Robert Bird Group

Civil Concept Design Report

Meadowbank Public School Redevelopment

Issue: 01

25 November 2022

Prepared For: School Infrastructure, Department of Education

Project No.: 20579C

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Report Amendment Register

Issue Ref	Amended Section(s)	Issue / Amendment Details	Author(s)	Reviewer	Date
01	All	Issue for Review	Nghia Ly Hasib Shaikh	Chris Waite	25/11/22

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Date: 25 November 2022

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Date: 25 November 2022

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APPENDICES

1 Introduction

1.1 Document Scope

This Civil Concept Design Report has been prepared by Robert Bird Group (RBG) and is intended to provide an overview of the civil engineering design scheme for the proposed Meadowbank Public School Redevelopment project.

This document denotes Robert Bird Group's (RBG) understanding of the client's requirements in relation to the civil engineering and architectural design elements of the project and the parameters used in the design. It summarises the design information that RBG have relied upon and the document references codes, standards, consultants report and the design analysis procedures.

1.2 Site Description

The subject site is currently known as the Meadowbank Public School and located at 4-6 Thistle Street, Ryde NSW 2112, which is currently occupied by existing school playground and a number of low-rise buildings.

The site is bounded by Belmore Street to the east and Gale Street to the west as well as Thistle Street to the North with existing retaining walls along the footpath interface, see Figure 1-1 below.

Figure 1-1 Site Locality Map

It has a total site area of approximately 8,660 m^2 and generally falls from the north-east to south-west at approximate 5.6% gradient. The site has been separated into two catchments, i.e. northern and southern catchments, by the community hall.

1.3 Project Description

The proposed works of this redevelopment project consist of demolishing a number of the low-rise school buildings and converting this existing school area to a new public recreational area open space with turf surfaces, see Figure 1-2 below.

Figure 1-2 Proposed Architectural Landscape Plan

1.4 Reference Documents

The reference documents related to the proposed civil design are listed in the following Table 1-1.

Table 1-1 Reference Documents

Document	Revision	Date Issued
Geotechnical report – Douglas Partners	R.001.Rev0	16.12.20
Architectural Drawings – Pedavoli Architects	-	15.11.22
Survey – YSCO Geomatics	6720/4	05.10.22

1.5 Design Standards and Guidelines

The design standards and guidelines related to the proposed civil design are listed below.

- AS 3500.3:2018 - Plumbing and Drainage Part 3: Stormwater Drainage;
- AS 2890.2:2018 - Parking Facilities - Off-street Commercial Vehicle Facilities;
- City of Ryde Development Control Plan 2014, including 8.2: Stormwater and Floodplain Management:
    - Stormwater Management Technical Manual;
    - Water Sensitive Urban Design Guidelines;
- Australian Rainfall and Runoff 2019.

1.6 Abbreviations

The following abbreviation are included in this concept report.

Table 1-2: Abbreviations

Abbreviation	Description
AHD	Australian Height Datum
ARI	Average Recurrence Interval
CoR	Council of Ryde
FFL	Finished Floor Level
OSD	On Site Detention
RBG	Robert Bird Group
WSUD	Water Sensitive Urban Design

2 Civil Design

2.1 Design philosophy

The civil engineering design concept for the project is to provide elements that:

- Provide minimal disturbances to the region, maintaining catchments for stormwater drainage paths and reduced earthworks.

- Provide natural systems where possible

- Propose assets that are seamless within the site, incorporate constructability aspects, are safe and minimise nuisance

2.2 Site Works, Grading, Earthworks

2.2.1 Design Intent

The design intent is to grade and best utilise the natural fall across the site. The design aims to balance cut and fill required to minimise earthworks. The proposed grading works will aim to match pit levels where possible and match with the existing topographic levels that will be retained.

2.2.2 Design Inputs

The site works will be in accordance with council standards and Douglas Partners Geotechnical assessment recommendation.

2.2.3 Design criteria

Previous geotechnical investigation had found that:

- FILL/TOPSOIL: sand, silty sand and clayey sand fill to depths of between 0.05 m and 0.3 m, and topsoil to a depth of 0.1 m; overlying
- RESIDUAL CLAY: firm to hard silty clay and clay to depths of between 3.0 m and 3.2 m.

In addition, the geotechnical report prepared by Douglas Partners had also noted:

"From a geotechnical perspective, existing fill on the site is likely to be suitable for re-use as engineered fill, provided that it is free of oversize particles (>75 mm) and deleterious material. The underlying residual clays are also likely to be suitable for re-use, however, as they are also likely to be moderately to highly reactive, it will be very important to control the moisture content of these soils during compaction."

"The suitability of re-using site-won fill and natural soil should also be considered from a contamination perspective."

"If fill is imported to the site, then the engineering properties (e.g. plasticity, reactivity, CBR, etc.) should ideally be equivalent, or superior, to the existing materials on site."

Table 2-1 Bulk Earthwork Design Criteria

Bulk Earthwork Design Criteria		
Parameter	**Criteria Adopted**	**Reference**
Excavation Batters	Temporary batter slopes up to 3 m high: - Maximum 1.5(H):1(V) in fill; - Maximum 1(H):1(V) in residual clay and weathered rock (if encountered). Permanent batter slopes: - Should not be steeper than 2(H):1(V); - Should generally be flatter, i.e. 3(H):1(V) where vegetation maintenance is required.	Douglas Partners Report: Geotechnical Desktop Assessment

2.2.4 Design

RBG has prepared a site grading design which was coordinated with the Proposed Architectural at Figure 1-2 above, see Bulk Earthwork Plan in Appendix A.

The grading plan has highlighted proposed grade level to match with existing topographic levels. In general, majority of the cut and fill is required in the norther area of the site where the major demolition is required, shown in Figure 2-1.

The retaining walls along the driveway edge will be demolished and the site will be graded at varying from approximately 1% to 12% towards the northern boundary edge. The site will require filling around the northern boundary edge and at the proposed level spreader located at the south-west of the site. Cutting is required in areas adjacent to the driveway edge, see Bulk Earthwork Plan in Appendix A.

There are multiple pits located within the cut and fill area located in the northern catchment. The grades of the site were aimed to match the top of the existing pits where possible and along the driveway edge. However, some pits will require demolishing as finish level will be below the surface level of the pit. In addition, pit that will be buried under the fill will require sealing as illustrated in the Stormwater management plan in Appendix A.

The cut and fill volume calculated based on the site grading plan are as follow:

- Total Cut: 221m^3;
- Total Fill: 218m^3;
- Balance of cut: 3m^3;

with a maximum cut depth at approximate 1.5 m at the retaining wall to be demolished located north-western corner of community hall, see Cut and Fill Plan in Appendix A.

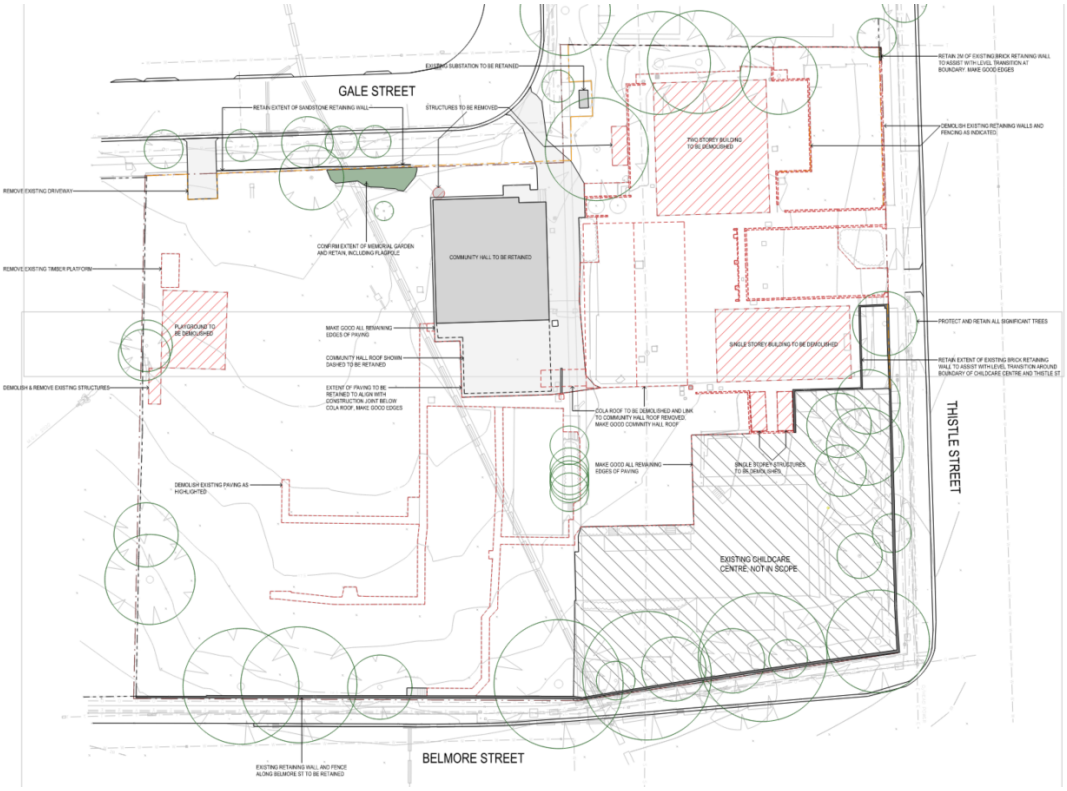

Figure 2-1 Demoltion plan, (source: Pedavoli Architects)

2.3 Sediment and Erosion Control

2.3.1 Design Intent

To maintain the water quality during the construction stage, erosion and sediment control measures are proposed. The intent is to manage land disturbances of the development by reducing sediment runoff from the site to downstream areas in accordance with the project requirements.

2.3.2 Design Criteria

Soil management measures shall follow the Landcom guidelines – Managing Urban Stormwater Runoff: Soils and Construction ("Blue Book") and the City of Ryde Engineering and Drainage Standards.

Table 2-2 Sediment Erosion Control Design Criteria

Sediment Erosion Control Design Criteria		
Parameter	**Criteria Adopted**	**Reference**
Design Approach	Industry Standards in accordance with Council guidelines and Landcom Blue book.	CoR DCP 8.1: Construction Activities Section 2.1 Managing Urban Stormwater: Soils and Construction Volume 1 (Blue Book)
Disturbed soil type	Sand, silty sand and clayey sand fill	Douglas Partners Report: Geotechnical Desktop Assessment

2.3.3 Design

Prior to any earthworks commencing on site, erosion and sediment control measures will be required to be put in place generally in accordance with the Landcom Blue Book requirements. These measures will include:

- Sediment fence (or site hoarding) to be installed along the downstream perimeter of the work site area.
- The use of sediment diverting methods to minimize sediments in Council's stormwater drainage network using sandbags around kerb inlet pits and geo-textile filter fabric around drop inlet pits.
- The provisions of a temporary shaker grid to service vehicles existing the site during the construction stage.
- Earth bund to divert and prevent sediments runoff across property downstream

Bulk Earthworks is required for the project. The site will remain under sheet flow drainage conditions along with the proposed stormwater management plan.

Through construction, the contractors on site shall coordinate general and local erosion and sediment control needs to suit the project construction and in particular the site staging.

Grass seeding/topsoil replacement will occur as soon as practical after completion of bulk earthworks to minimise soil exposure, therefore reducing the erosion potential.

The total proposed disturbed area is less than 2500 m^2 hence no sediment basin is not required as per the Landcom Blue Book guidelines.

2.4 Stormwater Management

2.4.1 Design intent

The stormwater management is aimed to maintain and replicate the existing catchment drainage systems. The works are to be constructed in accordance with the Hydraulic Engineers, Council and Architects.

2.4.2 Design inputs

Table 2-3 Stormwater Model Parameters

Stormwater Model Parameters		
Parameter	**Criteria Adopted**	**Reference**
Hydrological analysis	To undertake the stormwater quantity analysis the runoff routing computer model DRAINS will be used. Within DRAINS the Ilsax/Horton method of analysis will be used to calculate peak flows.	CoR DCP 8.2: Stormwater Management Technical Manual Section 4.1.
Rainfall intensity data	Rainfall data has been obtained from the Bureau of Meteorology. The updated data from 2016 will be used.	CoR DCP 8.2: Stormwater Management Technical Manual Section 4.5.
Design storm events	Minor System: All underground/piped drainage shall have sufficient capacity to convey 20 Year ARI, 5% AEP storm event without overtopping or surcharging onto pedestrian areas. Major System: The projects overland flow path shall have sufficient capacity to safely convey a 1% AEP storm.	CoR DCP 8.2: Stormwater Management Technical Manual Section 4.2. AS3500.3: Plumbing and drainage Part 3 - Stormwater drainage
Run-off Coefficients	C10 (Impervious) = 0.9 C10 (Pervious) = 0.51	CoR DCP 8.2: Stormwater Management Technical Manual Table 4.6.
Time of Concentration (T_C)	T_C has been calculated using the Kinematic Wave Equation. TC shall be not less than 5 minutes. TC shall not be more than 20 minutes.	CoR DCP 8.2: Stormwater Management Technical Manual Section 4.4 AS3500.3: Plumbing and drainage Part 3 - Stormwater drainage
Hydraulic Grade Line Analysis	The Colebrook-White formula will be used with a roughness coefficient of 0.3 for all reinforced concrete pipes.	CoR DCP 8.2: Stormwater Management Technical Manual Section 5.4
Pit loss coefficient	The Missouri Charts will be adopted for the purpose of calculating the energy losses within a pit, with a minimum allowable value of 0.3.	CoR DCP 8.2: Stormwater Management Technical Manual Section 5.4
Tail Water Condition	Minor Storm: The inlet pipe obvert in the downstream pit. Major Storm: Top of kerb at the point of connection.	CoR DCP 8.2: Stormwater Management Technical Manual Table 5.2

Table 2-4 Pit and Pipe Design Criteria

Pit and Pipe Design Parameters		
Parameter	**Criteria Adopted**	**Reference**
Minimum Pipe Sizes	In ground and within the building development - 225mm dia. Within the road reserve - 375mm dia. Connection to existing council stormwater infrastructure - 375mm dia.	AS3500.3: Plumbing and drainage Part 3 - Stormwater drainage CoR DCP 8.2: Stormwater Management Technical Manual Section 1.3.1 and 5.6

Pipe Gradients	Pipe <225mm dia - minimum grade of 1% is to be provided. Pipe > 225mm dia - minimum grade of 0.5% is to be provided. Thrust blocks required for all grades in excess of 15%. A maximum pipe grade of 20% is not to be exceeded.	CoR DCP 8.2: Stormwater Management Technical Manual Section 5.6 AS3500.3: Plumbing and drainage Part 3 - Stormwater drainage
Pipe Cover	A minimum pipe cover of 450mm is to be provided.	CoR DCP 8.2: Stormwater Management Technical Manual Section 5.6
Pit Blockages	On-grade kerb inlet pit - 10% Blocked Sag kerb inlet pit - 20% Blocked Surface inlet pit - 30% Blocked Surface inlet pit with legs (letterbox) - 50% blocked All other on grade pits - 20% blocked All other sag pits - 50% blocked	CoR DCP 8.2: Stormwater Management Technical Manual Section 5.5 AS3500.3: Plumbing and drainage Part 3 - Stormwater drainage
Minimum internal pit dimensions	Within Council drainage system - 900x900 Internal Depth — Width x Length (mm) D≥ — 300 x 300 600≥D>300 — 450 x 450 900≥D>600 — 600 x 600 1200≥D>900 — 900 x 900 D>1200 — 900 x 900 (With Step Irons)	CoR DCP 8.2: Stormwater Management Technical Manual Section 5.5

Table 2-5 Overland Flow Design Criteria

Overland Flow Design Criteria		
Parameter	**Criteria Adopted**	**Reference**
Overland Flow Design	Maximum DxV = 0.4m²/s Maximum DxV = 0.6m²/s (Kerb and Gutter)	CoR DCP 8.2: Stormwater Management Technical Manual Section 5.3.
Swale Freeboard	Major: All swales shall be designed to have a minimum freeboard of; - 150mm (No flood risk to adjacent property) - 20% of the flow depth - Velocity head of the flow	Austroads Part 5B: Drainage – open channels, Culverts and Floodway's
Swale Design	Grass lined channels; adopt Manning's formula for unpressurised flow with a Manning (n) = 0.03 – (Grass lined channels TYP)	Austroads Part 5B: Drainage – open channels, Culverts and Floodway's AS3500.3: Plumbing and drainage Part 3 - Stormwater drainage
Design Swale Velocities	Min. velocity: 0.5m/s (Grass Lined) Max Velocity: 1.7m/s (Grass Lined – allows for minimum 70% coverage) Maximum DxV = 0.4m²/s	Austroads Part 5B: Drainage – open channels, Culverts and Floodway's
Minimum Grade	All Swales are to be designed to a minimum of 1.0% grade, however Austroads allows the designer to reduce the grade to 0.2% if the minimum velocity is achieved.	Austroads Part 5B: Drainage – open channels, Culverts and Floodway's

Table 2-1 On-Site Dention Design Criteria

On-Site Detention Design Criteria		
Parameter	**Criteria Adopted**	**Reference**
OSD Catchment area	As much as possible of the site area is to drain through to the OSD system(s). A portion of the impervious area may discharge directly to Council's system if it cannot be drained to the storage facility, provided the PSD is reduced and SRR increased to compensate for the smaller catchment. The maximum desirable extent of impervious surfaces bypassing the OSD system is 25% of the total impervious site area.	CoR DCP 8.2: Stormwater Management Technical Manual Section 1.4.2
Permissible Site Discharge	Permissible site discharge must not exceed the peak stormwater discharge arising from the pre-developed works, during a 5-year ARI event. (To be further discussed with CoR)	CoR DCP 8.2: Stormwater Management Technical Manual Section 1.4.4
Design Storm	All storms up to and including the 100 year ARI storm.	CoR DCP 8.2: Stormwater Management Technical Manual Section 1.4.3
Warning signs required	Yes	CoR DCP 8.2: Stormwater Management Technical Manual Section 1.4.10

2.4.3 On-Site Detention Requirement

The subject site is located within proximity to the Parramatta River and immediately upstream to the OSD exemption zone as shown in Figure 2-2 below extracted from the City of Ryde Stormwater Management Technical Manual.

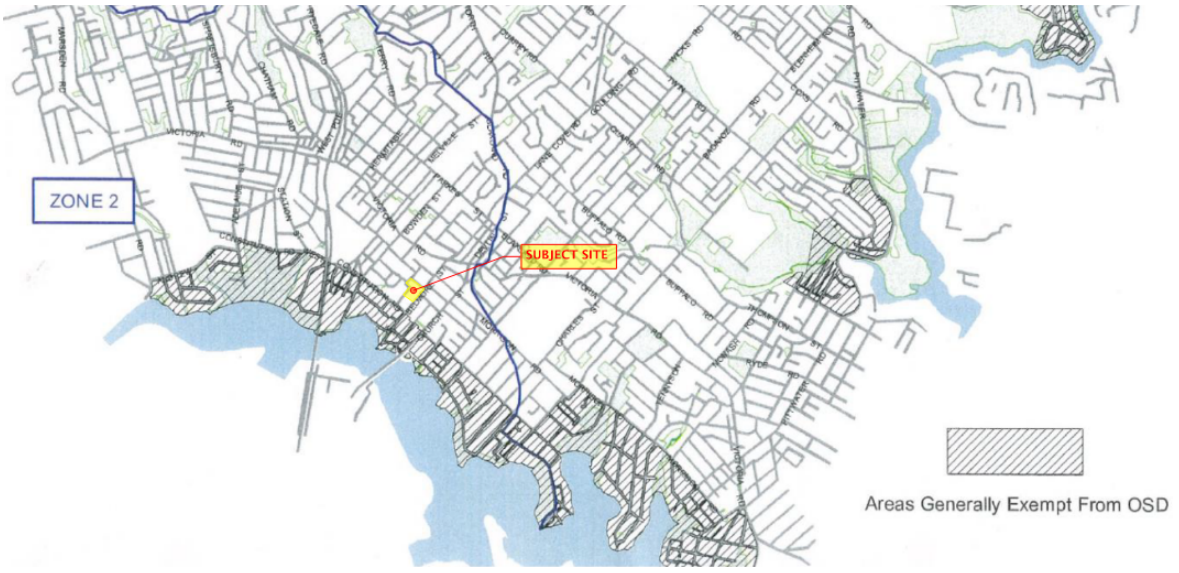

Figure 2-2 City of Ryde OSD Exemption Zone

Since a large amount of the impervious area will be reduced from the proposed redevelopment converting the existing school building area to a revegetated grass land area. As a result, the site discharge is expected to be less than the pre-development condition. Hence OSD has not been proposed.

2.4.4 Overland flow analysis

The overland catchment has been determined using contours extracted from Elvis Spatial Data. The catchment has separated into two as shown in the Figure 2-3 below.

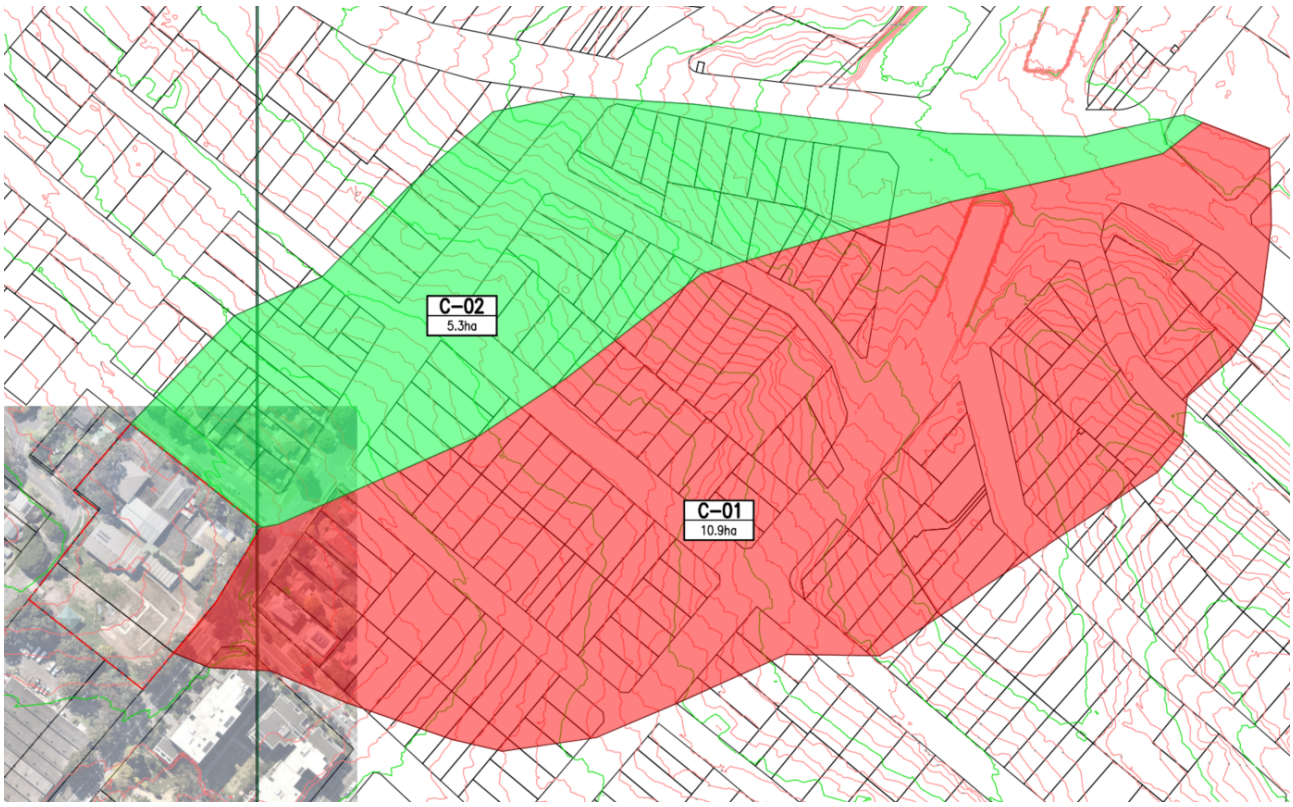

Figure 2-3 Overland Catchment Plan

The output has been determined using DRAINS analysis to determine the overland flow criteria.

The analysis will compare the pre-development and post development, i.e. with the level spreader at 10% AEP and 1% AEP for the critical catchment C01.

The analysis has been done based on the following assumptions:

- 50% catchment C01 is entering the site;
- 10% impervious and 90% pervious considering the catchment was built up with OSD facilities;
- Pits are considered as blocked;

Overland Flow Analysis (10% AEP)		
Pre-development	**Pre-development**	**Post-development**
Depth, d	0.15 m	0.09 m
Max Velocity, v_{max}	0.92 m/s	0.92 m/s
Flow, Q	1.67 m^3/s	1.67 m^3/s
Product of velocity and depth, v.d	0.14 m^2/s	0.09 m^2/s

Overland Flow Analysis (1% AEP)		
Pre-development	**Pre-development**	**Post-development**
Depth, d	0.19 m	0.12 m
Max Velocity, v_{max}	1.08 m/s	1.11 m/s
Flow, Q	2.8 m^3/s	2.8 m^3/s
Product of velocity and depth, v.d	0.21 m^2/s	0.13 m^2/s

2.4.5 Drainage Design

The site has been separated into two catchments, i.e. northern and southern catchments, by the community hall.

In the northern catchment, earth bund (low flow) along the northern boundary is used to prevent stormwater flowing over neighbouring properties. Additional Earth Bund is used around the electrical kiosk to prevent stormwater entering the service area. It will serve to guide water into the proposed level spreader. The rock check dam next to the level spreader will work as an energy dissipator.

In addition, a proposed swale along the driveway edge will prevent water flowing over the driveway.

In the southern catchment, the area at the level spreader has been filled to allow for a relatively flat grade of approximately 1%. Stormwater from the southern catchment will flow towards the level spreader and rock check dam as an energy dissipator located at the south-west of the site.

2.4.6 Stormwater Quality Management

The proposed civil works include demolition of existing structures, site regrading and stabilising with turf, therefore WSUD will not be applicable in this design.

APPENDICES

Appendix A Civil Documentation

Appendix A Civil Documentation

Robert Bird Group

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PROPOSED MEADOWBANK PUBLIC SCHOOL REDEVELOPEMENT

CIVIL ENGINEERING DRAWING SET

Sheet List Table	
Sheet Number	Sheet Title
80000	COVER PAGE
81000	EROSION & SEDIMENT CONTROL PLAN
81101	EROSION & SEDIMENT CONTROL DETAILS
82001	BULK EARTHWORKS PLAN
87001	STORMWATER MANAGEMENT PLAN
87101	STORMWATER MANAGEMENT DETAILS

Rev	Revision Description	By	App	Date
P01	FOR COORDINATION	HS	CW	17.11.2022
P02	FOR REVIEW	HS	CW	25.11.2022

Rev	Revision Description	By	App	Date

Scale 1 2 3 4 5 6 7 8

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Client
DEPARTMENT OF EDUCATION

Title
COVER PAGE

Project
MEADOWBANK PRIMARY SCHOOL

Date 25.11.22
Scale at A1
SCALE
Drawn NL
Designer HS
Design Checker HS
Approved CW
Job Number 20579

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Drawing Number 20579-RBG-XX-XX-DR-CV-80000
Revision 02

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P01	FOR COORDINATION	HS	CW	17.11.2022
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Rev	Revision Description	By	App	Date

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Client
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Title
EROSION & SEDIMENT CONTROL PLAN

Project
MEADOWBANK PRIMARY SCHOOL

Date	Drawn	Design Checker
25.11.22	NL	HS
Scale at A1	Designer	Approved
SCALE	HS	CW

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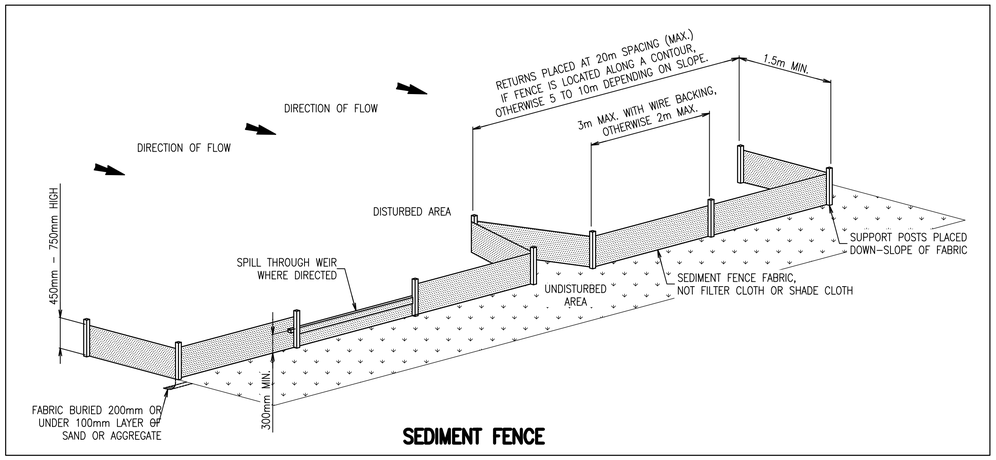
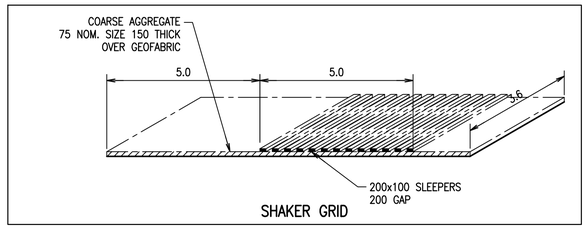
Revision
02



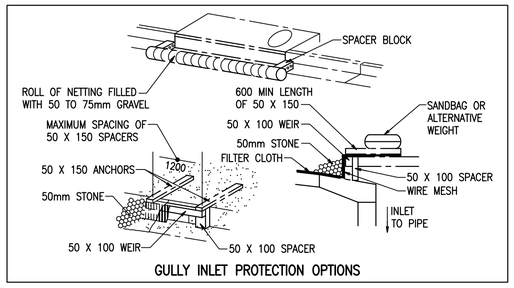
SEDIMENT FENCE

CONSTRUCTION NOTES

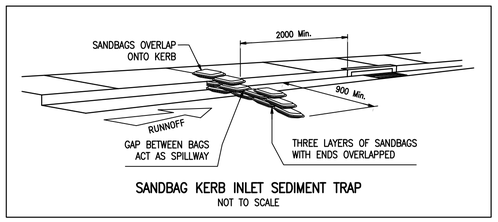
1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10 YEARS EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT 3m INTERVALS(MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.



SHAKER GRID



GULLY INLET PROTECTION OPTIONS



SANDBAG KERB INLET SEDIMENT TRAP

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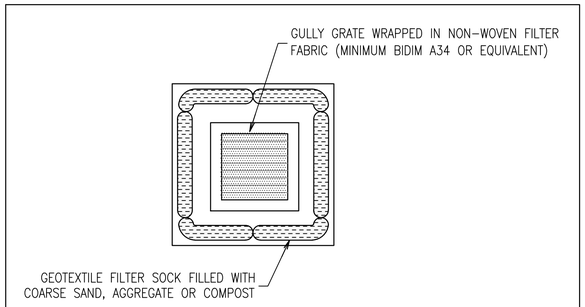

FIELD INLET SEDIMENT TRAP – FILTER SOCK

Rev	Revision Description	By	App	Date
P01	FOR COORDINATION	HS	CW	17.11.2022

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Client
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Title
EROSION & SEDIMENT CONTROL DETAILS

Project
MEADOWBANK PRIMARY SCHOOL

Date	Drawn	Design Checker
17.11.22	NL	HS
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Client
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Title
BULK EARTHWORKS PLAN

Project
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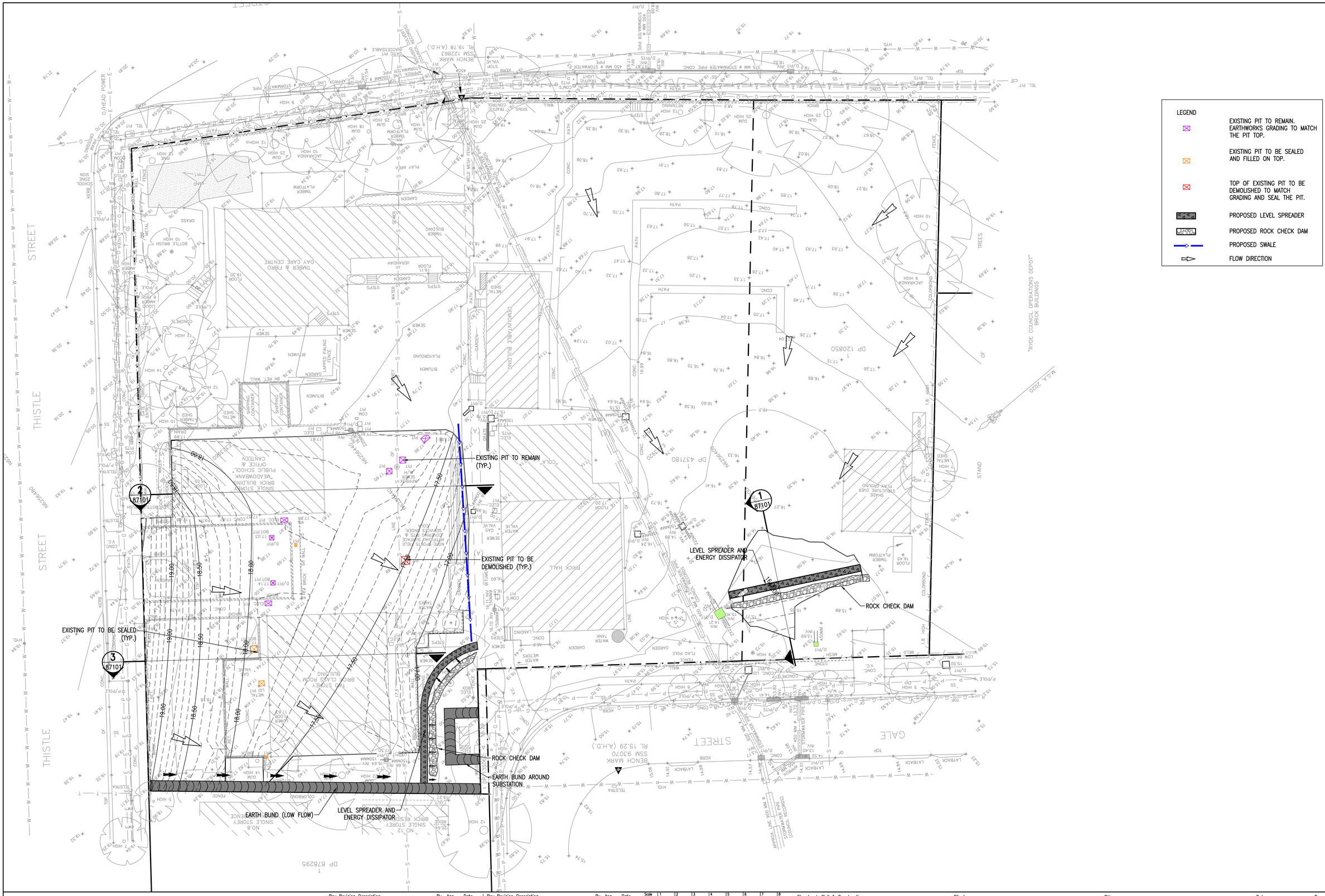
Drawing Number: 20579-RBG-XX-XX-DR-CV-82001
Revision: P03



SCALE 1:250

5 0 5 10m

Rev	Revision Description	By	App	Date
P01	FOR COORDINATION	HS	CW	17.11.2022
P02	FOR COORDINATION	HS	CW	22.11.2022
P03	FOR REVIEW	HS	CW	25.11.2022

Rev Revision Description By App Date

Scale 1 2 3 4 5 6 7 8

DO NOT SCALE DRAWINGS, USE FIGURED DIMENSIONS REFER TO GENERAL NOTES UNLESS NOTED OTHERWISE

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Client
DEPARTMENT OF EDUCATION

Title
STORMWATER MANAGEMENT PLAN

Project
MEADOWBANK PRIMARY SCHOOL

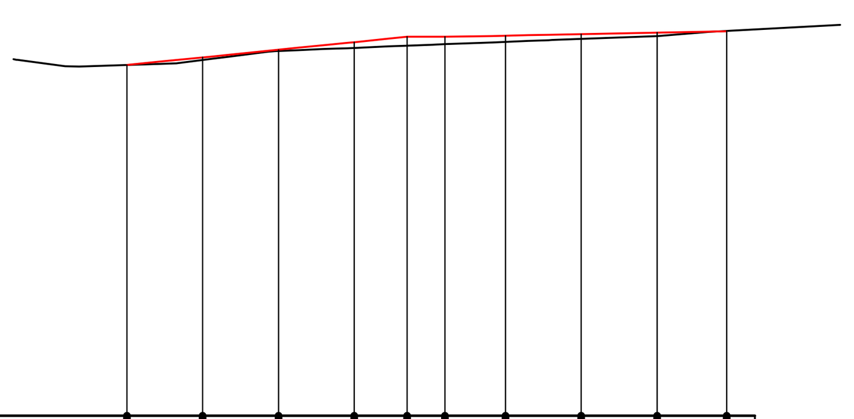
Date	Drawn	Design Checker
25.11.22	NL	HS
Scale at A1	Designer	Approved
SCALE	HS	CW

Job Number
20579

NOT FOR CONSTRUCTION

Drawing Number
20579-RBG-XX-XX-DR-CV-87001

Revision
P03

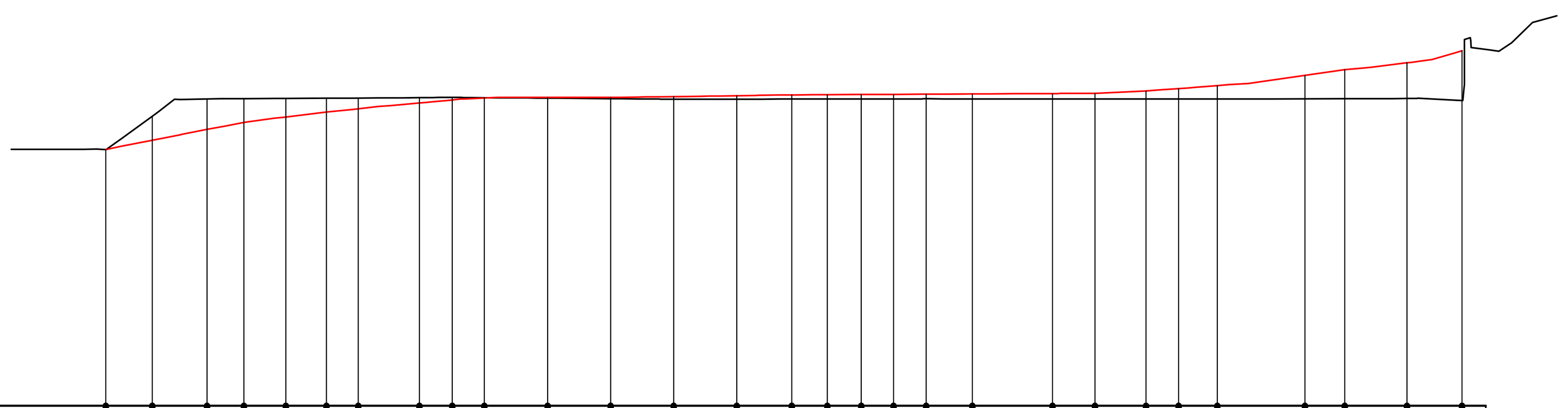


DATUM RL 11

CUT / FILL	0.000	0.035	0.015	0.075	0.117	0.097	0.081	0.063	0.047	-0.004
DESIGN SURFACE LEVEL	15.630	15.730	15.830	15.930	16.000	16.000	16.016	16.036	16.056	16.074
NATURAL SURFACE LEVEL	15.630	15.695	15.815	15.855	15.883	15.903	15.935	15.973	16.009	16.079
CHAINAGES	0.000	2.000	4.000	6.000	7.402	8.402	10.000	12.000	14.000	15.837

LONGITUDINAL SECTION (1/87001)

SCALES H 1:200 (A1)
V 1:100 (A1)

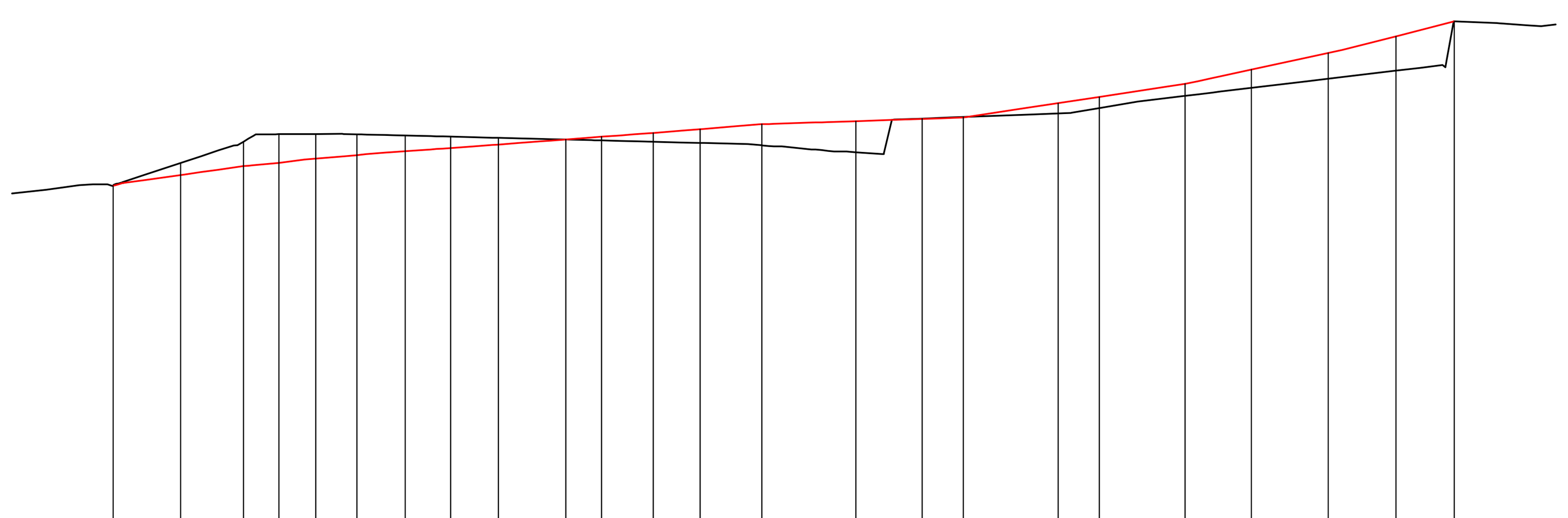


DATUM RL 13

CUT / FILL	0.000	-0.382	-0.484	-0.380	-0.298	-0.218	-0.173	-0.086	-0.039	-0.006	0.012	0.022	0.042	0.055	0.066	0.069	0.071	0.073	0.075	0.078	0.085	0.089	0.126	0.164	0.210	0.371	0.460	0.569	0.791
DESIGN SURFACE LEVEL	17.070	17.217	17.390	17.500	17.585	17.667	17.715	17.809	17.858	17.888	17.899	17.900	17.912	17.926	17.939	17.942	17.945	17.948	17.951	17.953	17.960	17.964	18.000	18.039	18.084	18.248	18.339	18.449	18.638
NATURAL SURFACE LEVEL	17.070	17.599	17.874	17.880	17.883	17.886	17.888	17.895	17.897	17.894	17.887	17.878	17.870	17.871	17.872	17.873	17.874	17.875	17.876	17.876	17.875	17.875	17.875	17.874	17.874	17.877	17.879	17.880	17.847
CHAINAGES	0.000	1.471	3.208	4.372	5.707	6.993	8.000	9.941	10.977	12.000	14.000	16.000	18.000	20.000	21.744	22.865	23.940	24.969	26.000	27.464	30.000	31.353	32.971	34.000	35.231	38.000	39.268	41.237	42.984

LONGITUDINAL SECTION (2/87001)

SCALES SCALES (H1):200 (A1)

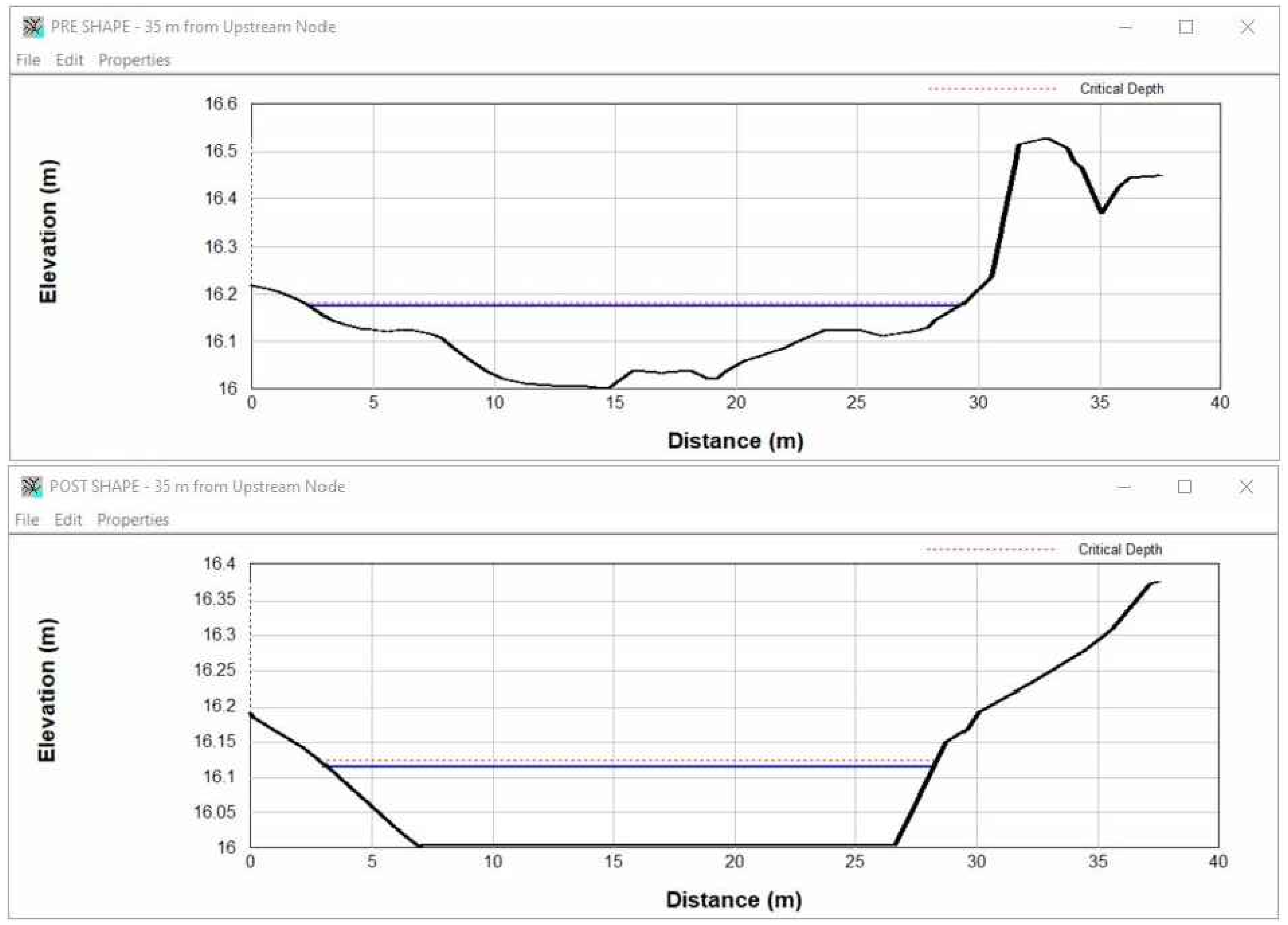


DATUM RL 12

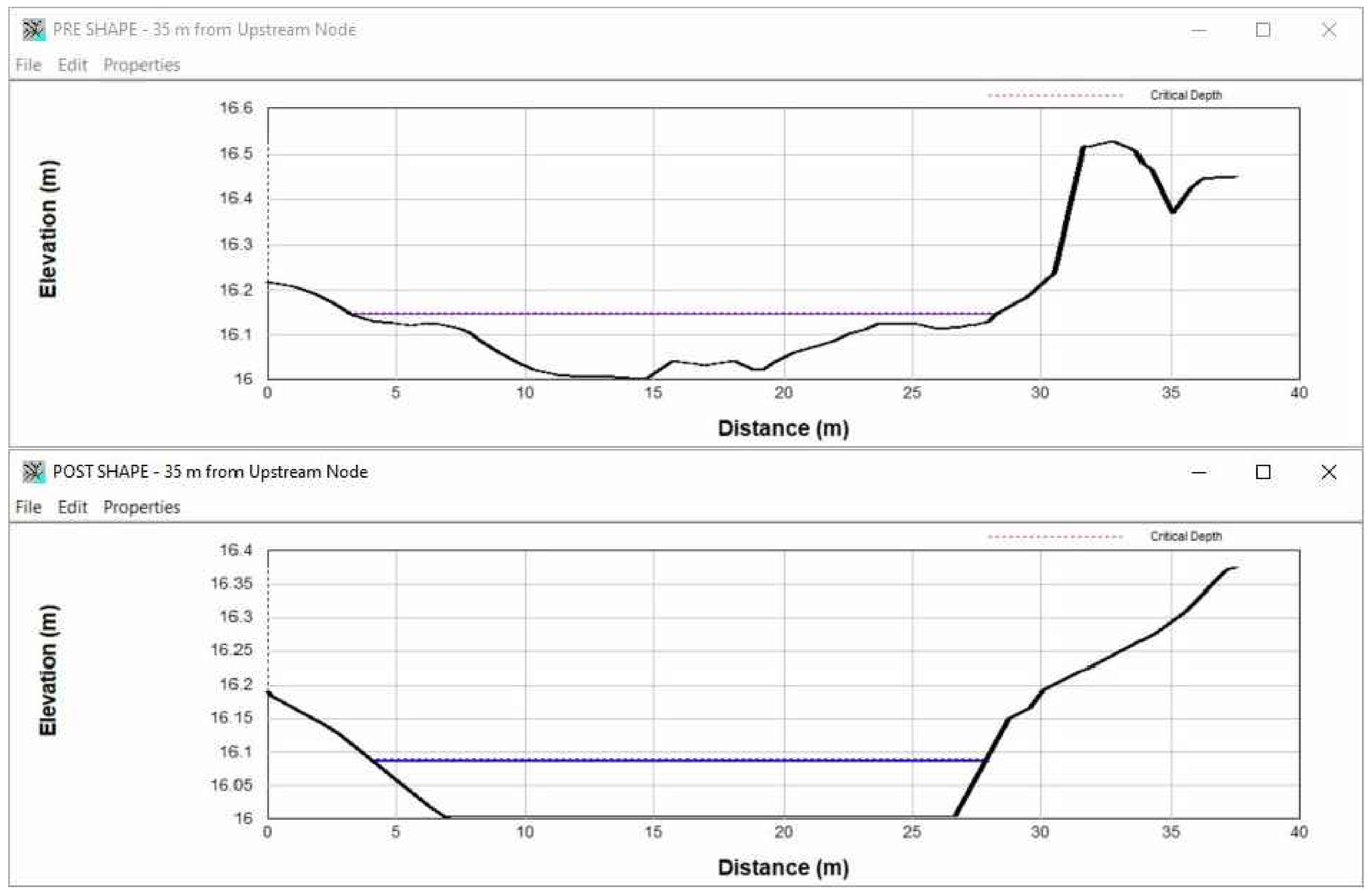
CUT / FILL	0.000	-0.178	-0.362	-0.425	-0.365	-0.311	-0.233	-0.168	-0.100	-0.001	0.054	0.131	0.203	0.313	0.459	-0.005	-0.007	0.152	0.165	0.177	0.271	0.381	0.510	0.000
DESIGN SURFACE LEVEL	16.987	17.148	17.278	17.327	17.389	17.440	17.499	17.548	17.598	17.672	17.714	17.772	17.826	17.900	17.944	17.979	18.000	18.213	18.305	18.498	18.711	18.956	19.203	19.425
NATURAL SURFACE LEVEL	16.987	17.326	17.640	17.752	17.754	17.751	17.733	17.716	17.698	17.673	17.660	17.641	17.623	17.587	17.485	17.984	18.007	18.061	18.139	18.322	18.439	18.575	18.694	19.425
CHAINAGES	0.000	2.000	3.859	4.914	6.000	7.222	8.653	10.000	11.411	13.408	14.472	16.000	17.392	19.215	22.000	23.965	25.190	28.000	29.214	31.758	33.723	36.000	38.000	39.734

LONGITUDINAL SECTION (3/87001)

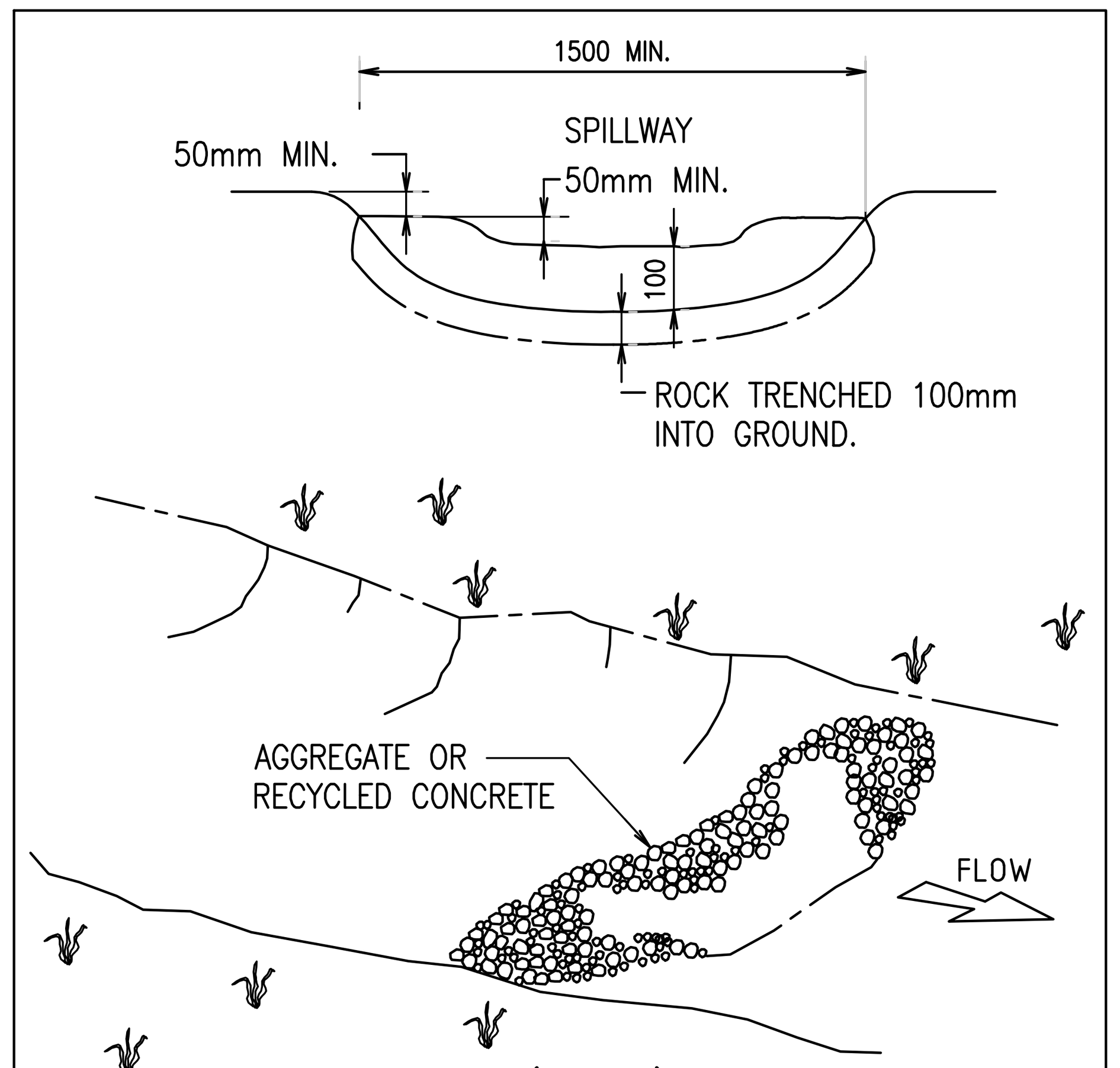
SCALES H 1:200 (A1)
V 1:100 (A1)



PRE AND POST SHAPE DRAINS RESULTS (1% AEP)



PRE AND POST SHAPE DRAINS RESULTS (10% AEP)



CHECK DAM DETAIL (GRAVEL)
LANDCOM DETAIL SD5-4

Rev	Revision Description	By	App	Date
P01	FOR COORDINATION	HS	CW	17.11.2022
P02	FOR COORDINATION	HS	CW	22.11.2022
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Rev	Revision Description	By	App	Date

Scale 1 2 3 4 5 6 7 8

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Client
DEPARTMENT OF EDUCATION

Title
STORMWATER MANAGEMENT DETAILS

Project
MEADOWBANK PRIMARY SCHOOL

Date 25.11.22
Drawn NL
Design Checker HS
Scale at A1 SCALE
Designer HS
Approved CW

20579

NOT FOR CONSTRUCTION

Drawing Number 20579-RBG-XX-XX-SK-CV-87101
Revision P03