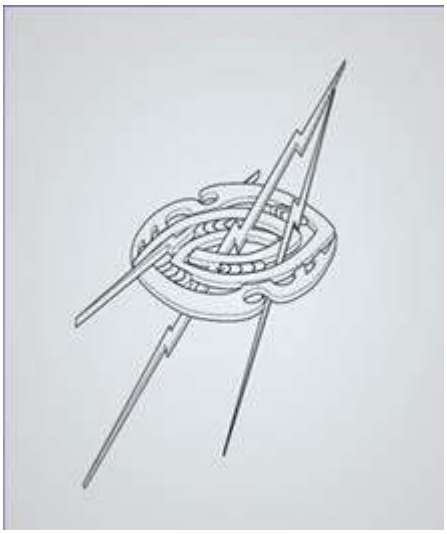
APPENDIX M

INFRASTRUCTURE & EARTHWORKS ASSESSMENT REPORT

terra consultants

Infrastructure Assessment Report



Prepared for

Global Contracting Solutions

Project Paewira, 401 Racecourse Road

Te Awamutu

Prepared by

Terra Group NZ Ltd.

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AUTHOR	Gallagher Cai – Civil Engineer
REVIEWED	Gary Clarke – Land Development Manager

OFFICE OF ORIGIN	Auckland
TELEPHONE	09 357 3557
EMAIL	terra@terragroup.co.nz
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1 INTRODUCTION

Terra Consultants have been engaged by the Global Contracting Solutions to carry out an Earthworks and 3 Waters Infrastructure Assessment Report (IAR) to support a proposed development at 401 Racecourse Road, Te Awamutu.

The subject site is located in the north of the urban area of Te Awamutu, adjacent to the urban area boundary. The subject site comprises the southern lots of title SA44C/676, that is Part 7, DP 20887; Lot 1 DPS 12327 and various part lots which make up the right of way access mouth at the intersection with Racecourse Road.

401 Racecourse Road, Te Awamutu

401 Racecourse Road, Te Awamutu

2 SCOPE OF ASSESSMENT

2.1 SCOPE OF WORK

As part of the assessment, the following were carried out:

- A review of the existing topography.
- Design of the proposed project, access, services and site works.
- Calculations of anticipated requirements of water, wastewater and stormwater.

2.2 MATTERS TO BE ASSESSED

This report addresses the following items:

Earthworks

Assess the requirements for earthworks, erosion and sediment control.

Access

Ensure provision of suitable access to the development.

Stormwater

Ensure runoff from the proposed buildings and development can be suitably treated and disposed. Ensure that overland flow is adequately managed on site.

Wastewater

Ensure that wastewater generated from the development can be suitably disposed.

Water Supply

Ensure a suitable supply of water for fire and domestic purposes is available to the development.

Utilities

Ensure power and phone services are available to the development.

3 SITE DESCRIPTION

The site comprises for the most part a series of terraces which gently cascade down to the Mangapiko Stream which forms the site's southern boundary. The highest parts of the site are those furthest from the stream adjoining the north-eastern boundary; the lowest parts of the site are those adjoining the Stream and the western boundary. As the site is entered from Racecourse Road topography is level and maintains the same form as the properties to the north and south of the right of way. This quickly changes as the accessway opens out onto the site proper with landform splitting between an upper shelf and a lower terrace down to the stream. Further towards the centre of the site upper and lower terraces meld more smoothly to a fairly uniform slope before taking a more defined form to the rear of the site's northern dwelling

The predominant land use across the site is dairy support farming. Dwellings for the current owner and farm staff are located near the north-east boundary on the top terrace. Some minor quarrying for sand and deposition of clean fill has taken place in the east of the site at the base of the steeper terrace scarp. Fill was placed in this location during construction of the nearby wastewater plant

4 DEVELOPMENT PROPOSAL

A resource consent for land use is being sought for a waste to energy plant within the property, which incorporates recycling and generation of power. The development site is approximately 11ha with the development area approximately 7ha including buildings, access, parking and landscaped areas.

The tasks related to the development consists of the following:

- Earthworks to form the building platforms, access, parking and open space areas.
- Construction of new vehicle crossings, accessways and parking.
- Provision of stormwater drainage for the 10-year stormwater control.
- Provision of wastewater drainage, water supply and utility services.

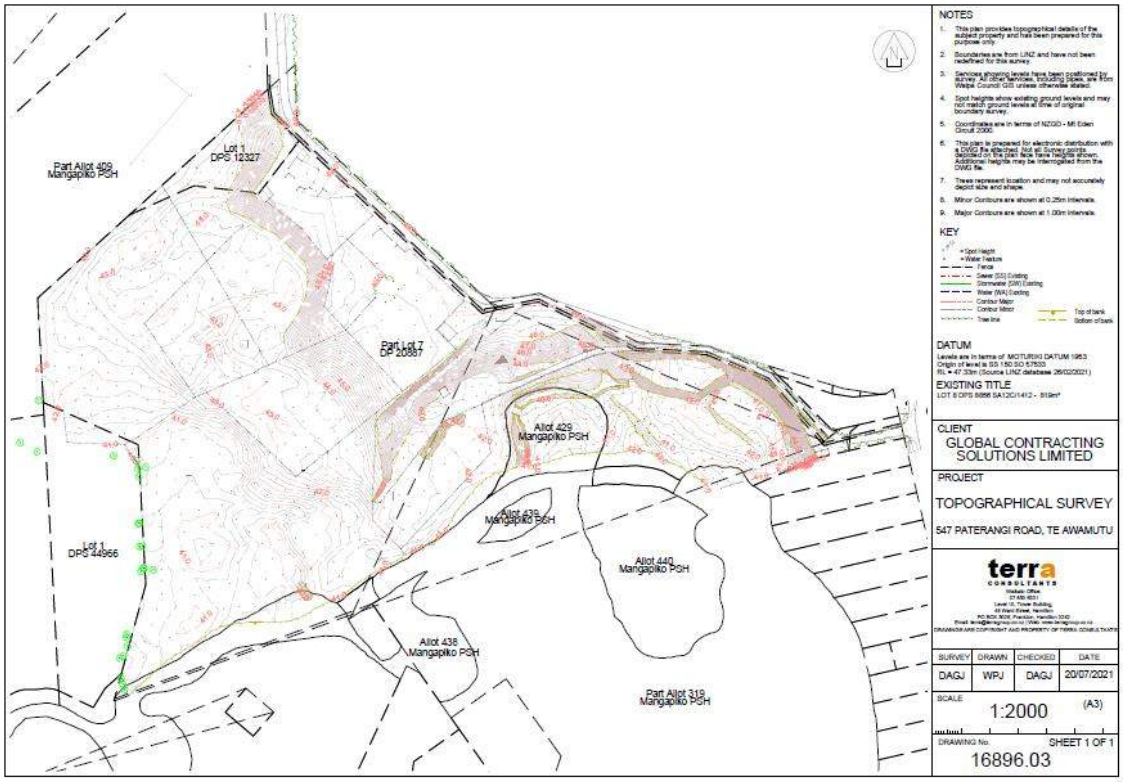
Consent drawings showing the proposed development civil engineering works are provided in Appendix 3.

5 EARTHWORKS

5.1 SITE FORM AND GEOTECHNICAL.

The existing site access enters from Racecourse Road along the northern boundary where site levels range from RL 48m to RL 49m. The mid site platform has level ground at approx. RL 47.5 and then drops to approx. RL 43 over 20m. The lower existing ground platform runs out approx. 60m/100m at RL 42.5m where it then slopes off to the stream at approx. RL 40m.

Site Topo Plan



Geological mapping of the area indicates the site is likely to be underlain by the younger soils of the Piako Subgroup to the south west of the site, and the older soils of the Hinuera Formation to the north east. The Piako Subgroup is described as alluvial and colluvial sand, silt, mud and clay with local gravel and peat beds. The Hinuera Formation is described as cross bedded pumice, sand, silt and gravel with interbedded peat.

A geotechnical investigation report has been prepared by HDGeo. The report details site investigation of the ground conditions, soils structure and comments on land stability in the area.

The report indicates that the site is geotechnically suitable for the proposed development and engineering fill can be constructed onsite to cater for the proposed development. The existing ground or where modified shall cater for foundations, stabilised batters and mitigation for any anticipated settlement.

The proposed earthworks operation shall be monitored by a suitably qualified geotechnical engineer to confirm the expected ground conditions during excavation and to monitor the placement of fill.

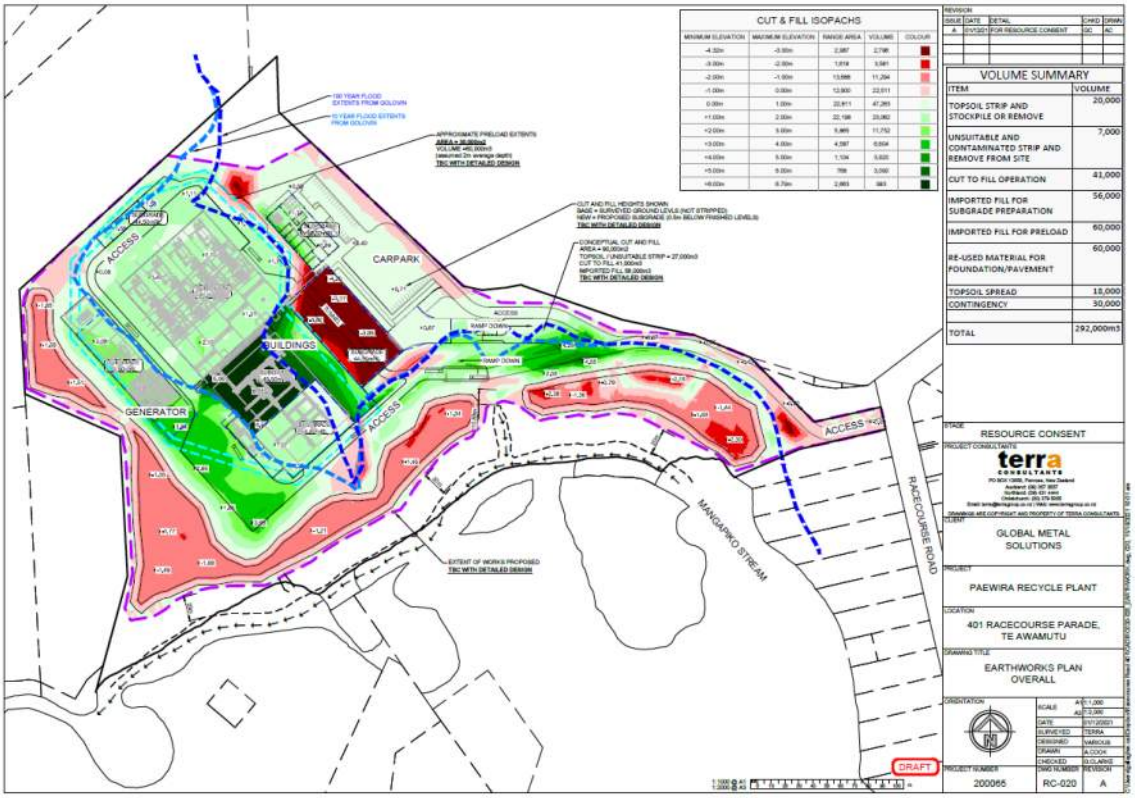
5.2 PROPOSED EARTHWORKS

Earthworks are proposed to form the building platforms for the buildings, access and parking and to shape the surrounding grounds. The topsoil will be stripped across the site and stockpiled for reuse or removed from site where it is unsuitable or in excess to the amount required for re-spreading. The earthworks are generally proposed in zones not affected by overland flowpaths, rivers, creeks or wetlands, margins and no significant removal of vegetation is proposed. The geotechnical report investigates soil strength and underlying geotechnical conditions which indicates soils preloading will be required to mitigate settlement for any medium to large depths of fill or significant building loads.

Earthworks operations will commence with stripping and clearing the site. The cut/fill operations will most likely be staged to manage the open exposed areas and minimise risks of silt runoff during periodic rainfall events. The staging will operate around the 3 proposed sediment control ponds as detailed. Earthwork embankments shall be revegetated or mulch sprayed as soon as practical adjacent to the stream edges. Earthwork area shall be controlled with clean water diversion swales to direct adjacent area runoff from entering the site. Dirty water swales shall collect sediment laden stormwater discharge and direct to one of the 3 sediment control ponds for decanting. The proposed sediment control ponds shall cater for the 20-year event storm; the 100-yr event storm shall pass through the ponds and discharge via appropriately sized overflow channels. All discharge to the sediment control pond shall be monitored by a suitably qualified silt and sediment control engineer; a sediment dosing system will be installed to ensure suitable discharge is achieved to comply with the 100mm clarity and visibility sampling methodology.

The earthworks will consist of a cut to fill operation on the site covering approximately 7ha. The volumes are expected to consist of approximately 41,000m^3 of cut to fill with onsite materials and 60,000m^3 of fill materials required to be imported. Earthworks associated with preloading is approx. 60,000m^3 which shall be imported and removed post settlement monitoring. The preload materials are expected to be completely removed from site 12-18 months post placement and upon certification. All materials imported to site shall be certified clean fill only.

Proposed Earthworks Plan RC- 020



Earthworks Summary

Area of Earthworks	70,000m^2
Strip Topsoil and unsuitable	27,000m^3
Cut/Fill on site	41,000m^3
Import Fill to site	56,000m^3
Import preload materials and remove	56,000m^3
Re-use materials(excavations)	60,000m^3
Topsoil respread	18,000m^3
Remove unsuitable	9,000m^3
Contingency	30,000m^3
TOTAL EARTHWORKS	**292,000m^3**

Truck Movements: The proposed earthworks identify approximately 56,000m^3 clean fill will be required to be imported to the site. This is envisaged to be imported via truck and trailer units carrying approximately 15-20m^3 per load, requiring approx. 3800 loads over 2.5m months. This equates to approximately 4 trucks loading 2 trips per hr, 10hrs per day over approx. 48 days.

5.3 EARTHWORKS MANAGEMENT PLANS

A Construction Management Plan and Erosion and Sediment Control Plan as described below will be provided to manage the construction process prior to the commencement of any physical work on the site for review and approval by the Waipa Council Compliance and Monitoring team.

5.3.1 Construction Management Plan (CMP)

This Plan shall include specific details relating to the construction and management of all works and include but not be limited to:

- A construction methodology;
- Specific details relating to avoiding, remedying or mitigating adverse effects, including the effects of vibration during demolition, excavation and other earthworks, construction and management of all works associated with the development;
- A plan of action to remedy any adverse effects which may occur to any adjacent property during construction;
- Confirmation that sufficient equipment, materials and personnel to be available on site to ensure that any necessary measures to avoid, remedy or mitigate adverse effects will be implemented;
- Measures to be adopted to maintain the site in a tidy condition in terms of disposal/ storage of rubbish, storage and unloading of building materials and similar construction activities;
- Measures for waste management which include designated sites for refuse bins, and for recycling bins for glass, plastic and can storage and collection in accordance with the Council's waste reduction policy;
- Location of workers' conveniences ("Portaloos");
- Dust control measures;
- Location of site hoardings. No hoardings on the site shall contain any advertising materials (whether affixed permanently or otherwise);
- Measures to ensure ongoing access for the properties that use the right of way.
- Temporary traffic management.

5.4 EROSION AND SEDIMENT CONTROLS

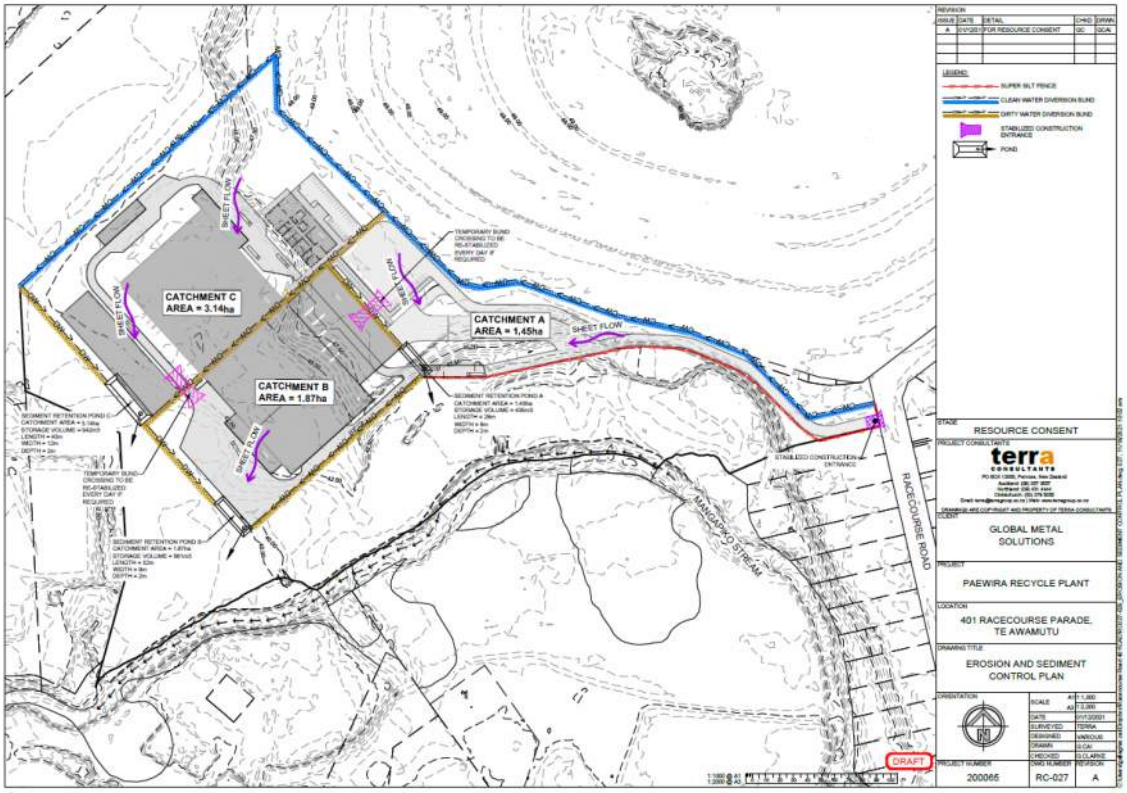
An erosion and sediment control plan has been prepared for the proposed earthworks and is shown in drawing RC-027 of the consent drawings in Appendix 3. The proposed controls consist of the following.

- A stabilised construction entrance will be constructed at the site entrance to minimise sediment being tracked onto the public road and the already completed private way.
- Super silt fences shall be installed along the boundary of the site or earthworks for capturing and filtering any sediment laden runoff.
- Three decanting earth bunds will treat runoff from the northern and eastern sides of the site. The decanting earth bund will be constructed with an emergency spillway to allow passage of runoff in larger storm events.

- Dirty water diversion bund will be installed along the boundaries of catchment areas to convey sediment laden runoff to the decanting earth bunds.

The proposed controls are based on best practices and all silt and sediment control works are proposed to be in accordance with established guidelines. The exposed areas are to be either mulched, grassed or replanted upon the completion of works. Mulching of the exposed areas may be undertaken pending the establishment of the grass and plants.

Erosion and Sediment Control Plan RC-027



6 ROADING AND ACCESS

6.1 EXISTING ACCESS AND PROPOSED

Access to the property is currently obtained from Racecourse Road which is categorised as Collector road within the Waipa District Plan.

Main access to the development site is via a proposed 7m wide carriageway to the operational areas of the site including for the recycling building, operations building, and parking. The internal access network consists of 6m-9m loop roads around the main recycling building and these pass out along the main access route. All vehicles will pass through weigh bridge and/or security controls. The facility will operate 24hrs a day, seven day a week, however heavy vehicle deliveries will only occur Monday to Saturday 7am to 5pm, and Sunday and Public Holidays 8am – 5pm. The loop road will cater for all

heavy delivery trucks, services vehicles and operational/visitor access. The proposed carparking area will cater for operational carparking and also daily visitors. There are 28 staff carparks and 15 visitor carparks together with bus parking.

6.2 TRAFFIC ASSESSMENT

A separate traffic assessment has been prepared by Commute Traffic Consultants. The report supports the proposed development and internal layout and operations.

7 STORMWATER

1. INTRODUCTION

The Earthworks Management Plan (EMP) as prepared by Terra details how erosion and sediment controls will be put in place to manage stormwater runoff during construction.

A separate Floodplain Assessment report has been prepared by Golovin Consultants. This document should be referred to for details on flood levels and flows, recommended minimum floor levels, and flood displacement.

The strategy for the remaining stormwater runoff management is discussed in this section and the summary is as follows:

- rainfall runoff from the various roof areas will be stored in tanks/ponds
- retention volume will be used by the facility as the water demands of the activity are high
- detention volume will fluctuate and be located in the upper parts of the storage
- high contaminant internal building wash areas require treatment by a proprietary product and discharging to the wastewater system.
- general access and carpark areas will be treated by water sensitive design measures such as swales and raingardens.
- Swales and check dams will also provide stormwater detention.
- The site will discharge to the stream using existing outfalls to Mangapiko River.

2. EXISTING

Discussion on the pre-development scenario follows:

2.1. Outfalls

There are no public stormwater assets on site. There are two existing discharge points into the Mangapiko River. The outfalls are located along the sites south eastern boundary. These are referenced as location A and B as shown in Figure 1. Other areas of the site sheet flow into the river across the grass bank.

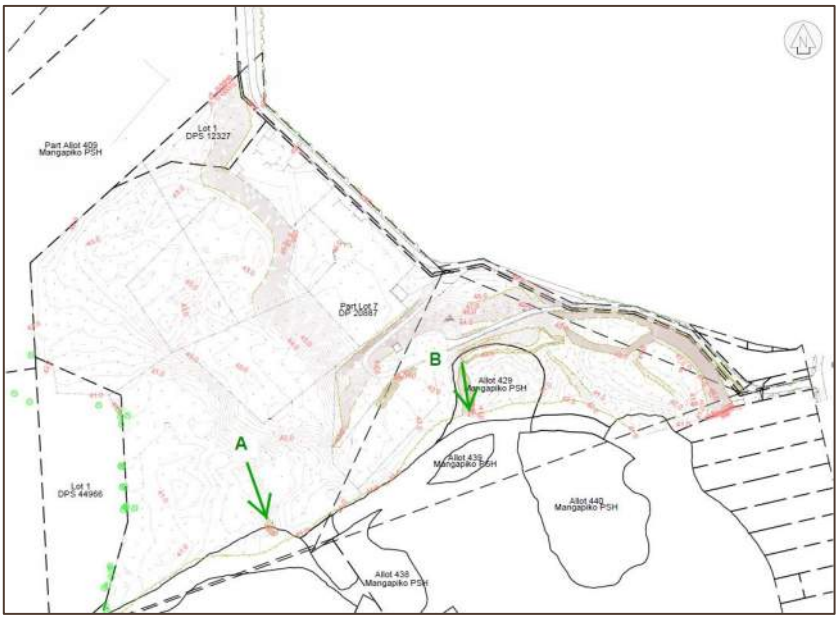


Figure 1: Existing outfall locations marked on topographical survey (Terra completed 20/07/2021 drawing reference 16896.03)

Outfall A

This outfall is a 300mm diameter pipe with 39.33mRL invert level. The ground level at the top of the river bank is 40.80mRL. According to Figure 2, this outfall is a pipe extending to the river and the outfall level is likely above the permanent water level.

Outfall B

A swale shape overland flow path outfall with 38.73mRL bottom of bank level. This is assumed to discharge directly into the river at a slightly higher level than the permanent flow level as per Figure 2.

Figure 2: Existing outfall locations marked on aerial view (2016-2019 Imagery from LINZ)

2.2. Catchment

Main catchment for the river is discussed in the Flood Assessment. Localised catchment is as shown in Figure 3. The site boundary is shown in light blue and the nearby rivers and flow paths dark blue. Red arrows indicate the general stormwater flow direction via sheet flow or shallow surface drains. Outfall A and B are shown for context. The pink line represents a ridge line and separation between high and low lying land. It is assumed the Racecourse catchment is managed on site due to the sloping camber of the tracks and existing private drainage systems.

Generally speaking, the catchment is the entire site boundary shown. The area is 110,000m^2 or 11 hectares.

The ground cover is predominately rural grass cover. Some access roads and buildings exist on site with impervious coverage. These areas have been disregarded for stormwater runoff calculations to calculate the 'greenfield' pre-development scenario flow rates.

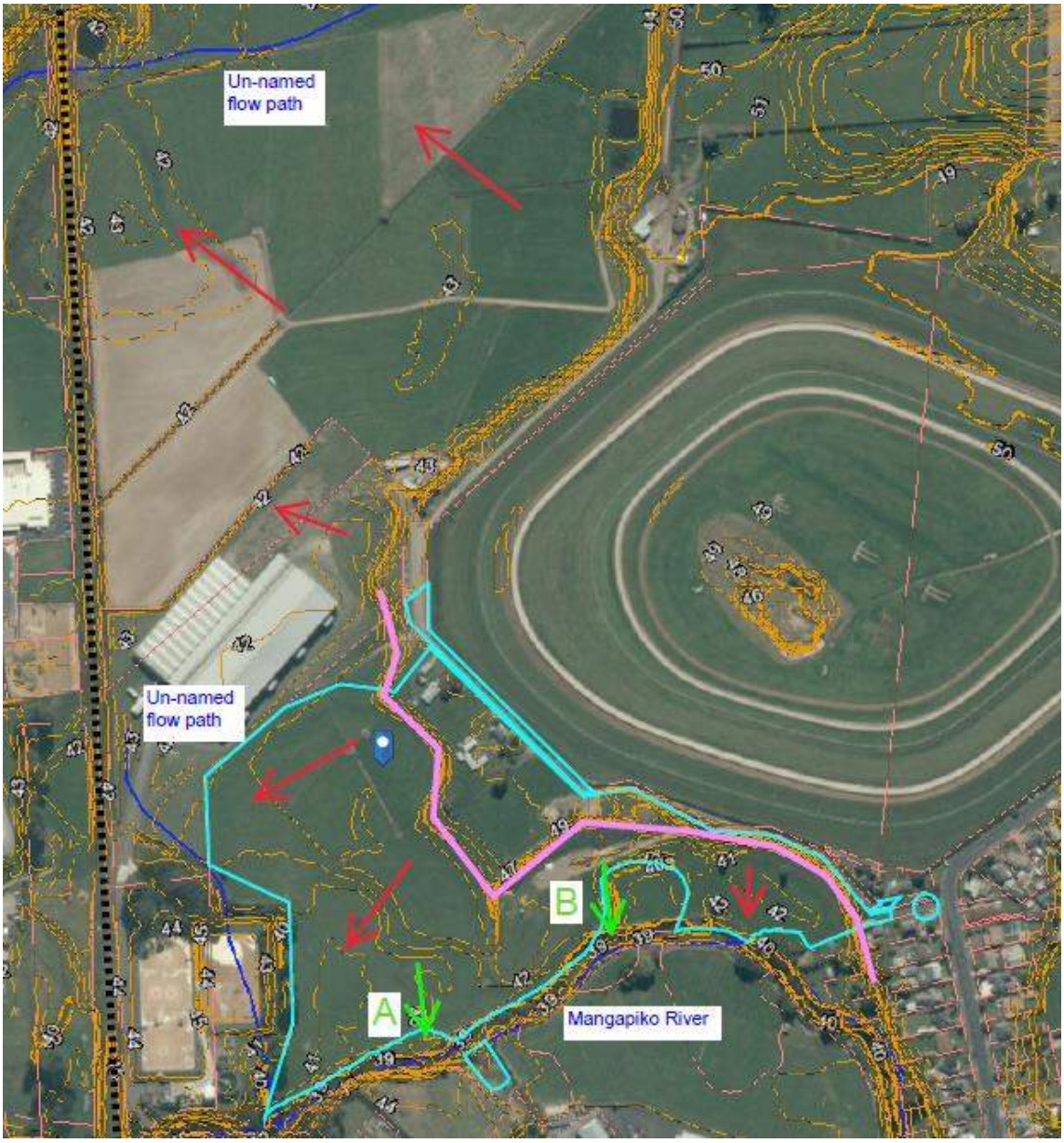


Figure 3: Existing stormwater catchment plan

2.3. Rainfall

As per section 4.2.4.3 of RITS, design rainfall data is to be obtained from HIRDS.

Excerpts from HIRDS are shown in Figure 5. Excluding climate change, the 10 year ARI storm event rainfall depth is 99.7mm over a 24 hour period. For a 10 and 20 minute storm duration, the intensity is 91.8 and 63.1mm/hr respectively.

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h
1.58	0.633	8.86	12.3	14.7	19.8	26.2	39.2	49.4	61.2
2	0.500	9.75	13.5	16.2	21.7	28.7	42.9	54.0	66.7
5	0.200	12.9	17.8	21.2	28.4	37.3	55.5	69.5	85.6
10	0.100	15.3	21.0	25.1	33.5	43.9	65.0	81.2	99.7

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h
1.58	0.633	53.2	36.8	29.5	19.8	13.1	6.54	4.12	2.55
2	0.500	58.5	40.5	32.3	21.7	14.3	7.14	4.50	2.78
5	0.200	77.3	53.3	42.5	28.4	18.7	9.24	5.79	3.57
10	0.100	91.8	63.1	50.2	33.5	22.0	10.8	6.77	4.15

Figure 4: HIRDS rainfall data (no climate change)

As per section 4.2.4.4 of RITS, an increase in rainfall because of the climate change allowance for 2.1ºC change is to be allowed for on the 24 hour storm.

HIRDS use various RCP scenarios to model climate change instead of temperature change. It is understood RCP 6.0 scenario most closely relates to the 2.1ºC temperature change from the RITS standard.

Excerpts from HIRDS is shown in Figure 5. Including climate change, the 10 year ARI storm event rainfall depth is 113mm over a 24 hour period. For a 10 and 20 minute storm duration, the intensity is 100 and 68.7mm/hr respectively.

Rainfall depths (mm) :: RCP6.0 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h
1.58	0.633	10.6	14.7	17.6	23.7	31.0	45.2	55.9	68.2
2	0.500	11.7	16.2	19.4	26.1	34.1	49.7	61.4	74.5
5	0.200	15.6	21.5	25.7	34.3	44.8	65.0	80.0	96.5
10	0.100	18.6	25.5	30.5	40.7	52.9	76.4	93.8	113

Rainfall intensities (mm/hr) :: RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h
1.58	0.633	57.5	39.8	31.8	21.4	14.1	6.96	4.34	2.67
2	0.500	63.4	43.8	35.0	23.5	15.5	7.62	4.76	2.91
5	0.200	84.0	57.9	46.2	30.9	20.2	9.90	6.16	3.76
10	0.100	100	68.7	54.7	36.5	23.8	11.6	7.21	4.38

Figure 5: HIRDS rainfall data (with climate change)

2.4. Flows

As per Table 4-7 from RITS, a 10-year ARI storm event is to be used for industrial developments. Calculations are attached to this report. The pre-development flow leaving the site is 900L/s in a 10 year storm event. This value was obtained using the rational formula with a C value calibrated against the TP108 methodology.

2.5. Volume

Runoff volume was calculated using TP108 methodology and in the pre-development scenario is 6,000m^3.

3. QUALITY

There are four distinct types of catchment on this project, namely the roof, roading, wash areas, and grass. The extent of each type is as shown in Figure 6. In terms of stormwater runoff quality, a combination of passive and active treatment methods is proposed to ensure the water quality leaving the Site meets the requirements of the Council.

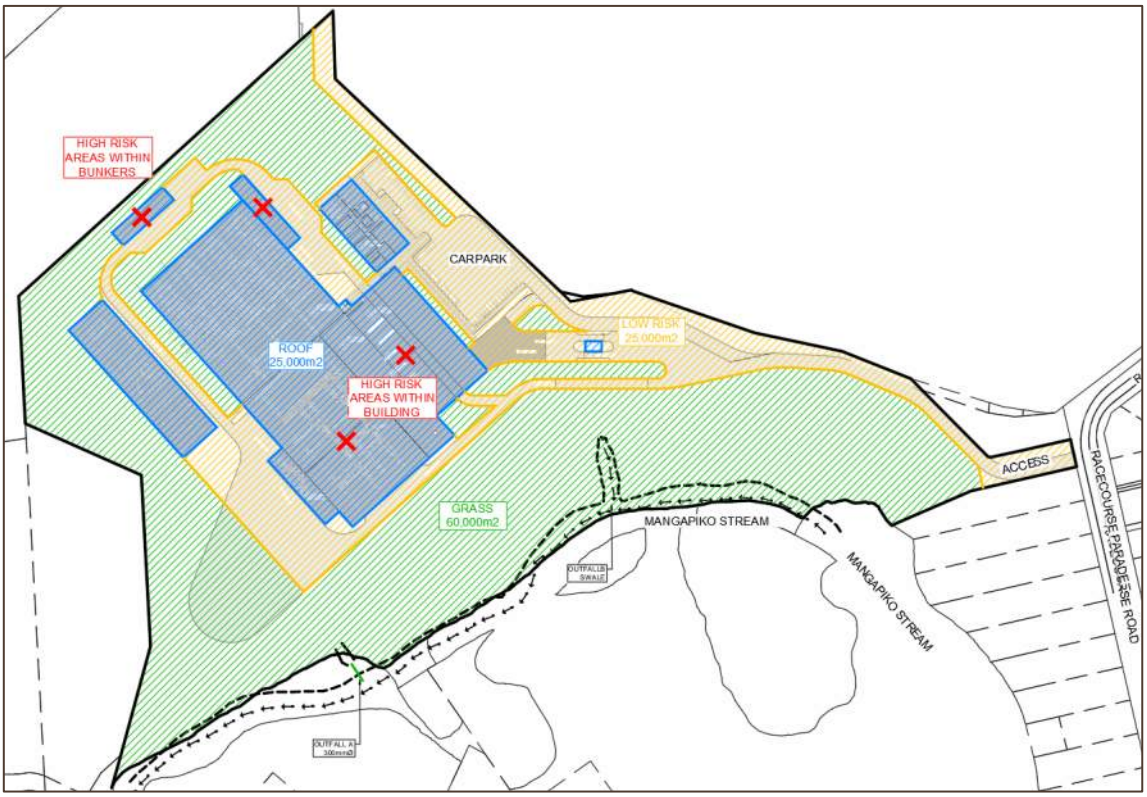


Figure 6: Stormwater treatment areas

Treatment of runoff is described below.

3.1. Roof

The roof catchment occupies 25,000m^2 or 22.7% of the site. This catchment is considered low risk.

The roof catchment of the Site is considered clean. Inert, non-contaminant yielding materials will be used for roof, spouting, and cladding construction (such as tiles or colour steel). No more than 25m^2 of exposed unpainted roofing, guttering, or cladding made from galvanised steel (zinc) is allowed. Downpipes are to have leaf separators if trees are present. Therefore, stormwater contamination from roofs will be minimal and additional stormwater treatment will not be required for stormwater runoff from the roof. This clean water will be kept separate from other un-treated water by ensuring that duplicate stormwater pipe systems are proposed. Details are to be confirmed at the building consent stage.

3.2. Roading

The roading catchment occupies 25,000m^2 or 22.7% of the site. This catchment is considered low risk. The general access and carpark areas will be predominately treated by water sensitive design measures such as swales and raingardens.

Due to site and level restrictions, some catchpits and manholes will be required instead of low impact design measures. Depending on the catchment size these are either proposed to have:

- gross pollutant traps/sumps, filter bags, and siphon outlets in catchpits

- manholes with cartridge filter systems.

This proposal will prevent the ‘first flush’ gross pollutants from entering the pipes.

All stormwater management devices are to be installed under supervision of a qualified civil engineer and complying with any manufacturer’s specifications.

Details of the proposed stormwater management system are shown on Terra engineering drawing RC-41.

3.3. Wash areas

Areas with higher risk for generating contaminants are proposed within the buildings. The red cross shows these locations on Figure 6. Proprietary products will be selected at the building consent stage to ensure that the discharged water is of acceptable quality. The wash water (once treated) will discharge to the wastewater system and not the stormwater system.

3.4. Grass areas

The balance of the site, some 60,000m^2 or 54.6% will be covered with grass or landscaping. No water quality treatment is required for this area.

4. QUANTITY

The design proposed has considered the post development stormwater runoff flow and volume values for a 10 year rainfall event. The catchments for roof and roading have been considered separately. The proposed grass catchment has been disregarded as there is no increased runoff.

4.1. Roof catchment to pond

Runoff from the generator, reception block, and bunker buildings will be captured in the downpipe and guttering system. This water will be directed to a stormwater pond near the reception block.

4.1. Roof catchment to tank system

Runoff from the main building will be directed to an internal tank system on the lower level of the building and will be available for re-use. This can be considered retention volume. Shortfall in water supply in between periods of rain can be supplemented by town supply.

The daily water usage from the list of water consumption items provided by Lambion Energy is 170m3/day. This can be supplied by the Council system subject to capacity checks on their network.

For commercial viability, it is proposed to provide 5 days of water storage on site. Therefore, 850m^3 of water is proposed to act as retention volume.

4.2. Roading catchment

It is not possible to provide underground stormwater storage for the carparking areas because this would be below the 10 year flood level. Therefore, it is proposed check dams be included in all swales to slow down the water flow. There is 820m of swales proposed.

The following table describes the pre and post development flows and volumes:

Area	Existing			Proposed				
	Area (m2)	**Flow (L/s)**	**Volume (m3)**	**Area (m2)**	Not mitigated **Flow (L/s)**	Mitigated **Flow (L/s)**	**Runoff Volume (m3)**	**Storage volume required (m3)**
Grass	110,000	900	6,000	60,000	480	480	N / A	0
Road	N / A			25,000	400	300		1,000 [2]
Roof (pond)				5,000	100	30		1,000 [3]
Roof (tank)				20,000	420	90		1,000 [4]
Total	110,000	900	6,000	110,000	1,400	900	9,000 [1]	3,000

[1] – Runoff volume calculated with TP108 methodology. Difference is 3,000m3
[2] – Road storage provided in swales by including check dams
[3] – Pond storage provided near reception building
[4] – Roof storage provided in top of water tank storage system

Each catchment will have stormwater management devices that allow stormwater detention during a 10 year storm event. Held water will be released slowly over a 24 hour period by low flow or orifice control. Final details will be supplied as part of a future building consent.

5. FLOOD

Refer to the separate Floodplain Assessment report that has been prepared by Golovin.

Summary is:

- Site is near the confluence of Mangapiko River and Mangaohoi River
- Catchment areas are 174km2, and 94km2 respectively
- Runoff co-efficient assumed 0.3 for predominately rural grass coverage
- 100 year storm runoff past site is 236m^3/s
- 0.3m freeboard recommended
- Minimum FFL 44.60mRL (Moturiki datum 1953)
- 10 year storm extents checked.

The 10 year flood extents are the same as the 100 year flood extents and approximately 1m lower. Therefore, both existing outfalls will be submerged, as will the majority of the site. The detention storage volume proposed will be on the high side of the flooding due to the proposed building level being raised above existing ground.

The underground pipe and swale system will be flooded during this time. Scruffy dome manholes will be placed in strategic locations around the building as overflow points. In this way, when the system becomes overflowed in the 100 year storm a pre-determined overflow point has been established in a safe location with scour protection proposed when needed.

6. DISCHARGE

It is proposed to re-use discharge points A and B.

1. Location A will discharge the roof overflow catchment and the western part of the road catchment.
2. Location B will discharge the balance of the road catchment.

As described in the above quantity and quality sections, the stormwater runoff leaving the site in the post development scenario has been appropriately treated or attenuated. Runoff leaving the site in a 10 year storm event will not scour the outlet, increase downstream flooding concerns or create any contamination.

7. STANDARDS / COMPLIANCE

Design has been carried out with consideration of the following standards:

- Regional Infrastructure Technical Specifications (RITS)
- Waipa District Council Development and Subdivision Manual (DSM)

Compliance with some of the relevant town planning / legislation is briefly discussed below. Refer to the Assessment of Environmental Effects for further discussion.

7.1. Waipa District Council

Relevant assessment criteria relating to stormwater from Section 21 follows:

21.1.1.9 Servicing	
(a)	Stormwater disposal will be managed on site in terms of quantity and quality so downstream adverse effects are mitigated.
(d)	Stormwater proposal is fully self contained on site.
21.1.15.16 Site suitability – general	
(b)	No easements are required. Site managed as per comments above.
21.1.15.17 Site suitability – general	
(v)	Low Impact Design (LID) standards are proposed such as rainwater re-use tanks, vegetated swales, and raingardens.
(vi)	Stormwater calculations include climate change allowances.
21.1.15.20 Infrastructure servicing: stormwater and land drainage	
(a)	A private stormwater system is proposed to cater for the required quantity of stormwater over the life of the project. Rainwater re-use water will be treated when used as a potable water source. Contaminants from stormwater runoff will be separated using LID standards to avoid adverse effects on the water borides. Secondary stormwater system management is covered under the separate flood report.

(b)	An operation and maintenance plan will provided to the property owner. This will be a condition of consent and enforced by consent notice. Details will be provided at the building consent stage.
(c)	LID methods used for treatment and transmission.

7.2. Waikato Regional Council

Relevant assessment criteria relating to stormwater from Section 8.1 follows:

8.1.2.5 Discharges	
a.	Consent is sought to discharge stormwater runoff from the site to the river
b.	Maximum volume of stormwater in a 10 year storm event is 9,000m3. Flood waters excluded.
c.	Maximum flow rate in a 10 year storm event is 1,400L/s
d.	Roof water untreated. Driveway water treated with LID measures.
e.	Volume discharged minimised by included stormwater detention tanks.
f.	Contaminant loading will be minimised through the proposed stormwater treatment devices.
g.	Sludge and solid waste generated will be disposed off site in a suitably licensed facility as per the operational and maintenance plan.
h.	Pollutant loads before treatment are expected to be limited to Total Suspended Solids (TSS), organic sediment, and some minor oil/grease. The treatment proposed will mitigate downstream adverse effects by filtering the stormwater so it is of an acceptable quality with TSS < 20mg/L, Cu < 10 µg/L, Zn < 30 µg. Water temperature will be < 25°C.
i.	No effects anticipated on the receiving environment.
j.	Point of discharge is outfall a and b on the design drawings.
k.	Contaminant loading will be minimised through the proposed stormwater treatment devices.
l.	Stormwater soakage is not possible and the site is below the road level so connection to the public stormwater system via a gravity pipe is not possible

8 WASTEWATER

8.1 EXISTING WASTEWATER RETICULATION

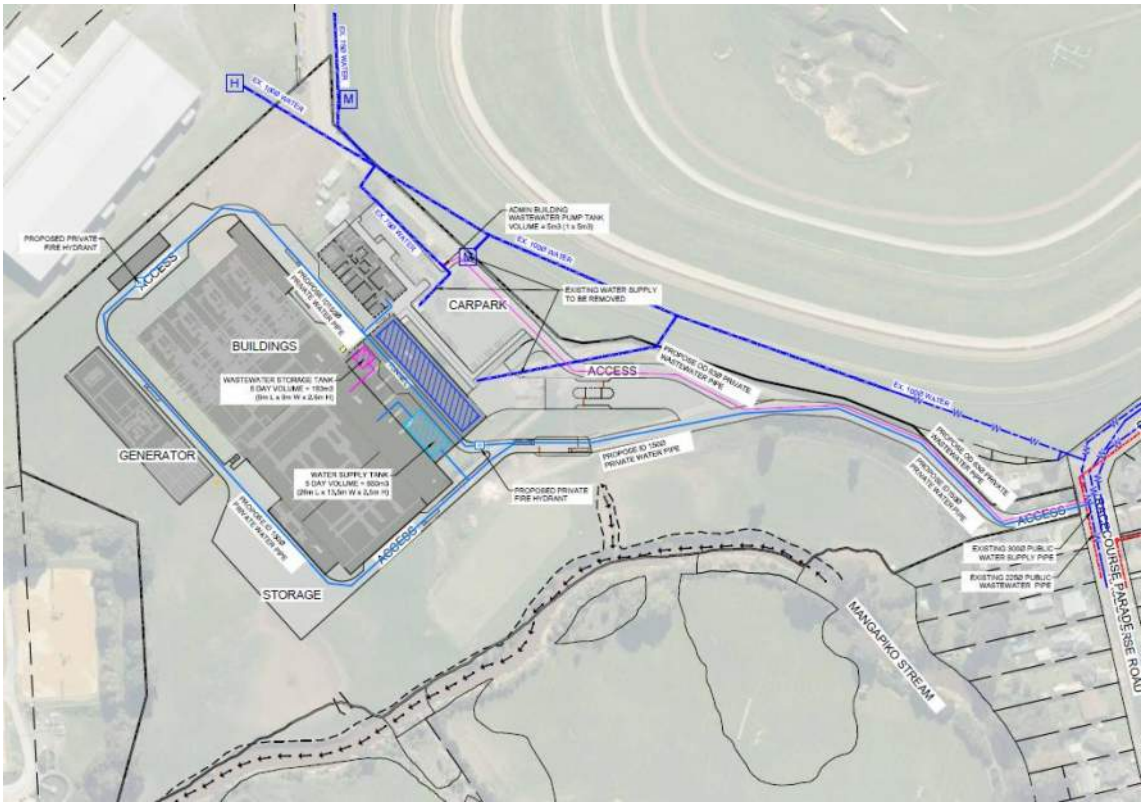
An existing public 225mm diameter public wastewater line runs along Racecourse Road and is considered in both a satisfactory location and of adequate capacity to supply a wastewater connection to service the site for general wastewater discharge.

8.2 PROPOSED WASTEWATER RETICULATION

The development is proposed to discharge wastewater via 2 separate systems.

1. The Waipa public wastewater pipeline located in Racecourse road will be utilised to cater for the office administration building, daily visitors and any service areas within the recycling building (toilets/handbasins/showers). The daily use by staff and visitors will cater for approx. 60 staff and 30-40 visitors twice daily. The site system to cater for administration/staff flows shall be discharged via a gravity system to a small private low pressure pump/s station. This will then pump daily waste via a low pressure rising main to the public connection point on Racecourse Road.

Wastewater Plan RC-050



2. All wastewater from the recycling process within the recycling building and washdown areas is proposed to be pumped from the building and stored onsite in waste storage tanks, located within a specified tank farm area. The wastewater

from the recycling building is wastewater that is not considered suitable for the existing Waipa treatment facility. The waste discharge will be removed from the site in sealed trucks and disposed of at a managed waste facility. The daily liquid process waste volume is estimated at 36.7m^3 per day plus approx. 120m^3 of daily washdown water. This is based on operational flow information provided by plant suppliers Lambion and allowance of 5mm washdown over 50% of inside building area. Onsite storage tanks will cater for a 5 day period of backup storage, min 183m^3 and 600m^3 respectively.

LAMBION ENERGY SOLUTIONS

Project : 01155 - RDF power plant
Customer : GMS Recycling

01155-List of water consumption_R03a

Estimation of fresh water consumption/ waste water amount

status of: Oct. 11, 2021

		Steam production rate (= total of 4 UNITS)	106,7	t/h
		Operating pressure	40	bar a
1. Fresh water demand for				
Feed Water to compensate deaerator vapours			1.781 kg/h	42,8 m³/d
Feed Water to compensate cont. BD losses			1.781 kg/h	42,8 m³/d
Feed Water to compensate discont. BD losses			19 kg/h	0,5 m³/d
Feed Water to compensat turbine condensate losses			1.247 kg/h	29,9 m³/d
Feed Water water for SH steam sampling			16 kg/h	0,4 m³/d
Feed Water for dilution water			31 kg/h	0,7 m³/d
Feed Water for dilution water			16 kg/h	0,4 m³/d
Feed Water to compensate exhaust vapours losses			534 kg/h	12,8 m³/d
Demin water to regenerate water treatment plant			48 kg/h	1,2 m³/d
Demin water for Boiler Feed Water sampling			2 kg/h	0,0 m³/d
Demin water for boiler water sampling			5 kg/h	0,1 m³/d
Demin water for saturated steam sampling			5 kg/h	0,1 m³/d
Demin water for spray water SNCR unit			48 kg/h	1,2 m³/d
Cooling water for BD tank			1.524 kg/h	36,6 m³/d
Wet de-asher			0 kg/h	0,0 m³/d
Total fresh water demand			7.057 kg/h	169,4 m³/d
Total fresh water demand per year (8280h)	**15 °C**		**[m³/a]**	**58435**
2. Waste water available for internal usage				
Off water from softening unit (contains natural Ca & Mg)			941 kg/h	23 m³/d
Off water from Deion unit (contains Na)			1.230 kg/h	29,5 m³/d
from BD tank (continous & intermitted BD & fresh water)			2.592 kg/h	62 m³/d
3. Wet de-asher water demand (for 4 boiler units)				
demand for flushing furnace wet deasher			322 kg/h	7,7 m³/d
demand for flushing discharge wet deasher			19 kg/h	0,5 m³/d
demand for continuous wet deasher losses (evaporation & ash moisture ~30 %)			335 kg/h	8,0 m³/d
Internally recovered from off water of deion unit (& softening unit)			*-676 kg/h*	-16,2 m³/d
4. Waste water				**per annum (8280h)**
from softening unit (contains natural Ca & Mg)	**15 °C**	941 kg/h	22,6 m³/d	**7.789 m³/a**
from Deion unit (contains Na)	**15 °C**	554 kg/h	13,3 m³/d	**4.587 m³/a**
from BD tank (contains BD & fresh water)	**50 °C**	2.592 kg/h	62,2 m³/d	**21.464 m³/a**
from wet deashers (contains ash)	**~25 °C**	341 kg/h	8,2 m³/d	**2.823 m³/a**

Administration/visitor wastewater discharge

In the scenario of development use, the total discharge is estimated as follows:

Administration staff: PWWF = 60x 65l/day/person x 5(peak) = 19,500 L/day 0.225l/s

Visitor allowance PWWF = 40 x 65 x 0.5x 5 = 6,500 L/day, 0.075l/s

Total peak daily flows 0.30l/s

The post development discharges for the existing public system are considered reasonably within the capacity of the wastewater pipe. Therefore, the proposed development will not cause any adverse effects or overflows to the existing wastewater network.

9 WATER SUPPLY

9.1 EXISTING SUPPLY

An existing 300mm diameter public reticulated water supply pipe runs along Racecourse Road. The existing public water supply network is considered to have reasonable capacity to serve the proposed development.

9.2 PROPOSED SUPPLY

A proposed new 150mm dia connection and a bulk water meter will be constructed from the existing public 300mm diameter watermain to service the site as shown on the engineering drawing RC-050. The operational watersupply is based on daily use demand calculations for the plant as provided by the supplier Lambion(refer above). The daily operational demand volume is calculated at approximately 170m^3 over 24hrs. Supply continuity provision will be catered for by the provision of onsite backup storage of a minimum of 5 days storage of 850m^3. The supply of potable water is considered to be supported by rain water harvesting via the 25,000m^2 of building roof areas plus as necessary overnight refilling of storage tanks by the public system network. The provision of backup tanks, rain water harvesting and overnight filling is considered more than adequate to mitigate supply requirements. The new private supply pipeline shall be 150mm ID with fire hydrants appropriately spaced to give 90m coverage around the development site. The bulk supply meter is a bypass type to cater for uninterrupted fire flows.

9.3 FIRE SUPPLY

It is expected that the proposed recycling building and administration building will be sprinkler fire structures. As such the buildings will be classified FW7 under SNZ PAS 4509:2008.

Based on Table 2 - Method for determining firefighting water supply - A FW1 (all external building areas) requires a minimum firefighting water supply of 12.5L/s within a 135m distance of the development with an additional 12.5L/s from within 270m distance. The required flow must be achieved using a maximum of two hydrants operating simultaneously. A minimum of 100kPa residual pressure is required and a recommended maximum of 1050kPa. This classification shall apply to the administration building.

It is proposed to install a fire sprinkler system for the main recycling building plus a new fire hydrant system within the site to meet the firefighting requirements. It is anticipated that the firefighting requirements will be adequate. However, Fire hydrant flow testing will be undertaken at later stage to confirm FW1 and 7 standard has been met.

10 Utility Services

Power and telecommunication services are available on Racecourse Road plus additionally the new plant will produce electricity to be fed into the local and national network. The power and telecommunication services will be extended into the site to serve all proposed buildings. All overhead power services will be redirected underground.

11 Conclusions

This assessment has been carried out in accordance with the local government and Waipa Plan requirements.

Earthworks management plans are to be in place prior to commencement of site work and these are subject to review and approval by Waipa Council Compliance and Monitoring Team. Relevant activities shall be carried out in accordance with the relevant design guidelines.

Wastewater assessment was carried out in accordance with the Waipa Code of Practice. The Waipa District Council GIS system was used to identify the sewer network in the locality. It was concluded through our assessment that the existing downstream infrastructure has adequate capacity to cater for the effects of the proposed development for operational staff and visitors. An application will be made for connection into the public sewer. All recycling wastewater shall be trucked in sealed tanks to a managed fill facility.

Stormwater management systems have been designed in accordance with general best design principles and the AC Technical Publication GD05 used as a guideline for silt and sediment controls. The onsite management for a 10yr storm event has been designed to attenuate flows to ensure the post development to not affect the river downstream or cause adverse effects.

The New Zealand Fire Service - Fire Fighting Water Supplies Code of Practice SNZ PAS 4509:2008 was used to assess the adequacy of water supply in the locality to service the proposed development. It was determined that there is sufficient flow and pressure in the existing network for potable supply and firefighting requirements supplemented with

onsite potable water storage tanks, backup supply, rainwater harvesting and overnight refilling.

Other utilities will be connected with approval from the various service providers.

The proposed development is considered from this assessment to have a less than minor effect.

Appendix 1 GIS PLAN

NOTES

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ALL DIMENSIONS ARE TO BE CHECKED ON SITE BEFORE FABRICATION OF ANY COMPONENTS.

DO NOT SCALE. FIGURED DIMENSIONS MUST BE TAKEN IN PREFERENCE TO SCALE.

ALL ARCHITECTURAL PLANS TO BE READ IN CONJUNCTION WITH ENGINEERS DETAILS. PLEASE NOTIFY THE ARCHITECT OF ANY ANOMALIES BETWEEN ARCHITECT'S AND CONSULTANTS'.

FOR INFO.

DATE STAMP 30/11/2021 11:27:00 am

NOTE: ALL FFL'S ARE INDICATIVE.

REV	DESCRIPTION	DATE

terra consultants

79 GRAFTON ROAD,
GRAFTON, AUCKLAND 1010
09 357 3557
WWW.TERRAGROUP.CO.NZ

PROJECT STATUS:

PROJECT TITLE: PAEWIRA WASTE TO ENERGY PLANT

PROJECT ADDRESS: PAEWIRA – 401 RACECOURCE ROAD, TE AWAMUTU

SHEET TITLE: SITE PLAN

PROJECT ISSUE DATE: NOVEMBER 2021

SCALES: 1 : 1000 at A1

DESIGNER	DRAWN BY	CHECKER
Designer	Author	Checker

PROJECT NO.	SHEET NO.	REV NO.
200065	A01-01	

C:\Users\Emily.Zhong\Documents\200065_PAEWIRA RECYCLING PLANT_BUILDING_REVIT 2021_cilla.vanheerden@terragroup.co.nz.rvt

Appendix 2 STORMWATER CALCULATION

terra consultants

JOB:		
401 Racecourse Road		
SUBJECT:		
Hydraulic Neutrality Calculations		
BY:	DATE:	JOB NO:
A.Cook	16/11/21	200065

WORKSHEET 1: RUNOFF PARAMETERS AND TIME OF CONCENTRATION - EXISTING CATCHMENT

RUNOFF CURVE NUMBER (CN) AND INITIAL ABSTRACTION (Ia):

Soil Classification	Cover Description	Reticulated	CN	Area (ha)	CN x A
Waitemata Class C	**Urban Grass**	**No**	**70**	**11.0000**	770
	Impermeable Areas				0
					0
					0
					0
				11.0000	770

CATCHMENT SLOPE

Elevation (m)	h (m)	x (m)	Δx (m)	h (m)	ΔA (m²)
39	0.0	**0**			
40	1.0	**144**	144	0.5	72
42.9	3.9	**192**	48	2.45	118
43	4.0	**419**	227	3.95	897
48.5	9.5	**444**	25	6.75	169
49	10.0	**470**	26	9.75	254
	0.0		0	0	0
	0.0		0	0	0
		∑	470	∑	1509

Slope:	**S**	**1.37%**	*(S = 2.A / L²)*

TIME OF CONCENTRATION

	Reticulated	Unreticulated	
CN (weighted)	0	70	
I_a (weighted)	0.0	5.0	mm
Channelisation Factor	**0.8**	**0.8**	
Catchment Length	**0.470**	**0.470**	km
Catchment Slope	**1.37%**	**1.37%**	%
Runoff Factor	0.00	0.54	
Time of Concentration	**10.0**	**20.8**	**min**
SCS Lag for HEC-HMS	**6.7**	**13.9**	**min**

terra consultants

JOB: 401 Racecourse Road		
SUBJECT: Hydraulic Neutrality Calculations		
BY: A.Cook	DATE: 16/11/21	JOB NO: 200065

WORKSHEET 2: GRAPHICAL PEAK FLOW RATE - EXISTING CATCHMENT

SUB-BASIN DETAILS:

			Reticulated			Unreticulated	
Catchment Area	A		0.000	km^2		0.11	km^2
Initial Abstraction	I_a		0.0	mm		5.0	mm
Runoff Curve Number	CN		0			70	
Time of Concentration	t_c		10.0	mins		20.8	mins
		=	0.17	hrs		0.35	hrs
Storage	S		0.0	mm		108.9	mm

STORM DATA:

Average Recurrence	ARI	**10**					
24hr Rainfall Depth	P_{24}	**100**					mm
Climate Change Adjusted	P_{24}	**113.2**					mm

RETICULATED RUNOFF

Compute	c*	**1.000**					
Specific Peak Flow Rate	q*	**0.165**					(Fig 5.1)
Peak Flow Rate	q_p	**0.000**					m^3/s
Runoff Depth	Q_{24}	**113.2**					mm
Runoff Volume	V_{24}	**0**					m^3

UNRETICULATED RUNOFF

Compute	c*	**0.322**					
Specific Peak Flow Rate	q*	**0.069**					(Fig 5.1)
Peak Flow Rate	q_p	**0.858**					m^3/s
Runoff Depth	Q_{24}	**53.9**					mm
Runoff Volume	V_{24}	**5933**					m^3

TOTAL RUNOFF

Peak Flow Rate	q_p	**0.858**					m^3/s
Runoff Volume	V_{24}	**5933**					m^3

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JOB: 401 Racecourse Road		
SUBJECT: Hydraulic Neutrality Calculations		
BY: A.Cook	DATE: 16/11/21	JOB NO: 200065

WORKSHEET 1: RUNOFF PARAMETERS AND TIME OF CONCENTRATION - DEVELOPED CATCHMENT

RUNOFF CURVE NUMBER (CN) AND INITIAL ABSTRACTION (Ia):

Soil Classification	Cover Description	Reticulated	CN	Area (ha)	CN x A
Waitemata Class C	**Urban Grass**	**No**	**74**	**6.0000**	444
-	**Impermeable Areas**	**Yes**	**98**	**5.0000**	490
					0
					0
					0
				11.0000	934

CATCHMENT SLOPE

Elevation (m)	h (m)	x (m)	Δx (m)	h (m)	ΔA (m²)
39	0.0	**0**			
40	1.0	**144**	144	0.5	72
42.9	3.9	**192**	48	2.45	118
43	4.0	**419**	227	3.95	897
48.5	9.5	**444**	25	6.75	169
49	10.0	**470**	26	9.75	254
	0.0		0	0	0
	0.0		0	0	0
		∑	470	∑	1509

Slope:	**S**	**1.37%**	*(S = 2.A / L²)*

TIME OF CONCENTRATION

	Reticulated	Unreticulated	
CN (weighted)	98	74	
I_a (weighted)	0.0	5.0	mm
Channelisation Factor	**0.6**	**0.8**	
Catchment Length	**0.470**	**0.470**	km
Catchment Slope	**1.37%**	**1.37%**	%
Runoff Factor	0.96	0.59	
Time of Concentration	**11.3**	**19.8**	**min**
SCS Lag for HEC-HMS	**7.6**	**13.2**	**min**

terra consultants

JOB: 401 Racecourse Road		
SUBJECT: Hydraulic Neutrality Calculations		
BY: A.Cook	DATE: 16/11/21	JOB NO: 200065

WORKSHEET 2: GRAPHICAL PEAK FLOW RATE - DEVELOPED CATCHMENT

SUB-BASIN DETAILS:

			Reticulated			Unreticulated	
Catchment Area	A		0.050	km^2		0.06	km^2
Initial Abstraction	I_a		0.0	mm		5.0	mm
Runoff Curve Number	CN		98			74	
Time of Concentration	t_c		11.3	mins		19.8	mins
		=	0.19	hrs		0.33	hrs
Storage	S		5.2	mm		89.2	mm

STORM DATA:

Average Recurrence	ARI	**10**					
24hr Rainfall Depth	P_{24}	**100**					mm
Climate Change Adjusted	P_{24}	**113.2**					mm

RETICULATED RUNOFF

Compute	c*	**0.916**					
Specific Peak Flow Rate	q*	**0.153**					(Fig 5.1)
Peak Flow Rate	q_p	**0.865**					m^3/s
Runoff Depth	Q_{24}	**108.2**					mm
Runoff Volume	V_{24}	**5412**					m^3

UNRETICULATED RUNOFF

Compute	c*	**0.366**					
Specific Peak Flow Rate	q*	**0.079**					(Fig 5.1)
Peak Flow Rate	q_p	**0.533**					m^3/s
Runoff Depth	Q_{24}	**59.3**					mm
Runoff Volume	V_{24}	**3558**					m^3

TOTAL RUNOFF

Peak Flow Rate	q_p	**1.399**					m^3/s
Runoff Volume	V_{24}	**8970**					m^3

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JOB: 401 Racecourse Road		
SUBJECT: Hydraulic Neutrality Calculations		
BY: A.Cook	DATE: 16/11/21	JOB NO: 200065

SUMMARY:

STORM DATA

Average Recurrence	ARI	**10**					
Climate Change Adjusted	P_{24}	**113.2**					mm

EXISTING STORMWATER RUNOFF

Peak Flow Rate	0.858					m^3/s
Storm Runoff Volume	5933					m^3

DEVELOPED STORMWATER RUNOFF

Peak Flow Rate	1.399					m^3/s
Storm Runoff Volume	8970					m^3
Pond Storage Elevation						m
Pond Storage Volume						m^3

SUMMARY

Peak Flow Rate Change		**0.541**					m^3/s
% Difference		**163.1%**					
Runoff Volume Change	q_p	**3037**					m^3
% Difference	V_{24}	**151.2%**					

terra consultants

JOB: 401 Racecourse		
SUBJECT: SWALE 5		
BY: A.Cook	DATE: 16/11/21	JOB NO: 2000065

SWALE DESIGN CALCULATIONS

Auckland Council GD01; C6.0

CATCHMENT AREA

Impermeable Area		**1300**	m^2
Permeable Area		**400**	m^2
Total Catchment Area	**A_c**	**1700**	**m^2**

RUNOFF FLOW

Rational Method

Water Quality Rainfall Intensity	i	10.0	mm/hr
Impermeable Coefficient	C_{imp}	0.95	
Permeable Coefficient	C_{perm}	0.50	
Total Water Quality Flow	**Q**	**0.004**	**m^3/s**

SWALE DESIGN

Auckland Council GD01

Water Quality Flow Depth	d	**0.023**	m		
Planting Type		**Grass**			
Channel Slope	s	**1.00%**			*Subsoil Drain Required*
Base width	b	**0.600**	m		*0.6m < b < 2m*
Side Slope	Z 1:	**3**			
Mannings 'n'	n	0.030			
Cross-sectional area	A	0.015	m^2		*$A = bd+Zd^2$*
Hydraulic radius	R	0.022	m		
Width at Water Level	w	0.74	m		*$T = b+2dZ$*
WQV Design Flow Check	**Q_d**	**0.004**	**$m^3/s \geq Q$**	**OK**	*Eqt 34*
Velocity	**V**	**0.262**	**m/s**		*V = Q/A*
V < 0.8m/s		**OK**			

10 YEAR STORM RUNOFF

10yr Rainfall Intensity		**111**	mm/hr
Total 10 Year Flow	**Q_{10}**	**0.044**	**m^3/s**

10 YEAR SWALE FLOW

10 Year Flow Depth	d_{10}	**0.085**	m		
Mannings 'n'	n	0.030			
Cross-sectional area	A	0.073	m²		
Hydraulic radius	R	0.078	m		
Width at Water Level	w_{10}	1.11	m		
Design Flow Check	**Q_d**	**0.044**	**m³/s ≥ Q_{10}**	**OK**	*Eqt 34*
Velocity	**V**	**0.606**	**m/s**		*V = Q/A*
V < 1.5m/s		**OK**			

CHECK DAM DESIGN

Check Dams Used	**No**		*Check Dams Not Required*
Swale Longitudinal Grade	1.00%		
Check Dam Height	**0.00**	m	
Check Dam Spacing	**N/A**	**m**	*Eqt 38*
Check Dam Volume	-	m³	
Residence Time at WQF	**0.0**	**min**	*Eqt 36*

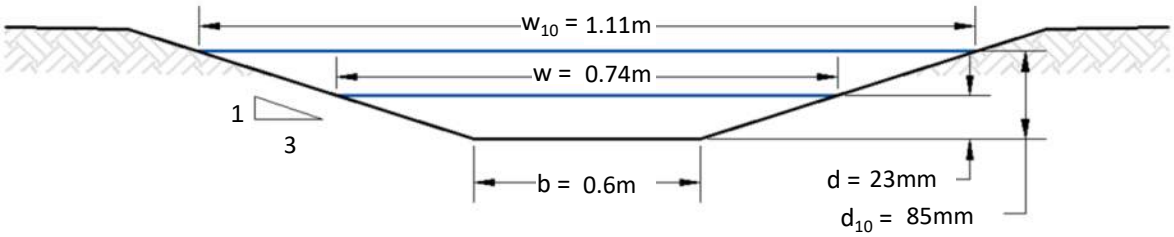
CHECK 10 YEAR FLOW OVER CHECK DAMS

Depth of Flow Over Check Dam	0.123	m	*Eqt 41*
Depth of Water at Check Dam	**N/A**	**m**	

CHECK RESIDENCE TIME

Minimum travel time	t	**9**	min		*Minimum 9mins*
Minimum swale length	**L**	**141.4**	**m**		*Eqt 35 & 36*

SWALE DIMENSIONS:



Planting = Grass
Longitudinal Slope = 1 %
Check Dams = N/A
Length Required = 141.4 m

Basic Sizing Filterra (if catchment is all impervious)

Stormwater360 NEW ZEALAND

STANDARD MODELS

Model	V=Vault MH=Manhole BC=Box Culvert	Footprint [m²]	Deisgn Media Rate (mm/hr)	Design Treatment Flow Rate (L/s)	Auckland Council Design Treatable Impervious Area (m2) Assume 100% Impervious Hardstand using Stormwater360 Flow-Based Sizing Model version 1.1 September 2013 (Rational Method C=1.0 for Imp, C=0.3 for Per & i=10mm/hr)	Christchurch City Council Design Treatable Impervious Area (m2) Assume 100% Impervious Hardstand using Flow-Based Sizing model Version 1.1 September 2013 (Rational Method C=0.85 for Imp, C=0.25 Per & i=5mm/hr)	Other Design Treatable Impervious Area (m2) Assume 100% Impervious Hardstand using Flow-Based Sizing model Version 1.1 September 2013 (Rational Method C=0.85 for Imp, C=0.25 Per & i=10mm/hr)
FT1212	V	1.44	2540.00	1.02 L/s	366 m2	861 m2	430 m2
FT1218	V	2.16	2540.00	1.52 L/s	549 m2	1,291 m2	645 m2
FT1812	V	2.16	2540.00	1.52 L/s	549 m2	1,291 m2	645 m2
FT1224	V	2.88	2540.00	2.03 L/s	732 m2	1,721 m2	861 m2
FT2412	V	2.88	2540.00	2.03 L/s	732 m2	1,721 m2	861 m2
FT1818	V	3.24	2540.00	2.29 L/s	823 m2	1,936 m2	968 m2
FT1236	V	4.32	2540.00	3.05 L/s	1,097 m2	2,582 m2	1,291 m2
FT1824	V	4.32	2540.00	3.05 L/s	1,097 m2	2,582 m2	1,291 m2
FT2418	V	4.32	2540.00	3.05 L/s	1,097 m2	2,582 m2	1,291 m2
FT3612	V	4.32	2540.00	3.05 L/s	1,097 m2	2,582 m2	1,291 m2
FT1830	V	5.40	2540.00	3.81 L/s	1,372 m2	3,227 m2	1,614 m2
FT3018	V	5.40	2540.00	3.81 L/s	1,372 m2	3,227 m2	1,614 m2
FT1836	V	6.48	2540.00	4.57 L/s	1,646 m2	3,873 m2	1,936 m2
FT3618	V	6.48	2540.00	4.57 L/s	1,646 m2	3,873 m2	1,936 m2
FT2140	V	8.40	2540.00	5.93 L/s	2,134 m2	5,020 m2	2,510 m2
FT4021	V	8.40	2540.00	5.93 L/s	2,134 m2	5,020 m2	2,510 m2

Shallow MODELS

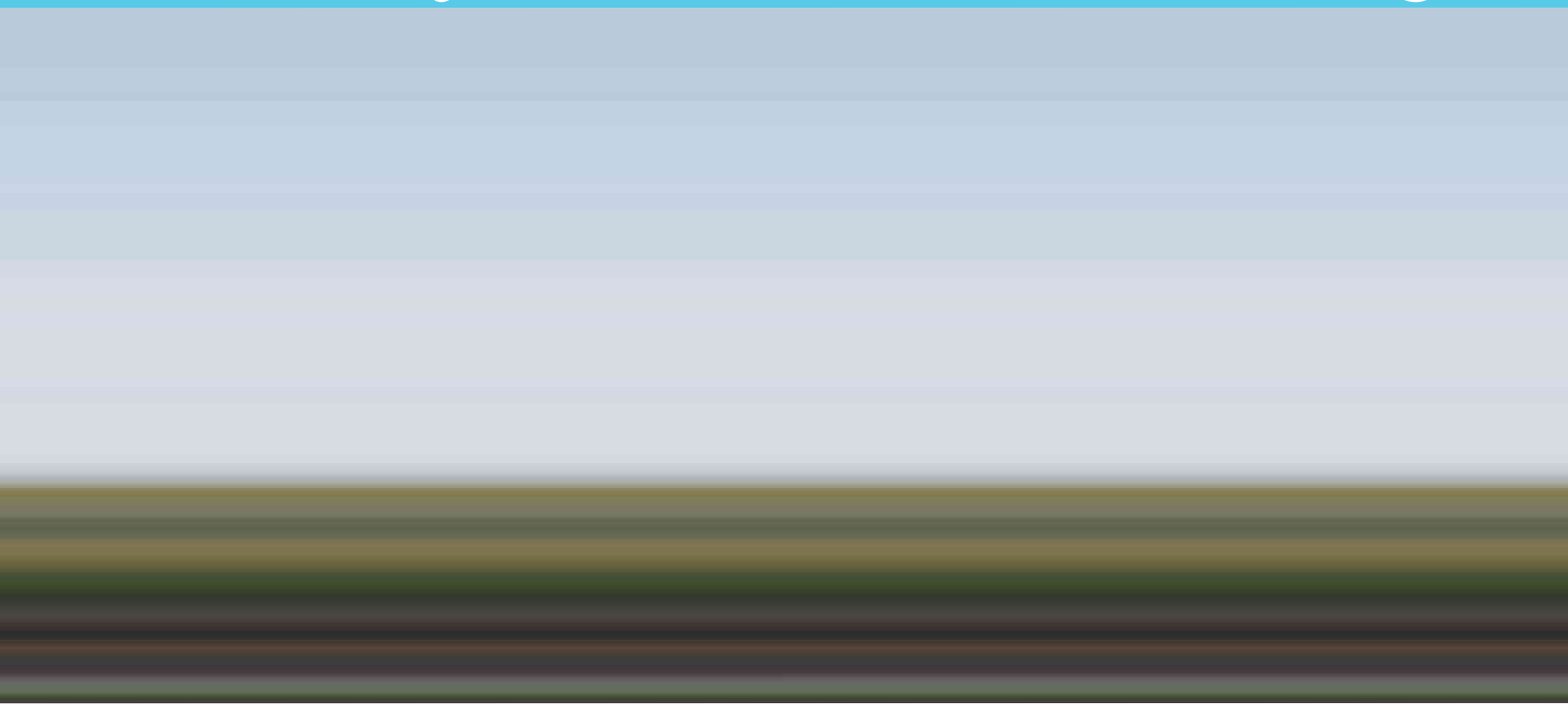
Model	V=Vault MH=Manhole BC=Box Culvert	Footprint [m²]	Deisgn Media Rate (mm/hr)	Design Treatment Flow Rate (L/s)	Auckland Council Design Treatable Impervious Area (m2) Assume 100% Impervious Hardstand using Stormwater360 Flow-Based Sizing Model version 2.0 June 2016 (Rational Method C=1.0 for Imp, C=0.3 for Per & i=10mm/hr)	Christchurch City Council Design Treatable Impervious Area (m2) Assume 100% Impervious Hardstand using Flow-Based Sizing model Version 1.1 September 2013 (Rational Method C=0.85 for Imp, C=0.25 Per & i=5mm/hr)	Other Design Treatable Impervious Area (m2) Assume 100% Impervious Hardstand using Flow-Based Sizing model Version 1.1 September 2013 (Rational Method C=0.85 for Imp, C=0.25 Per & i=10mm/hr)
FT1212S	V	1.44	1814.83	0.73 L/s	261 m2	615 m2	307 m2
FT1218S	V	2.16	1814.83	1.09 L/s	392 m2	922 m2	461 m2
FT1812S	V	2.16	1814.83	1.09 L/s	392 m2	922 m2	461 m2
FT1224S	V	2.88	1814.83	1.45 L/s	523 m2	1,230 m2	615 m2
FT2412S	V	2.88	1814.83	1.45 L/s	523 m2	1,230 m2	615 m2
FT1818S	V	3.24	1814.83	1.63 L/s	588 m2	1,384 m2	692 m2
FT1236S	V	4.32	1814.83	2.18 L/s	784 m2	1,845 m2	922 m2
FT1824S	V	4.32	1814.83	2.18 L/s	784 m2	1,845 m2	922 m2
FT2418S	V	4.32	1814.83	2.18 L/s	784 m2	1,845 m2	922 m2
FT3612S	V	4.32	1814.83	2.18 L/s	784 m2	1,845 m2	922 m2
FT1830S	V	5.40	1814.83	2.72 L/s	980 m2	2,306 m2	1,153 m2
FT3018S	V	5.40	1814.83	2.72 L/s	980 m2	2,306 m2	1,153 m2
FT1836S	V	6.48	1814.83	3.27 L/s	1,176 m2	2,767 m2	1,384 m2
FT3618S	V	6.48	1814.83	3.27 L/s	1,176 m2	2,767 m2	1,384 m2
FT2140S	V	8.40	1814.83	4.23 L/s	1,524 m2	3,587 m2	1,793 m2
FT4021S	V	8.40	1814.83	4.23 L/s	1,524 m2	3,587 m2	1,793 m2

10/06/2016

CONTECH®
ENGINEERED SOLUTIONS

Filterra®
High Performance Bioretention

The experts you need to solve your stormwater challenges



Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team

STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.

STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.

REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.

SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

Low Impact Development in a Small Footprint – Filterra®

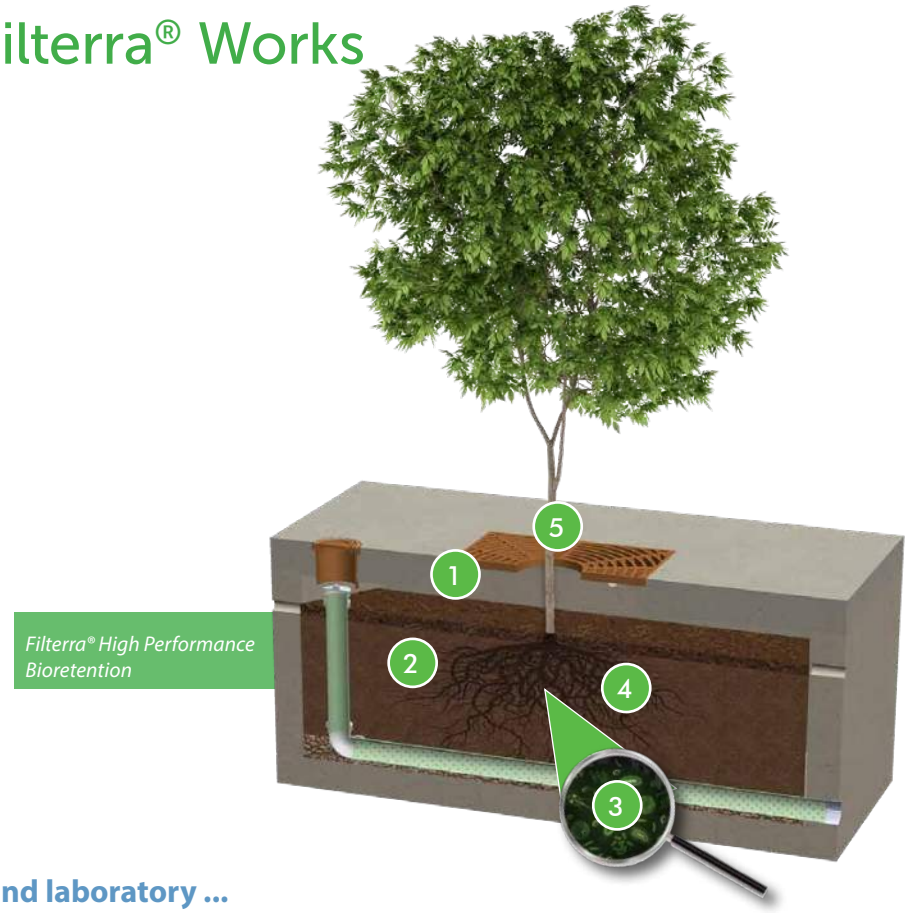
Filterra is an engineered high-performance bioretention system. While it operates similar to traditional bioretention, its high flow media allows for a reduction in footprint of up to 95% versus traditional bioretention practices. Filterra provides a Low Impact Development (LID) solution for tight, highly developed sites such as urban development projects, commercial parking lots, residential streets, and streetscapes. Its small footprint also reduces installation and life cycle costs versus traditional bioretention. Filterra can be configured in many different ways to enhance site aesthetics, integrate with other LID practices, or increase runoff reduction through infiltration below or downstream of the system.

At the Manchester Stormwater Park seen above, the Filterra systems surrounding the central courtyard allowed for the creation of a community space with parking, sidewalks, and benches in a quaint downtown area. A traditional bioretention system treating the same drainage area would have occupied the entire park area leaving no room for these amenities.

filterra®
Bioretention Systems

filterra® Bioscape

How the Filterra® Works



Tested in the field and laboratory ...

1. Stormwater enters the Filterra through a pipe, curb inlet, or sheet flow and ponds over the pretreatment mulch layer, capturing heavy sediment and debris. Organics and microorganisms within the mulch trap and degrade metals and hydrocarbons. The mulch also provides water retention for the system's vegetation.

2. Stormwater flows through engineered Filterra media which filters fine pollutants and nutrients. Organic material in the media removes dissolved metals and acts as a food source for root-zone microorganisms. Treated water exits through an underdrain pipe or infiltrates (if designed accordingly).

3. Rootzone microorganisms digest and transform pollutants into forms easily absorbed by plants.

4. Plant roots absorb stormwater and pollutants that were transformed by microorganisms, regenerating the media's pollutant removal capacity. The roots grow, provide a hospitable environment for the rootzone microorganisms and penetrate the media, maintaining hydraulic conductivity.

5. The plant trunk and foliage utilize nutrients such as Nitrogen and Phosphorus for plant health, sequester heavy metals into the biomass, and provide evapotranspiration of residual water within the system.

Plants and organic material are vital to the long term performance of bioretention systems

Using nature to facilitate Stormwater Management

Filterra® Features and Benefits

FEATURE	BENEFITS
High biofiltration media flow rate (up to 140”/hr+)	Greatly reduced footprint versus traditional bioretention and LID solutions
Filterra system is packaged, including all components necessary for system performance	Quality control for easy, fast and successful installation
Quick and easy maintenance	Low lifecycle costs
Variety of configurations and aesthetic options	Integrates easily into any site or landscape plan
Natural stormwater management processes featuring organics and vegetation	Meets Low Impact Development requirements and ensures long-term performance

The Filterra system can be configured with many different aesthetic options

Select Filterra® Approvals

Filterra is approved through numerous local, state and federal verification programs, including:

- New Jersey Department of Environmental Protection (NJ DEP)
- Washington Department of Ecology (GULD) – Basic, Enhanced, Phosphorus, and Oil
- Maryland Department of the Environment - Environmental Site Design (ESD)
- Texas Commission on Environmental Quality (TCEQ)
- Virginia Department of Environmental Quality (VA DEQ)
- Maine Department of Environmental Protection (ME DEP)
- Atlanta, GA Regional Commission
- Los Angeles County, CA - Alternate to Attachment H
- City of Portland, Oregon Bureau of Environmental Services
- North Carolina Department of Environmental Quality (NC DEQ)

Filterra® Performance Testing Results

APPLICATION TIPS

- The Filterra system has been tested under industry standard protocols and has proven its pollutant removal performance and system longevity.
- Contech invests significant resources in media blending calibration and product testing to ensure our media meets our strict performance specifications every time.
- Keep regulators and owners happy by selecting a product with predictable and proven maintenance longevity.

POLLUTANT OF CONCERN	MEDIAN REMOVAL EFFICIENCY	MEDIAN EFFLUENT CONCENTRATION (MG/L)
Total Suspended Solids (TSS)	86%	3.3
Total Phosphorus - TAPE (TP)	70%	0.05
Total Nitrogen (TN)	34%	0.54
Total Copper (TCu)	55%	0.004
Total Dissolved Copper	43%	0.003
Total Zinc (TZn)	56%	0.04
Total Dissolved Zinc	54%	0.1
Total Zinc (TZn)	56%	0.04
Total Petroleum Hydrocarbons	87%	0.71

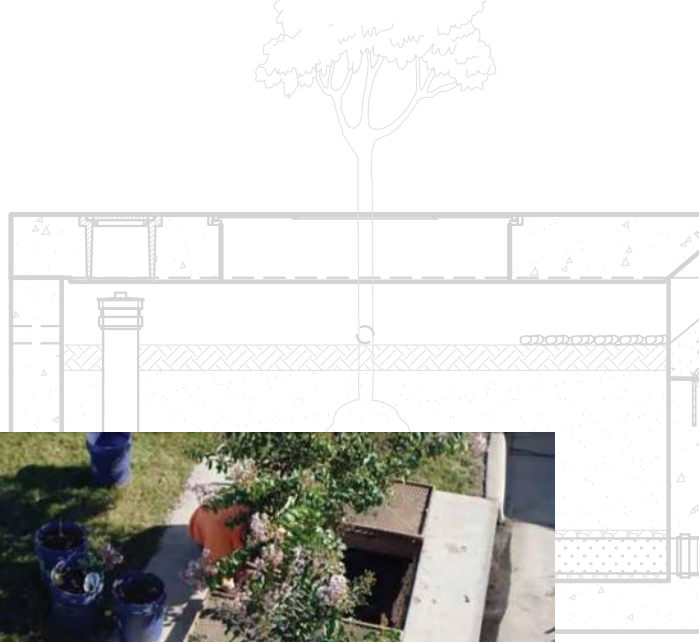
Each batch of Filterra® media has been extensively tested to ensure consistent performance every time.

Sources:
UVA (TARP) Field Study - 2006
Herrera (TAPE) Study - 2009
Herrera (TAPE) Study - 2014
NC State Study - 2015

Note: Some jurisdictions recognize higher removal rates. Contact your Contech Stormwater Consultant for performance expectations.

Field tested and performance verified

Filterra® Maintenance



Activation and first year of maintenance is included with every system.*

With proper routine maintenance, the engineered media within the Filterra system should last as long as traditional bioretention media. Routine maintenance is included by the manufacturer on all Filterra systems for the first year after activation.* This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation.

Maintenance is low-cost, low-tech and simple:

- Remove trash, sediment, and mulch
- Replace with a fresh 3" layer of mulch
- No confined space entry or special tools
- Easily performed by landscape contractor or facilities maintenance provider

** Some exclusions may apply.*

Filterra offers high performance bioretention for advanced pollutant removal with easy maintenance.

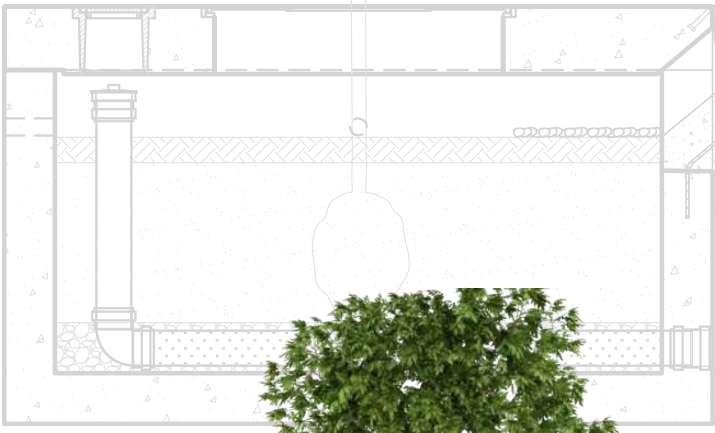
Plant health evaluation and pruning is important to encourage growth.

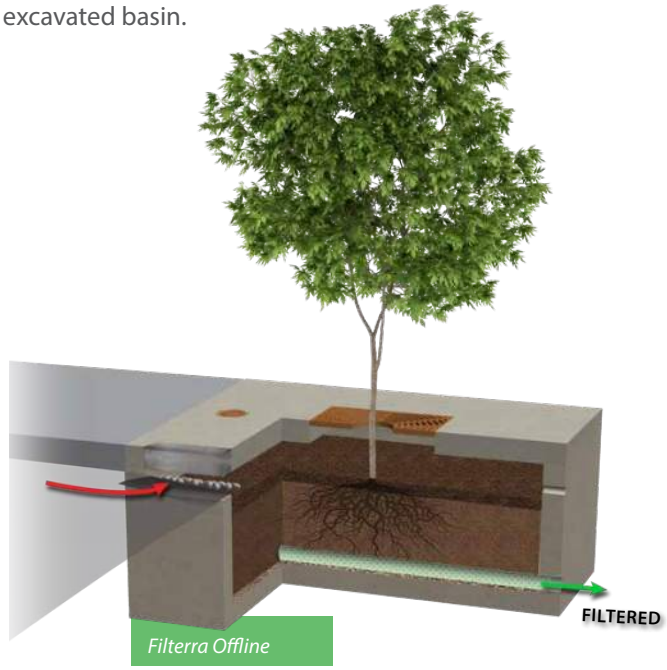
All stormwater treatment systems require maintenance for effective operation.

Filterra® Configurations

Multiple system configurations integrate with site hydraulic design and layout ...

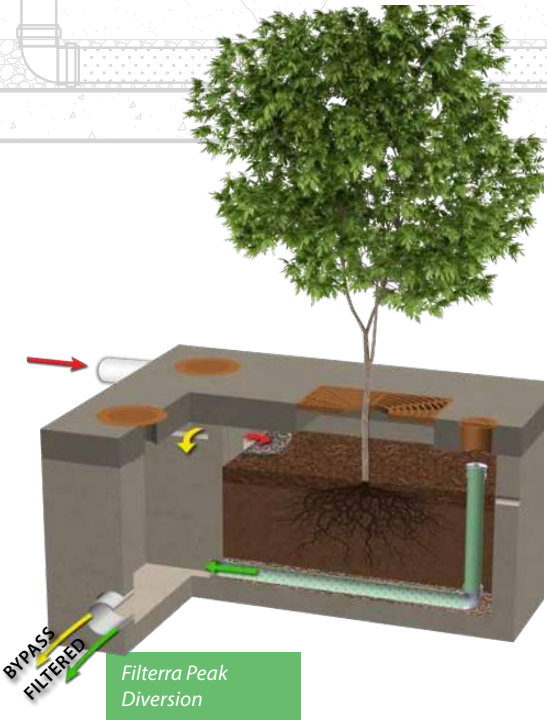
The Filterra is available in a variety of precast configurations as well as Filterra Bioscape, which can be installed directly into an excavated basin.



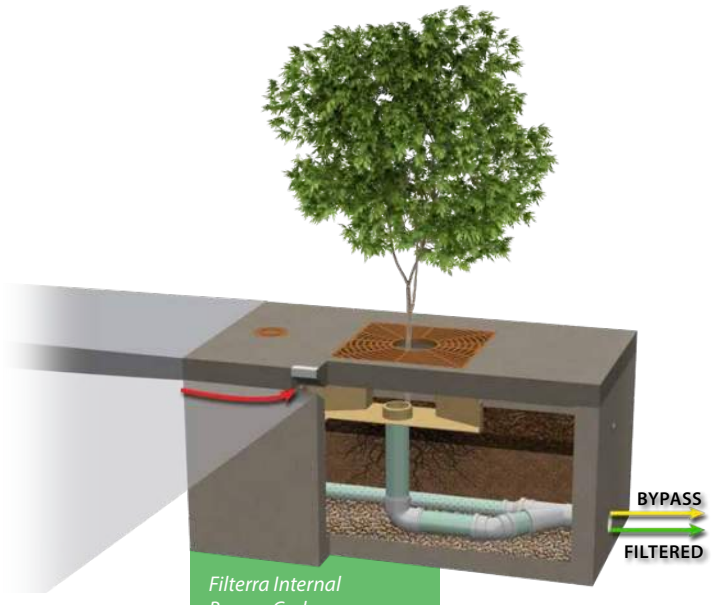


Filterra Offline

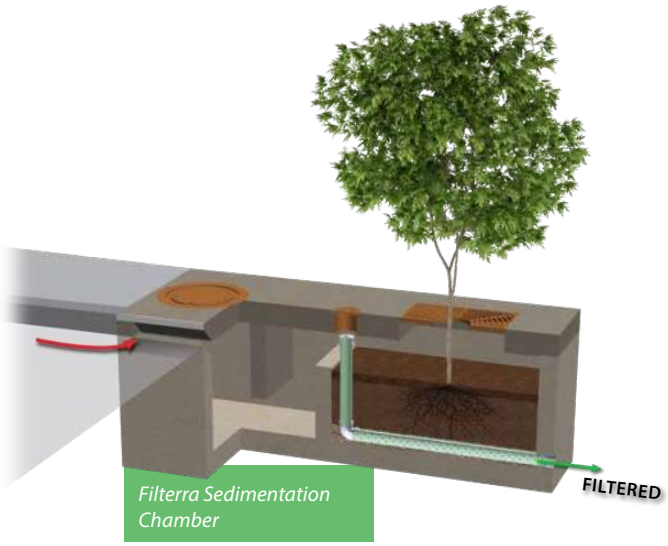
Bypass via downstream catch basin.



Filterra Peak Diversion



Filterra Internal Bypass Curb



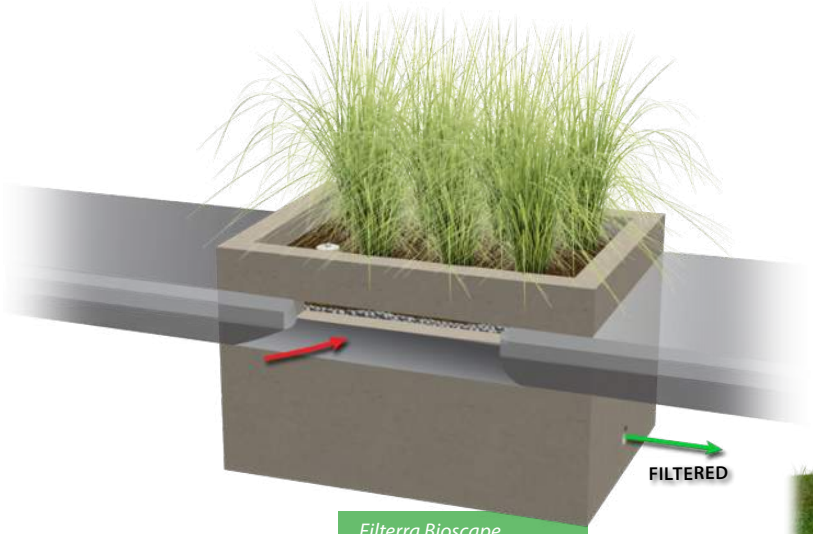
Filterra Sedimentation Chamber

Bypass via downstream catch basin.

**Additional configurations available, including offline - pipe, peak diversion - grate, and internal bypass curb-chamber.*

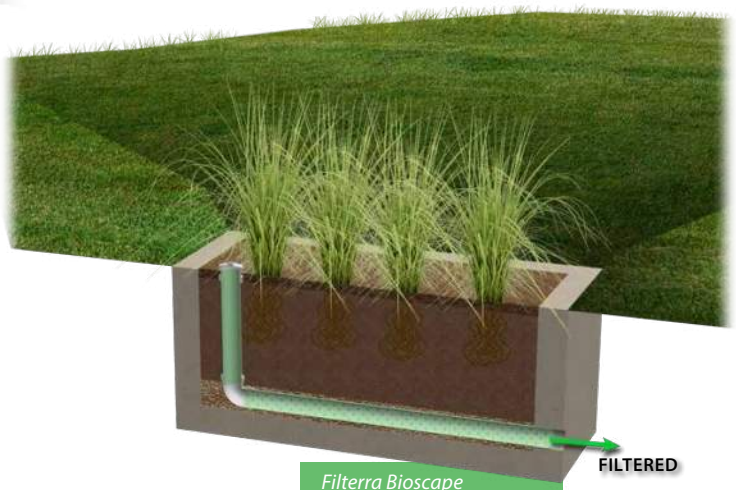
Modular configurations allow for easy site integration

Filterra® Bioscape® Configurations



Filterra Bioscape Vault Offline

Bypass via downstream catch basin.



Filterra Bioscape Vault Basin

Bypass via upstream structure. Multiple inlet options.

Filterra Bioscape

Bypass via upstream structure. Multiple inlet options.

**Additional configurations available, including bioscape vault offline pipe.*

Filterra® Aesthetic Options

Multiple aesthetic options to enhance the appearance and integrate with landscaping ...

Standard Tree Grate

Custom/Decorative Tree Grate

Full Grate with Grasses

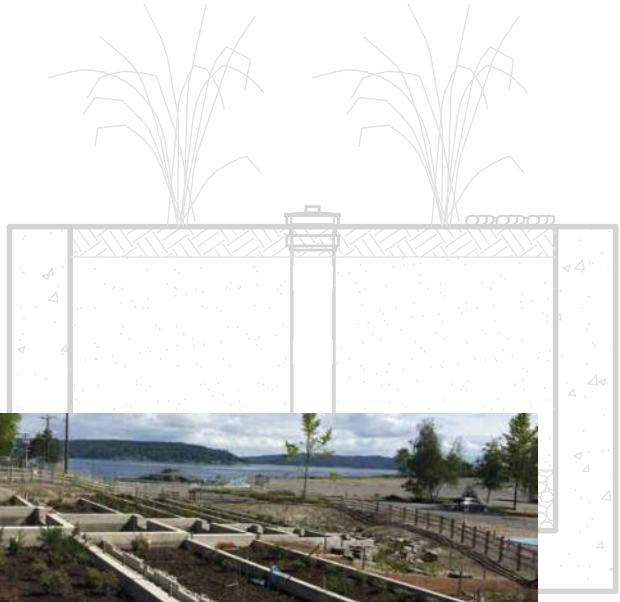
Recessed Top Slab

Open Top Planter - Filterra Bioscape

Street Tree

An aesthetic solution to meet your bioretention needs

Filterra® Bioscape®



Large-scale Filterra that can be customized to your site ...

- Ideal for Filterra systems greater than 300 square feet
- Design with or without containment structure
- Incorporate infiltration directly below the system, where required
- Combine with upstream storage or downstream infiltration
- Use as an alternative to larger regional traditional bioretention systems
- Easily add pretreatment Hydrodynamic Separator for large-scale or heavy pollutant loading applications

CONTECH® ENGINEERED SOLUTIONS

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

For more information: www.ContechES.com

CONTECH® ENGINEERED SOLUTIONS

Get social with us:

800-338-1122 | www.ContechES.com

Document Set ID: 10725645
Version: 1, Version Date: 02/12/2021

STORMFILTER™

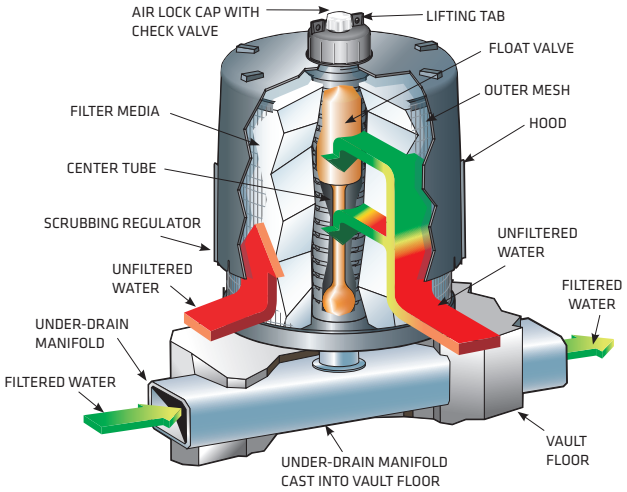
High efficiency / low maintenance stormwater filter.

SIPHON-ACTUATED FILTRATION The Stormwater Management StormFilter® cleans stormwater through a patented passive filtration system, effectively removing pollutants to meet the most stringent regulatory requirements. Highly reliable, easy to install and maintain, and proven performance over time, StormFilter products are recognised as a versatile BMP for removing a variety of pollutants, such as sediments, oil and grease, metals, organics, and nutrients. These systems come in variable configurations to match local conditions and come with prolonged maintenance periods to ensure long-term performance and reduce operating costs.

HOW DOES IT WORK?

During a storm, runoff passes through the filtration media and starts filling the cartridge center tube. Air below the hood is purged through a one-way check valve as the water rises. When water reaches the top of the float, buoyant forces pull the float free and allow filtered water to drain.
After the storm, the water level in the structure starts falling. A hanging water column remains under the cartridge hood until the water level reaches the scrubbing regulators. Air then rushes through the regulators releasing water and creating air bubbles that agitate the surface of the filter media, causing accumulated sediment to drop to the vault floor. This patented surface-cleaning mechanism helps restore the filter's permeability between storm events.

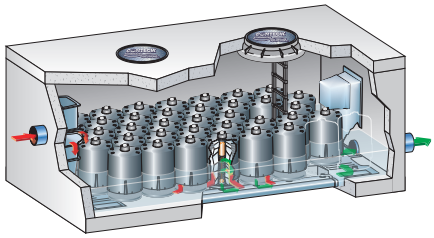
STORMFILTER CARTRIDGE



PROVEN PERFORMANCE

- New Zealand's only independently verified filter by Washington Department of Ecology, New Jersey Department of Environmental Protection and USEPA's Environmental Technology Verification program).
- Approved Auckland Council >75% TSS removal and approved on high trafficked roads (>20,000 V.P.D)
- Over 550 x StormFilter's installed throughout New Zealand-treating over 3.7 million m^2 of catchment area
- 8th generation of the product. Design refined and perfected over two decades of research and experience

STORMFILTER VAULT



STORMFILTER BENEFITS

UNDERGROUND SYSTEMS MAXIMISE PROFITABILITY

- Save land space allowing denser developments reducing sprawl
- Add parking spaces and increase building size, increasing profitability
- Compact design reduces construction and installation costs by limiting excavation

RELIABLE LONGEVITY & LOWER MAINTENANCE COSTS

- Self cleaning hood prevents surface blinding, ensures use of all media and prolongs cartridge life
- 1-3 year maintenance cycles
- 8 years maintenance experience – 1-5 year contracts with cost guarantees
- Minimal or no standing water. Lower disposal costs

CONTACT DETAILS

Stormwater360

FREEPHONE:
0800 STORMWATER
(0800 786769)

www.stormwater360.co.nz

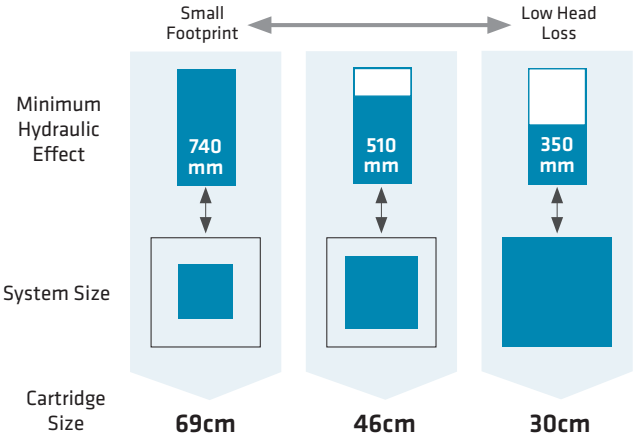
Stormwater360®
BETWEEN SKY AND SEA

www.stormwater360.co.nz

BETWEEN SKY AND SEA

SUPERIOR HYDRAULICS

Multiple cartridge heights gives design solutions for site restraints.



Other hydraulic benefits

- Low hydraulic effect as low as 350 mm head loss
- Zero surcharge of inlet pipe unlike upward flowing filters
- Can be operated with tail water e.g tidal conditions
- Online and offline configurations can limit hydraulic effects

MEDIA CHOICES

Our filtration products can be customised using different filter media to target site-specific pollutants. A combination of media is often recommended to maximise pollutant removal effectiveness.

Perlite is naturally occurring puffed volcanic ash. Effective for removing TSS, oil and grease.

ZPG™ is a multi-purpose media option approved for highly trafficked sites or sites with high metal loadings. ZPG is a mixture of Zeolite, Perlite and GAC (granular activated carbon). ZPG is ideal for removing soluble metals, TSS, oils and grease, organics and ammonium.

Zeolite is a naturally occurring mineral used to remove soluble metals, ammonium and some organics.

GAC (Granular Activated Carbon) has a micro-porous structure with an extensive surface area to provide high levels of adsorption. It is primarily used to remove oil and grease and organics such as PAHs and phthalates.

CONFIGURATION

Stormfilter's can be configured in any drainage structure. Please contact SW360 for a customised design.

PRECAST VAULT

- Treats medium sized sites
- Simple installation – arrives on-site fully assembled

DRYWELL/SOAKAGE

- Provides treatment and infiltration in one structure
- Available for new construction and retrofit applications
- Easy installation
- Shallow and Rock soakage models available

HIGH FLOW

- Treats flows from large sites
- Consists of large, precast components designed for easy assembly on-site
- Several configurations available, including: Panel Vault, Box Culvert, or Cast-In-Place

DETENTION

- Meets volume-based stormwater treatment regulations
- Captures and treats site specific Water Quality and Quantity Volume
- StormFilter cartridges provide treatment and control the discharge rate
- Can be designed to capture all, or a portion, of the WQv
- Detention vault configured to provide pre-treatment

CATCHPIT/ CURB-INLET

- Provides a low cost, low drop, point-of-entry configuration
- Treats sheet flow from small sites
- Accommodates curb inlet openings from 1 to 3 metres long

PRECAST MANHOLE

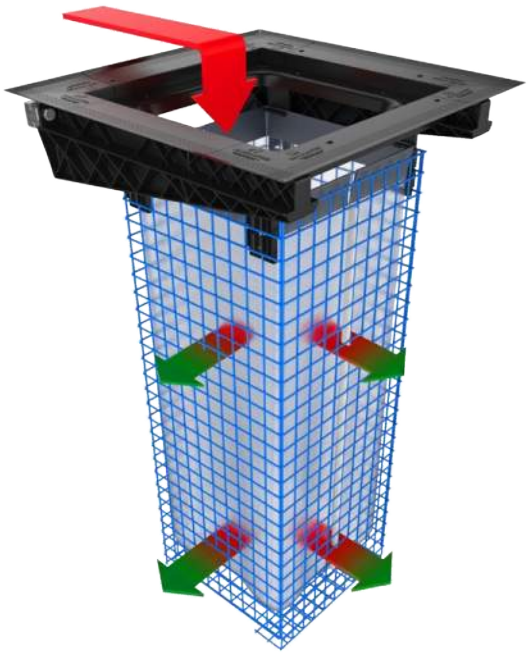
- Provides a low drop, point-of-entry configuration
- Uses drop from the curb inlet to the conveyance pipe to drive the passive filtration cartridges
- No crane required (Hi-AB lifting for most sizes)
- 1050-2400mm diameter sizes available

ENVIROPOD®

Cost-effective, easily maintained catchpit/ gullypit insert

Stormwater pollution is a leading cause of environmental degradation in New Zealand. Urban existence produces contaminants, which are discharged on to impervious surfaces. When it rains contaminants such as lead, copper, zinc and PCBs are washed from these impervious surfaces into the stormwater system and eventually discharged into harbours, streams, rivers and aquifers.

The EnviroPod® is a proven catchpit insert designed to be easily retrofitted into new and existing stormwater catchpits, requiring no construction or land take. It removes a significant portion of sediment, trash, debris and other pollutants from water entering the stormwater system, and can be installed in either curb inlet, standard pre-cast catchpits or manhole catchpits. Using low-cost passive screening and optional oil-adsorbent media, the EnviroPod® can be customised to meet site-specific requirements with interchangeable polyester mesh screens ranging from 100 to 1000+ micron pore size.



The EnviroPod® is also effective as a pre-treatment device for use in a treatment train with hydrodynamic separators, filtration devices, ponds and wetlands. In many cases, it is often the most practical solution for retrofits.

Independently trialled and tested by City Councils throughout New Zealand and Australia and with installation of over 20,000 units including in North America, the EnviroPod® Filter is the premiere pit insert.

HOW DOES IT WORK?

As stormwater enters a storm grate or catchpit/gullypit, it passes over the oil adsorbent pads (optional) and into the screening bag. Litter, debris, and other pollutants larger than the screening bag aperture are captured and retained, while oil and grease are reduced by the oil adsorbent pads. If the screening bag is full or during high flows, overflow is released through the overflow apertures in the frame assembly.

DESIGN AND OPERATION

The Drop-In EnviroPod® is designed to simply insert into the catchpit below the grate and rest on the base of the pit. It consists of a screening bag supported by a filterbox and structural cage. Modular plastic deflector panels attach to the filterbox and guide the flow of water to the screening bag. The screening bag captures pollutants and allows the water to pass through to the outlet pipe.

Optional absorbent material inside the screening bag captures oil and grease. Openings in the filterbox allow water to bypass the screening bag during high flow conditions to prevent surface flooding.

There are two standard sizes to fit most pre-cast regular and curb entry catchpits. Custom designs are able to be fabricated for non-standard pits.

CAPABILITIES

- Captures sediment, litter, debris and other pollutants before they enter the drainage system
- Fits a range of catchpit sizes – ideal for retrofits
- Easy access - maintenance friendly design, generally no confined space entry required
- Bypasses high flows with no moveable parts
- Adjustable panels allow fine-tuning during installation for a perfect fit
- Independently tested by Auckland University, NZTA, Auckland Council, Tauranga City Council, University of South Australia

Lab test results:

(200 Micron)
= 95%+ Removal of 100> up to 20 l/sec

(Gross Pollutant bag)
= 95%+ Gross pollutant capture up to 100 l/sec

BENEFITS

- No construction resulting in low costs i.e. lowest capital cost of any stormwater treatment device
- A range of filter sizes to target gross pollutants to fine sediment
- Hand maintainable options – no need for expensive equipment
- Can be used to easily target heavily polluted areas
- Ideal pre-treatment device for filters, ponds and wetlands or overflow of swales and raingardens
- No confined space entry

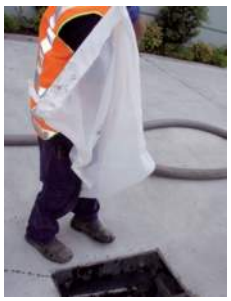
MAINTENANCE

The system must be monitored and maintained in accordance with relevant local authority guidelines. Enviropod® installations vary due to the vast number of catchpit configurations and site conditions. Typically Enviropod® filters will require maintenance between 3 & 12 months, depending on local site conditions, pit depth and the number of vehicle movements. The frequency of maintenance services should be reviewed at the completion of each service and modified if pollutant loadings deem this necessary. At the required maintenance interval the contaminants need to be removed from the filterbags and disposed of appropriately.

The maintenance crew is responsible for the disposal of debris in accordance with all applicable regulations and is responsible for following all applicable regulations, and Health and Safety requirements.

Contact the Stormwater360 maintenance department at maintenance@Stormwater360.co.nz for more information or to order EnviroPod® bags and oil absorbent pouches.



MAINTENANCE USING A VACUUM INDUCTOR TRUCK OR BY HAND

Maintenance utilising an Inductor truck is the preferred option for cleaning EnviroPod® filters. Hand maintenance is discouraged as it can lead to damage of the filters and has Health and Safety implications with sediments often being highly contaminated. Filters are also capable of storing a large weight of material.

1. Establish a safe working area per typical catchpit service activity
2. Remove grate / access cover
3. Vacuum accumulated debris from the upper portion of the catchpit
   or by hand maintenance
   Remove the bag from the EnviroPod® with two lifting hooks through the loops on the top of the bag. Excess debris should be scooped out first if the bag is over half full
4. Remove and inspect the oil absorbent pouches (if applicable) clipped to the inside of the EnviroPod® bag. Replace with new pouches in step 8 if the pouches are dark with oil
5. Vacuum contents from bag. Once most of the material is removed, remove the bag from the EnviroPod® with two lifting hooks through the loops at the top of the bag. Inspect filterbag and repair or replace if damaged
   or by hand maintenance
   Pour contents of the bag into a disposal container. Inspect filterbag and repair or replace if damaged
6. Remove stainless steel ring from top of bag and rejuvenate bag by washing using a double cold wash, or waterblast at an approved cleaning site
7. Place rejuvenated bag in EnviroPod®. CRITICAL - Make sure the loose ends of the stainless steel ring are joined together in the connector tube
8. Re-install oil absorbent pouches (if applicable)
9. Replace grate

CONTACT DETAILS

Stormwater360

FREEPHONE:
0800 STORMWATER
(0800 786769)

www.stormwater360.co.nz

Document Set ID: 10725645
Version: 1, Version Date: 02/12/2021

Appendix 3 ENGINEERING PLAN

401 RACECOURSE ROAD,
TE AWAMUTU

CLIENT: GLOBAL METAL SOLUTIONS
PROJECT No. 200065

ENGINEERING PLANS FOR
RESOURCE CONSENT
REVISION A

DECEMBER 2021

LOCALITY PLAN
N.T.S

terra
CONSULTANTS

401 RACECOURSE ROAD,
TE AWAMUTU

CLIENT: GLOBAL METAL SOLUTIONS
PROJECT No. 200065

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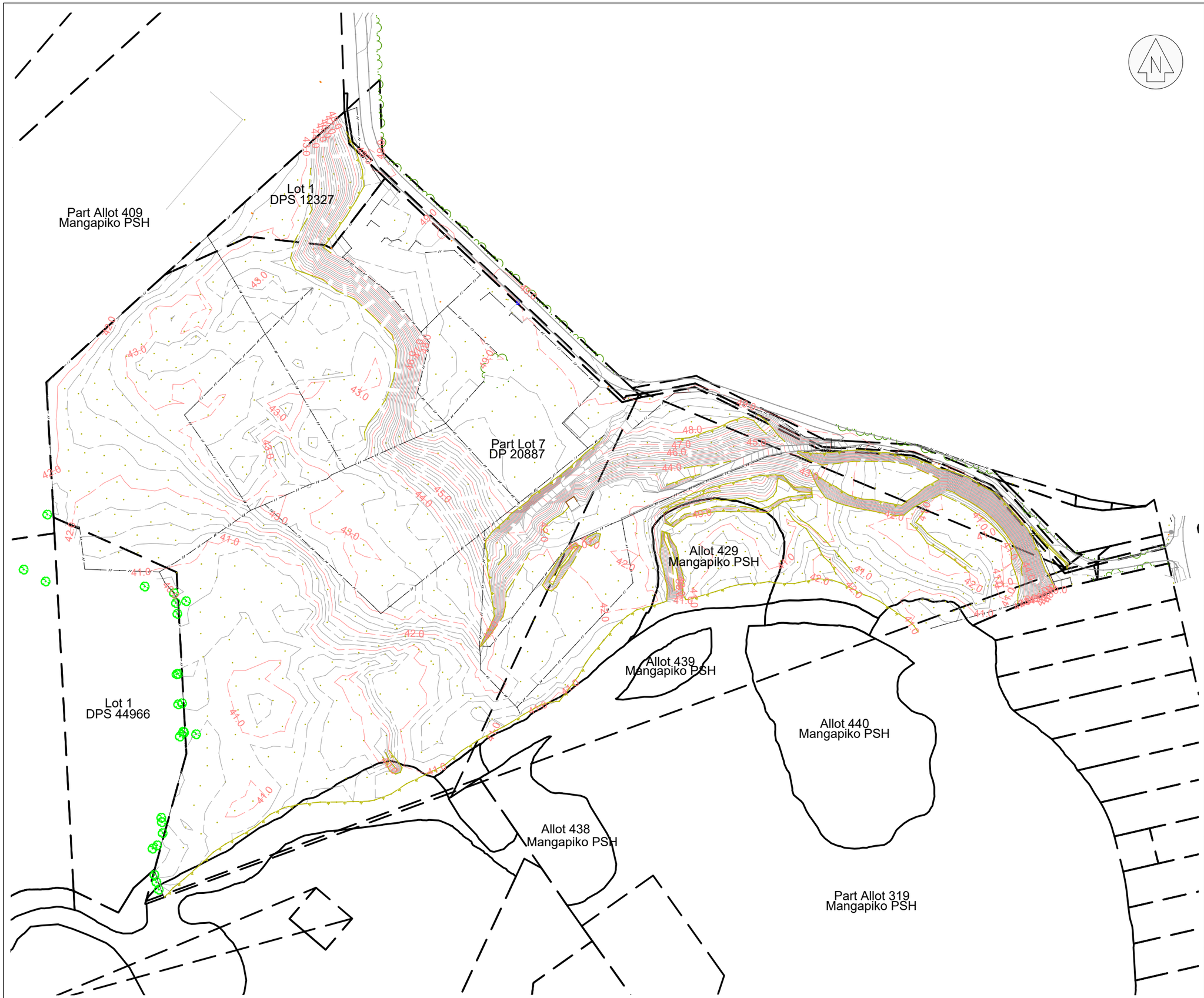


NOTES

1. This plan provides topographical details of the subject property and has been prepared for this purpose only.
2. Boundaries are from LINZ and have not been redefined for this survey.
3. Services showing levels have been positioned by survey. All other services, including pipes, are from Waipa Council GIS unless otherwise stated.
4. Spot heights show existing ground levels and may not match ground levels at time of original boundary survey.
5. Coordinates are in terms of NZGD - Mt Eden Circuit 2000.
6. This plan is prepared for electronic distribution with a DWG file attached. Not all Survey points depicted on the plan face have heights shown. Additional heights may be interrogated from the DWG file.
7. Trees represent location and may not accurately depict size and shape.
8. Minor Contours are shown at 0.25m intervals.
9. Major Contours are shown at 1.00m intervals.

KEY

× 19.54 = Spot Height
= Water Feature
Fence
Sewer (SS) Existing
Stormwater (SW) Existing
Water (WA) Existing
Contour Major
Contour Minor
Tree line
Top of bank
Bottom of bank

DATUM

Levels are in terms of MOTURIKI DATUM 1953
Origin of level is SS 150 SO 57533
RL = 47.33m (Source LINZ database 26/02/2021)

EXISTING TITLE

LOT 8 DPS 8856 SA12C/1412 - 819m²

CLIENT
GLOBAL CONTRACTING SOLUTIONS LIMITED

PROJECT

TOPOGRAPHICAL SURVEY

547 PATERANGI ROAD, TE AWAMUTU

terra CONSULTANTS
Waikato Office:
07 850 6331
Level 10, Tower Building,
48 Ward Street, Hamilton
PO BOX 5028, Frankton, Hamilton 3242
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

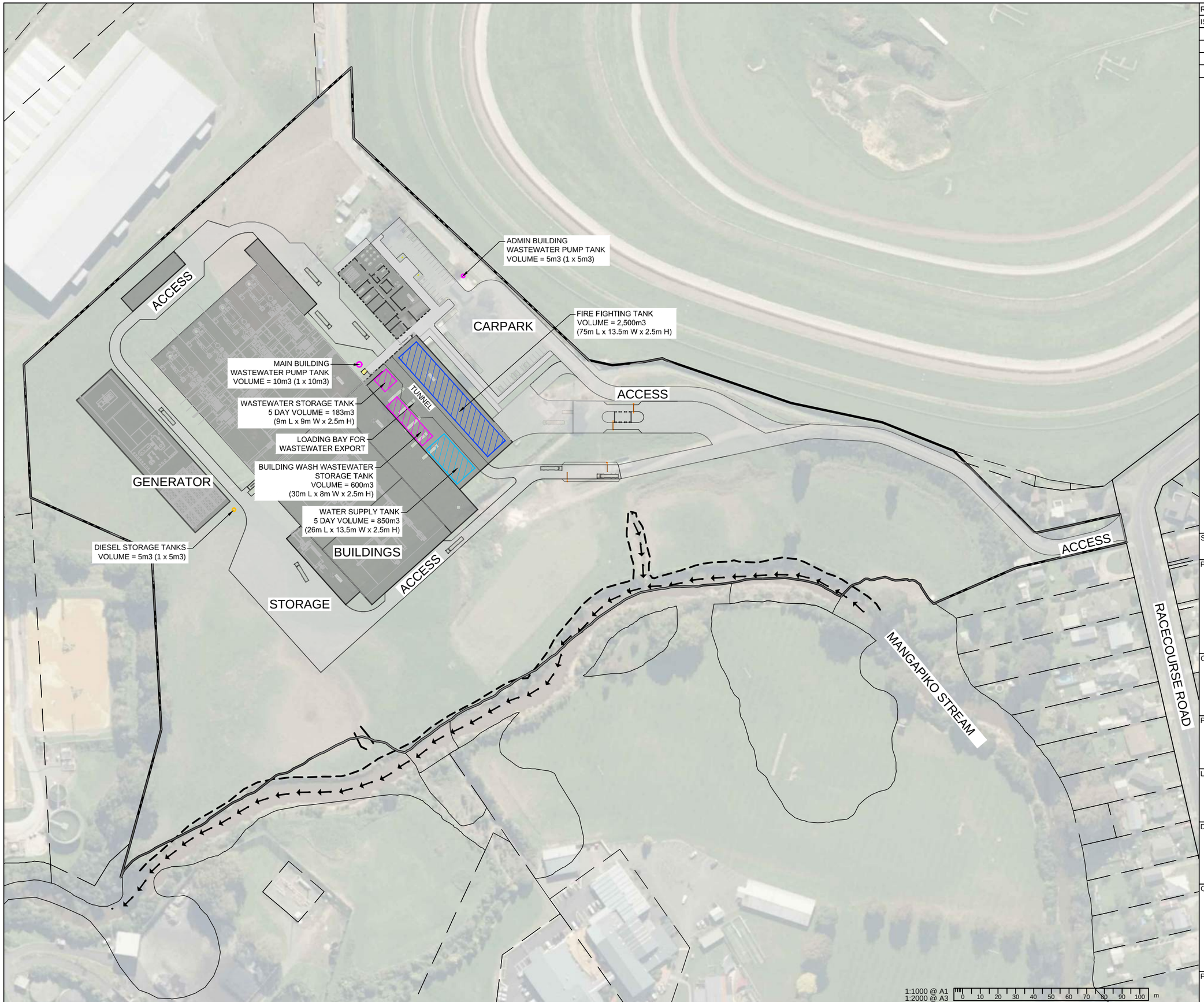
SURVEY	DRAWN	CHECKED	DATE
DAGJ	WPJ	DAGJ	20/07/2021

SCALE 1:2000 (A3)

DRAWING No. 16896.03

SHEET 1 OF 1

Document Set ID: 10725645
Version: 1, Version Date: 02/12/2021



REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI

STAGE

RESOURCE CONSENT

PROJECT CONSULTANTS

terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT

GLOBAL METAL SOLUTIONS

PROJECT

PAEWIRA RECYCLE PLANT

LOCATION

401 RACECOURSE PARADE,
TE AWAMUTU

DRAWING TITLE

OVERALL SITE LAYOUT PALN

ORIENTATION

N

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		G.CAI
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-001	A

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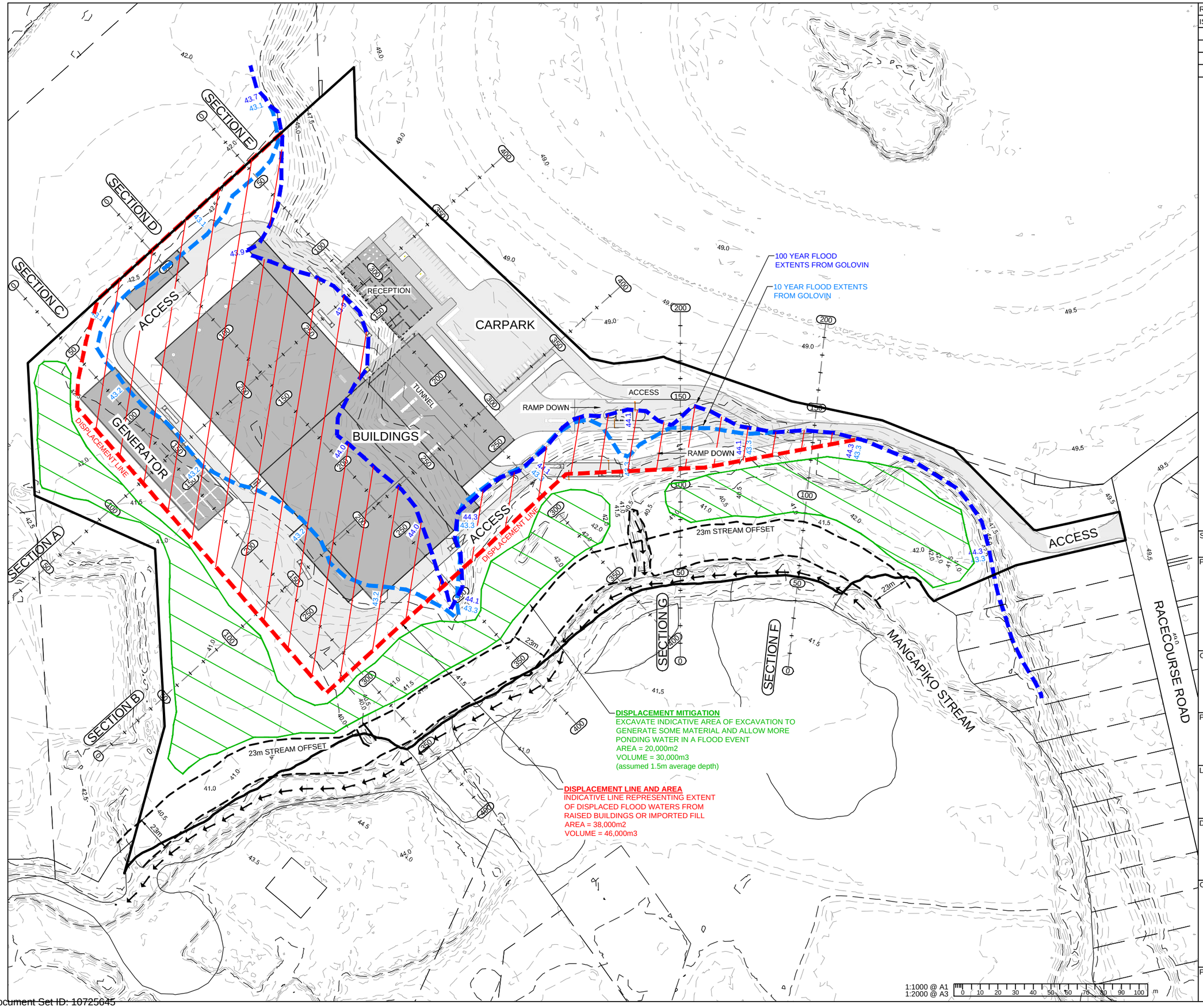

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	AC

STAGE

RESOURCE CONSENT

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CLIENT

GLOBAL METAL SOLUTIONS

PROJECT

PAEWIRA RECYCLE PLANT

LOCATION

401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE

LOCATION OF TYPICAL CROSS SECTIONS

ORIENTATION

N

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		A.COOK
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-010	A

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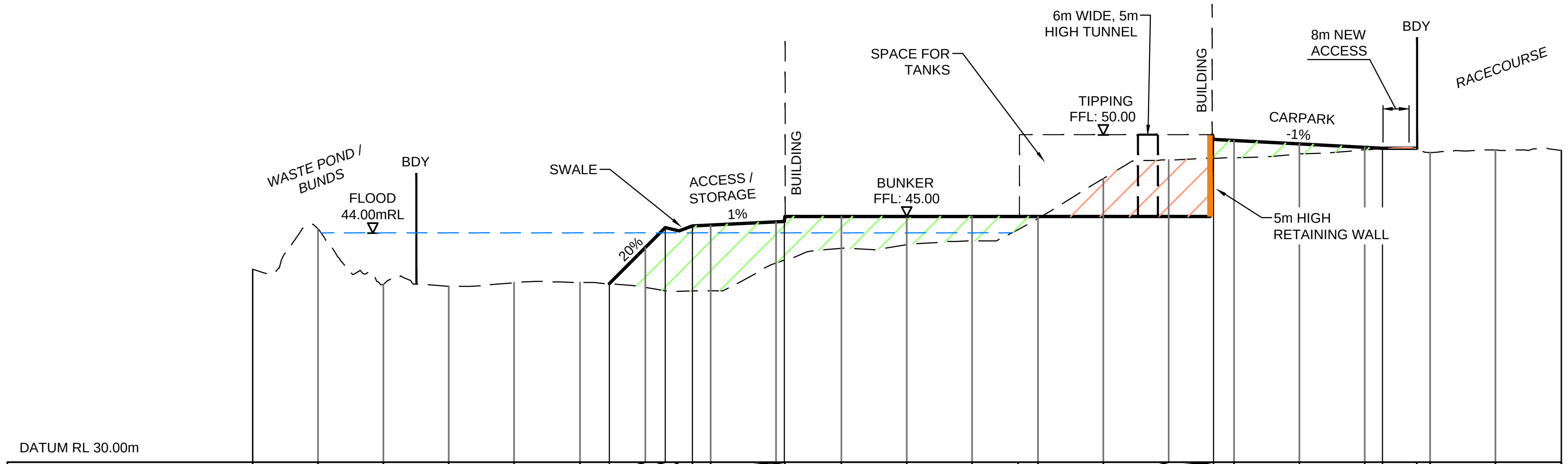
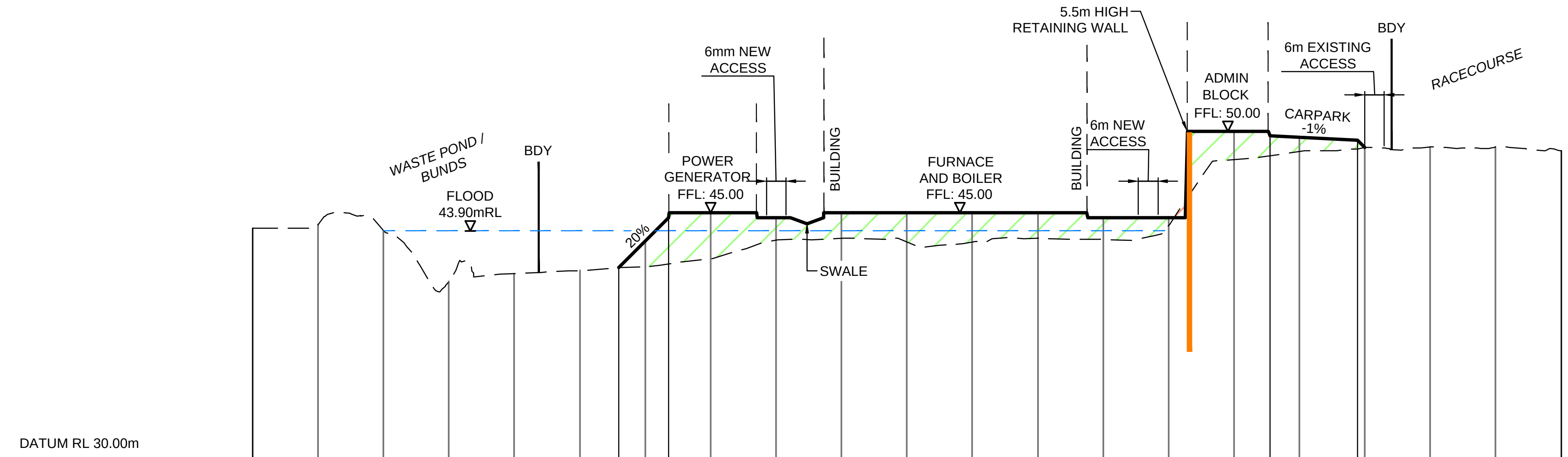


PROPOSED LEVEL							40.90	43.10	44.34	44.13	44.42	44.47	44.67	44.70	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	50.00	49.70	49.64	49.44	49.24	49.18	49.17		
EXISTING LEVEL	41.79	44.24	40.88	40.76	40.97	40.98	40.90	40.69	40.48	40.44	40.45	40.47	42.16	42.33	42.35	43.06	43.29	43.51	44.22	44.87	47.32	48.47	48.56	48.57	48.57	48.60	48.83	49.08	49.16	49.17	48.92	49.06	49.04
CUT (-) / FILL (+)							0.00	2.41	3.85	3.68	3.96	4.01	2.51	2.37	2.65	1.94	1.71	1.49	0.78	0.13	-2.32	-3.47	-3.56	1.43	1.13	1.04	0.61	0.16	0.02	0.00		
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	109.00	120.00	126.17	130.42	134.35	140.00	160.00	162.51	162.78	180.00	200.00	220.00	234.06	240.00	260.00	280.00	292.75	293.33	293.82	300.00	320.00	340.00	345.35	355.91	360.00	380.00	400.00

SECTION B (5x VERTICAL EXAGGERATION)
1:1000H 1:200V @ A1 (DOUBLE FOR A3)



PROPOSED LEVEL							41.64	43.26	44.70	45.00	45.00	45.00	44.70	44.70	44.70	44.33	44.70	45.00	45.00	45.00	45.00	45.00	45.00	44.70	44.70	44.70	44.70	50.00	50.00	50.00	49.70	49.61	49.43	48.99			
EXISTING LEVEL	44.06	44.29	43.90	40.80	41.27	41.47	41.64	41.71	41.86	41.86	42.19	43.05	43.06	43.34	43.36	43.36	43.39	43.39	43.45	43.22	43.21	43.43	43.38	43.38	43.36	44.23	45.72	45.92	48.26	48.47	48.49	48.76	48.90	48.99	49.03	49.03	48.81
CUT (-) / FILL (+)							0.00	1.55	2.84	3.14	2.81	1.95	1.64	1.36	1.34	0.97	1.31	1.61	1.55	1.78	1.79	1.57	1.62	1.32	1.34	0.47	-1.02	4.08	1.74	1.53	1.21	0.85	0.53	0.00			
CHAINAGE	0.00	20.00	40.00	60.00	80.00	100.00	111.89	120.00	127.19	127.29	140.00	153.99	154.16	160.00	164.37	169.46	174.58	174.63	180.00	200.00	220.00	240.00	255.05	255.38	260.00	280.00	285.06	285.73	300.00	310.45	310.97	320.00	337.69	340.00	360.00	380.00	400.00

SECTION A (5x VERTICAL EXAGGERATION)
1:1000H 1:200V @ A1 (DOUBLE FOR A3)

1:1000 @ A1 0 10 20 30 40 50 60 70 80 90 100 m
1:2000 @ A3

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	AC

STAGE
RESOURCE CONSENT

PROJECT CONSULTANTS

terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT
GLOBAL METAL SOLUTIONS

PROJECT
PAEWIRA RECYCLE PLANT

LOCATION
401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE
TYPICAL SECTION A AND B

ORIENTATION

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		A.COOK
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-011	A

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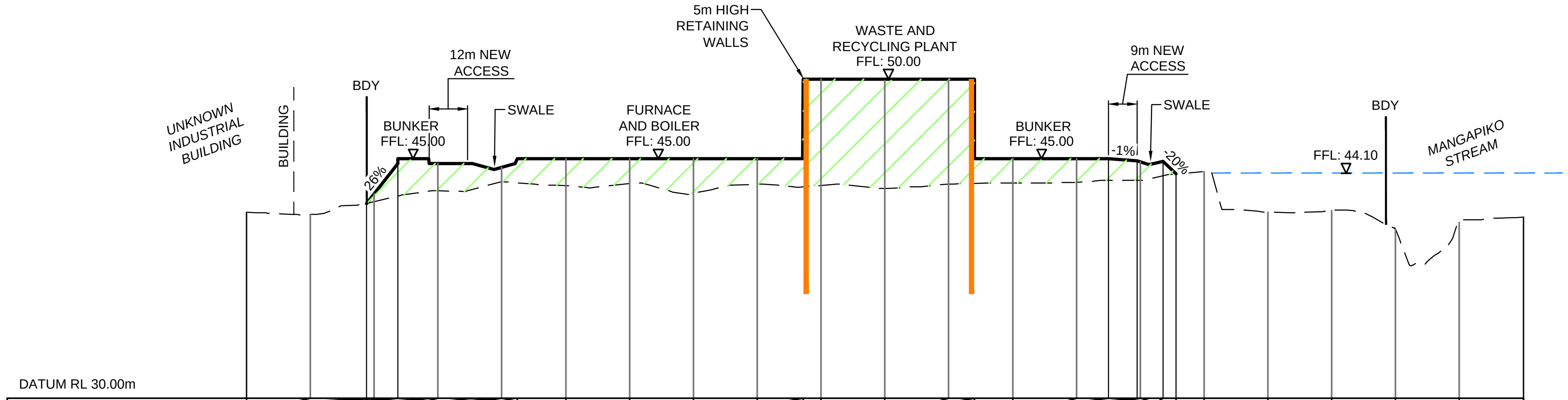
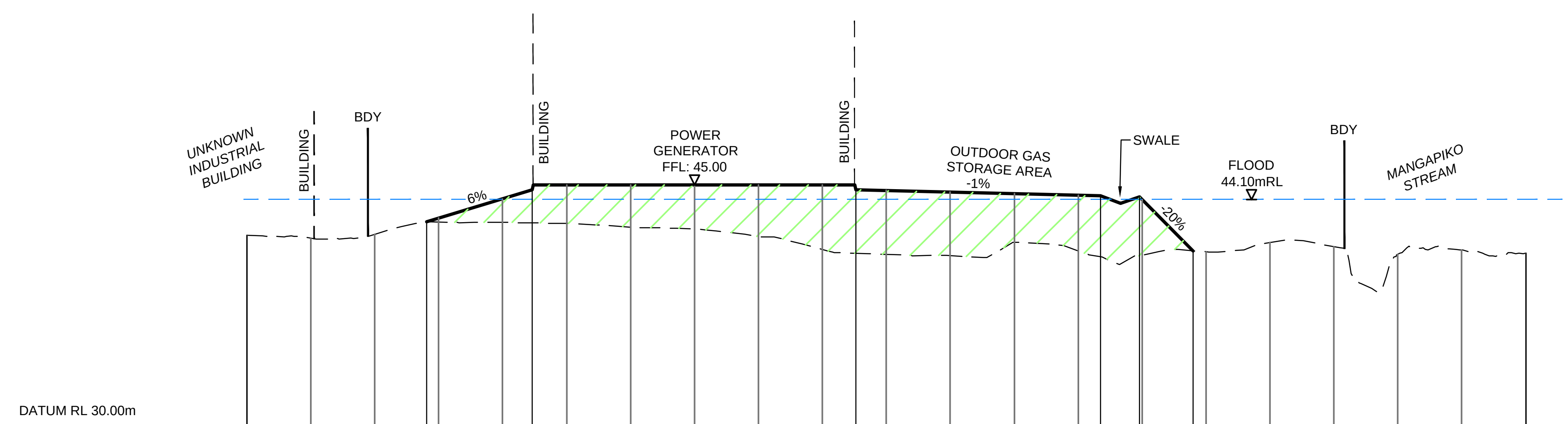


CHAINAGE	PROPOSED LEVEL	EXISTING LEVEL	CUT (-) / FILL (+)
0.00		41.66	
20.00		41.52	
37.63	42.21	42.21	0.00
40.00	42.82	42.32	0.50
47.33	44.70	42.67	2.03
47.37	45.00	42.68	2.32
57.10	45.00	42.97	2.03
57.17	44.70	42.97	1.73
60.00	44.70	43.01	1.69
70.70	44.70	43.07	1.63
77.59	44.34	43.45	0.89
80.00	44.47	43.56	0.91
84.22	44.70	43.50	1.20
84.77	45.00	43.49	1.51
100.00	45.00	43.32	1.68
120.00	45.00	43.46	1.54
140.00	45.00	42.85	2.15
160.00	45.00	43.40	1.60
174.28	45.00	43.26	1.74
174.38	50.00	43.26	6.74
180.00	50.00	43.34	6.66
200.00	50.00	43.14	6.86
220.00	50.00	43.43	6.57
228.00	50.00	43.47	6.53
228.06	45.00	43.47	1.53
240.00	45.00	43.49	1.51
260.00	45.00	43.52	1.48
270.00	45.00	43.67	1.33
279.02	44.88	43.67	1.21
280.00	44.81	43.67	1.15
282.76	44.63	43.73	0.90
287.22	44.85	43.94	0.91
291.24	44.05	44.05	0.00
300.00		44.21	
320.00		41.65	
340.00		41.76	
360.00		40.58	
380.00		41.02	
400.00		41.34	

SECTION D (5x VERTICAL EXAGGERATION)
1:1000H 1:200V @ A1 (DOUBLE FOR A3)



CHAINAGE	PROPOSED LEVEL	EXISTING LEVEL	CUT (-) / FILL (+)
0.00		41.85	
20.00		41.67	
40.00		41.92	
56.27	42.71	42.71	0.00
60.00	42.93	42.69	0.24
80.00	44.14	42.67	1.47
89.27	44.70	42.64	2.06
89.55	45.00	42.64	2.36
100.00	45.00	42.59	2.41
120.00	45.00	42.36	2.64
140.00	45.00	42.24	2.76
160.00	45.00	41.77	3.23
180.00	45.00	40.97	4.03
190.06	45.00	40.74	4.26
190.39	44.70	40.74	3.96
200.00	44.65	40.66	4.00
220.00	44.55	40.59	3.96
240.00	44.45	41.41	3.04
260.00	44.35	40.88	3.47
267.03	44.32	40.50	3.81
273.27	43.86	40.08	3.78
279.26	44.26	40.56	3.69
280.00	44.11	40.60	3.51
296.00	40.89	40.89	0.00
300.00		40.82	
320.00		41.41	
340.00		41.16	
360.00		40.69	
380.00		40.95	
400.00		40.74	

SECTION C (5x VERTICAL EXAGGERATION)
1:1000H 1:200V @ A1 (DOUBLE FOR A3)

1:1000 @ A1 / 1:2000 @ A3 — 0 10 20 30 40 50 60 70 80 90 100 m

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	AC

STAGE: RESOURCE CONSENT

PROJECT CONSULTANTS

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CLIENT: GLOBAL METAL SOLUTIONS

PROJECT: PAEWIRA RECYCLE PLANT

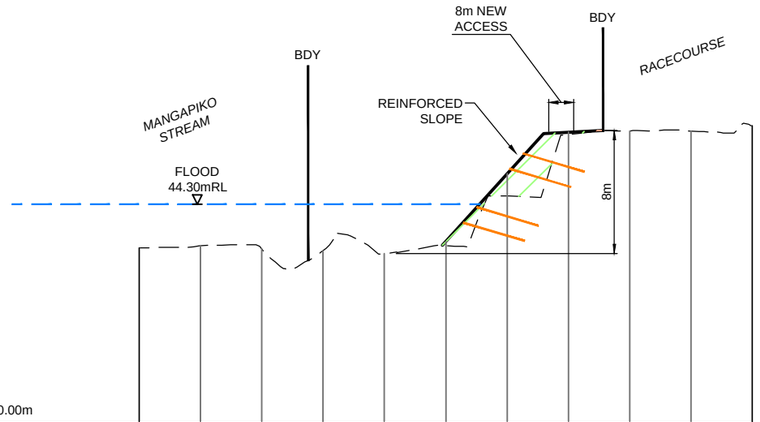
LOCATION: 401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE: TYPICAL SECTION C AND D

ORIENTATION

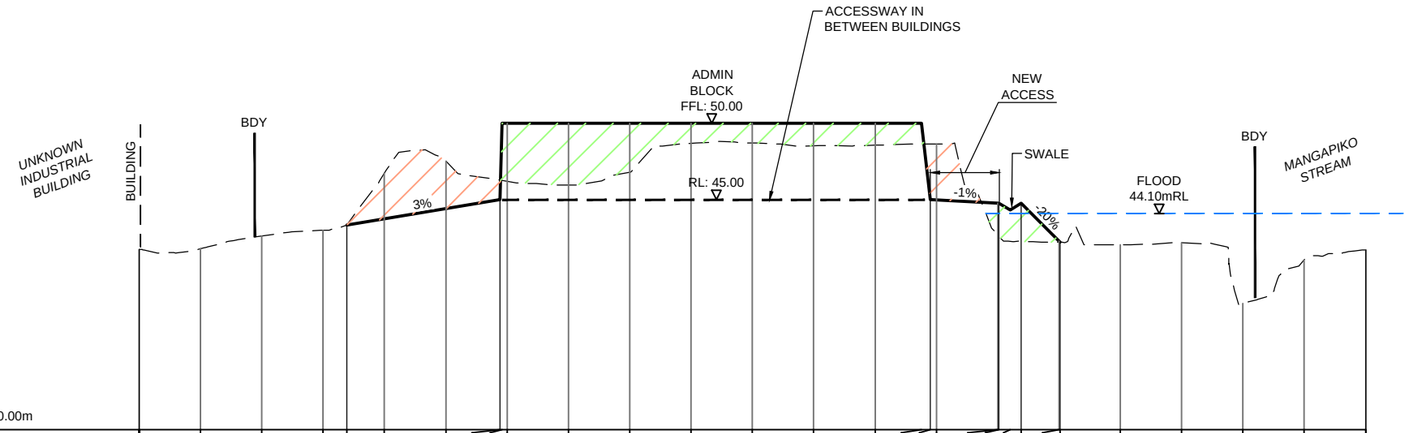
SCALE A1	1:1,000
SCALE A3	1:2,000
DATE	01/12/2021
SURVEYED	TERRA
DESIGNED	VARIOUS
DRAWN	A.COOK
CHECKED	G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-012	A



DATUM RL 30.00m														
PROPOSED LEVEL					41.62	41.86	46.29	48.91	48.99	49.10				
EXISTING LEVEL	41.44	41.60	41.37	41.26	41.09	41.62	41.60	44.85	45.25	48.83	49.10	49.09	49.07	49.41
CUT (-) / FILL (+)						0.00	0.26	1.44	3.66	0.17	0.00			
CHAINAGE	0.00	20.00	40.00	60.00	80.00	98.92	100.00	120.00	131.81	140.00	151.02	160.00	180.00	200.00

SECTION F (5x VERTICAL EXAGGERATION)
1:1000H 1:200V @ A1 (DOUBLE FOR A3)



DATUM RL 30.00m																										
PROPOSED LEVEL				43.34	43.75	44.41	45.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	45.00	44.98	44.78	44.78	44.32	44.77	42.30	42.22				
EXISTING LEVEL	41.77	41.81	42.64	43.00	43.34	46.72	47.52	46.27	46.25	46.20	45.95	46.78	48.68	48.69	48.51	48.56	48.62	48.62	48.62	42.72	42.62	42.28	42.29	42.22	42.22	42.05	42.21	38.22	41.08	41.72
CUT (-) / FILL (+)				0.00	-2.98	-3.11	-1.27	3.75	3.80	4.05	3.22	1.32	1.31	1.49	1.44	1.38	-3.62	-3.64	2.06	2.15	2.04	2.49	0.08	0.00						
CHAINAGE	0.00	20.00	40.00	60.00	67.69	80.00	100.00	117.69	118.38	120.00	140.00	160.00	180.00	200.00	220.00	240.00	255.13	258.02	260.00	280.00	280.44	284.03	287.62	300.00	300.39	320.00	340.00	360.00	380.00	400.00

SECTION E (5x VERTICAL EXAGGERATION)
1:1000H 1:200V @ A1 (DOUBLE FOR A3)

1:1000 @ A1
1:2000 @ A3
0 10 20 30 40 50 60 70 80 90 100 m

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	AC

STAGE
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PROJECT
PAEWIRA RECYCLE PLANT

LOCATION
401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE
TYPICAL SECTION E AND F

ORIENTATION

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		A.COOK
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-013	A

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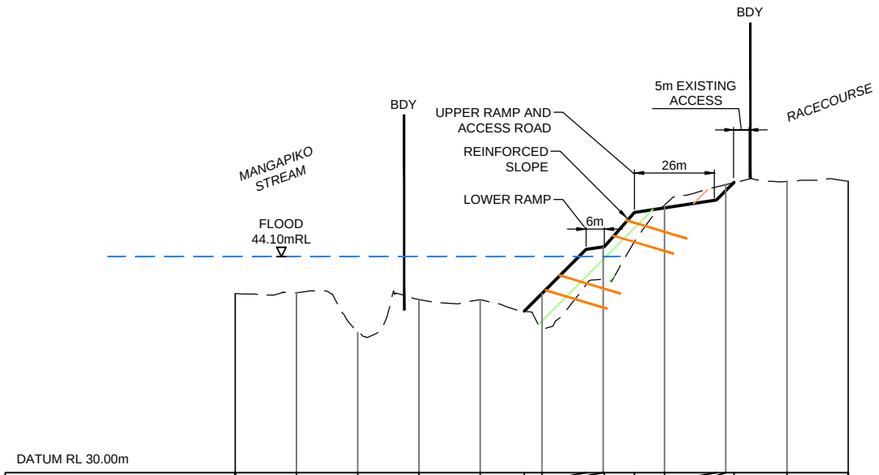

DATUM RL 30.00m

PROPOSED LEVEL						40.54	41.68	44.56	44.72	44.73	46.97	47.27	47.78	48.38	48.92		
EXISTING LEVEL	41.67	41.74	39.15	41.30	41.28	40.54	39.38	42.24	42.61	42.60	45.06	47.44	48.64	48.79	48.92	49.00	49.00
CUT (-) / FILL (+)						0.00	2.30	2.32	2.11	2.13	1.91	-0.17	-0.86	-0.41	0.00		
CHAINAGE	0.00	20.00	40.00	60.00	80.00	94.29	100.00	114.37	120.00	120.33	130.22	140.00	156.98	160.00	162.72	180.00	200.00

SECTION G (5x VERTICAL EXAGGERATION)
1:1000H 1:200V @ A1 (DOUBLE FOR A3)

1:1000 @ A1
1:2000 @ A3
0 10 20 30 40 50 60 70 80 90 100 m

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	AC

STAGE
RESOURCE CONSENT

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PAEWIRA RECYCLE PLANT

LOCATION
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DRAWING TITLE
TYPICAL SECTION G

ORIENTATION

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		A.COOK
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-014	A

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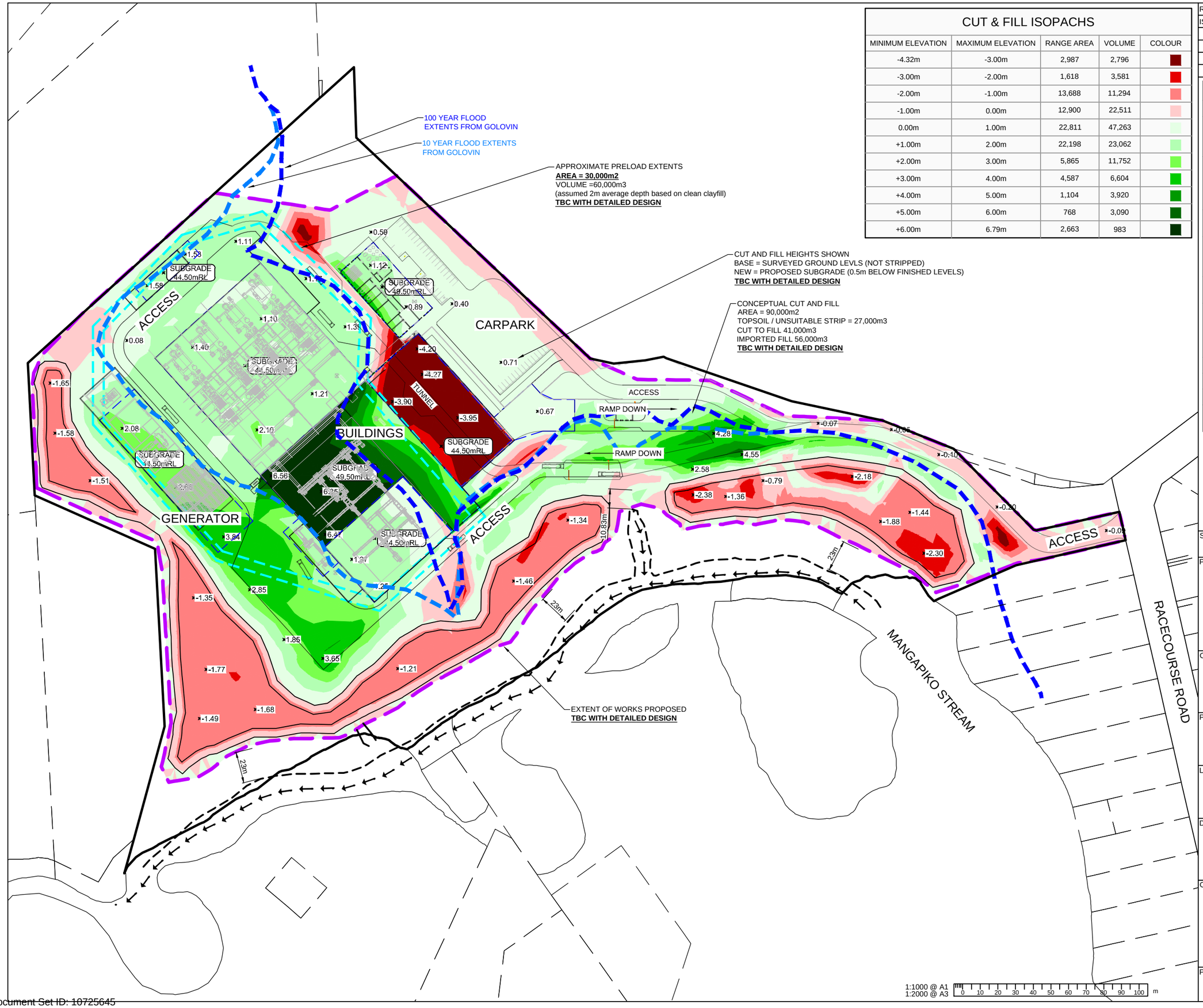


CUT & FILL ISOPACHS

MINIMUM ELEVATION	MAXIMUM ELEVATION	RANGE AREA	VOLUME	COLOUR
-4.32m	-3.00m	2,987	2,796	
-3.00m	-2.00m	1,618	3,581	
-2.00m	-1.00m	13,688	11,294	
-1.00m	0.00m	12,900	22,511	
0.00m	1.00m	22,811	47,263	
+1.00m	2.00m	22,198	23,062	
+2.00m	3.00m	5,865	11,752	
+3.00m	4.00m	4,587	6,604	
+4.00m	5.00m	1,104	3,920	
+5.00m	6.00m	768	3,090	
+6.00m	6.79m	2,663	983	

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	AC

VOLUME SUMMARY

ITEM	VOLUME
TOPSOIL STRIP AND STOCKPILE OR REMOVE	20,000
UNSUITABLE AND CONTAMINATED STRIP AND REMOVE FROM SITE	7,000
CUT TO FILL OPERATION	41,000
IMPORTED FILL FOR SUBGRADE PREPARATION	56,000
IMPORTED FILL FOR PRELOAD	60,000
ALLOWANCE TO REMOVE PRELOAD OFFSITE	60,000
TOPSOIL SPREAD	18,000
CONTINGENCY	30,000
TOTAL	292,000m3

STAGE

RESOURCE CONSENT

PROJECT CONSULTANTS

terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT

GLOBAL METAL SOLUTIONS

PROJECT

PAEWIRA RECYCLE PLANT

LOCATION

401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE

EARTHWORKS PLAN OVERALL

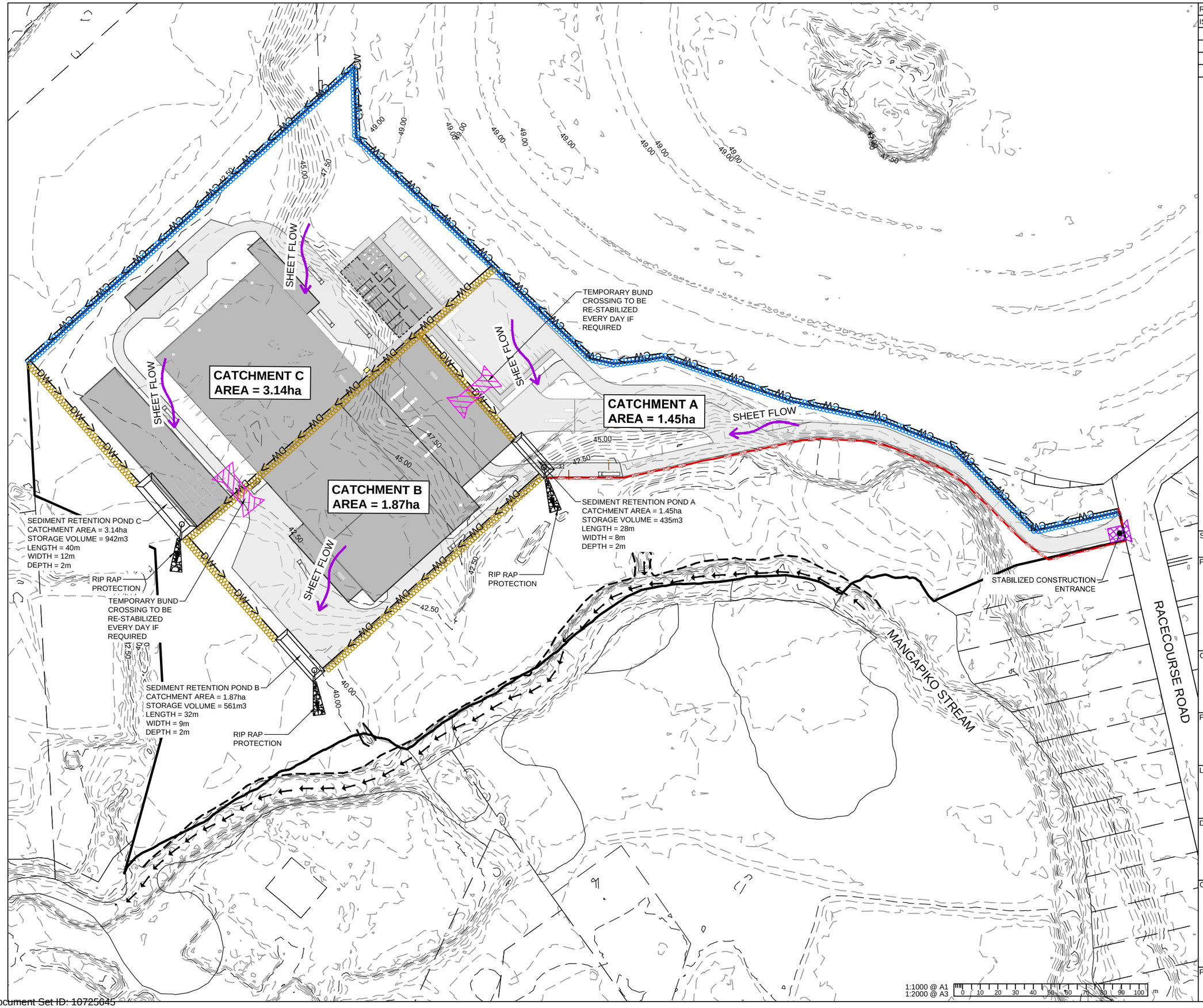
ORIENTATION

N

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		A.COOK
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-020	A

C:\Users\gallagher.cai\Dropbox\Racecourse Road 401\CAD\RC020-025_EARTHWORK.dwg, 020, 11/26/2021 3:33 pm



1:1000 @ A1
1:2000 @ A3
0 10 20 30 40 50 60 70 80 90 100 m

REVISION				
ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI

LEGEND:

- SUPER SILT FENCE
- CLEAN WATER DIVERSION BUND
- DIRTY WATER DIVERSION BUND
- STABILIZED CONSTRUCTION ENTRANCE
- POND

STAGE
RESOURCE CONSENT

PROJECT CONSULTANTS
terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT
GLOBAL METAL SOLUTIONS

PROJECT
PAEWIRA RECYCLE PLANT

LOCATION
401 RACECOURSE PARADE,
TE AWAMUTU

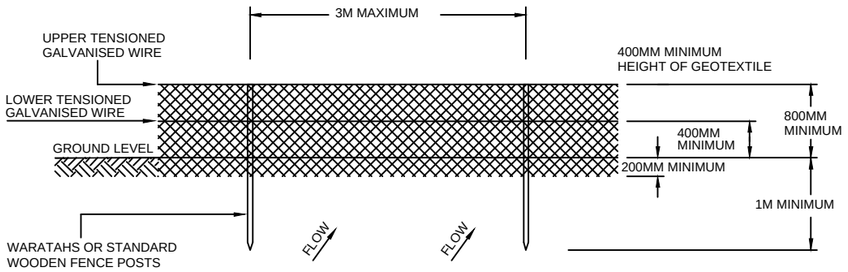
DRAWING TITLE
EROSION AND SEDIMENT CONTROL PLAN

ORIENTATION

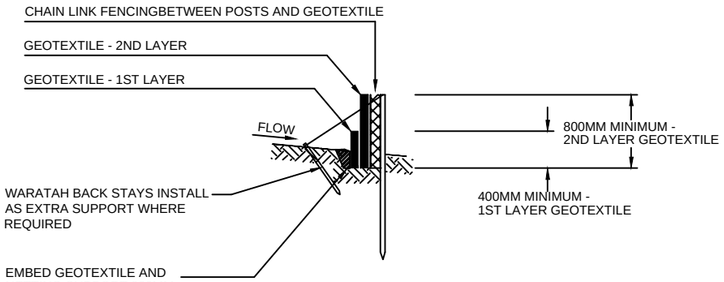
SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		G.CAI
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-027	A

C:\Users\gallagher.cai\Dropbox\Racecourse Road 401\CAD\RC027-028_EROSION AND SEDIMENT CONTROL PLAN.dwg, 027, 11/26/2021 3:34 pm

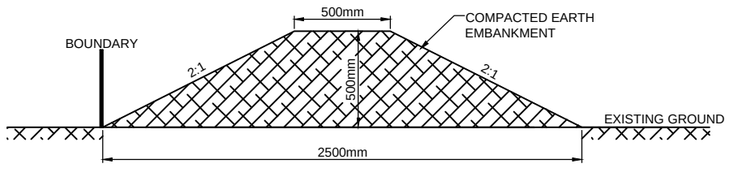


ELEVATION



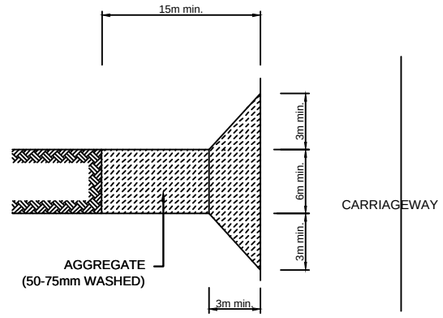
CROSS SECTION

SUPER SILT FENCE
N.T.S.



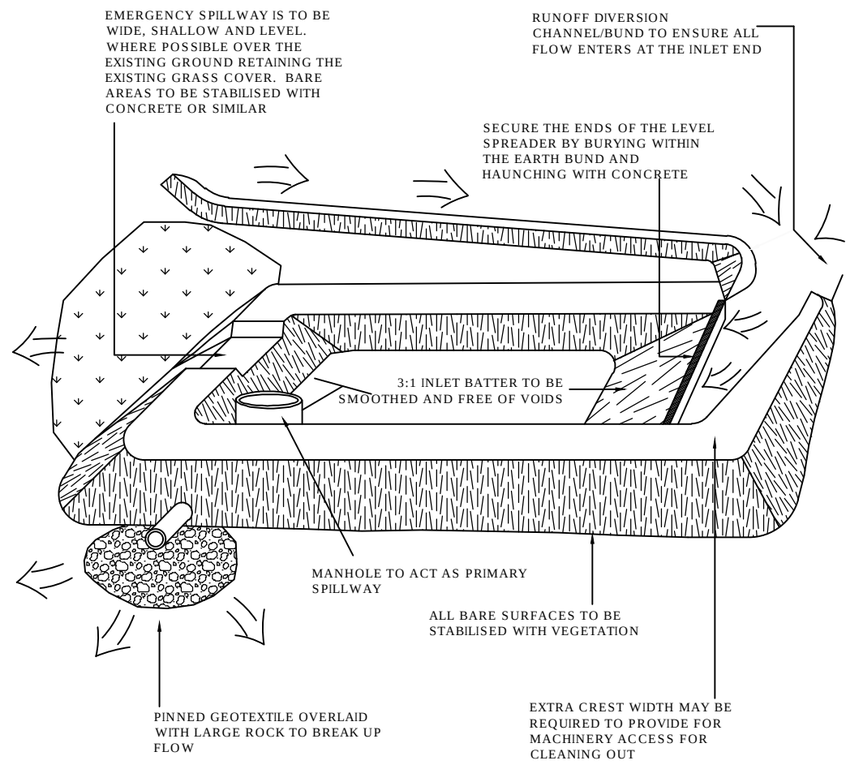
EARTH BUND CROSS SECTION
NTS

SIDE ELEVATION



PLAN VIEW

STABILISED CONSTRUCTION ENTRANCE
N.T.S.



REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI

STAGE
RESOURCE CONSENT

PROJECT CONSULTANTS
terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT
GLOBAL METAL SOLUTIONS

PROJECT
PAEWIRA RECYCLE PLANT

LOCATION
401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE
EROSION AND SEDIMENT CONTROL STANDARD DETAILS

ORIENTATION

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		G.CAI
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-28	A

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REVISION				
ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI

STAGE

RESOURCE CONSENT

PROJECT CONSULTANTS

terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT

GLOBAL METAL SOLUTIONS

PROJECT

PAEWIRA RECYCLE PLANT

LOCATION

401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE

ROADING LAYOUT PLAN

ORIENTATION

N

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		G.CAI
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-030	A

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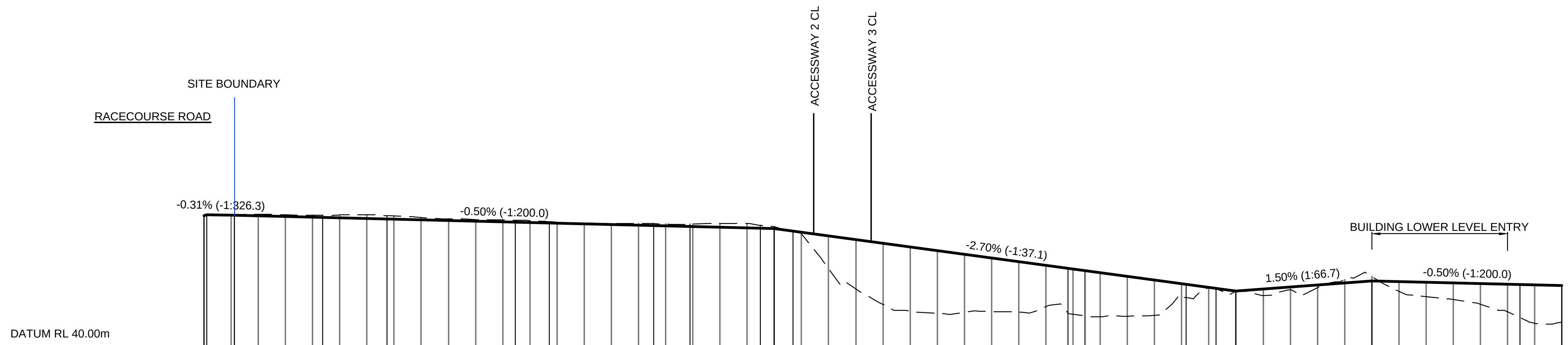

CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00
PROPOSED LEVEL	49.58	49.63	49.58	49.53	49.48	49.43	49.38	49.33	49.28	49.23	49.18	49.13	49.08	49.03	48.98	48.93	48.88
EXISTING LEVEL	49.58	49.63	49.69	49.65	49.62	49.64	49.68	49.57	49.45	49.35	49.30	49.28	49.23	49.11	49.03	49.01	49.02
CUT (-) / FILL (+)	0.00	0.00	-0.11	-0.12	-0.14	-0.21	-0.29	-0.24	-0.17	-0.11	-0.12	-0.15	-0.15	-0.08	-0.05	-0.07	-0.14

CHAINAGE	170.00	180.00	190.00	200.00	210.00	220.00	230.00	240.00	250.00	260.00	270.00	280.00	290.00	300.00	310.00	320.00	330.00
PROPOSED LEVEL	48.83	48.78	48.73	48.68	48.63	48.36	48.09	47.82	47.55	47.28	47.02	46.75	46.48	46.21	45.94	45.67	45.40
EXISTING LEVEL	48.98	48.98	49.03	49.00	48.79	48.25	45.69	44.20	43.05	42.54	42.39	42.47	42.53	42.48	42.88	42.32	42.13
CUT (-) / FILL (+)	-0.14	-0.20	-0.30	-0.32	-0.16	0.12	2.40	3.63	4.50	4.75	4.63	4.27	3.95	3.73	3.06	3.35	3.26

CHAINAGE	340.00	350.00	360.00	370.00	380.00	390.00	400.00	410.00	420.00	430.00	440.00	450.00	460.00	470.00	480.00	490.00	500.00
PROPOSED LEVEL	45.13	44.86	44.59	44.32	44.05	44.20	44.35	44.50	44.65	44.80	44.75	44.70	44.65	44.60	44.55	44.50	44.45
EXISTING LEVEL	42.19	42.24	43.72	44.29	44.04	43.70	44.13	44.28	44.89	45.12	44.02	43.62	43.41	43.07	42.51	41.66	41.77
CUT (-) / FILL (+)	2.94	2.62	0.87	0.03	0.01	0.50	0.22	0.22	-0.24	-0.32	0.73	1.08	1.24	1.53	2.04	2.84	2.68

HORIZONTAL: L=43.65m | L=23.80m R=23.50m | L=47.19m | L=12.49m R=46.50m | L=38.39m | L=13.47m R=46.50m | L=25.83m | L=11.98m R=45.50m | L=101.26m | L=6.29m R=30.00m | L=37.30m | L=10.99m R=15.00m | L=111.88m | L=26.70m R=17.00m

ACCESSWAY 1 LONGSECTION
CH: 0.00m TO CH: 500.00m
1:1000H 1:200V @ A1 (DOUBLE FOR A3)

1:1 @ A1
1:2 @ A3
0 10 20 30 40 50 60 70 80 90 100 mm

ISSUE	DATE	REVISION	CHKD	DRWN		NAME	DATE
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI	SURVEYED	TERRA	01/03/21
					DESIGNED		
					DRAWN		
					TRACED		
					CHECKED		

CONSULTANT
terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT
GLOBAL METAL SOLUTIONS

PROJECT / LOCATION
401 RACECOURSE PARADE,
TE AWAMUTU

DRAWING TITLE
ACCESSWAY 1 LONGSECTION
SHEET 1 OF 2

STAGE: FOR RESOURCE CONSENT
THIS DRAWING IS NOT SUITABLE FOR SETOUT PURPOSES
PROJECT NUMBER: 200065
SCALE: A1 1:1000, A3 1:2000
DWG NUMBER: RC-031
REVISION: A

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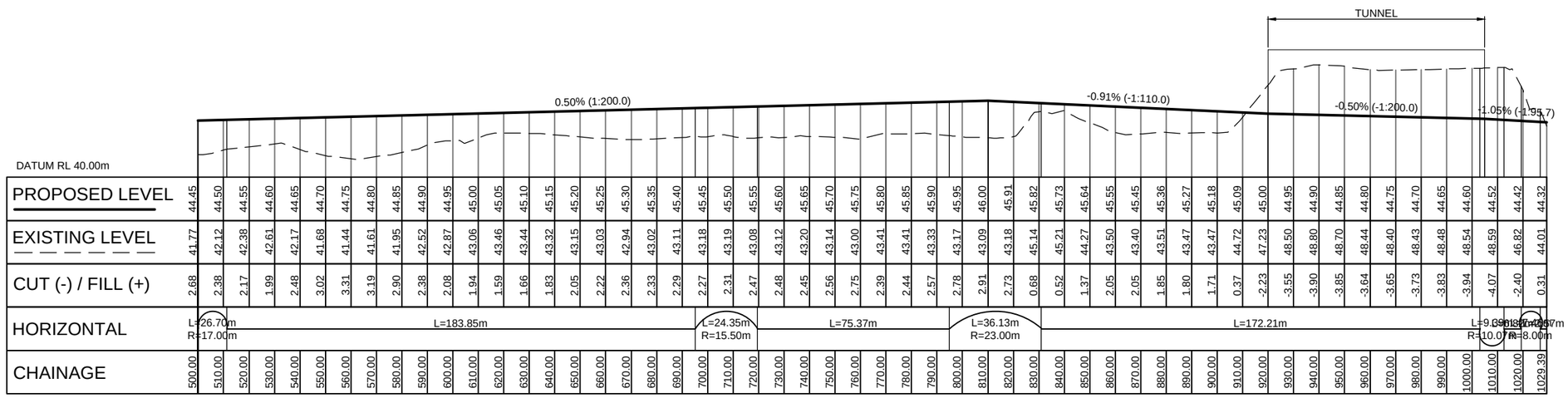

ACCESSWAY 1 LONGSECTION
CH: 500.00m TO CH: 1029.39m
1:1000H 1:200V @ A1 (DOUBLE FOR A3)

1:1 @ A1
1:2 @ A3
0 10 20 30 40 50 60 70 80 90 100 mm

ISSUE	DATE	REVISION	CHKD	DRWN		NAME	DATE
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI	SURVEYED	TERRA	01/03/21
					DESIGNED		
					DRAWN		
					TRACED		
					CHECKED		

CONSULTANT
terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT
GLOBAL METAL SOLUTIONS

PROJECT / LOCATION
401 RACECOURSE PARADE,
TE AWAMUTU

DRAWING TITLE
ACCESSWAY 1 LONGSECTION
SHEET 2 OF 2

STAGE
FOR RESOURCE CONSENT
THIS DRAWING IS NOT SUITABLE FOR SETOUT PURPOSES

PROJECT NUMBER
200065

SCALE
A1 1:1000
A3 1:2000

DWG NUMBER
RC-032

REVISION
A

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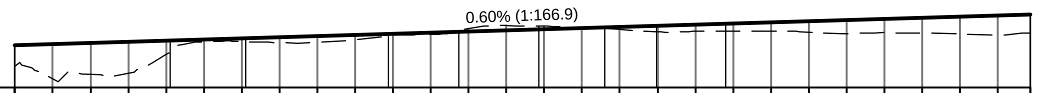
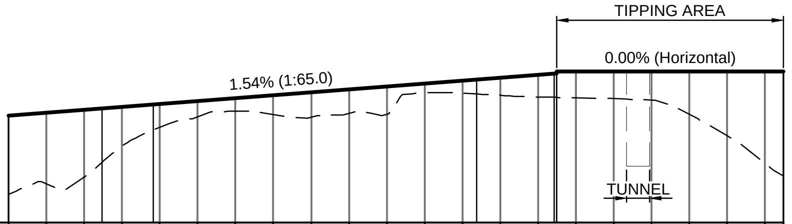


PROPOSED LEVEL	48.24	48.30	48.36	48.42	48.48	48.54	48.60	48.66	48.72	48.78	48.84	48.90	48.96	49.02	49.08	49.14	49.20	49.26	49.32	49.38	49.44	49.50	49.56	49.62	49.68	49.74	49.80	49.85
EXISTING LEVEL	47.13	46.46	46.69	46.75	47.75	48.40	48.43	48.37	48.38	48.51	48.76	48.80	49.11	49.28	49.24	49.17	49.07	48.94	48.96	48.98	48.97	48.92	48.84	48.89	48.88	48.83	48.78	48.86
CUT (-) / FILL (+)	1.11	1.84	1.67	1.67	0.73	0.14	0.17	0.29	0.34	0.27	0.08	0.10	-0.15	-0.26	-0.16	-0.03	0.12	0.32	0.35	0.40	0.46	0.58	0.72	0.72	0.80	0.91	1.02	0.99
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00	170.00	180.00	190.00	200.00	210.00	220.00	230.00	240.00	250.00	260.00	268.63

HORIZONTAL: L=40.99m | L=20.07m R=41.50m | L=37.69m | L=18.66m R=23.50m | L=21.12m | L=17.45m R=20.00m | L=13.68m | L=18.34m R=20.00m | L=80.63m

ACCESSWAY 2 LONGSECTION
CH: 0.00m TO CH: 268.63m
1:1000H 1:200V @ A1 (DOUBLE FOR A3)



PROPOSED LEVEL	47.67	47.82	47.98	48.13	48.29	48.44	48.59	48.75	48.90	49.06	49.21	49.36	49.52	49.67	49.82	50.00	50.00	50.00	50.00	50.00	50.00	50.00
EXISTING LEVEL	43.52	44.05	44.42	46.05	47.06	47.61	47.90	47.74	47.58	47.78	47.74	48.87	48.87	48.75	48.65	48.61	48.56	48.48	47.74	46.61	45.12	44.49
CUT (-) / FILL (+)	4.16	3.78	3.55	2.08	1.23	0.83	0.70	1.01	1.33	1.28	1.47	0.49	0.65	0.92	1.18	1.39	1.44	1.52	2.26	3.39	4.88	5.51
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00	170.00	180.00	190.00	200.00	204.88

HORIZONTAL: L=24.73m | L=13.54m R=28.00m | L=85.55m | L=20.51m R=28.00m | L=60.55m

ACCESSWAY 3 LONGSECTION
CH: 0.00m TO CH: 204.88m
1:1000H 1:200V @ A1 (DOUBLE FOR A3)

1:1 @ A1
1:2 @ A3
0 10 20 30 40 50 60 70 80 90 100 mm

ISSUE	DATE	REVISION	CHKD	DRWN		NAME	DATE
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI	SURVEYED	TERRA	01/03/21
					DESIGNED		
					DRAWN		
					TRACED		
					CHECKED		

CONSULTANT
terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT
GLOBAL METAL SOLUTIONS

PROJECT / LOCATION
401 RACECOURSE PARADE,
TE AWAMUTU

DRAWING TITLE
ACCESSWAY 2 & 3 LONGSECTION

STAGE
FOR RESOURCE CONSENT
THIS DRAWING IS NOT SUITABLE FOR SETOUT PURPOSES

PROJECT NUMBER 200065
SCALE A1 1:1000 A3 1:2000
DWG NUMBER RC-033
REVISION A

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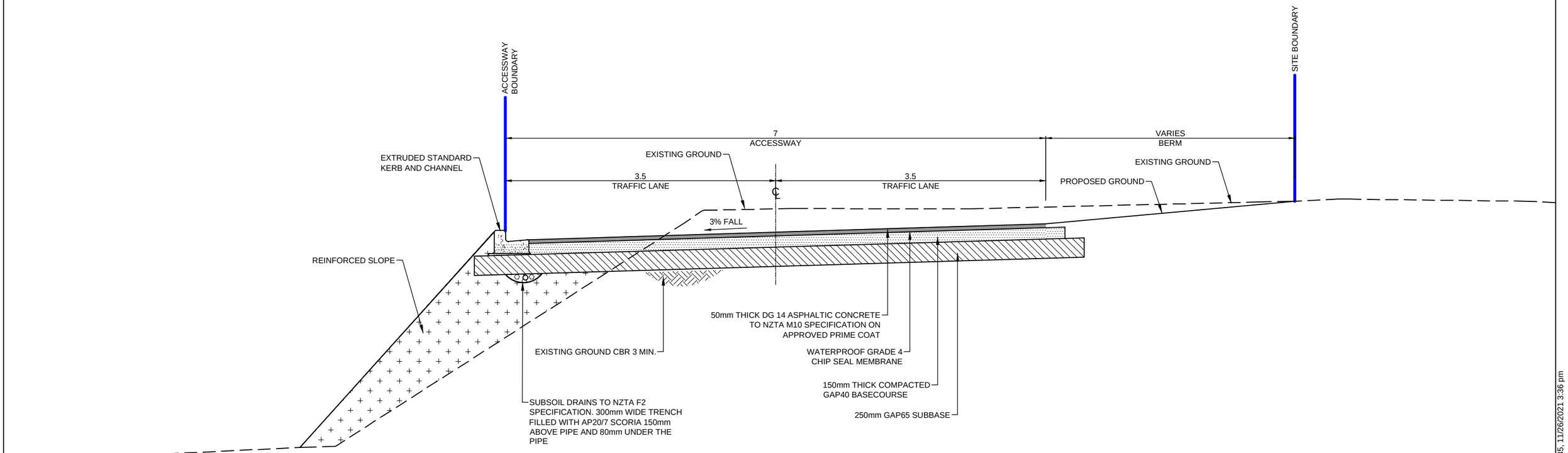

A 030 MAIN ACCESSWAY TYPICAL CROSS SECTION
SCALE 1:25 (A1)
SCALE 1:50 (A3)

1:25 @ A1
1:50 @ A3
0 400 800 1200 1600 2000 2400 mm

ISSUE	DATE	REVISION	CHKD	DRWN		NAME	DATE
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI	SURVEYED	TERRA	01/03/21
					DESIGNED		
					DRAWN		
					TRACED		
					CHECKED		

CONSULTANT
terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

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GLOBAL METAL SOLUTIONS

PROJECT / LOCATION
401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE
ROADING TYPICAL CROSS SECTION
SHEET 1 OF 3

STAGE
FOR RESOURCE CONSENT
THIS DRAWING IS NOT SUITABLE FOR SETOUT PURPOSES

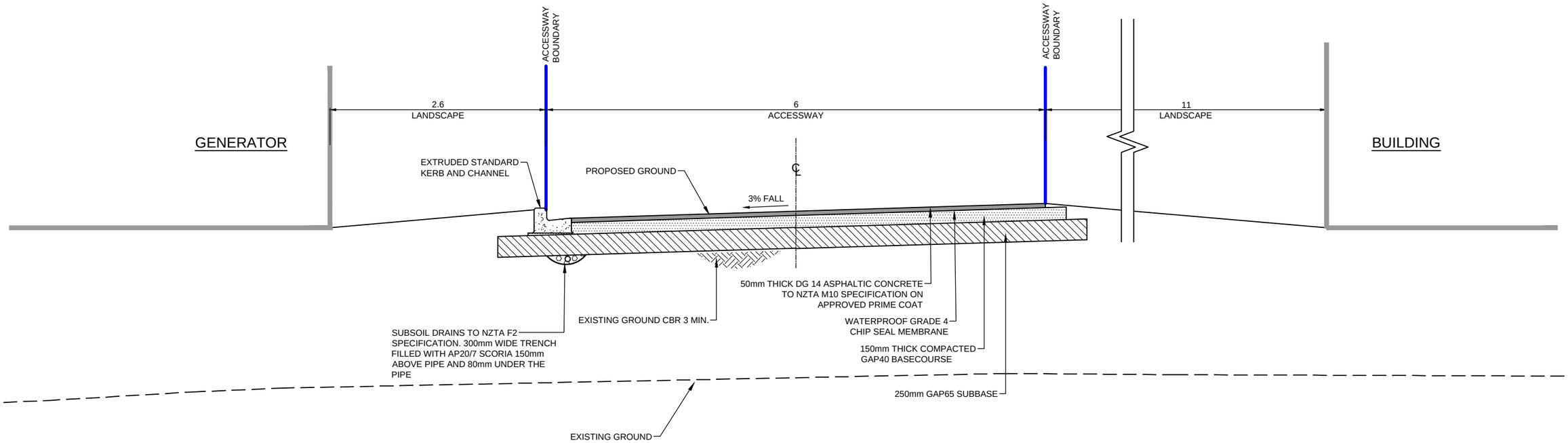
PROJECT NUMBER
200065

SCALE
A1 1:25
A3 1:50

DWG NUMBER
RC-035

REVISION
A

C:\Users\gallagher.cal\Dropbox\Racecourse Road 401\CAD\RC035_ROADING CROSS SECTIONS.dwg, 035, 11/26/2021 3:36 pm



B 030 ACCESSWAY TYPICAL CROSS SECTION
SCALE 1:25 (A1)
SCALE 1:50 (A3)

1:25 @ A1
1:50 @ A3
0 400 800 1200 1600 2000 2400 mm

ISSUE	DATE	REVISION	CHKD	DRWN		NAME	DATE
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI	SURVEYED	TERRA	01/03/21
					DESIGNED		
					DRAWN		
					TRACED		
					CHECKED		

CONSULTANT
terra CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT
GLOBAL METAL SOLUTIONS

PROJECT / LOCATION
401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE
ROADING TYPICAL CROSS SECTION
SHEET 2 OF 3

STAGE
FOR RESOURCE CONSENT
THIS DRAWING IS NOT SUITABLE FOR SETOUT PURPOSES

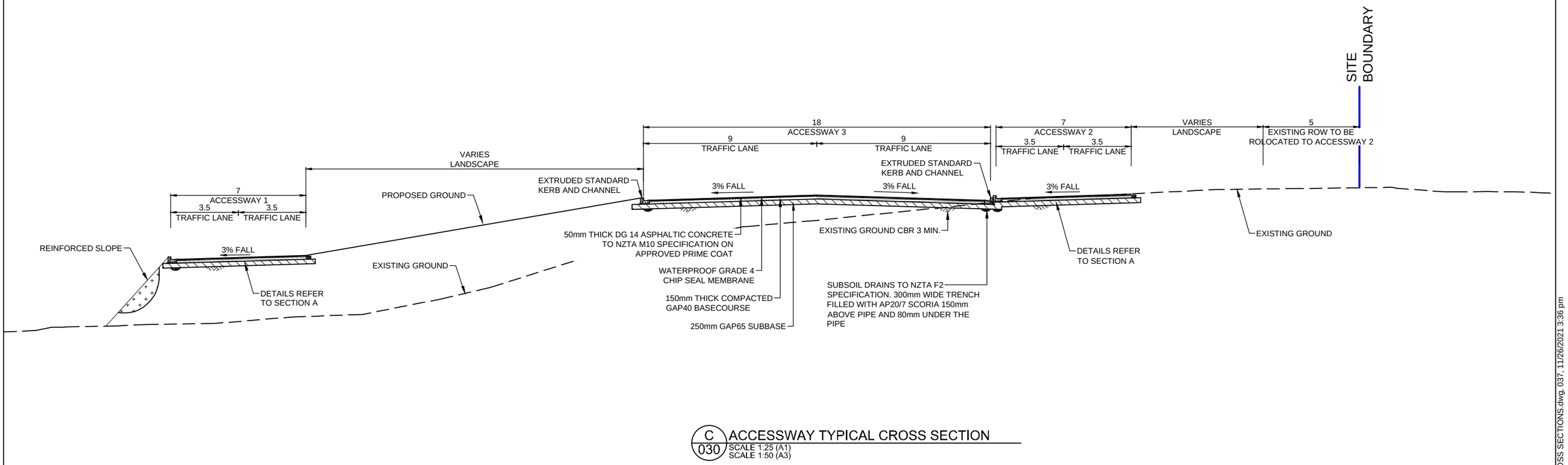
PROJECT NUMBER
200065

SCALE
A1 1:25
A3 1:50

DWG NUMBER
RC-036

REVISION
A

C:\Users\gallagher.cal\Dropbox\Racecourse Road 401\CAD\RC035_ROADING CROSS SECTIONS.dwg, 036, 11/26/2021 3:36 pm



C 030 ACCESSWAY TYPICAL CROSS SECTION
SCALE 1:25 (A1)
SCALE 1:50 (A3)

1:25 @ A1
1:50 @ A3
0 400 800 1200 1600 2000 2400 mm

ISSUE	DATE	REVISION	CHKD	DRWN		NAME	DATE
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI	SURVEYED	TERRA	01/03/21
					DESIGNED		
					DRAWN		
					TRACED		
					CHECKED		

CONSULTANT
terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
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Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT
GLOBAL METAL SOLUTIONS

PROJECT / LOCATION
401 RACECOURSE PARADE,
TE AWAMUTU

DRAWING TITLE
ROADING TYPICAL CROSS SECTION
SHEET 3 OF 3

STAGE
FOR RESOURCE CONSENT
THIS DRAWING IS NOT SUITABLE FOR SETOUT PURPOSES

PROJECT NUMBER
200065

SCALE
A1 1:25
A3 1:50

DWG NUMBER
RC-037

REVISION
A

C:\Users\gallagher.cal\Dropbox\Racecourse Road 401\CAD\RC035_ROADING CROSS SECTIONS.dwg, 037, 11/26/2021 3:36 pm

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI

STAGE

RESOURCE CONSENT

PROJECT CONSULTANTS

terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT

GLOBAL METAL SOLUTIONS

PROJECT

PAEWIRA RECYCLE PLANT

LOCATION

401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE

ENTRANCE LAYOUT PLAN

ORIENTATION

N

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		G.CAI
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-038	A

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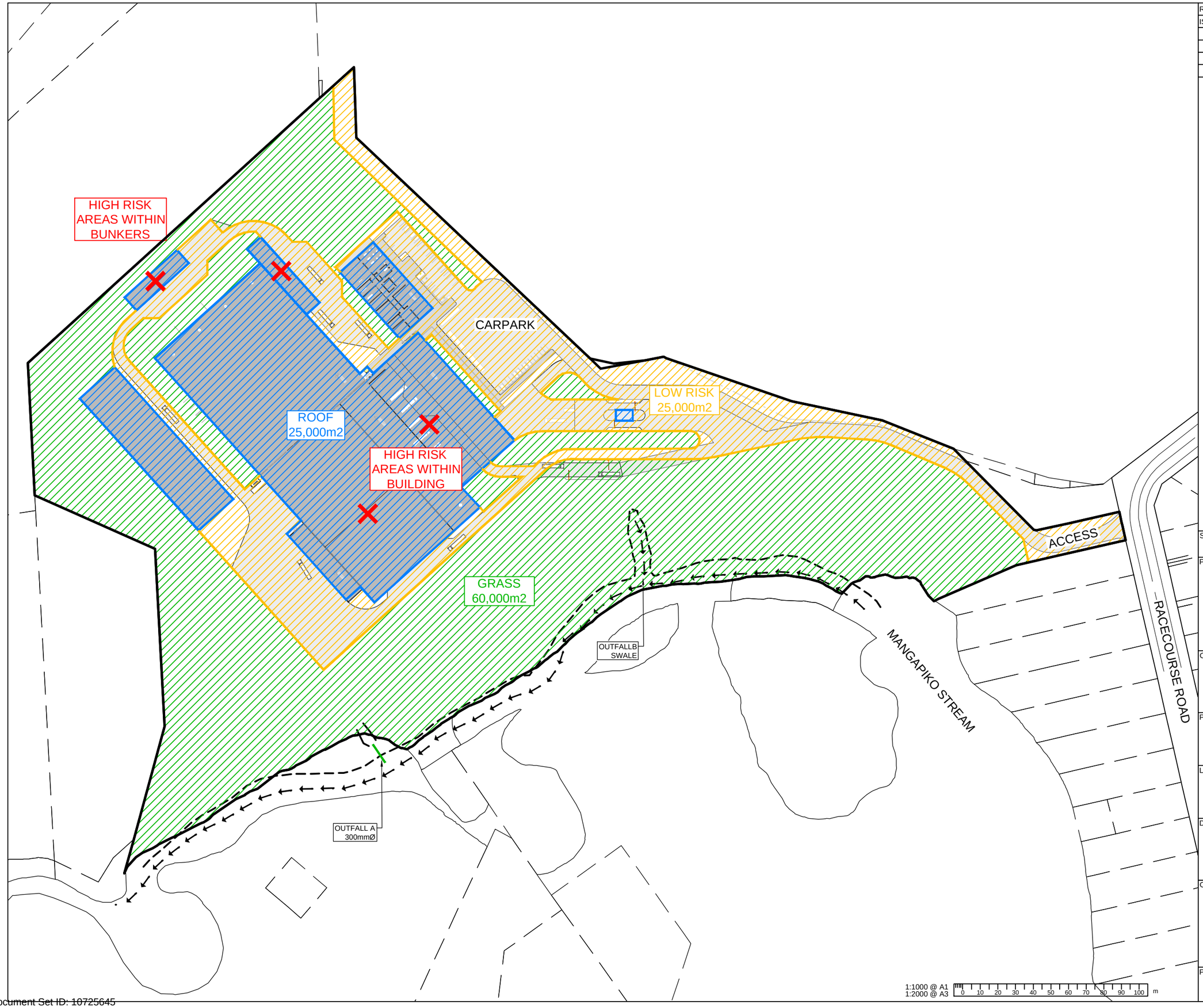

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI

STAGE

RESOURCE CONSENT

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CLIENT

GLOBAL METAL SOLUTIONS

PROJECT

PAEWIRA RECYCLE PLANT

LOCATION

401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE

STORMWATER CATCHMENT AREAS

ORIENTATION

N

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		G.CAI
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-40	A

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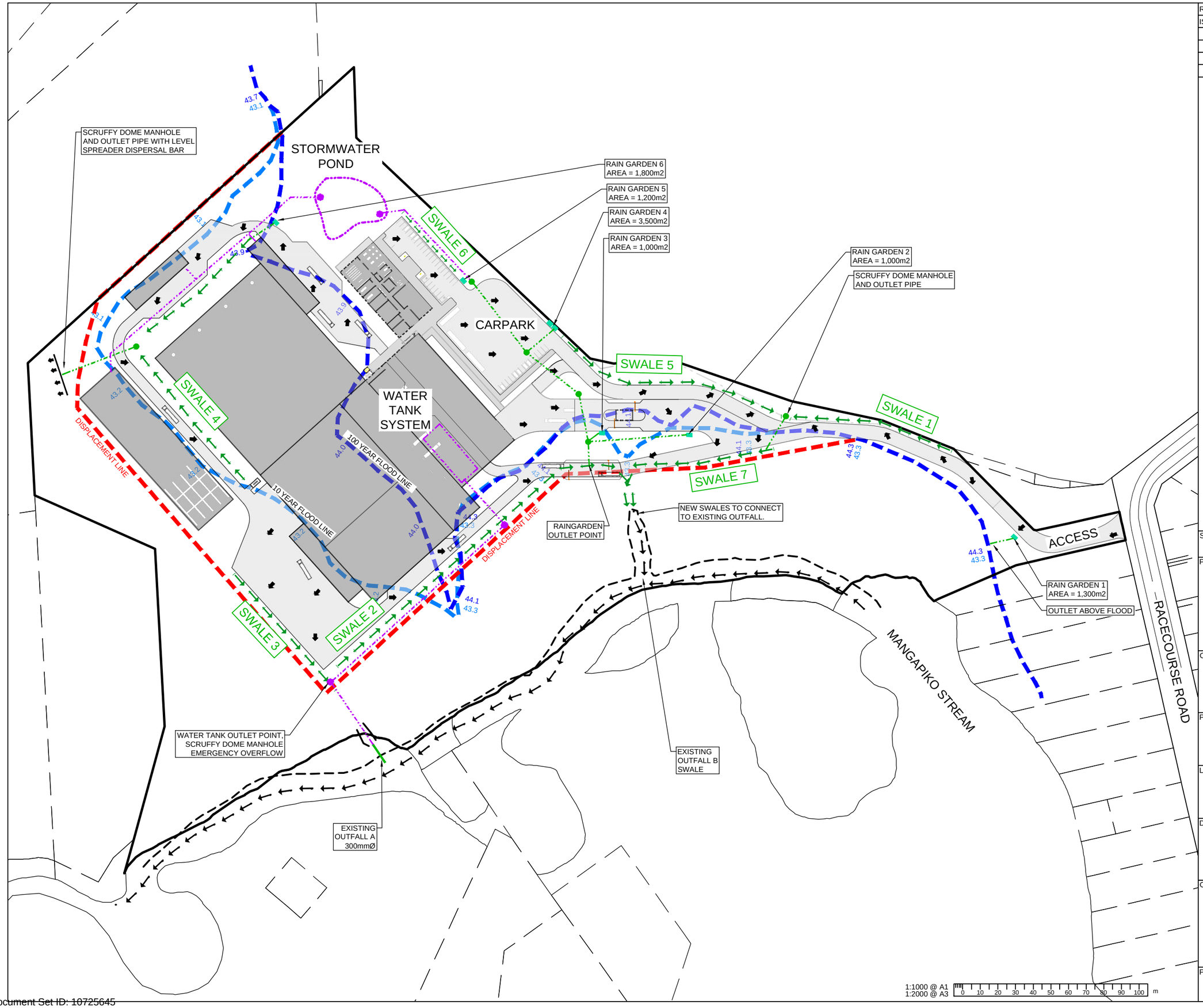

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI

STAGE

RESOURCE CONSENT

PROJECT CONSULTANTS

terra CONSULTANTS
PO BOX 12858, Penrose, New Zealand
Auckland: (09) 357 3557
Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT

GLOBAL METAL SOLUTIONS

PROJECT

PAEWIRA RECYCLE PLANT

LOCATION

401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE

STORMWATER PROPOSED SYSTEM

ORIENTATION

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		G.CAI
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-41	A

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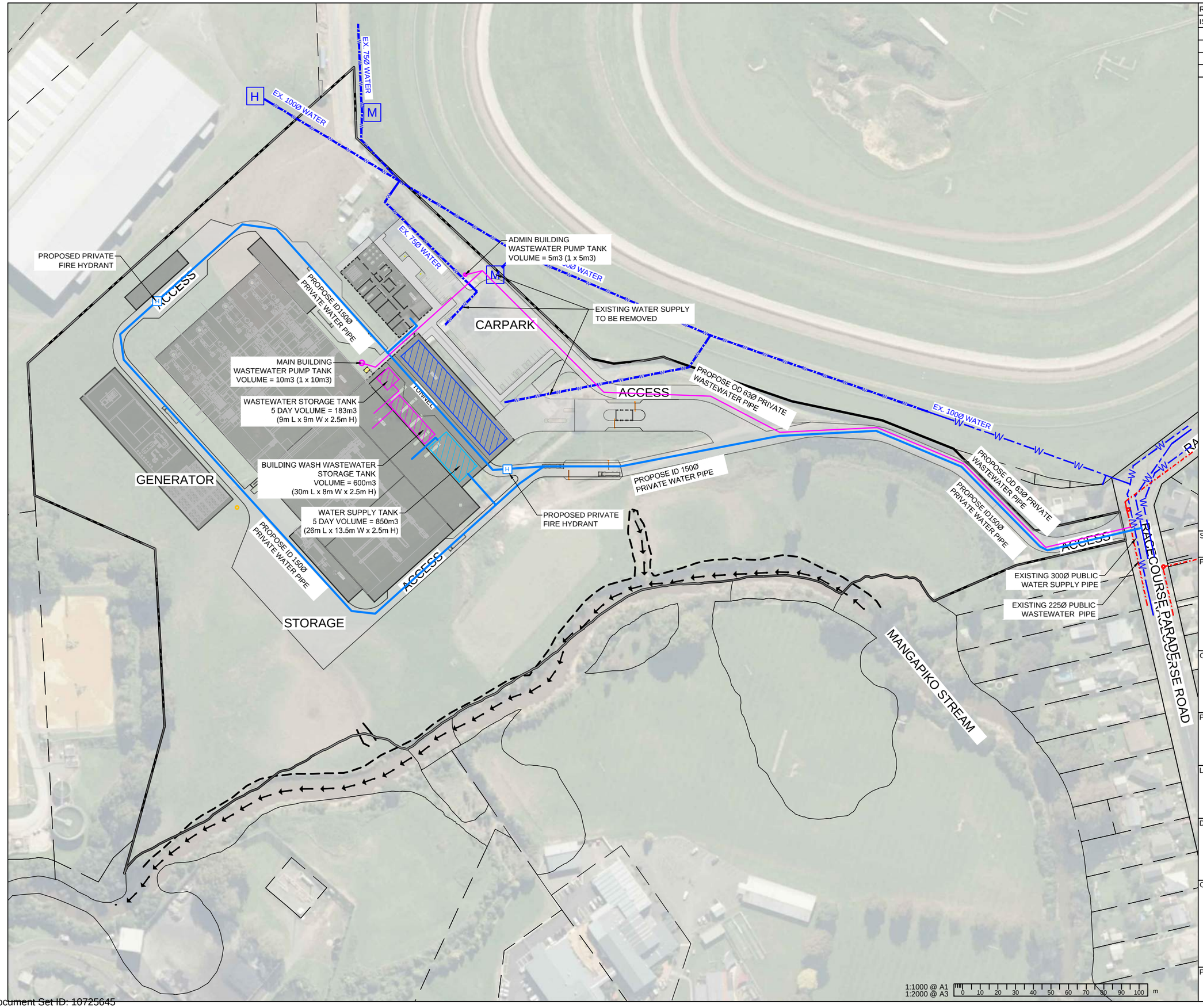

REVISION

ISSUE	DATE	DETAIL	CHKD	DRWN
A	01/12/21	FOR RESOURCE CONSENT	GC	GCAI

STAGE

RESOURCE CONSENT

PROJECT CONSULTANTS

terra
CONSULTANTS
PO BOX 12858, Penrose, New Zealand
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Northland: (09) 431 4444
Christchurch: (03) 379 5055
Email: terra@terragroup.co.nz | Web: www.terragroup.co.nz

CLIENT

GLOBAL METAL SOLUTIONS

PROJECT

PAEWIRA RECYCLE PLANT

LOCATION

401 RACECOURSE PARADE, TE AWAMUTU

DRAWING TITLE

WASTEWATER AND WATERSUPPLY LAYOUT PLAN

ORIENTATION

N

SCALE	A1	1:1,000
	A3	1:2,000
DATE		01/12/2021
SURVEYED		TERRA
DESIGNED		VARIOUS
DRAWN		G.CAI
CHECKED		G.CLARKE

PROJECT NUMBER	DWG NUMBER	REVISION
200065	RC-050	A

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