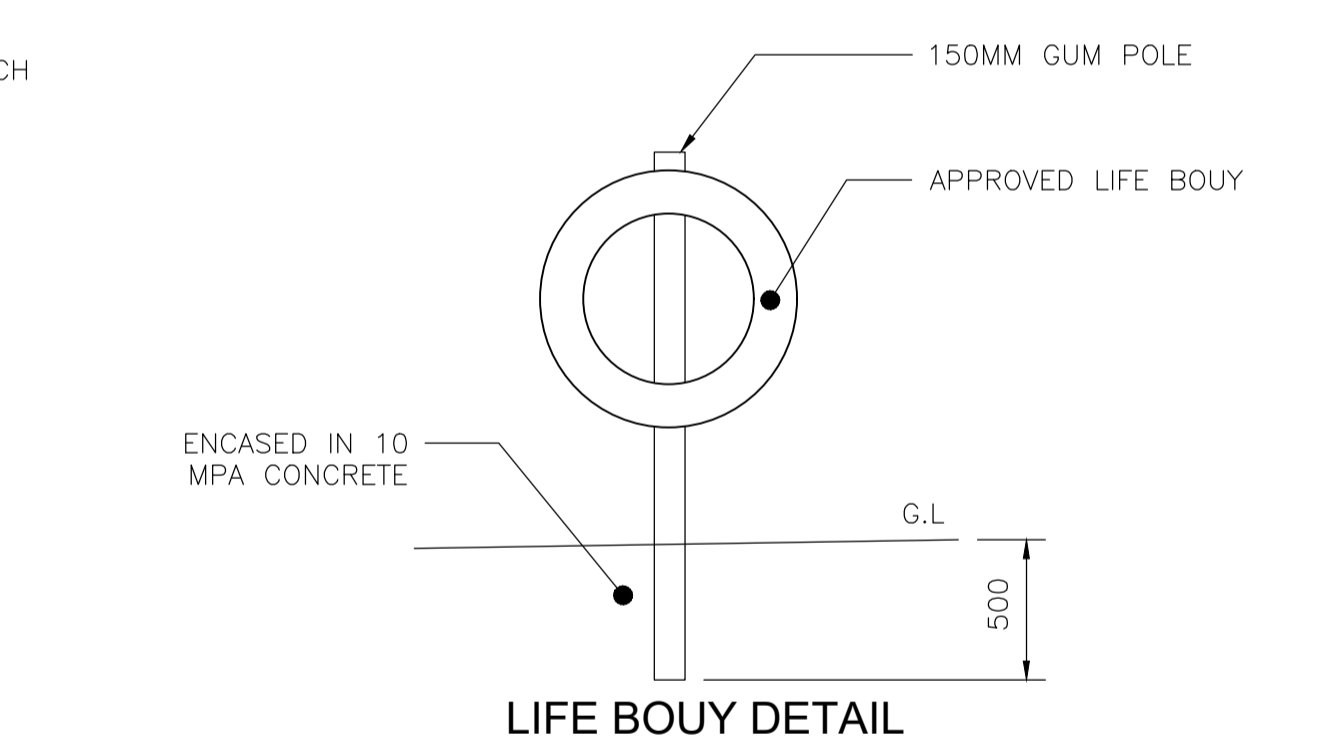
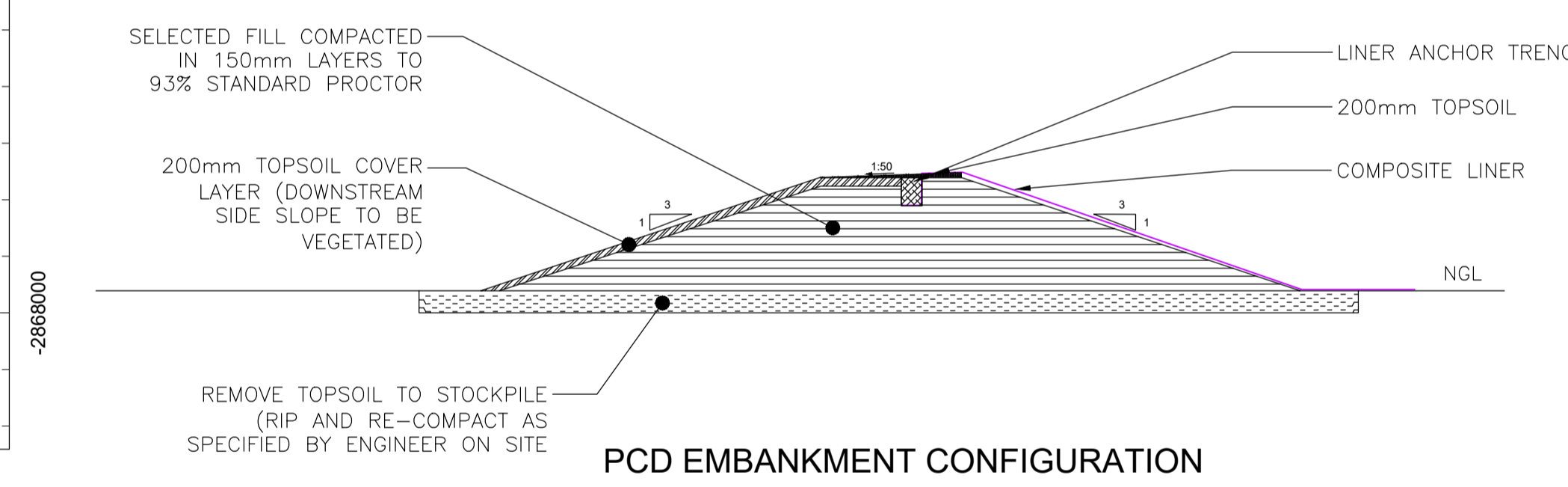
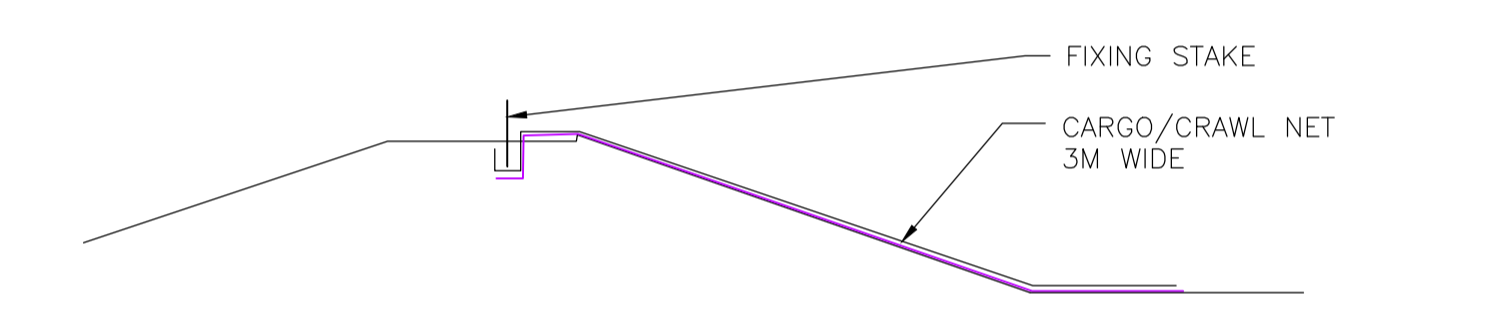
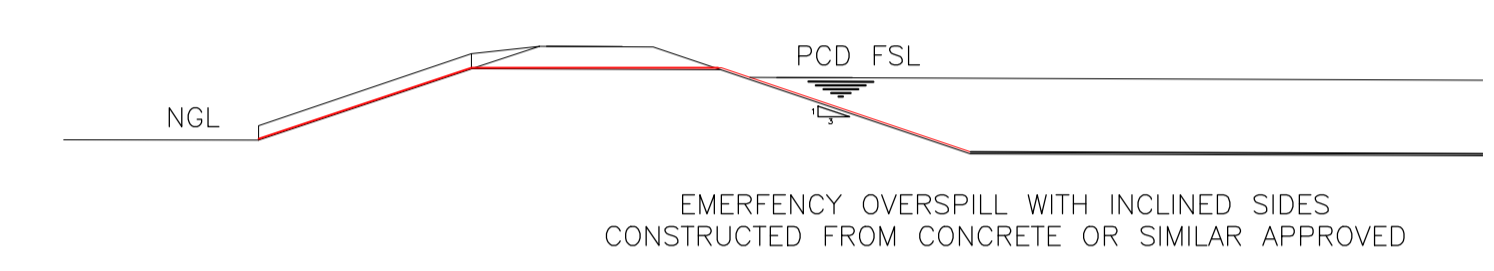
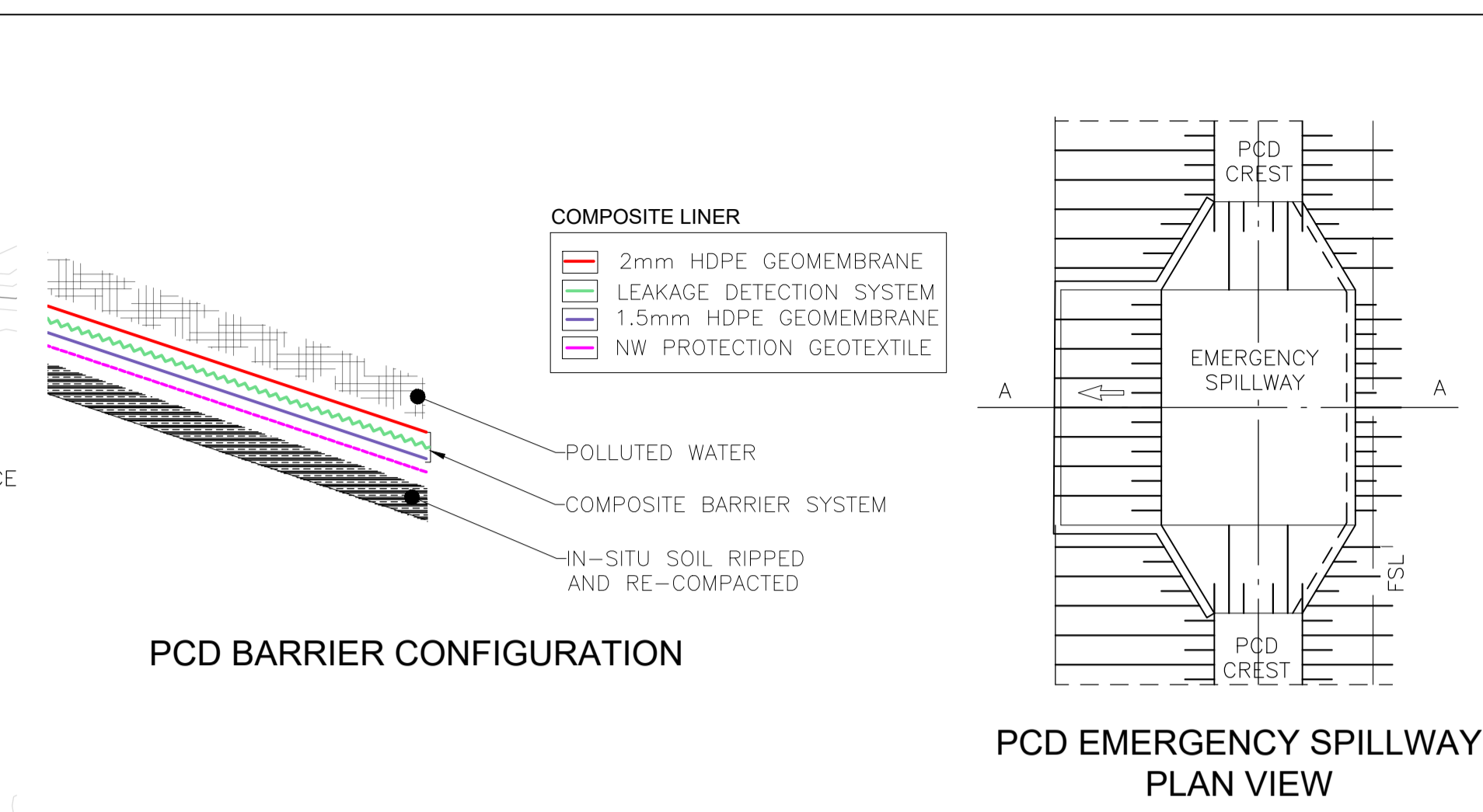
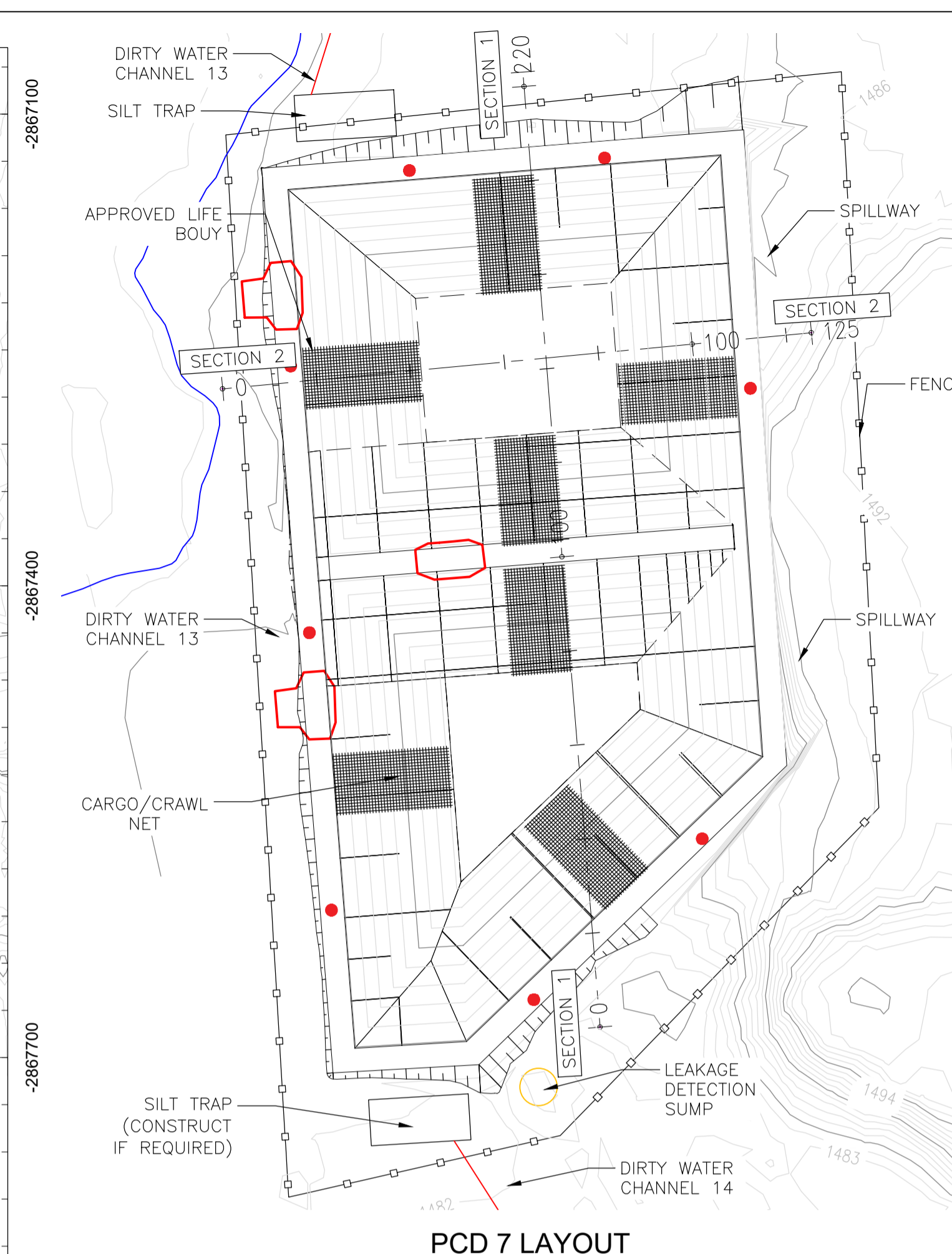
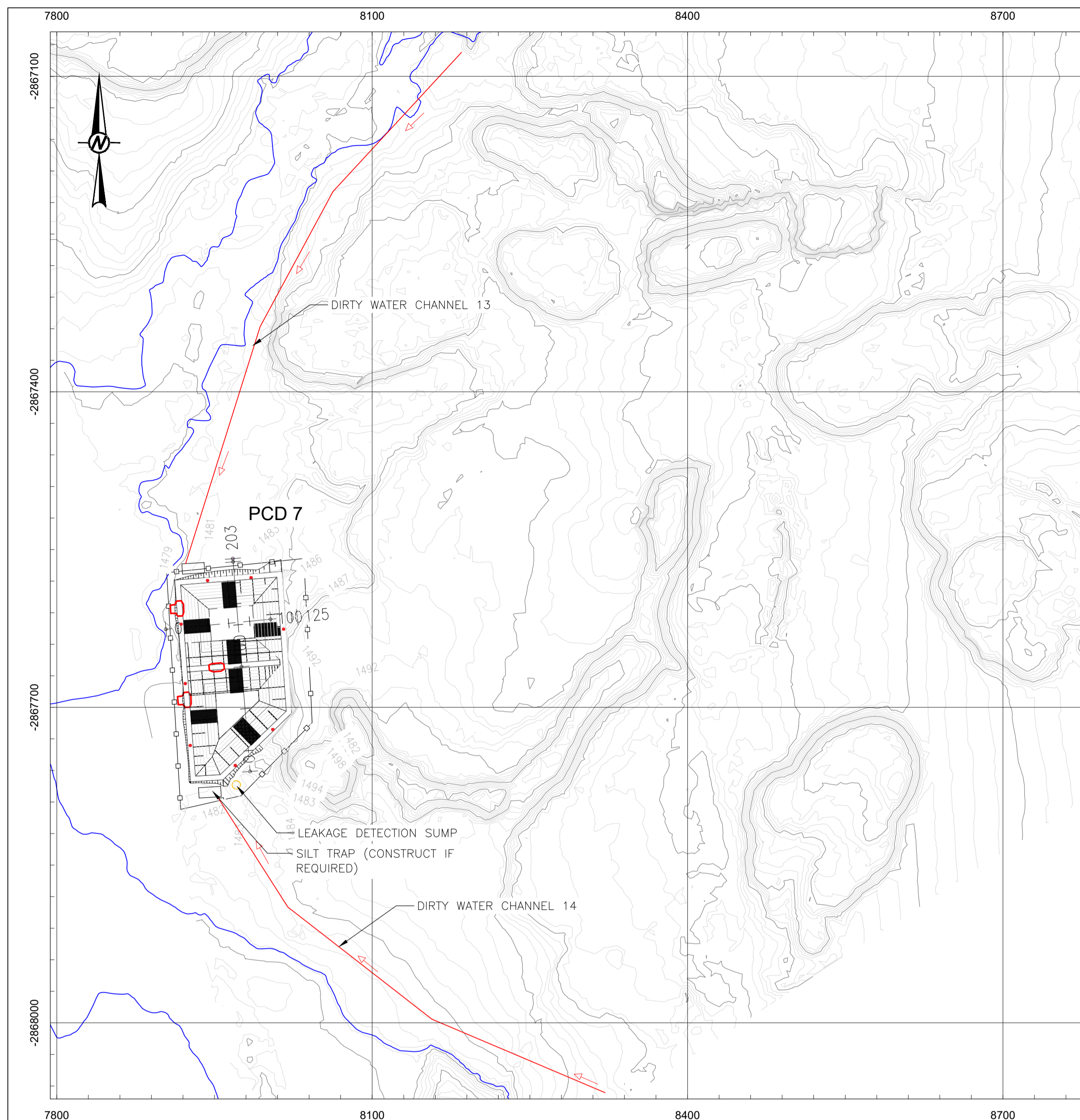
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 PROJECT MANAGER: MVDW
 SCALE: NTS
 SHEET SIZE: A1

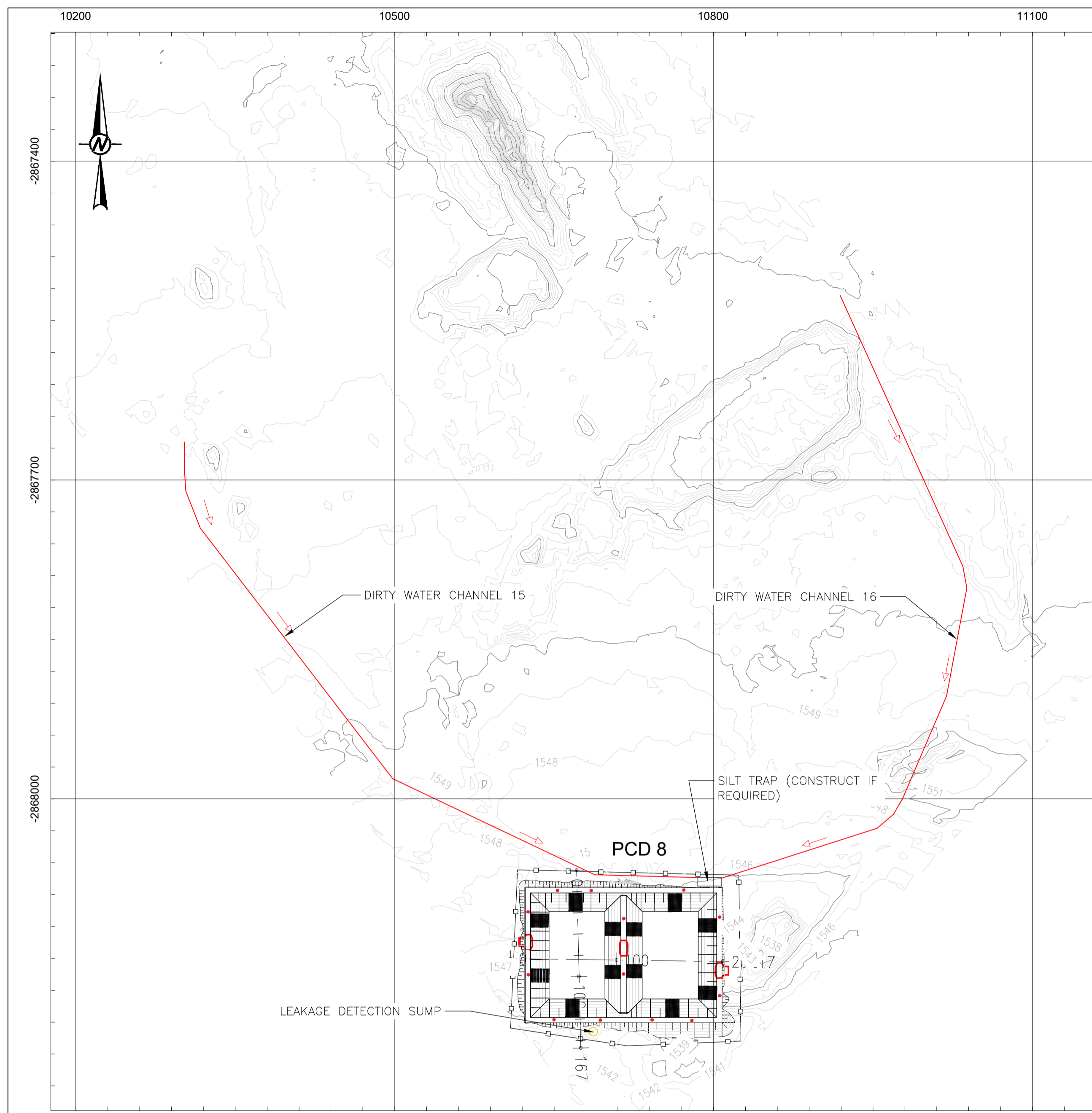
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PROJECT	CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE			
DRAWING TITLE	PCD 6 LAYOUT AND DETAILS			
PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
B599	001	CON	009	00



- NOTES:**
- ALL WORKS TO BE DONE TO SANS STANDARD.
 - 70KG SAND FILLED UV RESISTANT BALLAST BAGS PLACED ON 5M GRID SPACING ON PCD FLOORS.
 - THE PCD HAS A NORMAL OPERATING STORAGE OF 32 713M³.
 - THE PCD HAS A NORMAL OPERATING STORAGE + 50 YEAR STORM VOLUME OF 52 586M³.
 - THE PCD HAS A 0.8M FREEBOARD AND A CREST WIDTH OF 5M.
- EXCAVATED MATERIAL TO BE COMPACTED IN LAYERS OF 150mm AT 93% STANDARD PROCTOR DENSITY
- 150mm TOPSOIL (NOMINALLY COMPACTED), HYDROSEEDING TO ESTABLISH VEGETATION
- NATURAL GROUND LEVEL TO BE RIPPED & RECOMPACTED TO 150mm COMPACTED TO 90% STANDARD PROCTOR DENSITY

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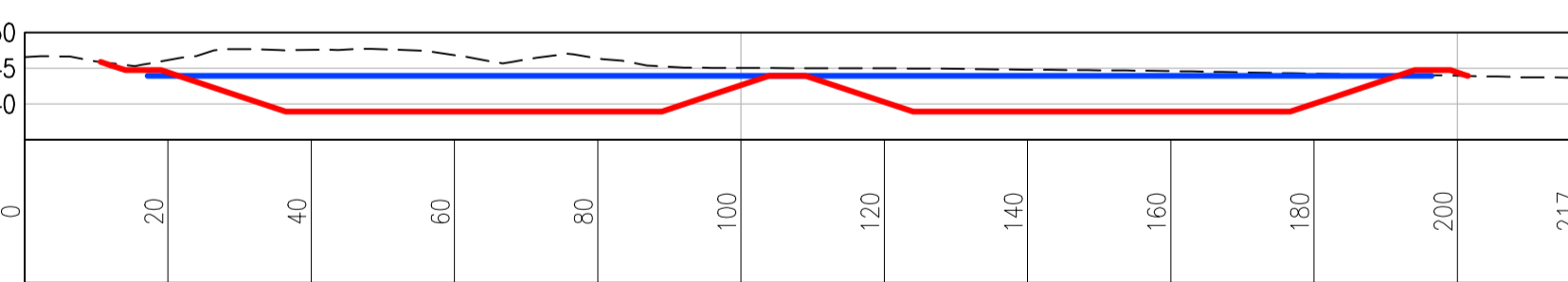
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DIRTY WATER SYSTEM - KEY PLAN

LEGEND
 - - - - NGL
 - - - - PCD 8
 - - - - FULL SUPPLY LEVEL

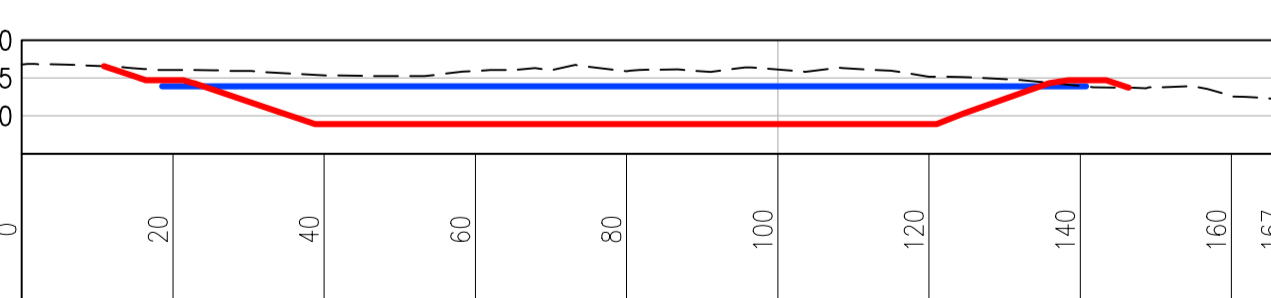
CHAINAGE (m)



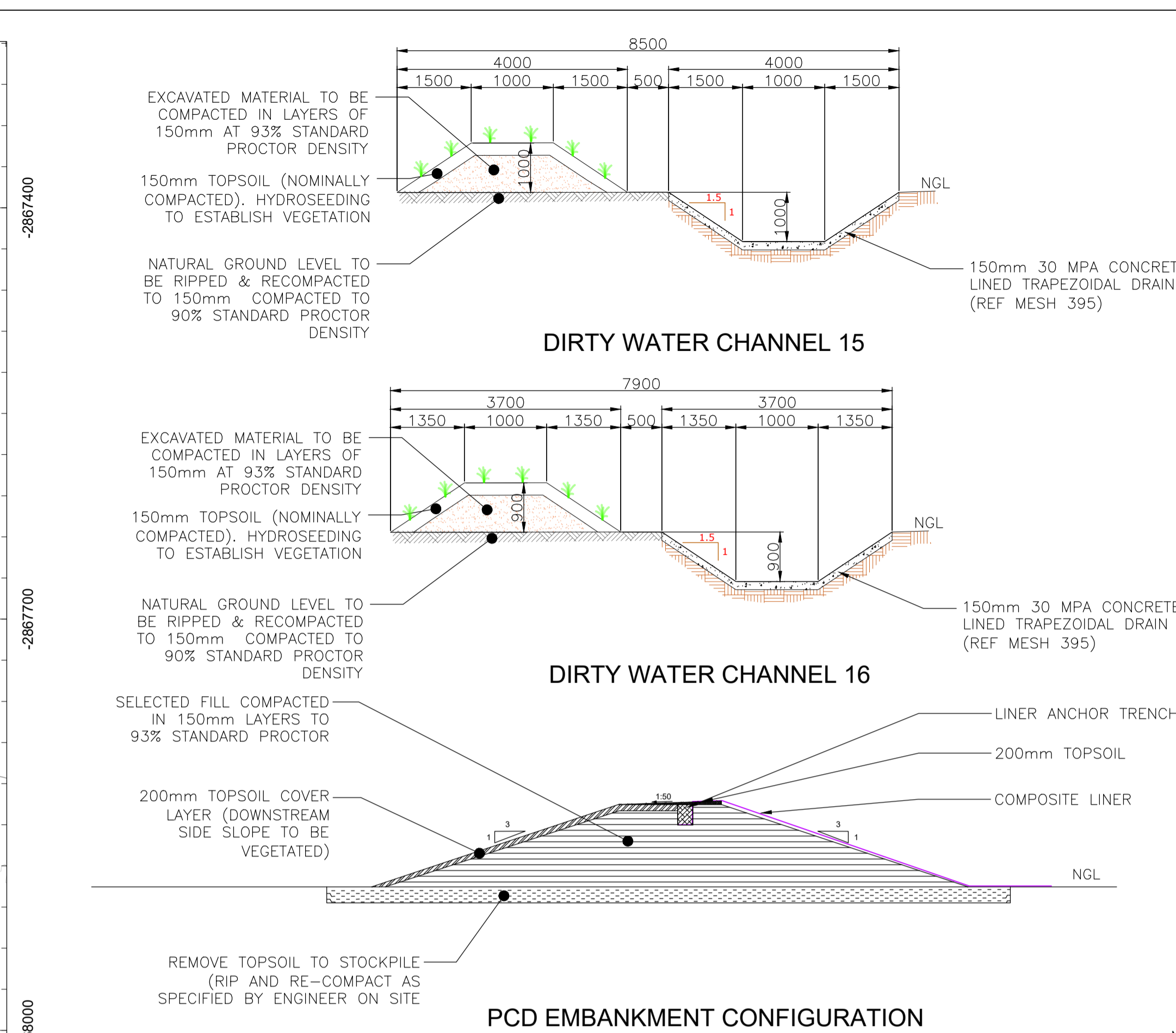
PCD 8 - SECTION 1

LEGEND
 - - - - NGL
 - - - - PCD 8
 - - - - FULL SUPPLY LEVEL

CHAINAGE (m)



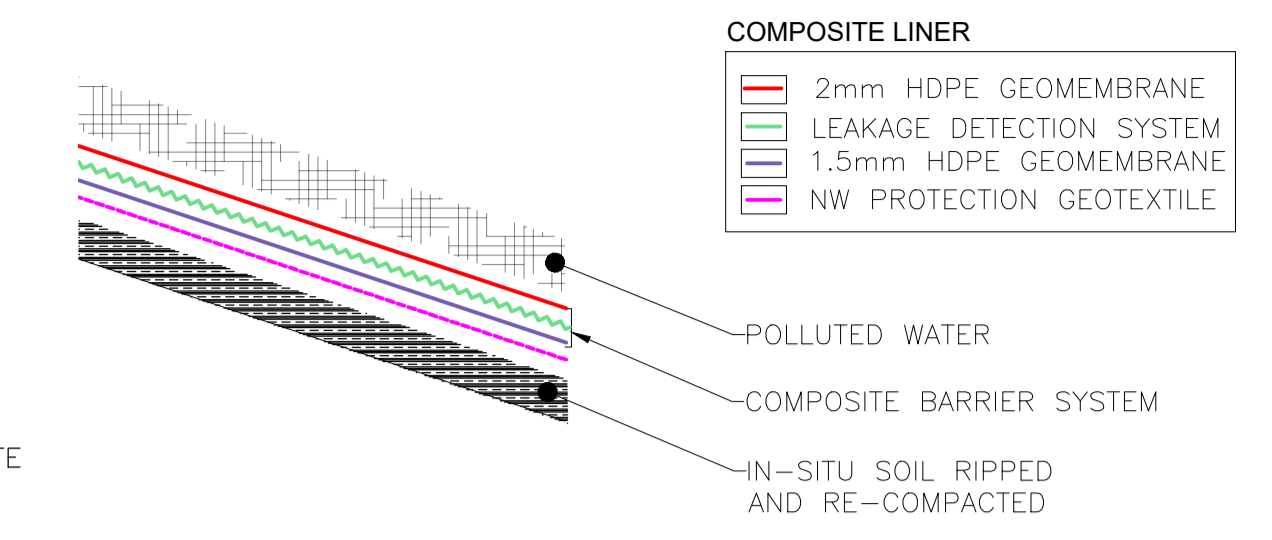
PCD 8 - SECTION 2



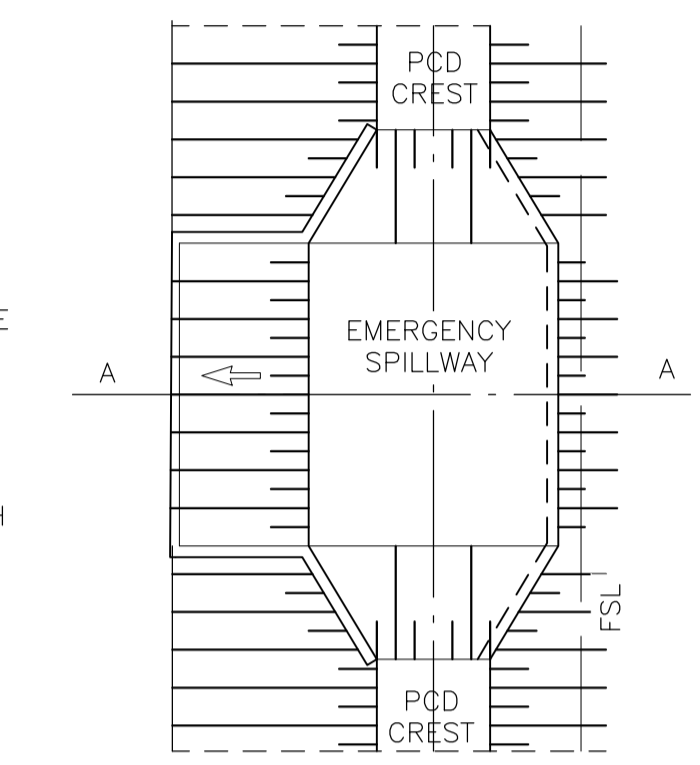
DIRTY WATER CHANNEL 15

DIRTY WATER CHANNEL 16

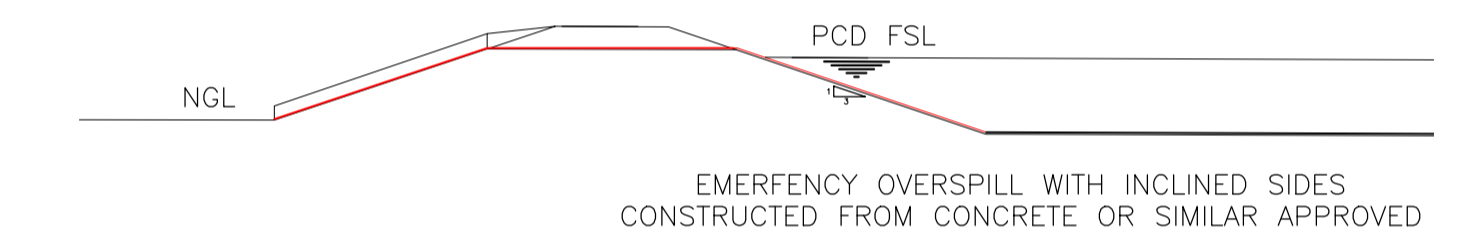
PCD EMBANKMENT CONFIGURATION



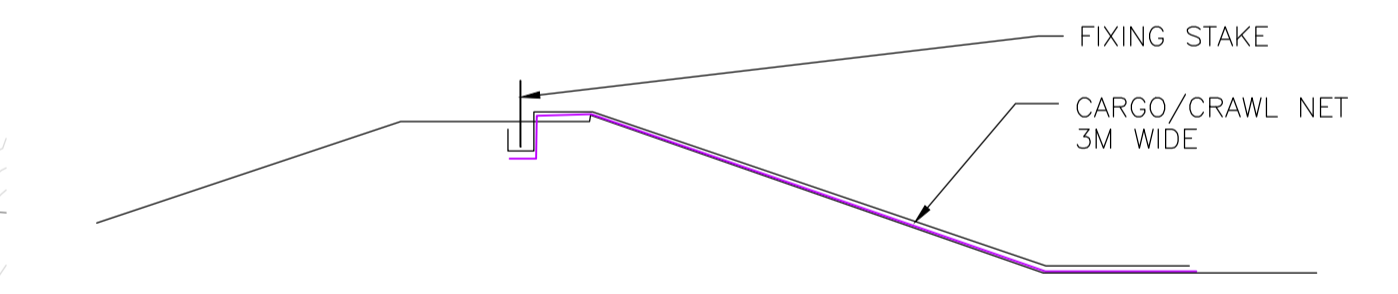
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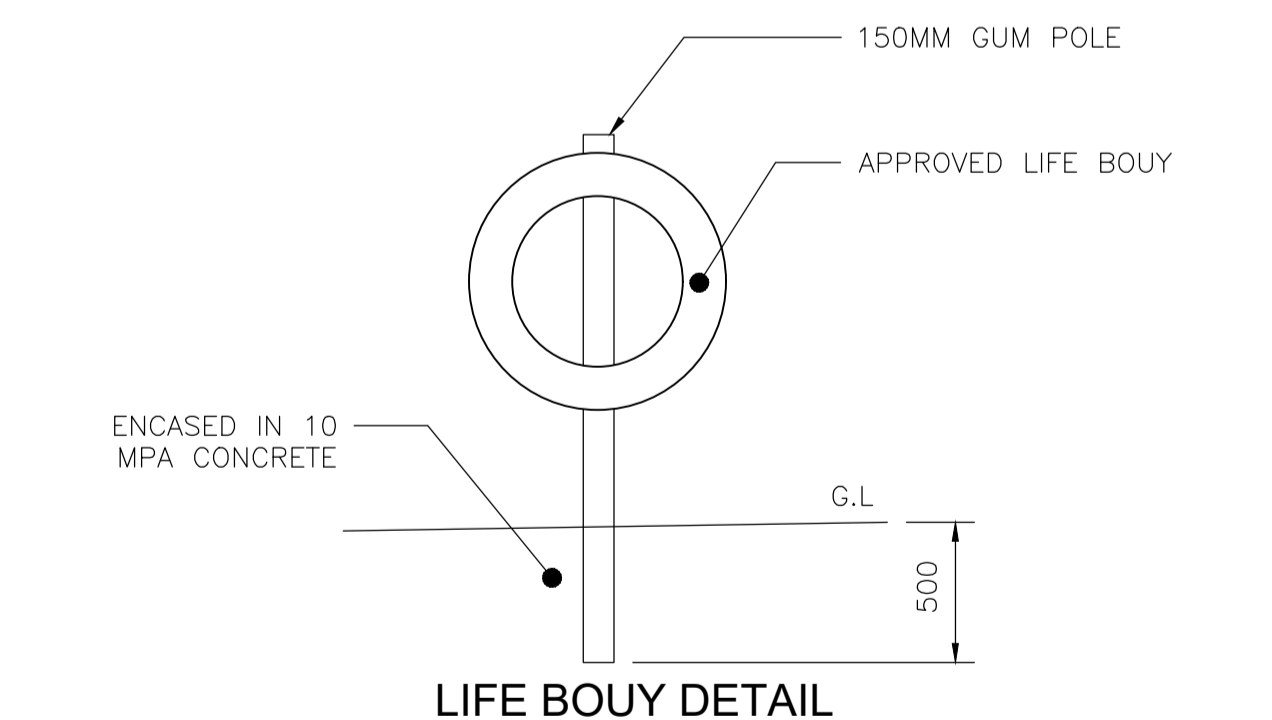
PCD EMERGENCY SPILLWAY PLAN VIEW



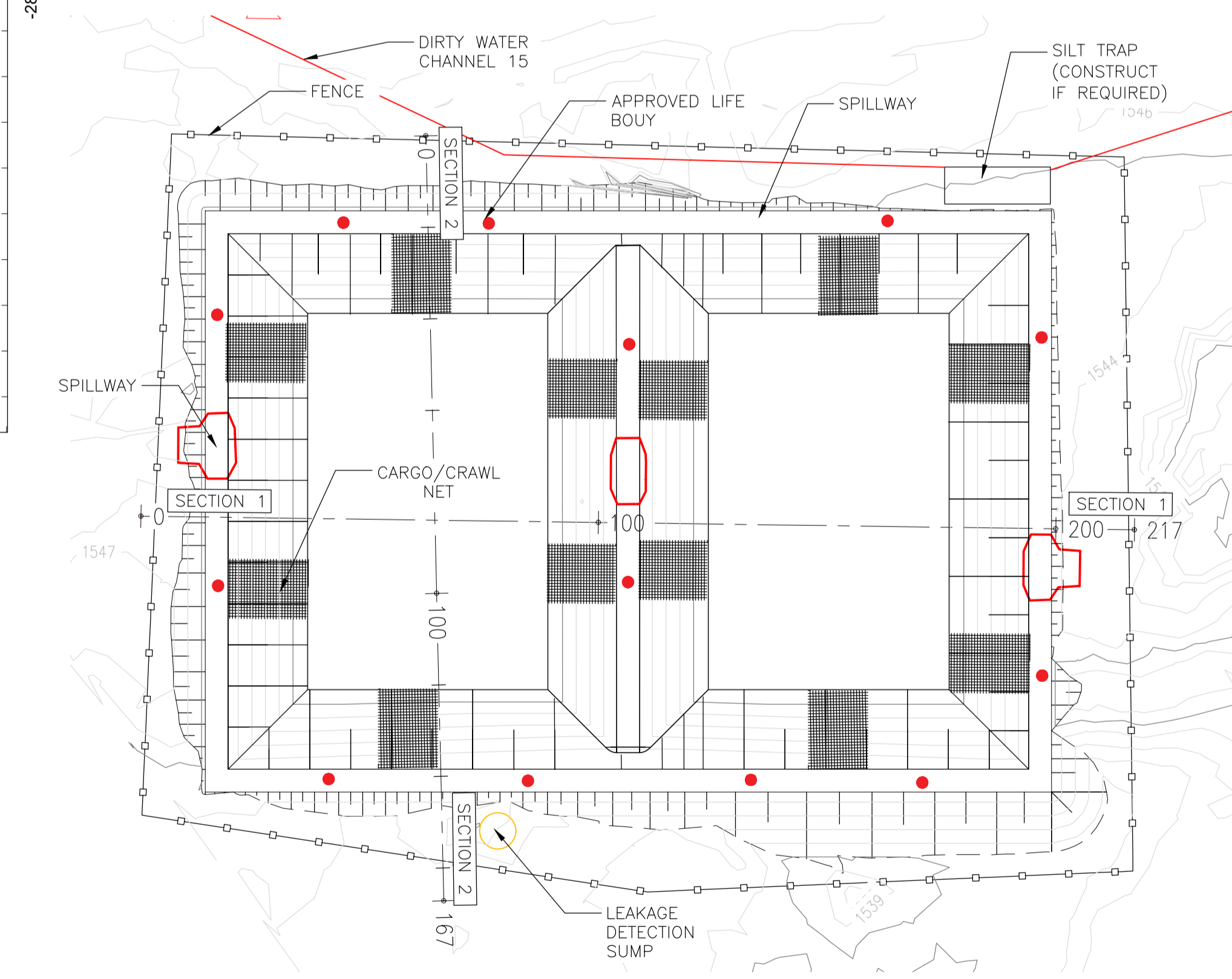
PCD EMERGENCY SPILLWAY - SECTION



CRAWL NET DETAIL



LIFE BOUY DETAIL



PCD 8 LAYOUT

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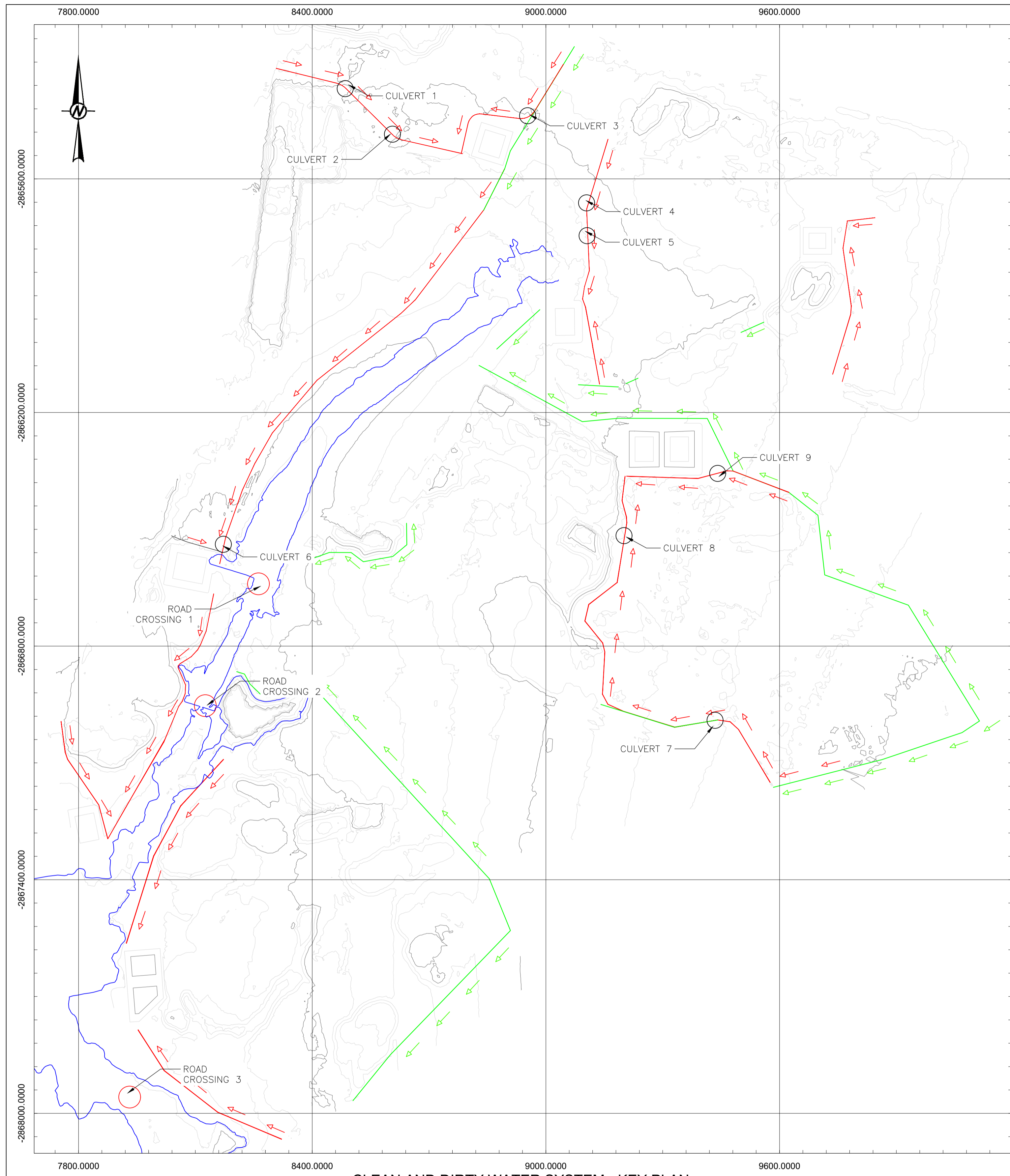
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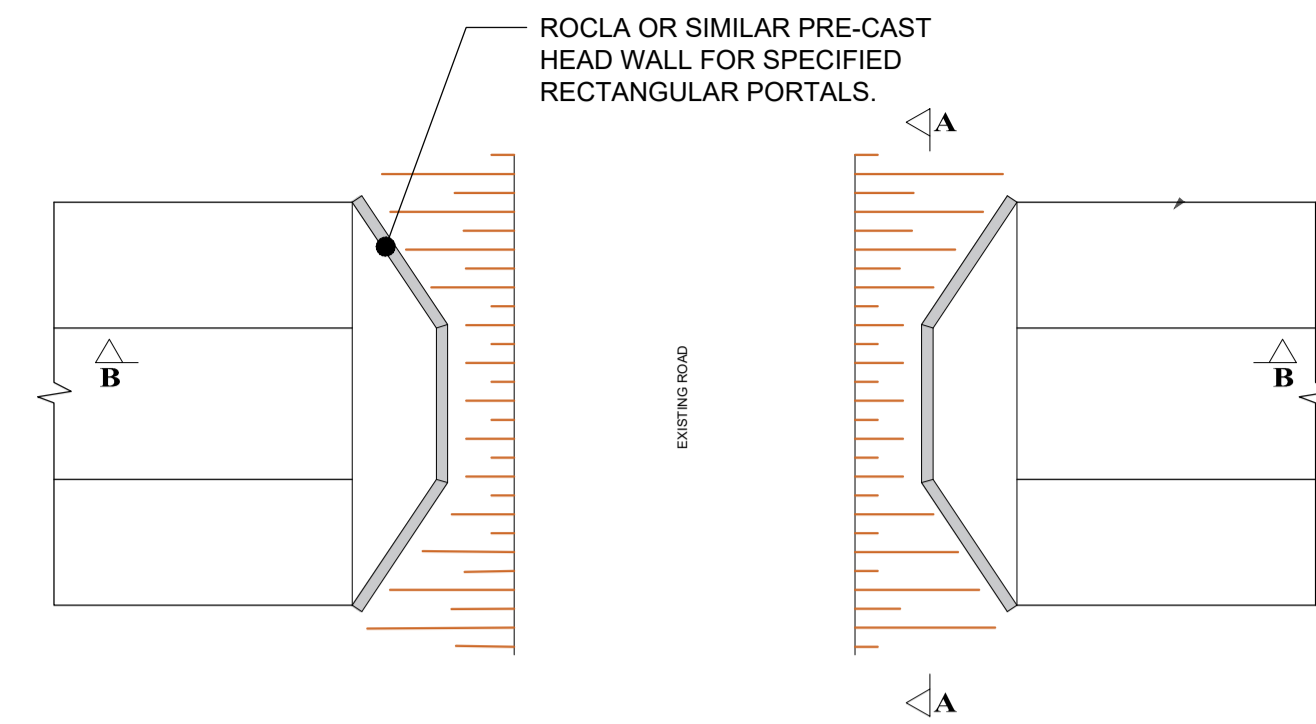
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LEAD PROJECT DRAFTER: MVDW
 PROJECT MANAGER: MVDW
 SCALE: NTS
 SHEET SIZE: A1

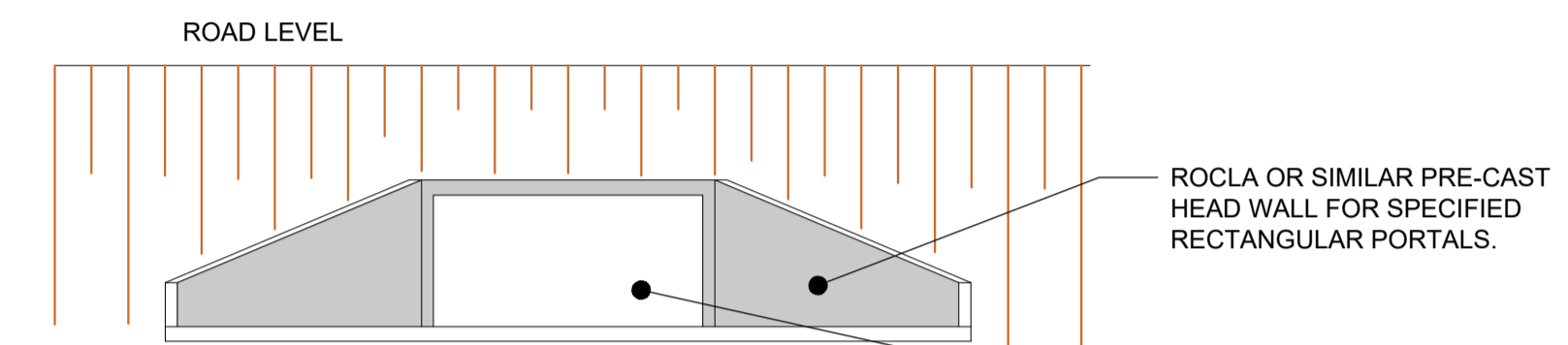
CLIENT	ANKER COAL (PTY) LTD				
PROJECT	CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE				
DRAWING TITLE	PCD 8 LAYOUT AND DETAILS				
PROJECT No	B599	DOC No	001	DOC TYPE	CON
DRAWING No	011	REVISION	00		



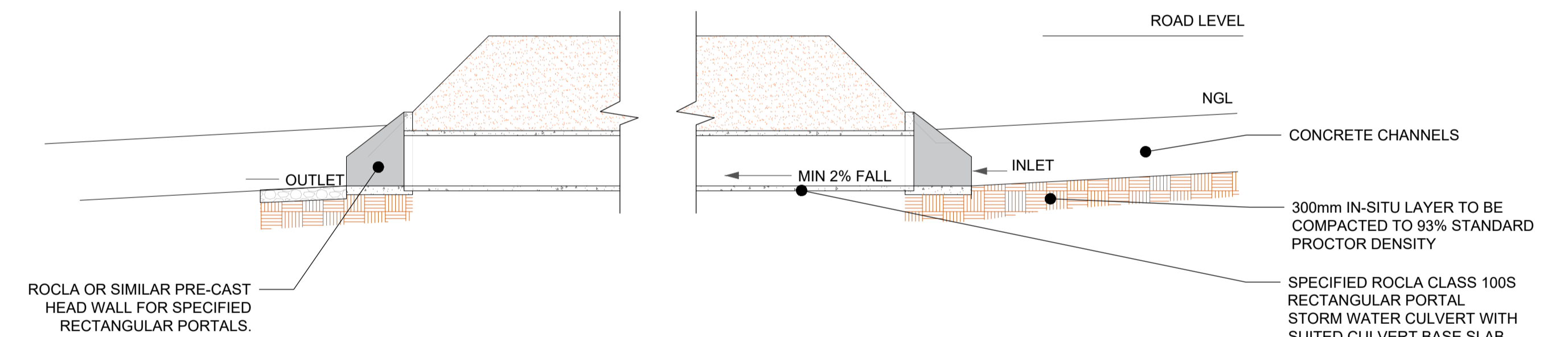
CLEAN AND DIRTY WATER SYSTEM - KEY PLAN



TYPICAL WATER CULVERT & STRUCTURE - PLAN VIEW



TYPICAL WATER CULVERT & STRUCTURE - SECTION A-A



TYPICAL WATER CULVERT & STRUCTURE - SECTION B-B

NOTE:
ALL CULVERTS THAT CROSS UNDER ROADS SHALL BE ROCLA RECTANGULAR PORTAL STORM WATER CULVERTS COMPLETE WITH BASE SLABS AND RUBBER SEALS & A MINIMUM COVER OF 1M. DISTURBED ROAD'S LAYER WORKS SHALL BE RECONSTRUCTED TO COMPLY WITH CLIENT'S EXISTING RECOMMENDATIONS & SPECIFICATIONS FOR ABNORMAL HEAVY LOADS. LAYERWORKS TO BE CONFIRMED WITH DETAILED GEOTECHNICAL STUDY

Culvert	50-yr flood peak (m ³ /s)	Type	Span (mm)	Height (V:H)*	No of
Culvert 1	2.97	Portal	3000	600	1
Culvert 2	2.97	Portal	3000	600	1
Culvert 3	0.18	Portal	450	450	1
Culvert 4	0.97	Portal	1200	600	1
Culvert 5	0.97	Portal	1200	600	1
Culvert 6	3.09	Portal	2100	900	1
Culvert 7	6.7	Portal	3000	1200	1
Culvert 8	6.7	Portal	3000	1200	1
Culvert 9	0.36	Portal	750	450	1

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00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY	IW	DR	MVDW	DR	AVDM	03/03

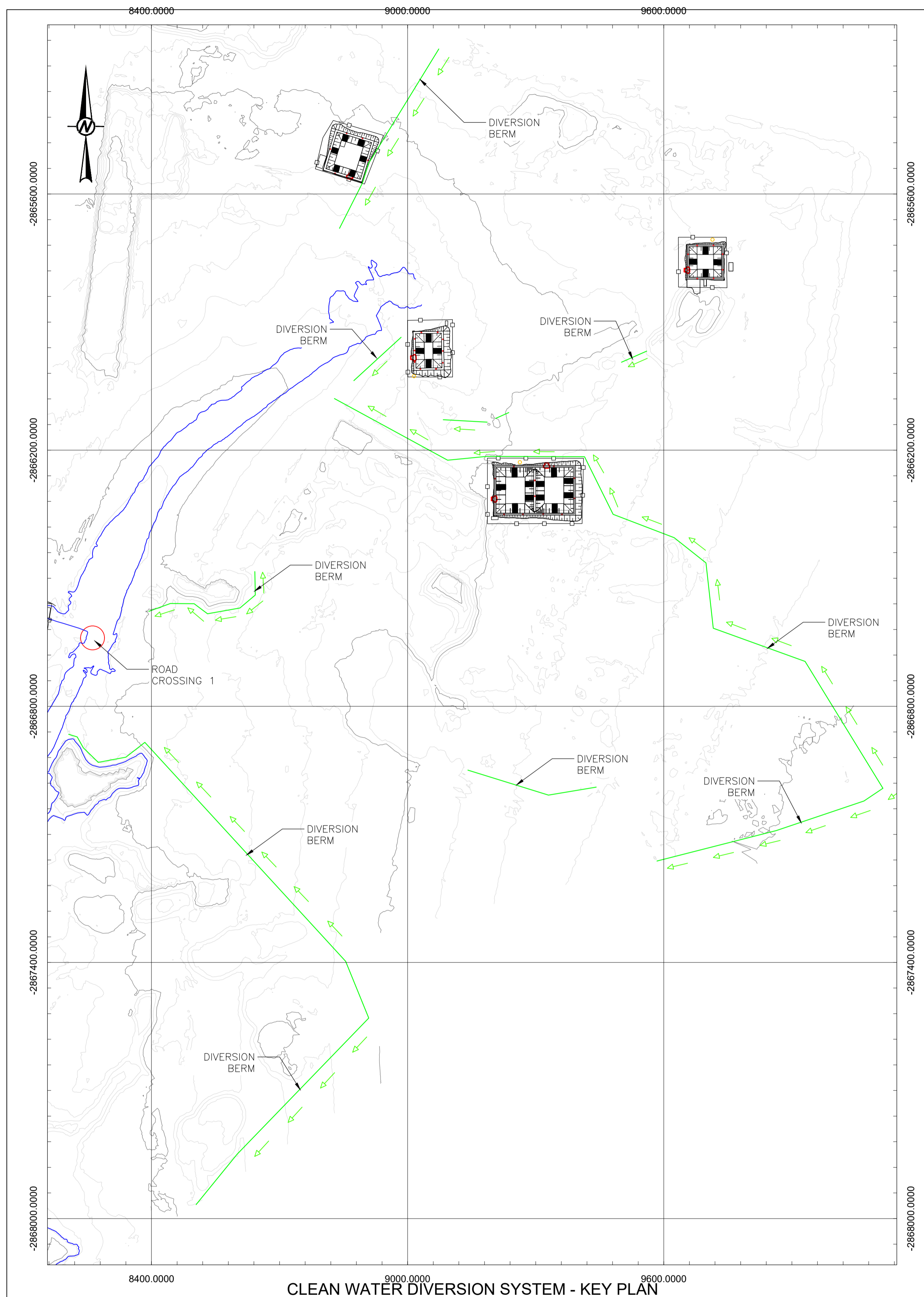
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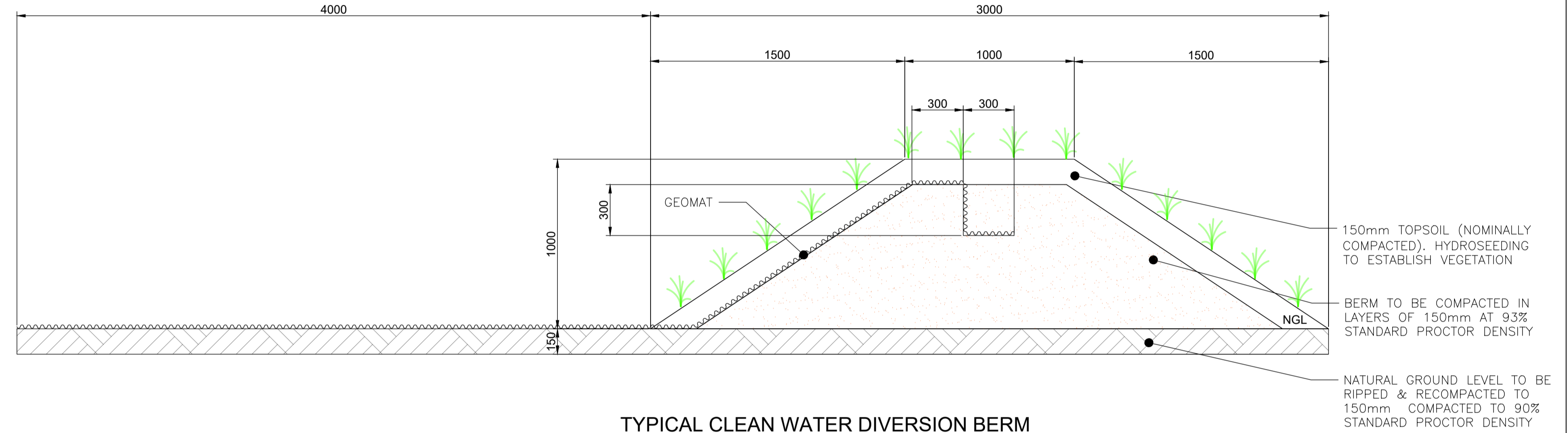
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CLIENT	ANKER COAL (PTY) LTD							
PROJECT	CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE							
DRAWING TITLE	DIRTY WATER CULVERTS - SCENARIO 1							
LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE	PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
MVDW	MVDW	NTS	A1	B599	001	CON	012	00




CLEAN WATER DIVERSION SYSTEM - KEY PLAN



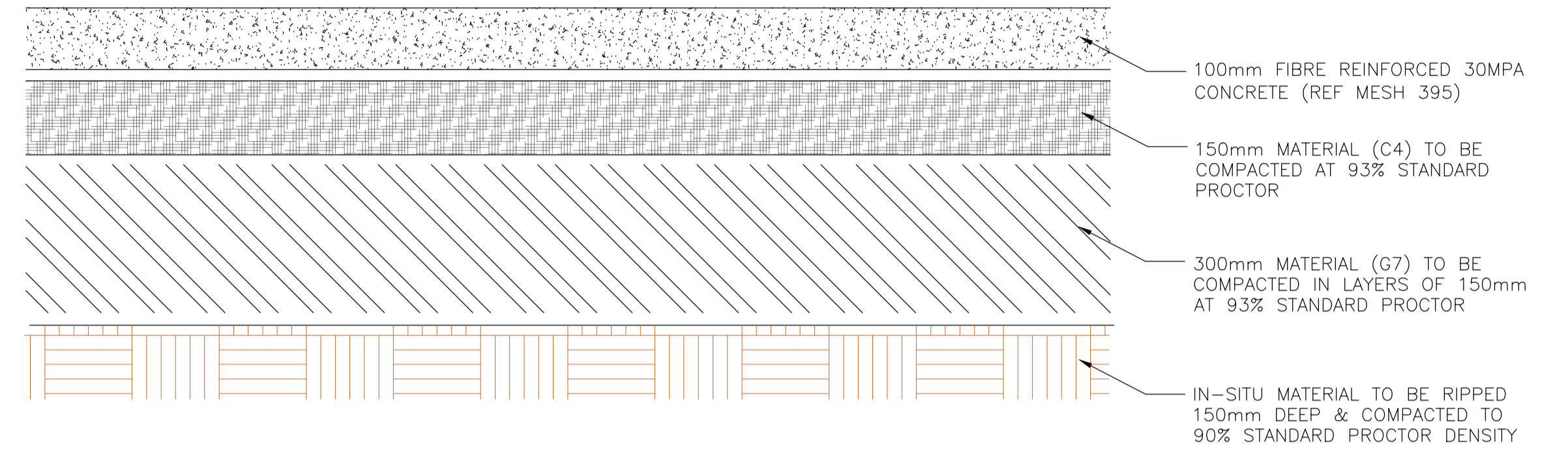
TYPICAL CLEAN WATER DIVERSION BERM

**CONCEPTUAL DESIGN
ISSUED FOR
INFORMATION ONLY**

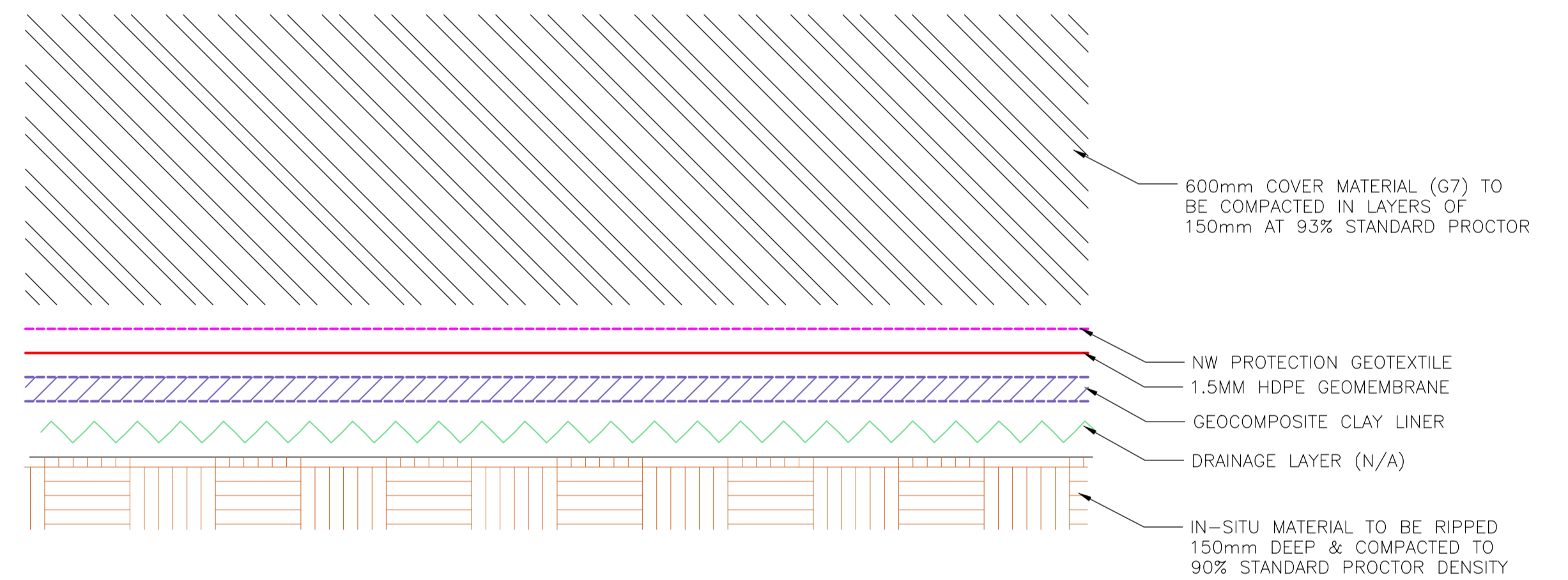
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00 CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY								PROJECT CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE		DRAWING TITLE CLEAN WATER DIVERSION INFRASTRUCTURE - SCENARIO 1						
REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE	LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE	PROJECT No	DOC No	DOC TYPE	DRAWING No	REVISION
		IW	DR	MVDW	DR	AVDM	03/03	MVDW	MVDW	NTS	A1	B599	001	CON	013	00



ROM AND PRODUCT STOCKPILE - KEY PLAN



WATER AFFAIRS (ALTERNATIVE)



ALTERNATIVE TO NORMS AND STANDARDS

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REVISION	DESCRIPTION	DRAWN	DRAWN CHECK	DESIGN	DESIGN CHECK	AUTHORISED	DATE
00	CONCEPTUAL DESIGN ISSUED FOR INFORMATION ONLY	IW	DR	MVDW	DR	AVDM	03/03

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CLIENT	ANKER COAL (PTY) LTD			
PROJECT	CONCEPTUAL DESIGN OF ELANDSFONTEIN SWM INFRASTRUCTURE			
DRAWING TITLE	ROM AND PRODUCT STOCKPILE BARRIER ALTERNATIVES			
LEAD PROJECT DRAFTER	PROJECT MANAGER	SCALE	SHEET SIZE	PROJECT No
MVDW	MVDW	NTS	A1	B599
DOC No	DOC TYPE	DRAWING No	REVISION	
001	CON	014	00	