

Engineered Seepage Capture Drains - Concept Design Report

04 September 2026

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From	Jeff Tuck	Project no.	12682240
Project name	Macraes Phase 4 - Fast Track Approvals Project		
Subject	Concept Design Report – Engineered Seepage Capture Drain		

GHD Limited (GHD) have been engaged by OceanaGold (New Zealand) Limited (OGNZL) to produce a concept design for a seepage capture system to demonstrate how waste rock stack (WRS) seepage can be captured, thus reducing contaminant loads discharging to the receiving environment. The concept design is to support water quality modelling undertaken by GHD for the Macraes Phase 4 (MP4) Project.

1. Introduction

OGNZL is proposing engineered seepage collection systems at the Macraes mine site to intercept seepage from WRSs before it enters surrounding streams and watercourses. The collected seepage would be discharged to the sites mine water management system or treated, before discharging it to the receiving environment.

WRSs have been constructed at the Macraes Operation by stripping topsoil and brown rock from the host area, and placing rock excavated from pits over this surface. Rainfall on the WRSs infiltrates vertically through the stacks before reaching the base of the constructed WRS and flowing in a nominally lateral direction along the underlying in-situ schist. The underlying schist has a lower permeability than the WRSs, which encourages a significant portion of the infiltrated water to flow laterally along the interface with the in-situ schist and present at the toe of the WRSs (i.e. where the constructed WRS extents meet the natural ground level). As the infiltrating water seeps through oxidising waste rock, it can mobilise contaminants that are undesirable for discharge to the receiving environment.

Water discharging from the WRSs can be generally described by the following categories:

- Surface runoff – surface water runoff via overland flow paths, typically of improved water quality following rehabilitation of the WRSs,
- Discrete toe seepage – seepage water discharging from the toes of WRSs within incised valleys (typically up stream of a constructed sediment retention pond or silt pond as is normal practice at the Macraes Operation),
- Distributed toe seepage – seepage water discharging over an extended perimeter of the WRS where there is no significant confining valley, and
- Basal seepage – seepage water that percolates through the WRS before entering the in-situ schist bedrock and generating a groundwater contaminant plume that extends beyond the extents of the WRS.

To reduce the volume of mine impacted seepage exiting the site, and therefore reduce the contaminant load carried by that seepage, it is proposed that discrete toe seepage be captured using subsoil bunds and sumps and distributed toe seepage be captured using subsoil drains retrofitted to existing WRSs. The proposed seepage collection system will direct seepage water to collection sumps. The collected water will be pumped to the mine water management system, or a water treatment plant (WTP) prior to being discharged from site.

This concept design addresses the likely WRS seepage flow paths, the most suitable locations to intercept and collect those flows, and the preliminary conveyance infrastructure required to transfer collected seepage for eventual treatment. This includes concept-level consideration of subsoil drains, subsoil bunds, collection sumps, pump stations, rising mains, indicative materials, and excavation requirements.

1.1 Site Location and Description

OGNZL owns and operates the Macraes Operation at Macraes Flat, approximately 30 km northwest of Palmerston in the Otago Region. The Macraes Operation is the largest gold mine in New Zealand and, since commissioning in 1990, has produced more than 6 million ounces of gold.

Macraes Flat is situated on an elevated plateau at approximately 500 m above sea level. The plateau is flanked by the Taieri Ridge to the northwest, Shag Valley and Horse Range to the east, and the coastal hills and extinct volcanic cones of Palmerston and Waikouaiti to the southeast. Macraes Road provides access to Macraes Flat and the Macraes Operation, connecting to State Highway 85 to the east and State Highway 87 (SH87, the Middlemarch–Hyde Road) to the west.

The environment within and surrounding the Macraes Operation has been shaped by historic and current mining activities undertaken in accordance with existing resource consents. Figure 1 below shows the arrangement of the major mine features at the Macraes Operation.

The concept design for seepage capture drains presented in this report centres around two areas, (1) the Coronation Mining Area located to the north of the site, specifically adjacent to the Coronation North WRS and Trimbells Gully WRS., and (2) The Central Mining Area located in the centre of the site, specifically adjacent to the Frasers West WRS. The concept also includes generic design features to be included at other WRSs across the site.

1.2 Purpose of this report

The purpose of this report is to present a concept design for interception, collection, and conveyance of WRS seepage water for the proposed MP4 Project. The concept design is to provide a basis for detailed design and site-specific investigations. It is developed based on proposed development for the proposed MP4 Project.

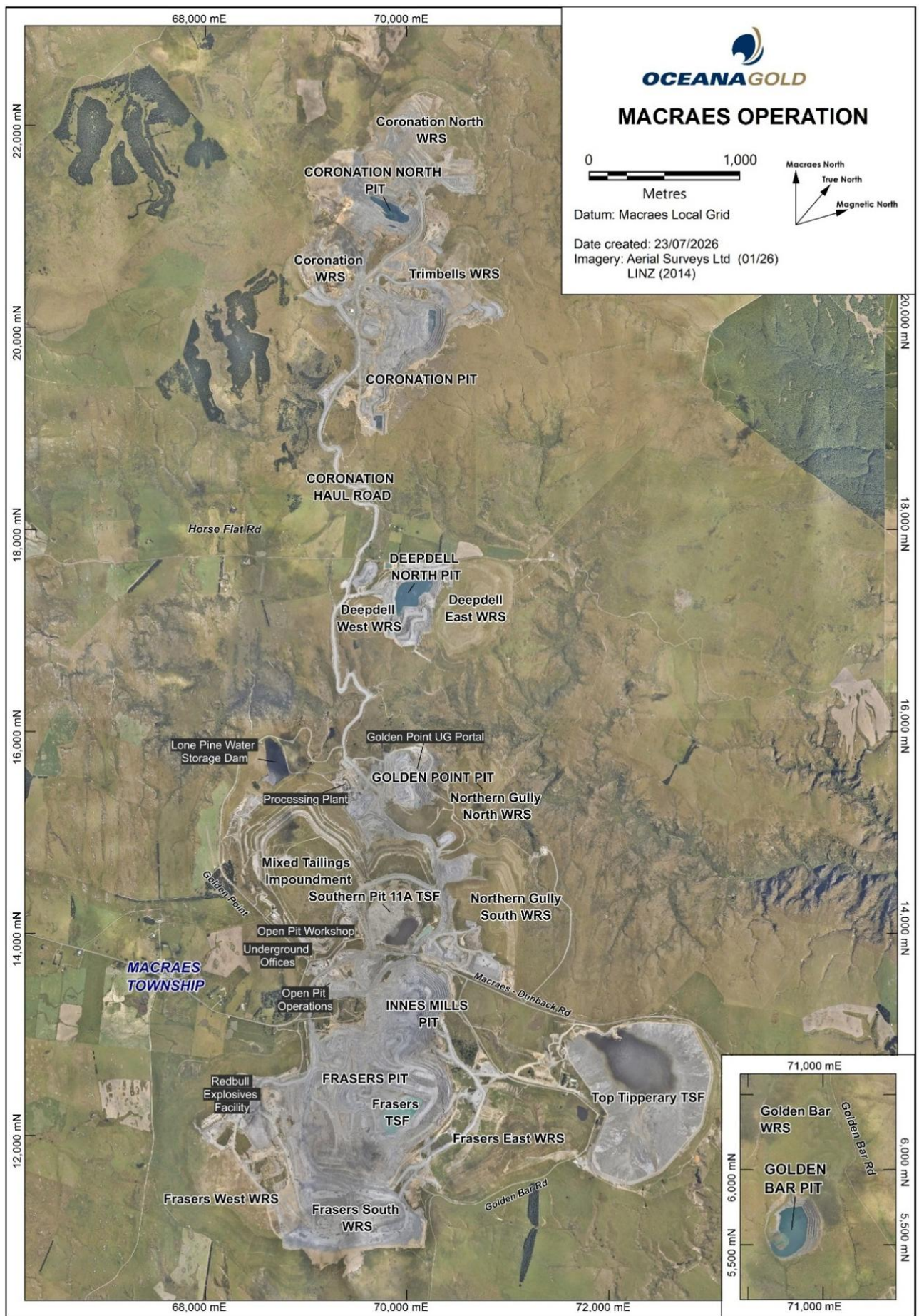


Figure 1 Existing site layout at the Macraes Operation (Source: OGNZL)

2. Scope and limitations

2.1 Scope of work

The scope of this report is to present a concept-level design for collection and transmission for WRS seepage waters. This includes:

1. Concept design of subsoil bunds and toe drains for the interception of discrete toe seepage and distributed toe seepage, including indicative horizontal and vertical alignments.
2. Concept design of seepage collection sumps, including estimates of flow rates and pumps required.
3. Concept design of conveyance infrastructure for the collected waters to a nominated WTP location.
4. A high-level description of potential power supply options for the proposed pumping infrastructure.

2.2 Limitations

This report has been prepared by GHD for OceanaGold (New Zealand) Limited and may only be used and relied on by OceanaGold (New Zealand) Limited for the purpose agreed between GHD and OceanaGold (New Zealand) Limited as set out in this report. Without limiting the foregoing, this report is intended to support OceanaGold (New Zealand) Limited's application under the Fast-track Approvals Act 2024 and may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application.

GHD otherwise disclaims responsibility to any person other than OceanaGold (New Zealand) Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 3 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by OceanaGold (New Zealand) Limited and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Information contained herein must not be relied on for investment purposes.

3. Assumptions

The following assumptions have been incorporated into the conceptual designs documented in this report.

- Power can be made available at all sites.
- Pumping will be to the process plant area for onsite treatment or use within the mine water management system.
- Return pipelines from the water treatment plant to catchment outlets are not included.
- Sizing of conveyance infrastructure is based on an assumed net percolation rate of 128 mm/yr from the contributing catchments, equivalent to 0.04 L/s/ha¹. It is expected that the net percolation rate to a WRS should be reduced below this rate following closure and capping of the WRS.
- The provided client data, or the as-mined surface, provides a usable representation of the underlying schist surface, and this schist surface is typically between 1.2 - 4 m deep.
- The level of the schist layer surface is represented by the provided 'As Mined' Digital Elevation Models (DEM).
- Intercepted flows are largely free of grit and other non-dissolved solids.
- Rising mains have been conceptually assessed using an indicative flow velocity of 1 m/s due to the long transfer distances and the associated increase in hydraulic losses at higher velocities. Future design stages may consider larger pipelines to reduce losses and lower pump requirements.

¹ GHD (2026). Macraes Phase 4 – Surface and Groundwater Assessment. Report for OceanaGold (New Zealand) Limited. 12682240-REP-REV0.

4. Concept Design

The concept design has been developed using available topographic survey information, including both the current ground surface and an interpreted original schist surface beneath the waste rock stacks. These surfaces were used to identify likely seepage pathways and suitable locations for subsoil drains and subsoil bunds to most effectively intercept infiltration before it exits the waste rock stack footprint.

Catchments were then generated for the proposed interception alignments to verify that the areas of interest beneath the waste rock stacks were effectively intercepted and to provide the basis for estimating subsoil infiltration flows. These catchments, together with the adopted infiltration rate, were used to inform preliminary sizing of drains, collection sumps, pump stations, and rising mains.

4.1 Project Areas

This concept design considers seepage interception opportunities from two areas at the Macraes mine site:

- Coronation area, including:
 - Coronation WRS, and
 - Trimbells WRS
- Frasers area, including:
 - Frasers West WRS.

Indication of additional existing and proposed seepage capture points are made for:

- Proposed:
 - Coronation WRS
 - Golden Bar WRS via existing Clydesdale silt pond
 - Frasers South WRS
- Existing (with collection mechanisms to be amended for mine closure):
 - Northern Gully WRS
 - Frasers West WRS reporting to Murphys silt pond
 - Frasers East WRS

4.2 Groundwater Modelling

The concept design has been informed by available hydrogeological understanding and digital terrain data provided by the client. In particular, Digital Elevation Models (DEMs) representing both the current ground surface and the interpreted surface of the underlying schist were used to assess seepage behaviour and inform interception design. The input data sources for this assessment include:

- As-mined surfaces “*Macraes_coro as mined 2203301.dxf*” and “*Macraes_Site As-mined_251130.dxf*” with modifications made through cutting proposed MP4 features from the surface, and
- Current site surfaces “*Macraes_Coro_Site_Surface_241001.dxf*” and “*Macraes_Site_Surface_251130.dxf*” with modifications made through adding proposed above ground features.

These DEMs were imported into QGIS and analysed to derive elevation profiles, flow paths, and catchment extents. The as-mined surface DEMs were used as the primary control surface for seepage movement, reflecting the assumption that infiltrating water travels laterally along this relatively low-permeability boundary. The current surface DEM was used in parallel to assess horizontal alignment, excavation requirements and constructability.

Using QGIS tools, flow direction and flow accumulation analyses were undertaken on the schist surface to identify preferential seepage pathways and low points where infiltration is likely to concentrate. These outputs were then used to guide the positioning of subsoil drains and subsoil bunds to maximise interception efficiency while considering constructability. Site investigations will be required during subsequent design stages to confirm the depth to schist, validate the interpreted schist surface used in this assessment, and refine final drain and pipeline alignments.

The vertical alignment of each subsoil drain has been developed primarily with reference to the topography of the underlying schist rather than the current finished surface. This is because the subsoil drains functions as a gravity

drainage system and therefore requires continuous fall along the alignment. Localised high points and low points in the schist surface can impede drainage performance and must therefore be considered in the concept design. The current surface topography has also been taken into account to reduce excavation where practicable.

4.2.1 Groundwater Modelling Approach

The groundwater modelling approach for the purpose of determining contributing seepage areas adopted for this concept design is based on the interpretation of seepage flow paths derived from DEM analysis within QGIS, rather than detailed numerical groundwater modelling.

The methodology involved:

- Importing client-provided DEMs modified to represent the future surface and the underlying schist surface into QGIS.
- Generating flow direction and flow accumulation rasters to identify preferential seepage pathways across the schist surface.
- Overlaying interpreted flow paths with the current ground surface to assess feasible locations for subsoil drains and subsoil bunds.
- Visual seepage indicators observed onsite, including localised vegetation and standing surface water areas, were used as a qualitative check on the DEM and QGIS derived flow paths and low points.

An example of the modelled flow paths for the Frasers area, with subsoil drainage included as forced interceptions is shown below in Figure 2.

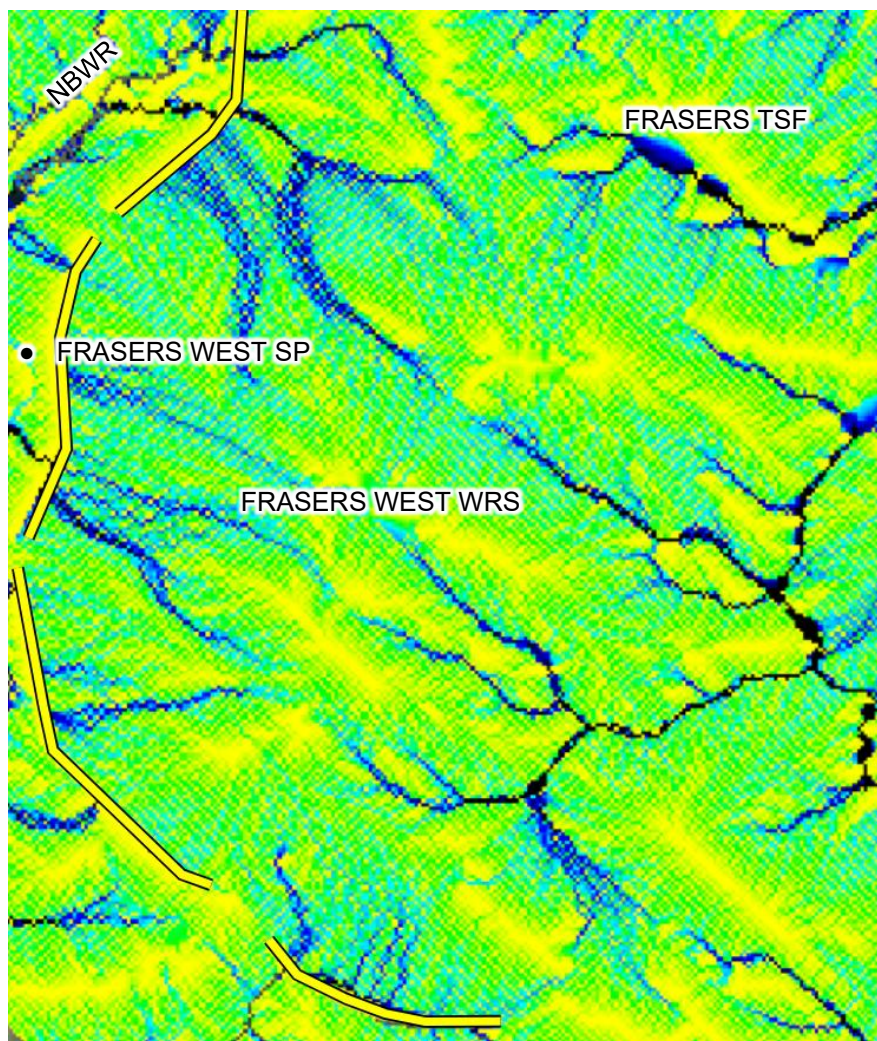


Figure 2 *Infiltration flow paths modelled with subsoil drain interceptions.*

4.2.2 Groundwater Modelling Results Summary

The DEM-based analysis indicates that seepage is expected to concentrate along defined pathways on the schist surface and at localised low points controlled by underlying topography. These areas represent the most effective locations for interception.

These field observations were considered alongside the digital terrain analysis to verify likely seepage pathways and to assist in locating subsoil drains and collection sumps at concept level.

The concept design suggests subsoil drains should be utilised along linear flow paths where seepage is distributed along the toe of the waste rock stacks. Subsoil bunds should be utilised at localised low points on the WRS margins, such as valley features, where seepage naturally converges.

Hydrogeological modelling indicates that effective interception is achieved where the drainage system penetrates the schist surface by at least 250mm. Conceptually, drainage pipes should be designed to intercept and capture laterally flowing seepage before it exits the waste rock stack footprint. Groundwater modelling has shown that the most effective location for the drains is within the toe of the WRS as incorporated into this concept design. In some ground conditions, locating the drain outside of the WRS toe can significantly reduce the seepage capture potential (Refer GHD (2026), Appendix D). Site specific ground investigations are to inform detailed design and confirm appropriate positioning of the drains with an understanding of the local ground conditions.

Further detail on the groundwater modelling is provided in GHD (2026, Appendix D)² documenting the design rational for seepage capture drain alignment and depth.

Catchment delineation undertaken in QGIS supports the estimation of contributing areas to each interception point, which in turn informs preliminary flow estimates using the adopted infiltration rate of 128 mm/yr (equivalent to approximate flows of 0.04 L/s/ha).

The catchment areas of each of the engineered subsoil drains for both the Coronation North and Frasers West areas are shown below in figures 2 and 3 respectively. These catchment areas are used to quantify flow rates, to then size drainage pipes, as well as pumps and pressure pipework.

² GHD (2026). Macraes Phase 4 – Surface and Groundwater Assessment. Report for OceanaGold (New Zealand) Limited. 12682240-REP-REV0. [APPENDIX D]



Figure 3 Coronation subsoil drainage sections and their corresponding catchment areas.

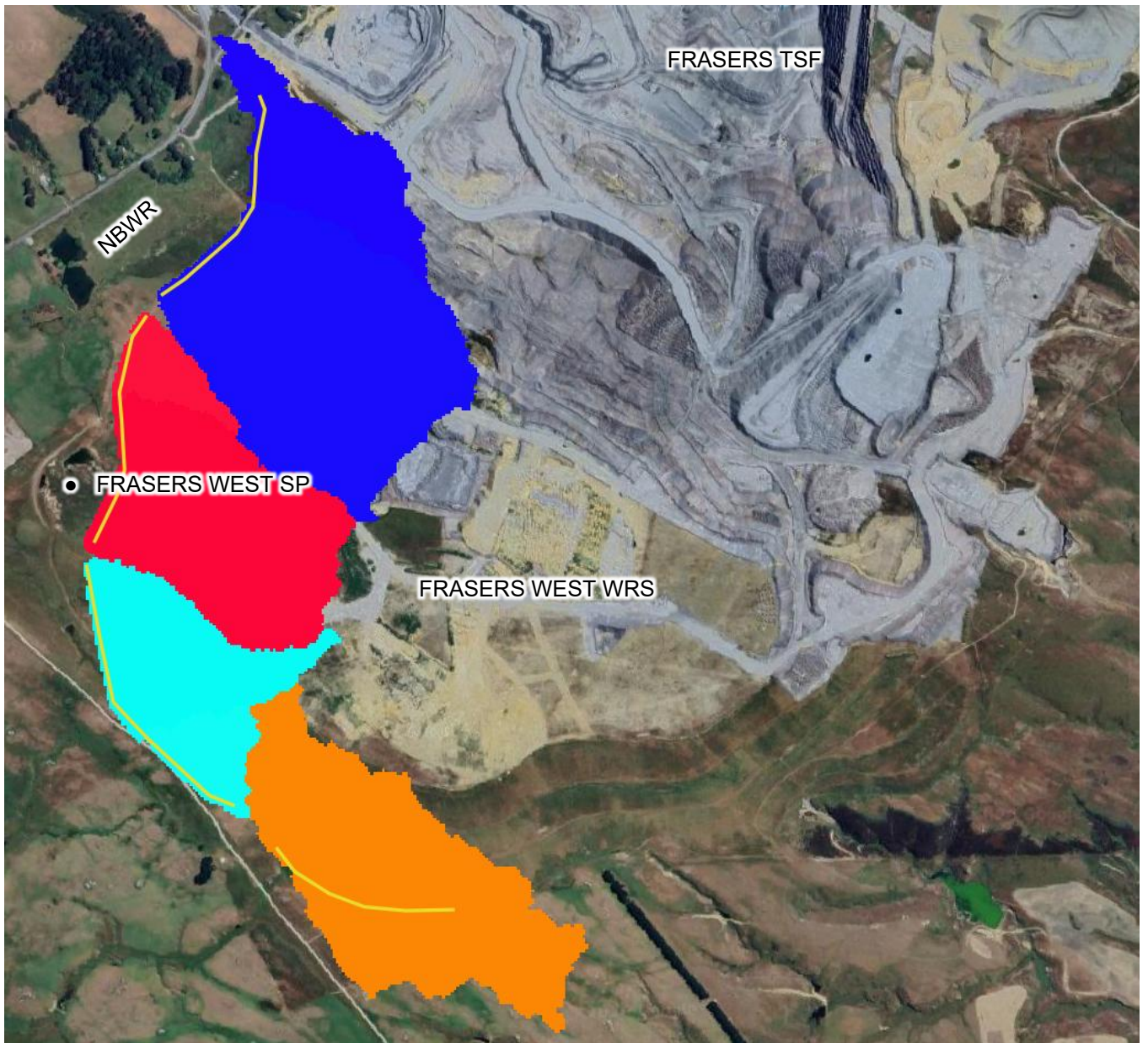


Figure 4 *Frasers West subsoil drains and their corresponding catchments.*

Further refinement of the alignments and their catchments will be undertaken as design and geotechnical investigation is progressed. The orange catchment in Figure 3, for example, may warrant further investigation to reduce the volume of uncontaminated seepage captured from paddock runoff. The final seepage modelling philosophy, including any numerical groundwater modelling and validation of interception performance, will likewise be further developed and documented in subsequent design stages.

4.3 Civil and Mechanical

This report proposes that subsurface infiltration flows are intercepted either by a linear subsoil drain or a subsoil bund collection point. The type of collection infrastructure is determined largely by the appropriateness of the surrounding geography. Where infiltration flows exit the waste rock stack over wide area, a drain is proposed. Where exiting flows are constrained and quickly channelled by landscape features like valleys, a point-collection subsoil bund is more appropriate.

A set of concept design drawings have been provided in Appendix A of this report. These drawings are provided for informational purposes and to aid in design development discussion. They are not suitable for construction or for the determination of quantities.

At Coronation, a significant proportion of the Coronation North WRS flow is concentrated at the existing Māori Hen silt pond. The estimated flows at this location have been preliminarily included into the capture system design. A similar approach could be applied to the existing sump and pond arrangements in the Murphys Silt Pond at Frasers.

4.3.1 Subsoil Drain

Subsoil drains are proposed along the toe of waste rock stacks, buried deep enough to be within the schist layer. A minimum longitudinal grade of 1% has been adopted for the subsoil drains, and the concept drainage pipe is DN100 'Euroflo' Slotted Pipe.

The typical subsoil drain detail comprises Euroflo perforated drainage pipe installed within a specified drainage aggregate. The pipe is to be protected by HDPE shade cloth to help prevent grit and fines from entering the pipework. The drainage aggregate is to be surrounded by geotextile to prevent fines migration, and low-permeability capping layer is to be installed atop it. This capping material will be installed to match the local surface profile and prevent surface flows from entering the drainage material.

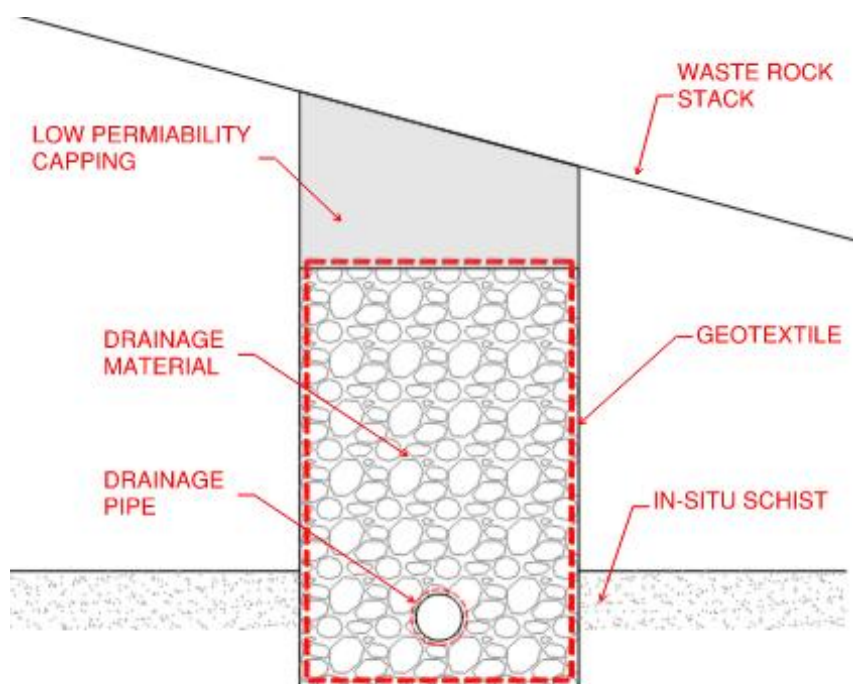


Figure 5 Typical cross section of engineered seepage drain trench.

Where a rising main is required to run parallel to a subsoil drain, the rising main is proposed on the outside of the stack drain so that it does not interfere with seepage interception. The low permeability capping and geotextile wrap will be extended to cover the rising main trenchwork, to maintain the effectiveness of the drain. Parallel alignments are preferred where feasible over both pipelines being installed atop each other within a single trench to maintain the maintenance accessibility of both pipelines.

4.3.2 Subsoil Bund

In locations where the underlying schist topography forms natural low collection points, such as incised valleys, a continuous subsoil drain is not required to intercept seepage. In these areas, a subsoil bund is proposed to collect infiltration flows at points of existing geographic accumulation, such as narrow valleys. The subsoil bund consists of a collection pipe laid within permeable drainage material and separated by geotextile from a low permeability bund. The bund works to intercept seepage, and the pipework directs the intercepted flow to a collection sump.

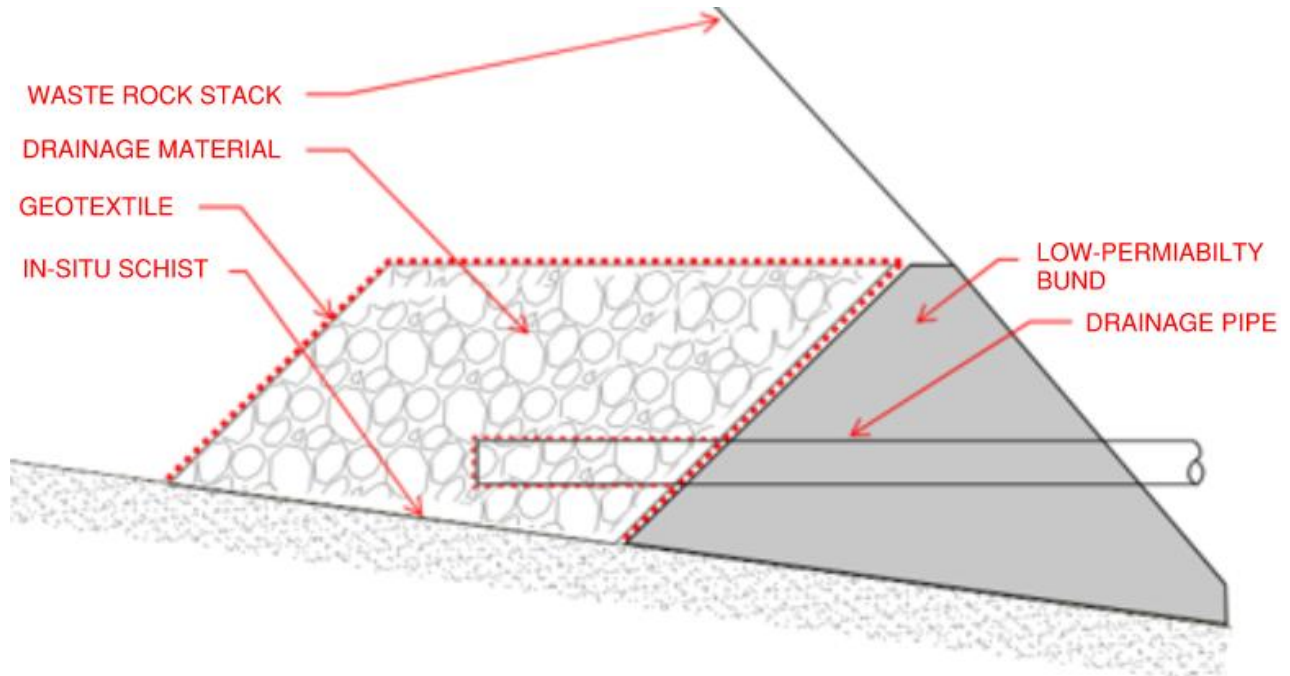


Figure 6 Typical cross section of seepage capture bund.

Most of the proposed subsoil bund collection points are located in the north-eastern part of the Coronation area, where local valleys provide suitable locations to intercept and collect seepage before it exits the site. One subsoil bund location is proposed in the Frasers area.

4.3.3 Collection Sump, Pump Station and Rising Main

Collected seepage from the subsoil drains and subsoil bunds is directed to collection sumps, from which it is pumped onward via rising mains to a water treatment plant. Manholes have been sized on a concept basis using a maximum of two pump operations every 10 minutes and a pump activation range of 900 mm. A basic system curve has been considered for each pump using the finished topography, the nominated pressure pipe material, and an allowance for friction and minor losses. Total dynamic head has therefore been considered as the combination of elevation head, pipe friction loss, velocity head, and minor losses.

The rising main concept has been assessed at an indicative flow velocity of 1 m/s to minimise head loss over the long transfer distances. Preliminary pressure main diameters have been selected on this basis. Future design stages may consider larger pipelines to reduce hydraulic losses and allow lower pump requirements.

At Coronation, the concept design includes a booster pump arrangement to avoid the need for a high-pressure transfer system. Flows collected by the Coronation subsoil drains discharge to a combined collection point and are then boosted toward a mid-level conveyance point. These flows, combined with seepage collected from the Coronation subsoil bunds, are further boosted to a high point from which they can be delivered by gravity flow to the final destination. At Frasers, the concept design includes a combination of daisy-chained and non-daisy-chained pump stations, depending on local topography and conveyance distance.

The design flow, indicative pump power requirement, and sump sizing for each of the sumps is presented in Table 1 below. Sumps have been numerically identified, with a F prefix for those at the Frasers site and a C prefix for Coronation. The sump locations, as well as the proposed pump location, is shown on the site location plan drawings available in Appendix A of this report.

Table 1 Sump design flow, indicative pump power, sump pit size

Pump Power kW and Manhole Sizes							
Coronation Mining Area				Fraser's Mining Area			
Pump ID	Design Flow (L/s)	Pump (kW)	MH Size (mm)	Pump ID	Design Flow (L/s)	Pump (kW)	MH Size (mm)
C1	3.1	7.5	2050	F1	0.3	7.2	1200
C2	3.2	6.1	2050	F2	1.9	30	2300
C3	0.7	2.9	1400	F3	0.8	8.1	1500
C4	4.0	31.3	2300	F4	1.3	3.7	2050
C5	1.3	6.0	2050	F5	6.3	31.2	2300
C6	0.3	3.1	1050				
C7	2.4	9.1	2300				
C8	0.4	5.4	1050				
C9	3.6	52.3	-				
C10	0.6	5.6	1400				

The rising main alignments shown in the concept design are indicative only. The mine layout is understood to change over time, and future design stages should therefore confirm the final pressure main alignments and trench loading requirements. The pressure main trench design will need to consider the possibility of vehicle loading across the alignment at any point and the alignment depth should account for this.

The conveyance of seepage waters to and from catchments will also include significant lengths with gravity driven flows. Energy capture systems (such as turbines) installed on these sections could materially reduce ongoing power inputs to the pumping systems.

Pump stations are to be designed so that pumps can be removed from the collection sump without requiring confined-space access. A pump rail or haul-chain arrangement is currently proposed so that pumps can be removed by personnel operating from surface level. Where practicable, non-return valves and other operating infrastructure should be located outside the collection sump to assist maintenance and avoid confined-space entry. Further detail regarding pump connections to the rising main and removal methodology will be progressed in future design when pump model and operating conditions are further defined.

The Macraes site also has existing seepage capture features. Some of these features, where they are near to the proposed seepage interception works, have been identified within the drawing plans. Their incorporation into the works is not within the current scope of this design, but if desired the feasibility of their inclusion could be examined in future design stages.

4.3.4 Schedule of Quantities

A preliminary Schedule of Quantities is provided in Appendix B to support future planning and design development. A high-level summary is provided in Table 2 below.

Table 2 Schedule of Quantities

Item	Quantity
Subsoil drain length	3,585 m
Subsoil bunds	6 No.
Collection sumps	14 No.
Pump stations	15 No.
Rising main length	12,277 m

4.4 Electrical

Electrical power will be required at each collection sump pump station to support operation of the seepage collection system and feasible permanent power supply options are available at the Coronation and Frasers areas. The following key requirements and considerations have been identified:

- Each sump pump station will require a permanent electrical power supply.
- Telemetry and alarm monitoring should be considered to support remote monitoring of pump operation and fault conditions.
- Power supply reliability requirements, including standby or backup power provisions, should be assessed during detailed design.

Preliminary investigations were undertaken to identify potential power supply options if connection to the existing OceanaGold electrical network is not feasible. For the Frasers area, potential alternatives were identified through extension of nearby utility-owned 11 kV and 33 kV overhead networks located near the proposed pump stations. These options are based on publicly available mapping information and have not been verified against network records or as-built information. For the Coronation area, alternative supply options were also investigated, including potential connections from existing power poles near Horse Flat Road and Longdale Road. However, the identified connection points were located at significant distances from the proposed pump stations and would require many new power poles to be installed across steep ground.

Based on the investigations undertaken and the information currently available, the preferred and proposed arrangement is to utilise the existing OceanaGold electrical network, subject to confirmation of available infrastructure, suitable points of supply, and available network capacity. Electrical infrastructure would be extended from the existing network to the proposed pump station locations and would include new overhead power lines, transformers, and pump control panels.

Further development of the proposed arrangement will be required during subsequent design phases. Additional information regarding the existing OceanaGold electrical network is required, including network drawings, available points of supply, network configuration, and available capacity within the Frasers and Coronation areas.

4.5 Geotechnical and Hydrogeology

A separate hydrogeological assessment (refer Appendix D, GHD (2026))³ is undertaken to inform the concept design. The civil drainage alignment has been developed using interpreted schist surface information provided by the client, together with preliminary hydrogeology assessments of the seepage flow. Site investigations, including test pits, drilling or other subsurface investigations, will be required during subsequent design stages to confirm the depth to schist, excavation conditions and constructability.

³ GHD (2026). Macraes Phase 4 – Surface and Groundwater Assessment. Report for OceanaGold (New Zealand) Limited. 12682240-REP-REV0.

5. Recommended Next Steps

The concept design demonstrates that interception and collection of seepage from the WRSs using engineered drains, collection sumps and pumped conveyance infrastructure is a practical and appropriate method for reducing contaminant loading to the receiving environment. The recommended next steps are:

1. Proceed with development of engineered seepage capture drains as a preferred seepage management measure for the Coronation and Frasers areas.
2. Advance the concept design to the next design stage to support detailed consent and implementation planning.
3. Implement seepage flow monitoring at discrete discharge locations to improve understanding of design flows prior to construction.
4. Undertake targeted site investigations to inform detailed design, including:
 - a. confirmation of depth to schist;
 - b. confirmation of existing ground conditions,
 - c. verify proposed alignments;
 - d. refine excavation requirements.
5. Implement the detailed designs for Frasers TSF West embankment and spillway, Frasers South WRS, Trimbells WRS and supporting sediment retention ponds to inform alignments and location of collection infrastructure in these areas.
6. Confirm the desired discharge points for treated water returning to the receiving environment to inform return conveyance infrastructure.
7. Confirm power supply availability and treatment system connection requirements.
8. Refine hydraulic and mechanical design.

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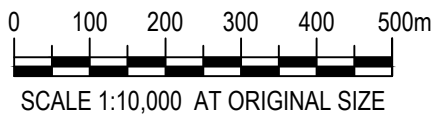
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Appendices

Appendix A – Concept Drawings



P01 PRELIMINARY ISSUE			
Rev	Description	Checked	Approved
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Designer	L. WARDENAAR	Design Check	J. TUCK



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Project No.
12682240

Client	OCEANAGOLD
Project	MACRAES ENGINEERED DRAIN DESIGN
Status	PRELIMINARY

Drawing Title
SITE LOCATION - CORONATION

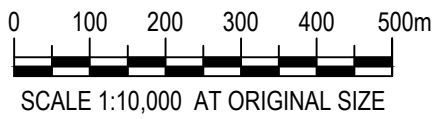
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Client OCEANAGOLD
Project MACRAES ENGINEERED DRAIN DESIGN
Status PRELIMINARY

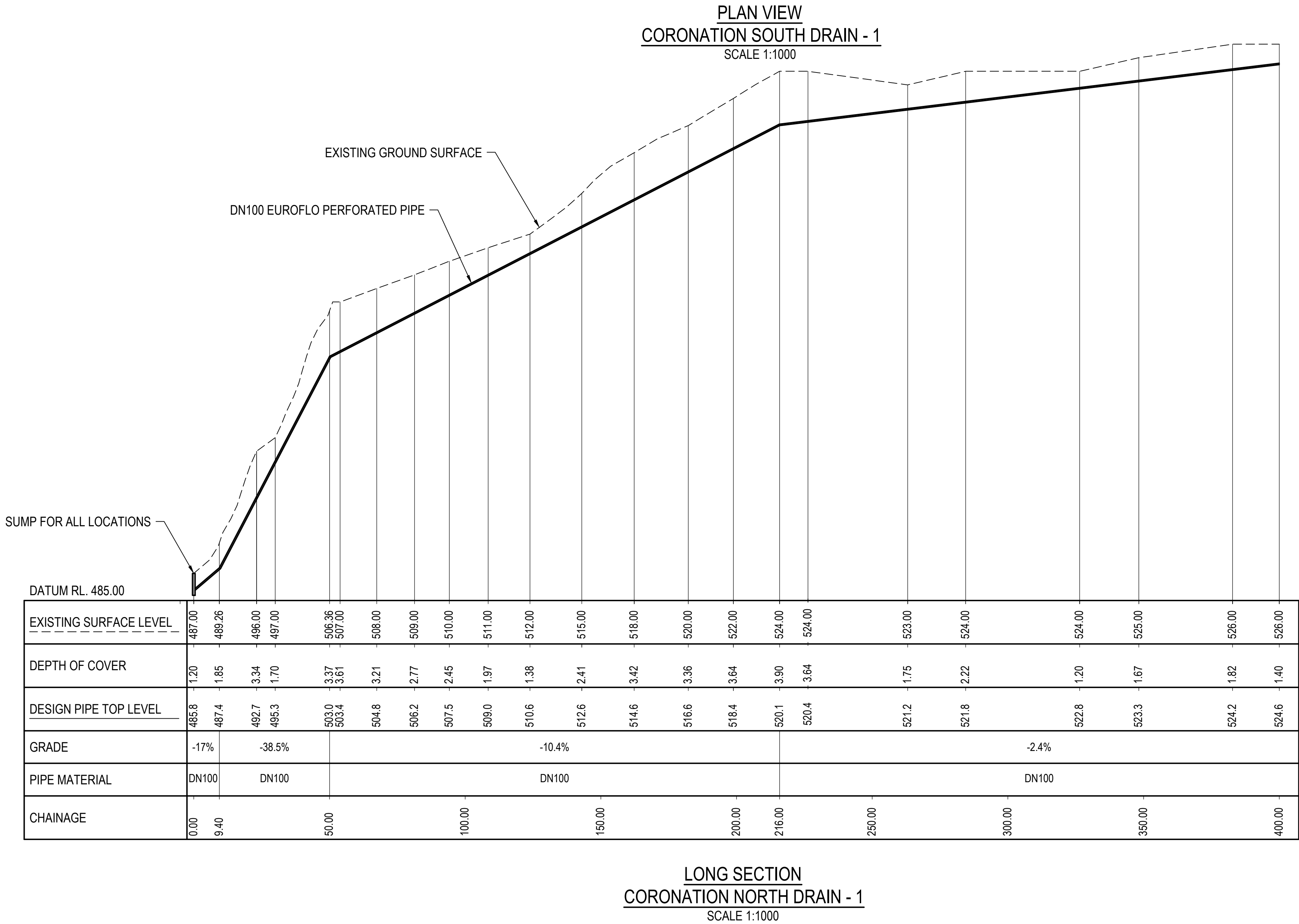
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12682240-GHD-00-00-DRG-00012

Drawing No.

Size
A1

Rev
P01



VERTICAL 1:200
AT ORIGINAL SIZE
HORIZONTAL 1:1000
AT ORIGINAL SIZE

P01	PRELIMINARY ISSUE	TO	JT 03/07/26
Rev	Description	Checked	Approved Date
Author	S. SEATH	Drafting Check	Reg No.
Designer	L. WARDENAAR	Design Check	J. TUCK Date

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Project No.
12682240

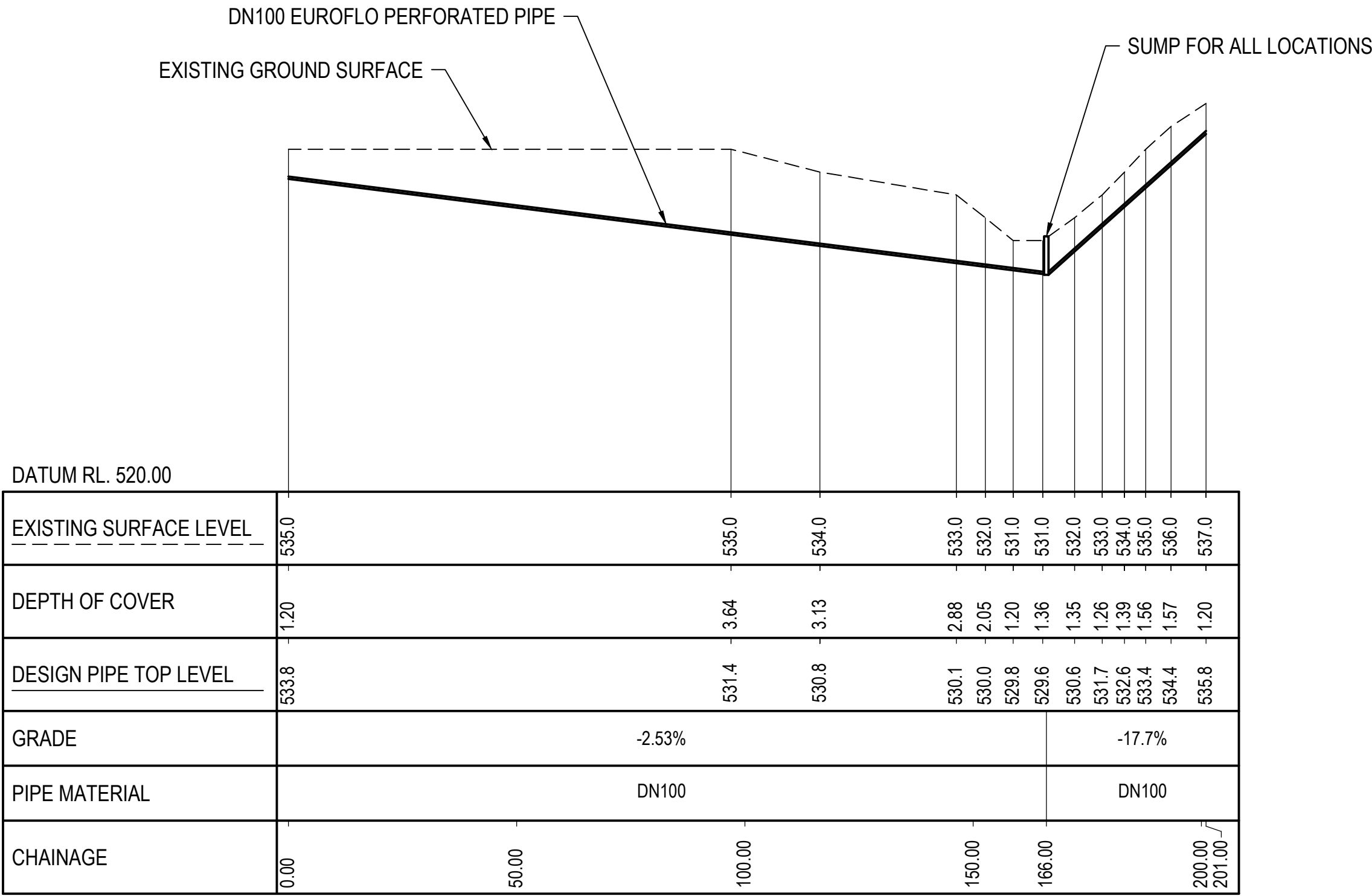
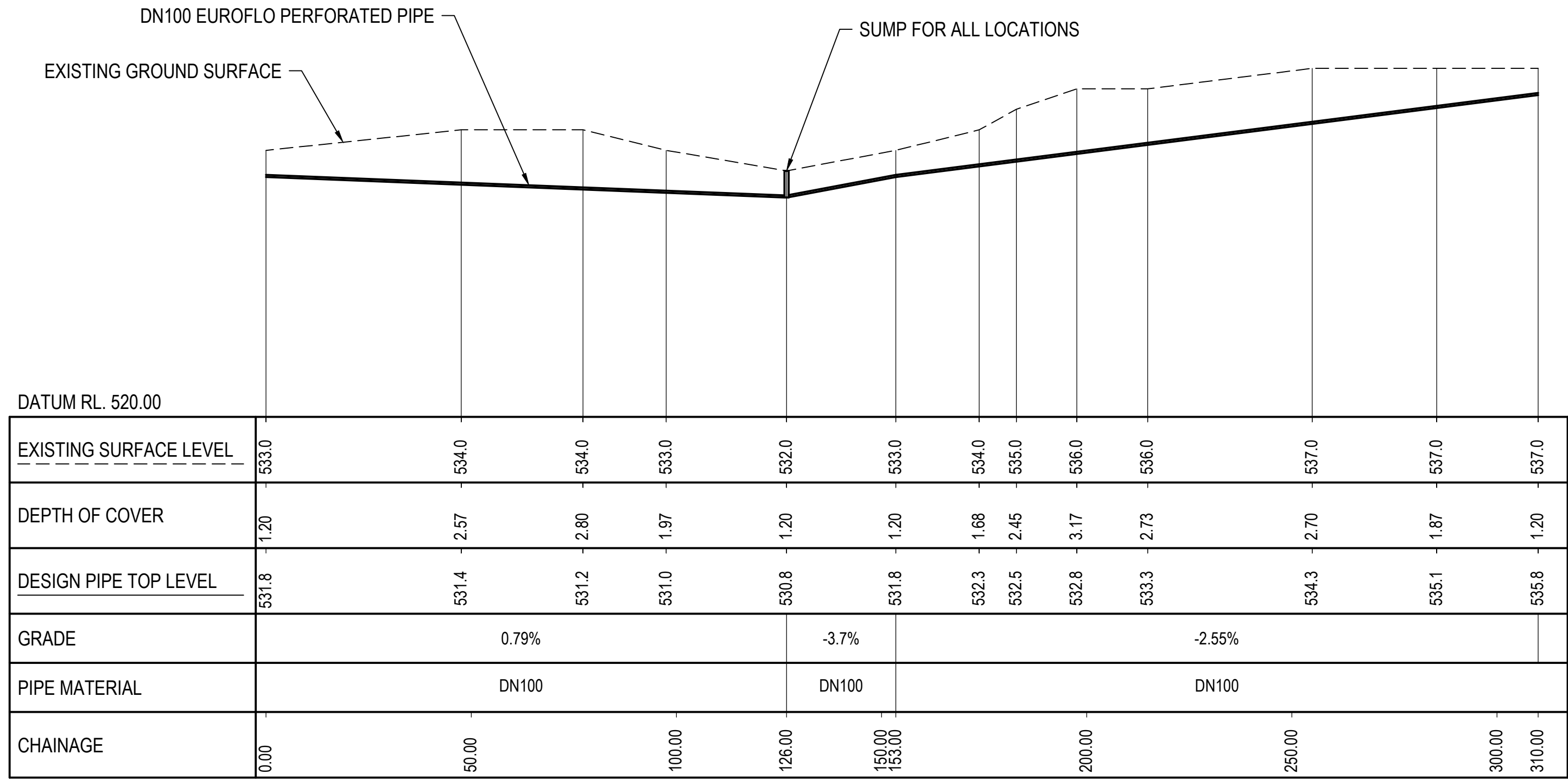
Client	OCEANAGOLD
Project	MACRAES ENGINEERED DRAIN DESIGN
Status	PRELIMINARY

Drawing Title
PLAN AND LONG SECTION
CORONATION SOUTH DRAIN - 1

Drawing No.
12682240-GHD-00-00-DRG-00015

Size
A1

Rev
P01



VERTICAL 1:200
AT ORIGINAL SIZE
HORIZONTAL 1:1000
AT ORIGINAL SIZE

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LONG SECTION

CORONATION NORTH DRAIN - 2

SCALE 1:1000

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Client OCEANAGOLD
Project MACRAES ENGINEERED DRAIN DESIGN
Status PRELIMINARY

Drawing Title
PLAN AND LONG SECTIONS
CORONATION NORTH DRAINS - 2 & 3

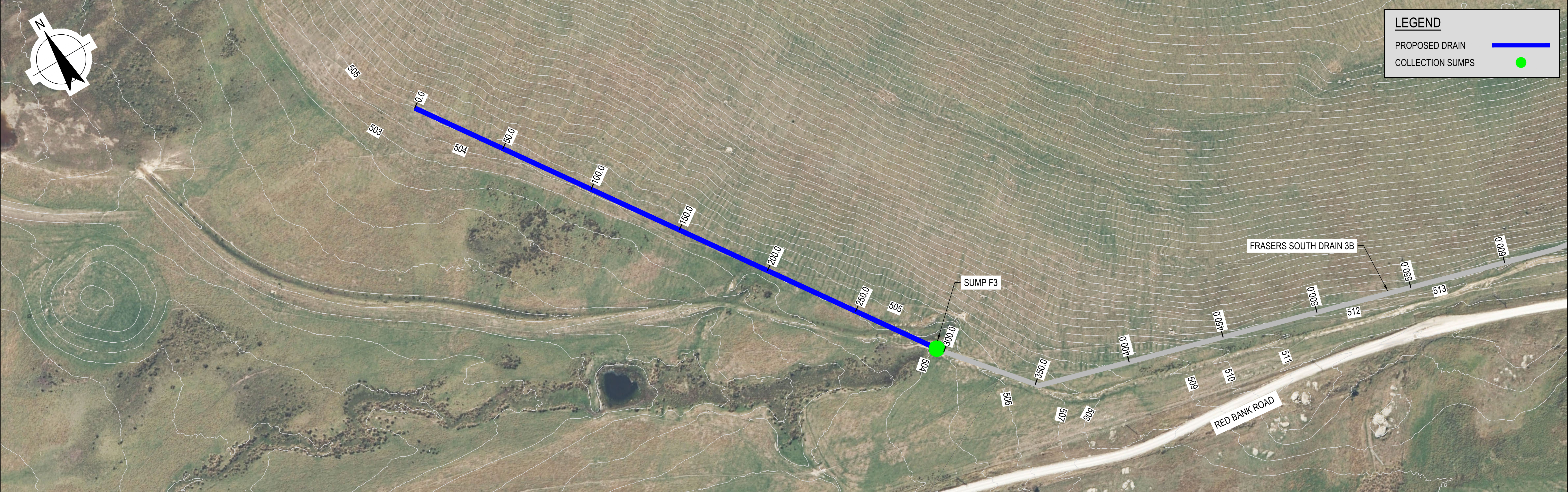
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Size
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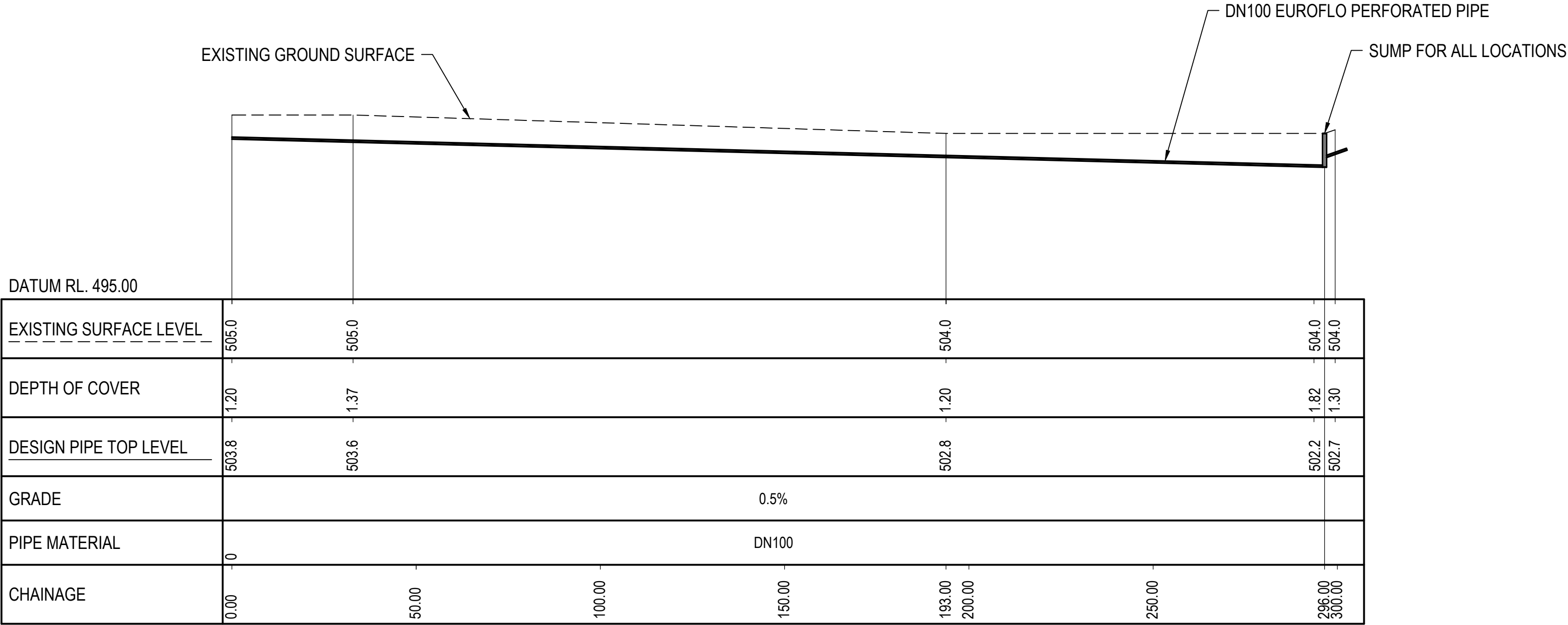
Rev
P01



PUMP kW AND MH SIZES FRASERS			
PUMP ID	DESIGN FLOW (m3/d)	PUMP kW	MH SIZE
F1	0.47	7.2	1200
F2	1.94	30	2300
F3	0.82	8.1	1500
F4	1.32	3.7	2050
F5	6.30	31.2	2300



PLAN VIEW
FRASERS SOUTH DRAIN - 3A
SCALE 1:1000



LONG SECTION
FRASERS SOUTH DRAIN - 3A
SCALE 1:1000

VERTICAL 1:200
AT ORIGINAL SIZE
HORIZONTAL 1:1000
AT ORIGINAL SIZE

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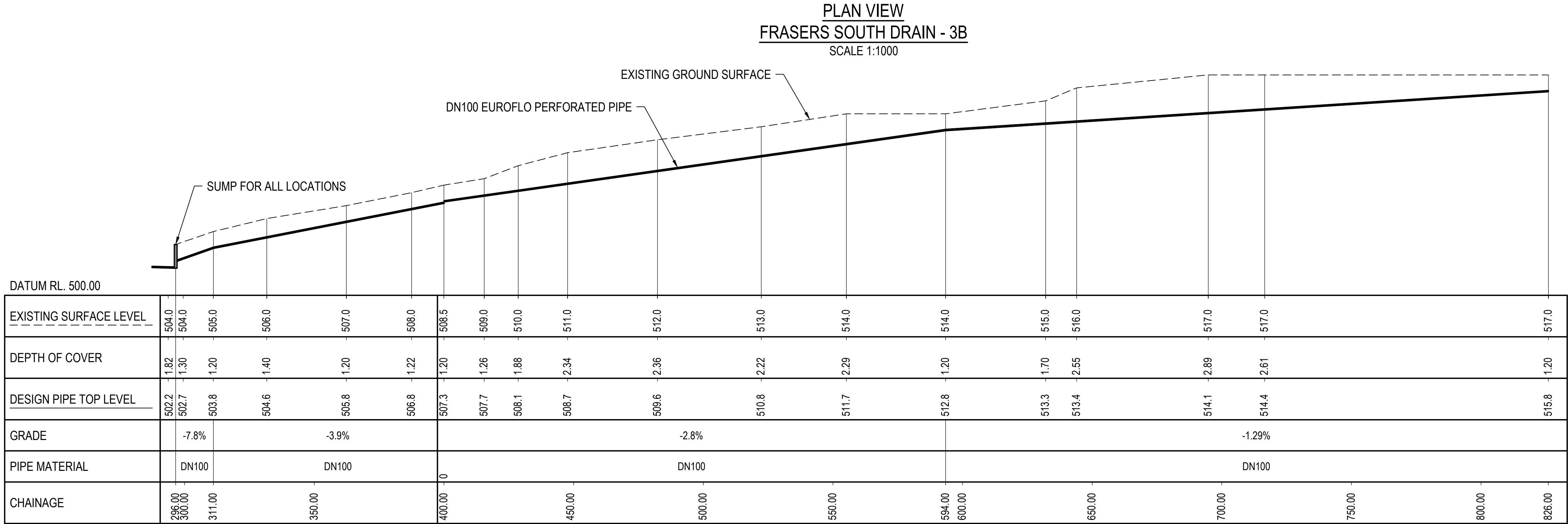
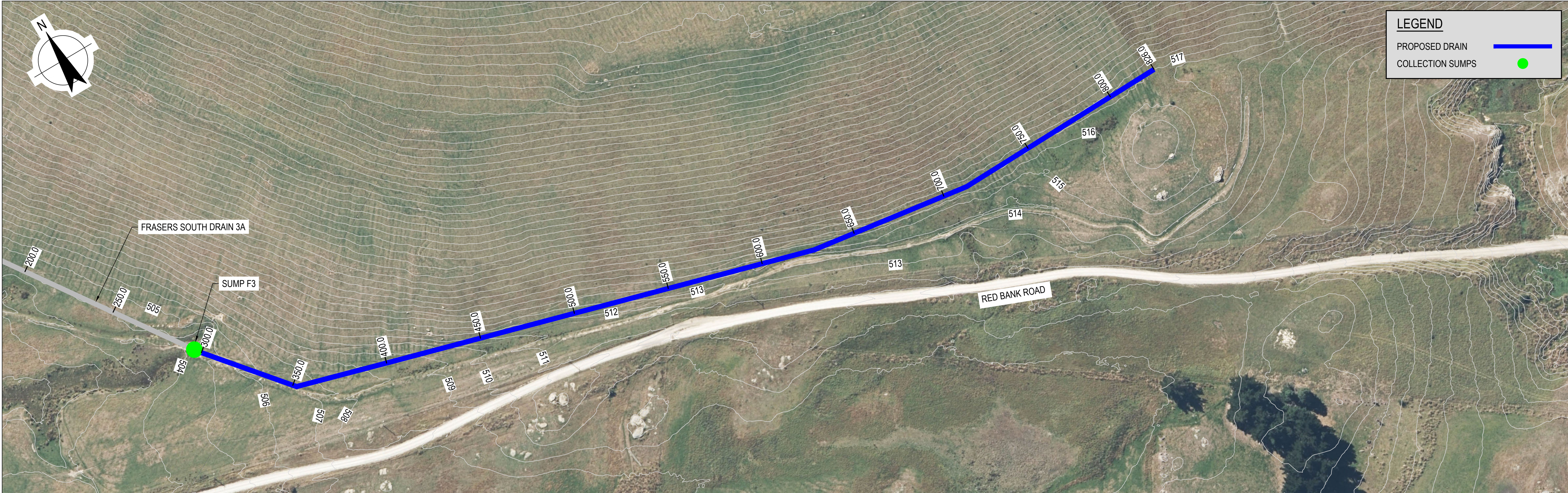
Client OCEANAGOLD
Project MACRAES ENGINEERED DRAIN DESIGN
Status PRELIMINARY

Drawing Title
PLAN AND LONG SECTION
FRASERS SOUTH DRAIN - 3A

Drawing No.
12682240-GHD-00-00-DRG-00022

Size
A1

Rev
P01



VERTICAL 1:200
AT ORIGINAL SIZE
HORIZONTAL 1:1000
AT ORIGINAL SIZE

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Drawing Title
LONG SECTION
FRASERS SOUTH DRAIN - 3B

Drawing No.
12682240-GHD-00-00-DRG-00023

Size
A1

Rev
P01

Appendix B – Schedule of Quantities

Schedule of Quantities			
	Concept design quantities are for informational purposes only, not intended for procurement or construction. Note: SOQ allows for only construction of and conveyance from the Coronation Mining Area and Frasers West WRS. Remaining areas shown on the drawings in Appendix A for reference only.		
Item			
1	Engineered Subsoil Drain		
	Gravity Pipe - DN100 PE100 Euroflo Slotted Drain Pipe		
	Quantity is linear metres of drain, inclusive of trench. Depth to pipeline invert between 1.2-4m, trench width 600mm minimum, drainage aggregate fill with 300mm min low permeability capping, and geotextile.		
	Coronation	Qty	Unit
1.1	Subsoil Drain	997	m
	Frasers	Qty	Unit
1.2	Subsoil Drain	2588	m
2	Subsoil Bund		
	Subsoil bund, excavation and installation of drainage material, filter fabric, low permeability toe material, oxygen advection barrier, and DN150 pipework.		
	Coronation	Qty	Unit
2.1	Subsoil Bund	5	Ea
	Frasers	Qty	Unit
2.2	Subsoil Bund	1	Ea
3	Pressure Main		
	Pressure Pipeline - PN16 PE100 Pipeline		
	Quantity is linear metres of pipeline, inclusive of trench. Pipeline to be installed with 750mm min cover, trench width 350mm, single size embedment material, and backfilled.		
	Coronation	Qty	Unit
3.1.1	Pressure Pipeline DN63	330	m
3.1.2	Pressure Pipeline DN75	1352	m
3.1.3	Pressure Pipeline DN90	1769	m
3.1.4	Pressure Pipeline DN110	3526	m
	Frasers	Qty	Unit
2.2.1	Pressure Pipeline DN110	3236	m
2.2.2	Pressure Pipeline DN125	2064	m
4	Gravity Pipeline		
	Gravity Pipeline - PN16 PE100 Pipeline		
	Quantity is linear metres of pipeline, including trench. Pipeline to be installed with 750mm min cover, trench with 350mm, single size embedment material, and backfilled.		
	Coronation	Qty	Unit
4.1	Gravity Pipeline	5521	m
	Frasers	Qty	Unit
4.2	Gravity Pipeline	1396	m
5	Concrete Sump Manholes		

	Concrete manhole, to between 1.2m and 4.5m depth, with non trafficable lid and 2m high fence surround.		
	Coronation	Qty	Unit
5.1.1	Concrete Manhole DN1050	2	Ea.
5.1.2	Concrete Manhole DN1400	2	Ea.
5.1.3	Concrete Manhole DN2050	3	Ea.
5.1.4	Concrete Manhole DN2300	2	Ea.
	Frasers	Qty	Unit
5.2.1	Concrete Manhole DN1200	1	Ea.
5.2.2	Concrete Manhole DN1500	1	Ea.
5.2.3	Concrete Manhole DN2050	1	Ea.
5.2.4	Concrete Manhole DN2300	2	Ea.
6	Pumps		
	Pumps installed with required reducers, check valves, air and scour valves for operation and maintenance requirements.		
	Coronation	Qty	Unit
6.1.1	Sump Pump	9	Ea.
6.1.2	Booster Pump	1	Ea.
	Frasers	Qty	Unit
5.2.1	Sump Pump	5	Ea.