ENVELOPE

STORMWATER MANAGEMENT PLAN

50 Westney Road, Mangere, Auckland
2022

DOCUMENT CONTROL RECORD

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CONTENTS

APPENDICES

EXECUTIVE SUMMARY

Envelope Engineering Ltd has been engaged by Rotokohu Investments Ltd to provide a Stormwater Management Plan (SMP) in relation to a private plan change and resource consent applications for the proposed development at 50 Westney Road in Mangere hereafter known as the 'site'. This SMP has been developed to achieve consistency with the objectives and policies of the Auckland Unitary Plan, as well as Auckland Council's Guideline Documents and industry best practice options.

This SMP sets out good management practices and identifies the mechanisms to be utilised to avoid or mitigate potential adverse effects on the receiving environment associated with stormwater discharge.

The main outcomes of the SMP include:

- The provision of an integrated stormwater management approach.
- The assurance of no/minimal adverse changes to the downstream OLFP and flood risk.
- The mitigation of any adverse effects from stormwater runoff on surface water quality by providing a treatment train approach.

The SMP will achieve the desired outcomes by adopting the following Water Sensitive Design principles:

- Promote inter-disciplinary planning and design.
- Protect and enhance the values and functions of natural ecosystems.
- Address stormwater effects as close to the source as possible.
- Mimic natural systems and process for stormwater management.
- Filtering, Conveyance and Re-use.
- Protect and enhancing the receiving environment.

In order to achieve the outcomes outlined above, the following methodologies are proposed:

- Provide stormwater treatment for all trafficable surfaces at source using treatment devices such as Stormfilter, and Enviropods.
- The proposed pipe network and OLFP between the site and the downstream creek will be sized to cater for the 1% AEP (100-year ARI) flows. Attenuation is not expected to be required (Option 1). If required, this could be provided by tanks located within the site.
- The maintenance and upgrading of erosion protection measures along the OLFP and at the outlet as required.
- Inert building materials to be used to ensure no contaminant discharge from the structures.
- The site is not located within a current SMAF zone but retention is proposed to be provided as a part of the development to reduce water demand associated with the new buildings.

1.0 EXISTING SITE APPRAISAL

This section analyses the existing site conditions and investigations undertaken to date.

1.1 SUMMARY OF DATA SOURCES AND DATES

EXISTING SITE APPRAISAL ITEM	SOURCE AND DATE OF DATA USED
Topography	• Envelope Surveying, 2024
Geotechnical / soil conditions	• Not Available
Existing stormwater network	• Auckland Council GeoMaps • Topography data, Envelope Surveying 2024
Stream, river, coastal erosion	• Auckland Council GeoMaps
Flooding and flowpaths	• Auckland Council GeoMaps
Coastal Inundation	• Auckland Council GeoMaps
Ecological / environmental areas	• Auckland Council GeoMaps
Cultural and heritage sites	• Auckland Council GeoMaps
Contaminated land	• Not Available

1.2 LOCATION AND GENERAL INFORMATION

EXISTING SITE ELEMENT	
Stormwater Management Area	• Not currently but SMAF 1 retention proposed.
Site address	• 50 Westney Road Mangere Auckland 2022
Legal description	• PT ALLOT 74 PARISH OF MANUREWA
Current Land Use	• Residential - Mixed Housing Suburban Zone
Current building coverage	• 4442 m^2 measured from Auckland GIS Map
Historical Land Use	• Unknown

1.3 TOPOGRAPHY

The current site topography, as indicated by the Envelope Surveying report dated May 2024 and accompanying survey plans, reveals that the site is predominantly utilized by the SPCA as its main Auckland base and animal shelter. The facility occupies the northern two-thirds of the site, while the rear third has recently been surfaced and serves as an open-air car park currently utilized for Motorhome parking.

The terrain of the site is generally flat, with only minor gradients ranging between 1% to 2% in various directions. Vehicular access is currently available from three access points on Westney Road.

The majority of the site exhibits gentle slopes, primarily descending towards the southeastern corner.

There was a temporary earth bund (1-2m high) around the eastern perimeter of the site. We understand this was installed to mitigate noise issues associated with the previous land use. These bunds have now been removed and a minor swale has been formed. We have carried out a site visit to clarify our understanding of the site levels and stormwater flowpaths as these differ from those identified on Geomaps. We note that Geomaps is based on lidar and therefore has accuracy limitations which can be more evident on very flat sites such as this. Please refer to Appendices 1 and 2 which contain the topographical survey, and our assessment of the current stormwater flow catchments present on the existing site. An extract of the catchment plan is shown below in Figure 1.

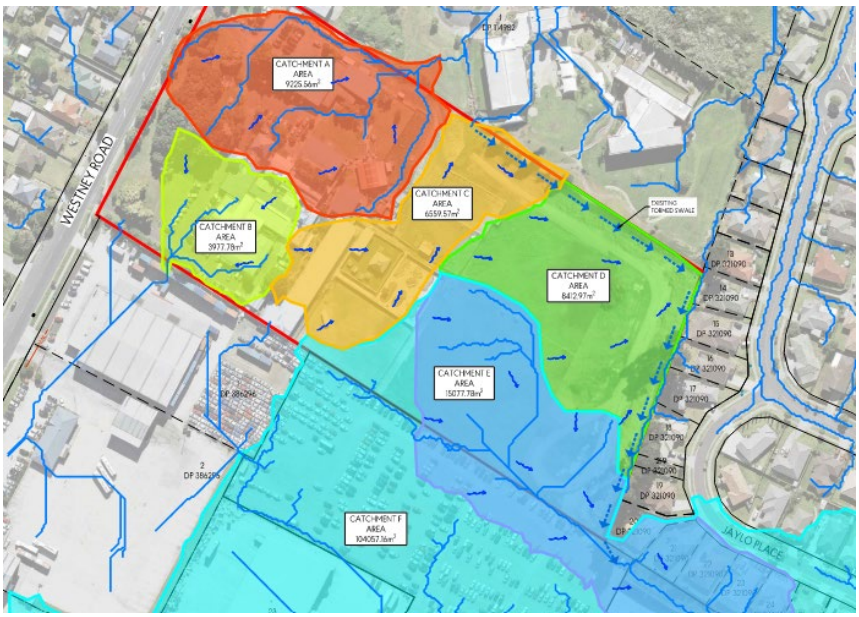


FIGURE 1: Existing Stormwater Catchment Plan.

1.4 GEOTECHNICAL

Currently, no geotechnical investigations have been conducted for the intended redevelopment of the site. These will be undertaken later, as part of the resource consent process for the land use. However, we have sighted reports prepared to support previous developments on the site. We note the identified presence of stiff silty clays and a relatively high groundwater level mean that soakage is unlikely to be viable.

We note that the site is generally flat, and that surrounding land has been developed for a range of buildings from two level dwellings and school buildings to large 10-12m high industrial buildings on land to the south.

Based on surrounding landuse and our site walkover we cannot see any issues precluding implementation of this stormwater management plan when developing the site.

1.5 EXISTING DRAINAGE AND STORMWATER INFRASTRUCTURE

There is existing stormwater infrastructure in the northern and western parts of the site close to Westney Road. A closeup extract from Geomaps showing the northern corner of the site in Figure 2 below shows the existing connections to the public network.

FIGURE 2: Existing Stormwater Network, Auckland Geomaps.

It appears that the stormwater from all existing buildings, sumps within the driveway and carparking on the site discharge to this system currently. As can be seen in Figure 1 this network crosses Westney Road and then heads Northeast parallel to Westney Road but within private lots before crossing Westney Road again and heading through No. 22 Westney Rd. The public main is a 225mm diameter up to 22 Westney Road where it increases in size to a 450mm diameter. Figure 3 below shows the public network at 22 Westney Rd.

FIGURE 3: Existing Public Stormwater Drainage (22 Westney Rd)

One notable feature in 22 Westney is a stormwater inlet structure (asset number 2000676404) which collects overland flow from 44 Westney Rd (which will include some overland flow from the subject site)

The subject site is at a localised high point along Westney Road so there is no public stormwater infrastructure along much of the street frontage. Another public stormwater network commences at no. 60 Westney Road and heads Southwest as can be seen in Figure 4 below:

FIGURE 4: Existing Public Stormwater Drainage (60 Westney Rd)

The land generally drops in elevation further away from Westney Rd and stormwater from the remainder of the site flows to the south and east. There is an existing stormwater discharge permit that allows stormwater runoff from the southwestern part of the site to be conveyed and discharged at an existing outlet located along the northern boundary of 1 Verissimo Drive on to an existing Overland flow path (OLFP). This has been identified in the topography information as below. From the property file record the outlet pipe is a 375mm pipe. The permitted discharge flow rate to the outlet is 133 L/s. which is valid till 31 December 2025.

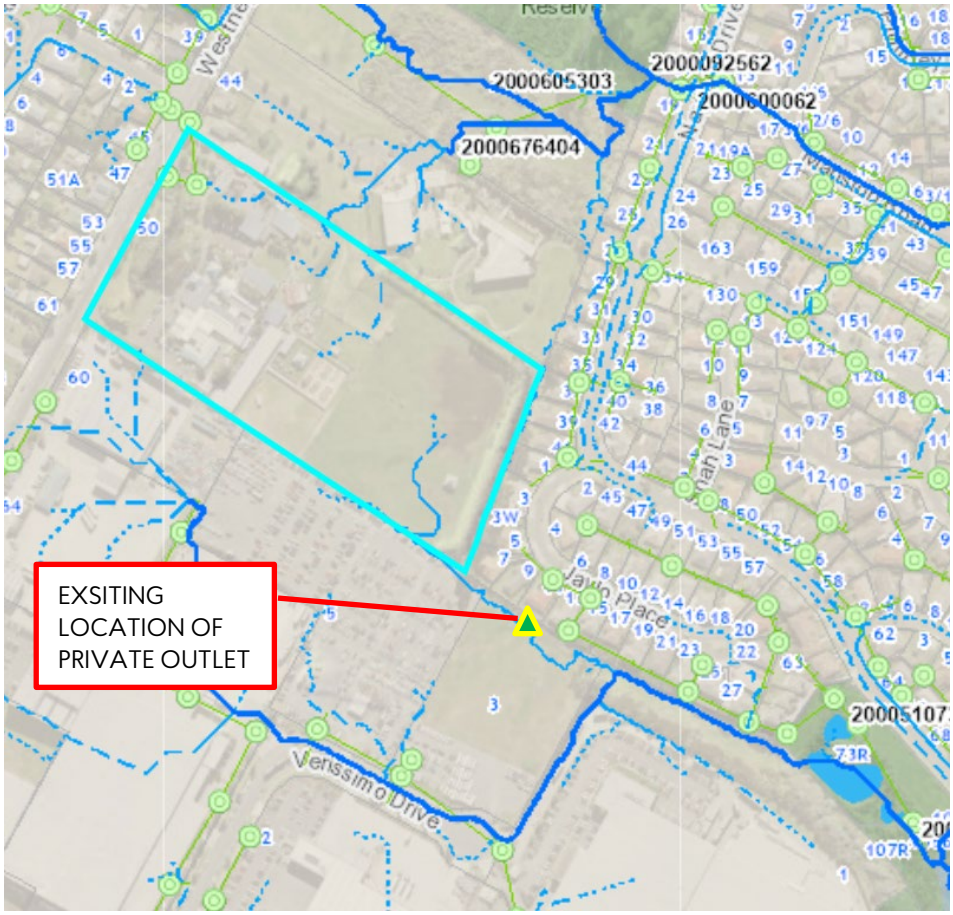


FIGURE 5: Existing location of private outlet, as per existing discharge permit.

1.6 RECEIVING ENVIRONMENT

1.6.1 GROUNDWATER

As noted above, geotechnical investigations have not yet been carried out. Due to the relatively flat nature of the site and the absence of previous evidence of soakage devices it is assumed that soakage is not likely to be a suitable method for primary stormwater discharge. This supported by geotechnical investigations carried out in close proximity to the site. Soakage is not proposed as a primary method of stormwater disposal for the development but may be utilised for localised discharge if conditions are suitable.

1.6.2 STREAM AND WETLAND

There is no existing stream or wetlands identified within the site and in the proximity of the subject site based on Auckland Council GIS data. Therefore, no direct effects to any stream and wetland due to the proposed private plan change.

There is an existing treatment and detention marsh pond located approximately 280m away from the site at 73R Naylors Drive Mangere Auckland 2022, as seen below. This is connected to Pukaki Creek. The levels of the existing open channel conveying overland flow from the site is at a similar elevation to this pond and therefore we believe than during moderate to high intensity rain events the open channel flows overtop into the pond.

The site will effectively be discharging to the coast via the land based discharge and overland flowpath. The Council healthy waters have specifically mentioned this so needs a bit more description. Stormwater discharges need to be carefully considered to prevent any untreated stormwater discharging to Pukaki Creek.

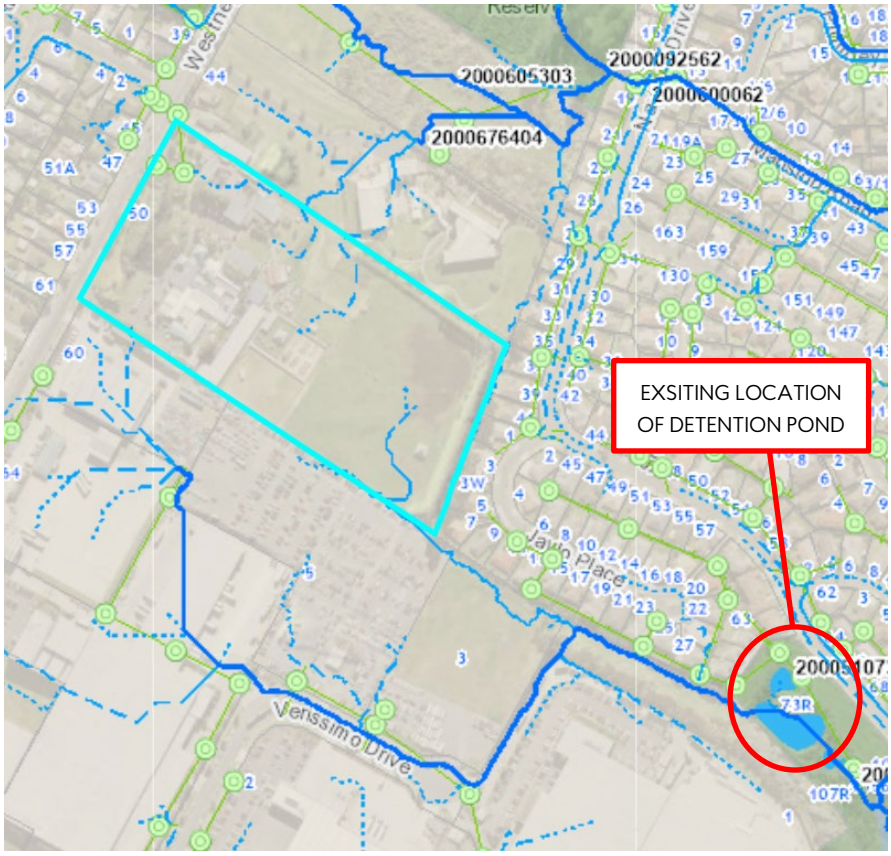


FIGURE 6: Existing Location of Wet Detention Pond.

1.7 EXISTING HYDROLOGICAL FEATURES

There is a small flood prone area identified on Geomaps within the southern corner of the site. Based on our review of the site topography this is due to a small depression that has been formed and is compounded by the previous temporary earth bund placed along the eastern edge of the site. We do not believe this flood prone area is significant and does not need further consideration when planning the site redevelopment. With the bund removed, we do not believe there is a ponding area on the site.

There are several small overland flowpaths indicated on Geomaps. We have studied the topographical survey and visited the site to investigate these in detail. Appendix 2 shows an updated plan of the existing overland flowpaths. These are described in more detailed in Section 1.8 below.

1.8 FLOODING AND FLOWPATHS

Auckland Councils Geomaps shows that the site is affected by Overland flow paths (OLFP) that pass through the northern, eastern and southern portions of the site, refer to Figure 4 below. A southern portion of the site is classed as a Flood Prone Area [1]. As noted above we do not believe this flood prone area exists on the site. All originate within the site as shown on the Geomaps however the flow paths vary and Appendix 2 has been prepared based on topographical survey and inspection so should be considered more accurate. Subcatchments C, D, and E discharge via the overland flow path in the southern corner of the site. Sub catchment B flows partially through the neighbouring property (no. 60 Westney Rd) before rejoining the flow from the other sub catchments in the same overland flow path (OLFP B).

1 Flood prone areas (FPA) are potential ponding areas that may flood and commonly comprise of topographical depression areas.

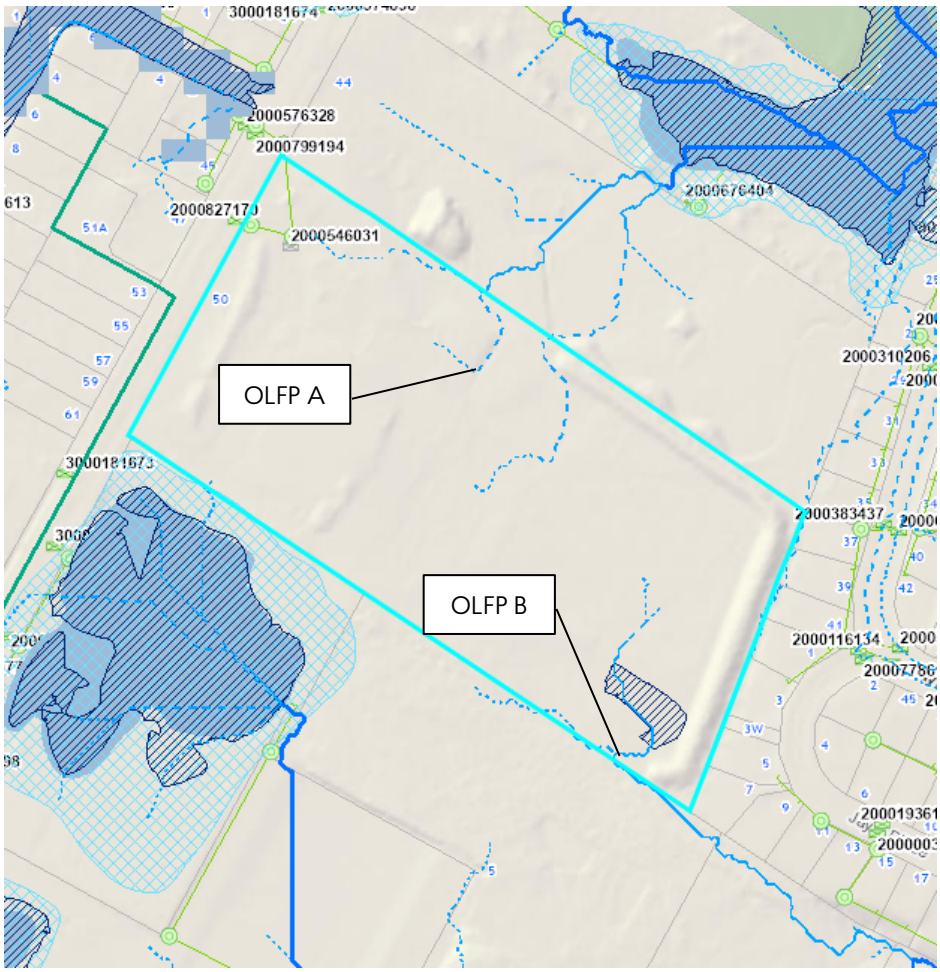


FIGURE 7: Existing OLFP, source Auckland GIS Geo maps.

Auckland Council's Geomaps shows that the site is subject to the following overland flow paths (OLFP) which affect the site or are in close proximity:

- OLFP A – Consist of three minor OLFP which is within the site and flows through 44 Westney Road in a north-westerly direction and then discharges to a flood plain located in 22 Westney Road. The catchment of the OLFP is slightly smaller than shown on Geomap and is represented by sub catchment A on our plan.
- OLFP B – OLFP which flows towards the southwestern corner of the site, which then passes through 3-5 Verissimo Drive and converges into a major OLFP that flows in south easterly direction and then discharge to a wet detention pond located at 73R Naylors Drive. As noted above this includes sub catchments C, D, and E and is also joined by sub catchments and F downstream from the site.

1.9 COASTAL INUNDATION

The site is not affected by the Coastal inundation zone. The site lies landward of the Auckland Council defined Areas Susceptible to Coastal Instability and Erosion (ASCIE).

1.10 BIODIVERSITY

As per GeoMaps, the site is not situated within a Significant Ecological Area and does not contain any protected 6. The overland flow route to the southwest traverses Open Space – Conservation Zone and then discharges to Coastal Transition Zone and then Coastal Marine Zone.

1.11 CULTURAL AND HERITAGE SITES

Consultation with mana whenua is currently being undertaken to ascertain if there are any significant development constraints i.e., koiwi tangata.

Initial consultation has been undertaken with Ngāti Tamaoho Trust. Ngāti Tamaoho Trust made several suggestions, and these have been integrated into the development proposal where practicable.

Initial consultation has not indicated that the site contains any specific sites of interest to mana whenua.

1.12 CONTAMINATED LAND

A preliminary site investigation (PSI) will be required to be completed prior to submitting resource consents for redevelopment of the site. This SMP must be updated if there are any issues raised during environmental investigations that could affect the management of stormwater within the site or receiving environment.

2.0 DEVELOPMENT SUMMARY AND PLANNING CONTEXT

2.1 REGULATORY AND DESIGN REQUIREMENTS

Based on review of Auckland Council's regulatory and stormwater guidelines, the site-specific stormwater management requirements have been identified. The relevant regulatory guidelines are listed in the Table below, and a summary of the requirements is presented in the sections following.

REQUIREMENT	RELEVANT REGULATORY / DESIGN TO FOLLOW
Unitary Plan – SMAF hydrology mitigation	AUP Chapter E10
Stormwater Discharge and Diversion	AUP Chapter E8
High Contaminant Generating Areas	AUP Chapter E9
Natural Hazards	AUP Chapter E36
Auckland Council Regionwide Network Discharge Consent	Brownfield – Large Development (Schedule 4)
Stormwater Management Devices Design	GD01
Application of Principles of Water Sensitive Design	GD01
Hydrology in the Auckland Region	Brownfield – Large Development (Schedule 4)
Design and Construction of Stormwater Systems	Auckland Code of Practice: For Land Development and Subdivision (Chapter 4 – Stormwater) – v3, January 2022
Outlet Design	Auckland Council's TR2013-018, Hydraulic Energy Management: Inlet and Outlet Design for Treatment Devices – July 2013

3.0 MANA WHENUA: TE AO MAORI AND MATAURANGA

The Private Plan Change process has involved consultation with mana whenua which will continue. This section is in draft and will be updated as iwi consultation progresses. It is noted initial consultation has been undertaken with Ngāti Tamaoho Trust. The following was recommended as a part of the initial consultation.

- We recommend accidental discovery protocols for any artefacts, features, or koiwi that may be found in the area.
- We recommend water tanks for the reuse of the rainwater off the roofs. Rain tanks are pivotal to easing the water shortage in Auckland due to the intensification of housing going on. The issue of where water will come from in the future is not being accounted for with such intense developments around Tāmaki Makaurau.
- We recommend enviropods. Cesspits alone are no longer acceptable due to their maintenance issues. If council does not maintain the cesspit, they overflow and end up in our waterway.

- We recommend sediment and silt controls for this project that go over and above GD05 requirements.
- We recommend a planting palette that reflects the original flora and fauna of the area.

These measures have been or will be incorporated into the development plans where practicable.

3.1 IDENTIFICATION AND INCORPORATION OF MANA WHENUA VALUES

It is a key objective that all stormwater management adheres to mana whenua values such that the proposed development does not adversely affect the life-force (mauri) of water. Collection, conveyance, and treatment will be undertaken with their guidance to ensure this valuable and important resource is appropriately managed.

The following practices have been considered during the implementation of this stormwater management plan:

- Restoring the mauri of water by passing all accessway and/or carpark runoff through a treatment device (proposed proprietary device). At this stage there are no development plans for buildings on site, but the future development plans will ensure, all the roofing material will be constructed using inert materials.
- Water conservation by re-use tanks where possible.
- Detention of stormwater to ensure no off-site effects on the wider catchment. We have considered this and provided the OLFP is upgraded between the site and the Pukaki Creek we do not believe there will be any benefit from stormwater detention.
- Ensure no adverse effects happen to the downstream of OLFP B from the proposed private plan change.

4.0 STAKEHOLDER ENGAGEMENT AND CONSULTATION

This section discusses the relevant stakeholders (external to the client) not just for stormwater, but for the project as a whole. This will be continuously updated as negotiation and consents progress.

STAKEHOLDERS	REASON FOR INTEREST	ENGAGEMENT COMPLETED	FEEDBACK AND RESPONSE
Mana Whenua	Early engagement to understand the Mana Whenua values	Letters sent to all relevant mana whenua groups Meeting with Ngāti Tamahao	Ngāti Tamahao Trust provided a written response suggesting several specific design actions to improve the sustainability of the development and improve cultural outcomes.
Auckland Transport	Vehicle access requirements	Not yet at this stage	Integrated Transport Assessment prepared and will form part of plan change request and inform future RC processes.
Auckland Council – Healthy Waters	Proposed stormwater mitigation and extension	Early HW engagement to determine the stormwater discharge methodology	General requirements of HW regionwide stormwater network discharge consent will need to be complied with. Attenuation required as per SMAF and NDC requirements. Further information on the proposed stormwater mitigation and hydrology is outlined in section 6 of this SMP
Watercare	To understand if there are any capacity constraints in the wider Wastewater network	Development consultation application	Watercare have advised that the developed site can connect to the existing 225mm public network on Westney Rd to the southwest of the site.
First Gas and Channel Infrastructure NZ Ltd	Works within or over the existing fuel pipeline	Ongoing consultation	Channel Infrastructure have confirmed that works in proximity to the fuel line (e.g. SW pipe installation) is allowed subject to certain minimum clearances and Construction Methodology processes. The detailed design of any works within the pipeline designation will be shared with and agreed with the asset owner,

5.0 PROPOSED DEVELOPMENT

5.1 GENERAL DEVELOPMENT INFORMATION

The subject property is currently zoned Residential – Mixed Housing Suburban. It serves as the primary Auckland base and animal shelter for the SPCA, occupying the northern portion of the site. The remaining southern section has been recently metalled and functions as an open-air car park, currently used for Motorhome parking.

The purpose of this Stormwater Management Plan (SMP) is to outline how stormwater will be handled for the site based on a proposed rezoning from Residential – Mixed Housing Suburban to Business Light Industry Zone.

5.2 SITE LAYOUT AND URBAN FORM

There is no proposed development plan for the site currently. This will be provided during the RC stage for the land use.

The Business Light Industry zoning would allow up to 100% impervious coverage on the land less any areas of yard setbacks (to the residential and school zones to the north and east). This would be up to approximately 38,500n^2 of impervious. This is an increase of around 14,200m^2 compared to the current zoning which allows up to 60% impervious or 24,300m^2).

6.0 STORMWATER MANAGEMENT

This section sets out the stormwater management approach for the post-development operation of the site. This approach is intended for the sustainable stormwater management and land development and land development within the site. It is also geared towards the protection, restoration, and enhancement of the receiving environment.

6.1 PRINCIPLES OF STORMWATER MANAGEMENT

6.1.1 ORIGINAL PRINCIPLES

Water Sensitive Design Principles Adopted

Guidelines and principles for Water Sensitive Design (WSD) are described as follows:

- Protect and enhance the values and functions of natural ecosystems.
- Address stormwater effects as close to the source as possible.
- Mimic natural systems and process for stormwater management, as much as practicable
- Filtering, Conveyance and Bioretention. This will be incorporated by use of proprietary treatment devices and stormwater attenuation.
- Respecting the receiving environment.

WSD Objectives

The objectives for WSD for stormwater aim to deliver the priorities identified in the Auckland Unitary Plan. These objectives include:

- Valuing our natural heritage
- Sustainably managing natural resources
- Treasuring our coastline, harbours, islands, and marine areas
- Realising quality, compact developments
- Demanding good design in all development
- Optimising, integrating, and aligning network provision and planning
- Protecting, enabling, aligning, integrating, and providing social and community infrastructure for present and future generations

Minimum Stormwater Management Provisions

The stormwater provisions that are applicable to this stormwater management plan are outlined in the following documents:

Auckland Unitary Plan:

- Section E1 – Water Quality and Integrated Management
- Section E8 – Stormwater Discharge and Diversion
- Section E9 – Stormwater Quality – High Contaminant Generating Car Parks and High Use Roads
- Section E36 – Natural Hazards and Flooding

The Code of Practice for Land Development and Subdivision, Chapter 4 – Stormwater (Auckland Council, 2015)

The Auckland Council Guideline Document GD2017/001 (GD01) – Stormwater Management Devices in the Auckland Region

6.1.2 UPDATED PRINCIPLES

The only changes to the above are the integration of the stakeholder feedback outline in Section 4 above, in particular mana whenua input.

6.2 PROPOSED STORMWATER MANAGEMENT

6.2.1 GENERAL

The proposed development will result in a net increase to the impervious coverage on the site from its current circa 4500m² to possibly up to nearly 40,000m²) and will generate increased stormwater runoff that will need to be managed. A stormwater management network of proprietary treatment devices or raingardens and pipes will be utilised to treat and convey flows from future impervious areas and roading infrastructure in a treatment train approach. The existing pipe, outlet, and open channel does not have capacity and will need to be upgraded to service the redeveloped site.

The site has an overall slope to the south and east, this is away from the existing piped stormwater network in Westney Road. A small part of the site (near the road frontage) may be able to connect to the existing public network, although this is limited due to capacity constraints. We have considered upgrading this piped network but there are further downstream constraints and, even if the pipe size constraints did not exist, only about a third of the site could achieve a gravity connection to the existing network. So, the proposal is that the majority of the site will utilise the dominant existing overland flowpath to the south and east. This will need to be upgraded to accommodate the increased flowrates. As noted in Appendix B a small part of the site (Catchment C) currently has an overland flowpath through the neighbouring school property. We have visited the site and there is no defined flowpath across the school, water simply ponds near the boundary before overtopping as sheet flow, see Figure 8 below. For this reason, retaining or upgrading this OLFP is not practicable. Installing a new piped network across the school property (to connect to the public network) may be possible. But, this would require neighbours approval and could only accept a small proportion of the site due to pipe capacity constraints (of existing 450mm pipe).

FIGURE 8: Existing OLFP, looking from northern boundary.

6.2.2 WATER QUALITY

The stormwater management provision requirements are as follows:

- Avoid as far as practicable, or otherwise minimise or mitigate, adverse effects of stormwater runoff from the development on freshwater systems by minimising or mitigating changes in hydrology. This is achieved by minimising erosion and related effects on stream health, maintaining stream base flows and supporting groundwater recharge.
- Minimise or mitigate adverse effects of stormwater runoff by reducing the discharge of gross stormwater pollutants from high contaminant generating activities and encouraging the restoration of freshwater systems.

To protect water quality, treatment will be provided for the Water Quality Flow of 10mm/hr. This will predominately be provided by proprietary devices. The use of bio-retention based treatment devices (such as raingardens) was also considered. It is likely that these would be capable of providing acceptable levels of treatment but would require a much larger footprint to achieve this. Additionally due to the flat nature of the site and high-water table it would not be possible to construct one or two larger rain gardens to provide treatment. A large number of rain gardens would need to be constructed with direct inflows from the carpark, this has drawbacks from a maintenance perspective and accordingly proprietary devices are preferred for this site. Rain gardens may be integrated where there is space and fall available to a piped network, but proprietary devices will predominate.

While we are proposing a change to the catchment C OLFP we do not believe there are negative effects associated with this. Other than flowing across the school property in an uncontrolled way this OLFP is piped to the same coastal environment as the proposed open channel to the southeast of the site.

It is anticipated that the carparking or accessway will be deemed to be a High Use Road with more than 5000 vehicular movements per day. Accordingly, it is proposed to provide treatment of all vehicular accessways and carparks as per the Network Discharge Consent (NDC). If left untreated, the receiving environment will be susceptible to high levels of sediments and contaminants, ultimately leading to a damaged ecosystem, loss in biodiversity and eutrophication.

The options to treat runoff from the future accessways and carparks (detail design of this will be done at later stage) are as follows:

Atlan Filter Treatment Devices (or similar)

Preliminary sizing of the Atlan treatment device has been carried and is indicatively detail is included in the drawings. At this stage we have assumed 50% of site, approx. 20000m2 will be used for trafficable/ parking, which will require 18 Atlan filter. These devices:

- Improve the quality of stormwater runoff before it enters receiving waterways using its inorganic filter media, which removes non-point source pollutants.
- Are capable of absorbing and retaining the most challenging pollutants from stormwater runoff including total suspended solids, total phosphorous and Total nitrogen
- Include a passive self-cleaning function is activated when the siphon is broken at the end of the storm event.
- Provide 85% TSS removal

Catchpit Inserts – Enviropod® Filter

- Captures sediment, litter, debris and other pollutants before they enter the drainage system.
- The 200-micron standard fitout allows for a 95% removal up to 20 L/s.

It is proposed to use inert building materials (ie no lead or bare zonc) to prevent the generation of contaminant-laden runoff from the proposed buildings.

6.2.3 WATER QUANTITY

The change in zoning and associated development of the site will increase the impervious area, which will result in an increase in stormwater runoff. We have considered different options to manage this.

Option 1

Treat all contaminant laden stormwater on the site, upgrade downstream pipework to the south and east of the site beyond the existing downstream treatment pond to allow direct discharge to the coastal environment.

Option 2

Upgrade the existing pond system to be able to provide treatment and attenuation for the proposed development. This would involve removal of existing vegetation within the conservation zone as well as extensive earthworks in and round the existing pond and outlet.

Option 3

Provide flow attenuation for all events by utilising an on-site underground tank system with discharge via the existing outlets and open channel to the southeast. We have calculated the tank size required, and it is possible to fit this within the development. Refer to plan 400, option 3 in Appendix 1.

Following consideration of the above we considered that providing attenuation for the larger storm events (10/100-year ARI) would not be the best overall solution considering the site lies in the lower portion of the catchment and any effects of increased stormwater runoff can be effectively managed due to the proximity to the coastal environment. Our preference is to adopt the option 1 approach which achieves treatment of stormwater at source and mitigation of any effects associated with the increase in stormwater runoff due to increased impervious area. Option 2 would not provide treatment at source and would involve significant disruption to well established landscaping within a conservation zone. Option 3 is possible, but there is significant additional capital cost associated with the on-site tanks for minimal benefits. The only benefit of option 3 is the removal of the need to upgrade the existing outlet and open channel, but as these upgrades are seen as readily achieved this benefit is small. The proposed approach achieves:

1. **Water Quality** – All impervious area within the development to be treated to GD01 standards as we are discharging to a coastal receiving environment.

2. **Stormwater Conveyance** – Downstream infrastructure has been assessed to ensure it is able to cater for all expected rain events up to the 1% AEP event. A new piped system and minor upgrades to the downstream OLFP are required. Based on topographic survey there is sufficient freeboard to neighbouring properties to allow the stormwater to be safely conveyed while maintaining an

appropriate freeboard. Cross sections have been generated at several points along the OLFP showing the water level during the 1% AEP event, these are appended to this report. The Marsden Point Fuel Transmission Line is underneath the OLFP alignment and is therefore a consideration when planning any earthworks in this vicinity. However, we have discussed the proposed plans with the asset owners who have advised the pipes are approximately 2.5m deep, allowing the proposed drainage and OLFP works to be safely carried out without comprising the fuel pipe. Clearance to the pipes should be confirmed (by survey) at the detailed design stage.

6.2.4 EXISTING PONDS

There is an existing constructed marsh pond system (forebay and main pond) downstream of the site. A topographical survey has been undertaken to study the existing OLFP and determine whether this discharges directly into the ponds or passes alongside them. Based on the survey the existing OLFP is not designed to discharge directly into the ponds (it is not aligned with the other inlets near the forebay) but the OLFP is at a similar elevation to the side of the main pond and therefore it is likely that the OLFP partially discharges into the main pond during large rain events. However, there is sufficient space to realign and deepen the OLFP so that can bypass the main pond and drain directly into the Pukaki Creek system.

We considered upgrading the existing pond to cater for the site, however, we do not believe that this is a preferred option for the following reasons:

- Enlarging the existing ponds and forebay would require the removal of most (if not all) of the well-established vegetation currently present. In time of course this could be re-planted, but it would be detrimental in the short term.
- We have a preference for managing stormwater quality as close to the source as possible. The general advantage of this is that it allows different levels of treatment to be provided in various locations. In particular, in this case it allows the treatment to be specific to the land use.
- There is limited land available around the existing pond, which would make enlargement more complex to design and construct.

6.2.5 CONSTRUCTION OF NEW PIPEWORK AND OLFP

To ensure that the upgrades associated with option 1 are practicable we have carried out a preliminary design and prepared a preliminary construction methodology for the construction and staging of the outlet and associated riprap apron. It is envisaged that a detailed methodology will be produced in conjunction with the contractor.

Establishment

Carry out a topographical survey of where the outfall structure and associated riprap apron will be located and set the alignment for the pipe. Positively identify the existing fuel pipes and verify depth of pipes along the alignment of proposed works.

Erosion and Sediment Control Devices Construction

Install a super silt fence on the downstream contours of the outlet structure, including up to the extents of the riprap. It is envisaged that this will occur concurrently with the other erosion and sediment control devices for the development although it is beyond the extent of the bulk earthworks. Since the stream is only fed by the stormwater from the pipe network, it is envisioned that the diversion of clean water can be achieved by flexible piping while works proceed.

Earthworks

Excavate the area where the outlet device and riprap are to be constructed. Based on the safety and practical requirements, the contractor will make an informed decision as to the size of equipment to use down the slope.

Pipe Laying (open trench)

Trenches will be excavated to the required levels to lay the pipes leading up to the outlet structure. It is expected that the contractor will take all the required safety precautions to reduce the risk of trench collapse.

Placement of Outlet structure and riprap

- The outlet structure will be positioned as per the detailed design and similar to current location so that any stream reclamation works (and consents) are not triggered, and secondly on a flatter part of ground where there is sufficient room for erosion protection measures to be constructed at the outlet.
- Place the filter fabric on the exposed ground and prepare the compacted hardfill for placement of the pre-cast outlet structure.
- Once the structure has been placed, the necessary pipe connection will be made and the area behind the structure is to be backfilled with drainage material (scoria).
- Place the angular rocks and secure them into position around the pre-excavated area. Larger rocks to be keyed into the slope and are to be used at the downstream end of the apron.
- Note that the upstream end of the pipe leading into the outlet should be kept closed (or diverted to the downstream end until works on site have been completed.

Channel Upgrade

- Progressively upgrade and stabilise the channel.

Post Construction

The super silt fences are to be kept in place for the duration of the works and removed at the commissioning of the network.

6.2.6 FLOODING 10 PERCENT AEP EVENT (NETWORK CAPACITY)

The option 1 approach includes designing an upgrade to the existing piped outlet. In accordance with Auckland Council's Stormwater Code of Practice and TP108, the stormwater system will be designed and sized to convey flows from the 10-year ARI rainfall event adjusted for a 13.2% increase due to climate change.

The proposed primary drainage network will consist of a two main stormwater networks as described below:

1. A piped network with approximate pipe size of 825mm between the site and the current open channel.
2. One open channel along the current OLFP route from the new outlet to beyond the downstream pond system, this will also have capacity to convey the 100-year event storm. The surface levels across the site need to be designed to ensure rain events greater than the piped system capacity can be conveyed by overland flow towards the open channel.

Overall combined peak flow from developed site for 10-year ARI event for each catchment and capacities reviewed. It is proposed that the final pipe and outlet structure will be vested as public stormwater assets and existing public network diversion will be publicly owned.

6.2.7 DEVELOPMENT STAGING

It is anticipated that all stormwater infrastructure will be installed prior to the formation of future buildings and accessways.

6.3 ASSET OWNERSHIP

It is proposed that the stormwater pipes and outlet structure outwith the site will be vested as public stormwater assets with the proposed stormwater network and treatment device within the site boundary to be privately owned.

The remainder of the stormwater infrastructure installed on-site will be privately owned by the landowners. The owners of the respective devices will be responsible for the operation of their device and are required to abide by Auckland Council's Stormwater bylaw (2015). This bylaw states that the owner of a private stormwater management system must ensure it is maintained in good operating condition. They must also, when requested by council, provide information which demonstrates that the device is maintained in good operating conditions and will function to its original specifications during a stormwater event. They must also carry out any works required to keep the device in good working condition. The Council can enforce this bylaw under the following Acts, The Local Government Act 1974, the Land Drainage Act 1908, the Soil Conservation and Rivers Control Act 1941, and the Health Act 1956.

6.4 ONGOING MAINTENANCE REQUIREMENTS

As stated in Section 6.3 above, it is the responsibility of the landowners to maintain the private stormwater devices in accordance with Auckland Council's Stormwater Bylaw. Typical operation and maintenance details for the individual stormwater devices are as follows:

6.4.1 PROPRIETARY TREATMENT DEVICES I.E., ATLAN FILTER AND ENVIROPOD

All stormwater devices implemented on site will have an Operations and Maintenance Plan (O&M). The specific responsibilities for the O&M of each device will depend on the owner of the stormwater device. It is envisaged that the proposed stormwater management devices and the reticulation network (excluding the pipes that serve the neighbouring sites to the west) All devices require audits that should be conducted once a year. Owners of stormwater devices must keep a copy of the operations and maintenance manual for the device available and produce this copy on request of the council. The O&M manuals should contain logbooks for recording inspections and maintenance activities. It is expected that manufacturers will provide each private device's own operations and maintenance manual. Attached is a draft copy of the O&M for the proposed Atlan Filter.

6.4.2 RAIN TANKS (NON-POTABLE RE-USE)

Raintanks may be specified during the building design to reduce potable water use. Periodically the property's plumbing and drainage system should be checked for leaks and faults. Only fully certified practitioners should inspect the tanks for inspections and maintenance. These maintenance check requirements range from quarterly for the outlet pipe to every few years for pump inspections.

It is essential that appropriate access is provided to all components of the rainwater tank system to enable regular inspection and maintenance (at least annually) to be carried out with minimal effort and inconvenience. Roofs and collections areas must be kept free of overhanging tress to reduce organic litter and prevent access by rodents, cats, possums, and other wildlife. Inlets and overflows should be screened, and access hatches kept closed.

6.5 IMPLEMENTATION OF STORMWATER NETWORK

The stormwater network has been conceptually designed to manage the stormwater run-off from the proposed development. All stormwater conveyance and treatment devices will be finalised as part of the Building Consent stage and Engineering Plan Approval. Once approved, the works will be installed and monitored in coordination with Auckland Council inspectors for signoff.

Operations, maintenance and monitoring of the proposed stormwater system will be critical in ensuring that the short and long-term performance of the system is maintained with the key focus being the prevention of sedimentation.

Monitoring will be carried out during the construction stages, on completion and will continue throughout the life cycle of the system.

6.6 DEPENDENCIES

Works external to the site boundary, including on neighbouring land, are required. Neighbours will be liaised with, and we understand that neighbour's approval can be obtained if required to enable the proposed works.

7.0 DEPARTURE FROM REGULATORY OR DESIGN CODES

The proposed stormwater management approach for the development meets the minimum regulatory or design codes and is considered the best practicable approach.

8.0 CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE WORK

8.1 CONCLUSIONS

This SMP has been developed for the specific private plan change of the site. An integrated stormwater management approach will be adopted across the site and has been developed based on the policies set out in the Auckland Unitary Plan along with stormwater specific guidelines from Auckland Council's Code of Practice, GD01 and the New Zealand Building Code. The main outcomes of the SMP include:

- The provision of an integrated stormwater management approach.
- The assurance of no/minimal adverse changes to the downstream OLFP and flood risk.
- The mitigation of any adverse effects from stormwater runoff on surface water quality by providing a treatment train approach.

In order to achieve the desired outcomes, the following Water Sensitive Design principles will be adopted:

- Promoting inter-disciplinary planning and design
- Protecting and enhance the values and functions of the natural ecosystems
- Addressing stormwater effects as close to the source as possible through the provision of proprietary treatment devices or raingardens for all contaminant generating impervious surfaces.
- Mimicking natural systems and process for stormwater management
- Enhancing the receiving environment.

Detailed Design of the proposed stormwater management approach, including device selection, sizing and location will be addressed and finalised at Detailed Design stage of the development and approved through the Engineering Plan Approval and Building Consent processes.

8.2 FUTURE WORK

This SMP is a live document and should be updated in response to feedback from future technical investigation and reports, iwi consultation, and the consenting process.

9.0 LIMITATIONS

9.1 GENERAL

This report is for the use by Rotokohu Investments Ltd only and should not be used or relied upon by any other person or entity or for any other project.

This report has been prepared for the particular project described to us and its extent is limited to the scope of work agreed between the client and Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.

APPENDICES

APPENDIX A
TOPOGRAPHICAL PLAN

LEGEND

- GIS WATER MAIN
- GIS SEWER MAIN
- GIS STORMWATER MAIN
- GIS HV POWER CABLE
- GIS LV POWER CABLE
- GIS GAS PIPE
- GIS FIBRE OPTIC CABLE
- GIS TELECOM CABLE
- GIS LIQUID FUEL TRANSMISSION PIPE
- EDGE OF SEAL
- CHANNEL
- FENCE
- TOP OF KERB
- EDGE OF CONCRETE
- WALL BOTTOM
- WALL TOP
- BUILDING OUTLINE
- CONTOUR MAJOR
- CONTOUR MINOR
- BOTTOM OF BANK
- TOP OF BANK
- GATE
- DRIPLINE
- CATCHPIT
- POWER POLE
- POWER TRANSFORMER
- WATER VALVE
- FIRE HYDRANT
- TREE
- MANHOLE - SURVEYED
- SITE BENCHMARK
- STREET LIGHT
- TREE TRUNK

NOTES:

1. LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016
   ORIGIN OF LEVELS
   AP 15 DP 358434 (EV0A)
   RL 13.30m

2. COORDINATES ARE IN TERMS NZ GEODETIC DATUM 2000
   MT EDEN CIRCUIT
   ORIGIN OF COORDINATES
   AP 15 DP 358434 (EV0A)
   788491.62 mN 402375.39 mE

3. CONTOURS ARE AT 0.20m INTERVALS. CONTOURS SHOWN ON THIS PLAN HAVE BEEN ELECTRONICALLY COMPUTED FROM SPOT HEIGHT DETERMINATIONS AND MAY NOT REPRESENT THE TRUE GROUND LEVELS. ANY CRITICAL HEIGHTS SHOULD BE CHECKED ON SITE PRIOR TO DESIGN AND CONSTRUCTION COMMENCING. CONTOURS SHOWN UNDER ANY BUILDING FOOTPRINT HAVE BEEN INTERPOLATED AND MAY NOT REFLECT THE TRUE GROUND SURFACE IN THESE AREAS.

4. THIS PLAN HAS BEEN CARRIED OUT TO TOPOGRAPHICAL STANDARDS OF +/-30MM ON HARD STAND AND +/-50MM ON SOFT SURFACES. ALL LEVELS SHOWN ARE CORRECT AT TIME OF SURVEY. CRITICAL DIMENSIONS AND LEVELS SHOULD BE VERIFIED.

5. BOUNDARIES SHOWN ON THIS PLAN HAVE BEEN ADOPTED FROM UNDERLYING SURVEY PLANS AND HAVE NOT BEEN SURVEYED. A BOUNDARY DEFINITION SURVEY SHOULD BE CARRIED OUT TO ESTABLISH EXACT BOUNDARY POSITIONS ON SITE & REMOVAL OF LIMITED AS TO PARCELS WILL BE REQUIRED PRIOR TO DESIGN OR CONSTRUCTION.

6. ALL EASEMENTS, COVENANTS AND OTHER LEGAL INSTRUMENTS ASSOCIATED WITH THIS SITE MAY NOT BE SHOWN ON THIS PLAN. AN INVESTIGATION OF THE MOST CURRENT LEGAL RECORDS SHOULD BE UNDERTAKEN PRIOR TO DESIGN AND CONSTRUCTION COMMENCING.

7. SERVICES POSITIONS AND ALIGNMENT MAY HAVE BEEN OBTAINED FROM THIRD PARTY RECORDS AND SHOULD BE VERIFIED ON SITE PRIOR TO CONSTRUCTION COMMENCING. ENVELOPE SURVEYING DOES NOT IN ANY WAY GUARANTEE THE ACCURACY OF ANY UNDERGROUND SERVICE SHOWN ON THIS PLAN.

8. THIS PLAN MAY NOT PROVIDE ENOUGH INFORMATION FOR HEIGHT TO BOUNDARY CALCULATIONS. WHERE HEIGHTS INTERPOLATED FROM THIS SURVEY ARE CRITICAL TO COUNCIL REQUIREMENTS, SUCH AS BUILDING RECESSION PLANES, SPECIFIC LOCATIONS AND LEVELS SHOULD BE CONFIRMED BY SPECIFIC GROUND SURVEY.

9. THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN.

10. THIS PLAN IS ISSUED FOR A SPECIFIC PROJECT AND MAY NOT BE ALTERED OR USED FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF ENVELOPE SURVEYING.

11. 3 VERISSIMO DRIVE WAS SURVEYED IN SEPTEMBER 2022 & NO FURTHER FEATURES HAVE BEEN MEASURED ON THIS SITE. REFER TO DWG 1636-01-050 FOR DETAILS.

12. THE AERIAL PHOTOGRAPH WAS SOURCED FROM GRIPMAP & DOES NOT REPRESENT THE CURRENT LAND USE IN SOME AREAS. AN UPDATED AERIAL SURVEY WOULD BE REQUIRED TO SHOW THIS.

13. LEGAL DESCRIPTION
    PART ALLOTMENT 74 PARISH OF MANUREWA & LOT 2 DP 486333
    COMPRISED IN RTs NA570/201(LTD AS TO PARCELS) & 693556
    AREA 6.1005 Ha

REVISIONS:

REV	NOTES	BY	DATE
A	FOR INFORMATION	AP	06-06-2024

PROJECT:

ROTOKOHU INVESTMENTS LTD
50 WESTNEY ROAD
MANGERE

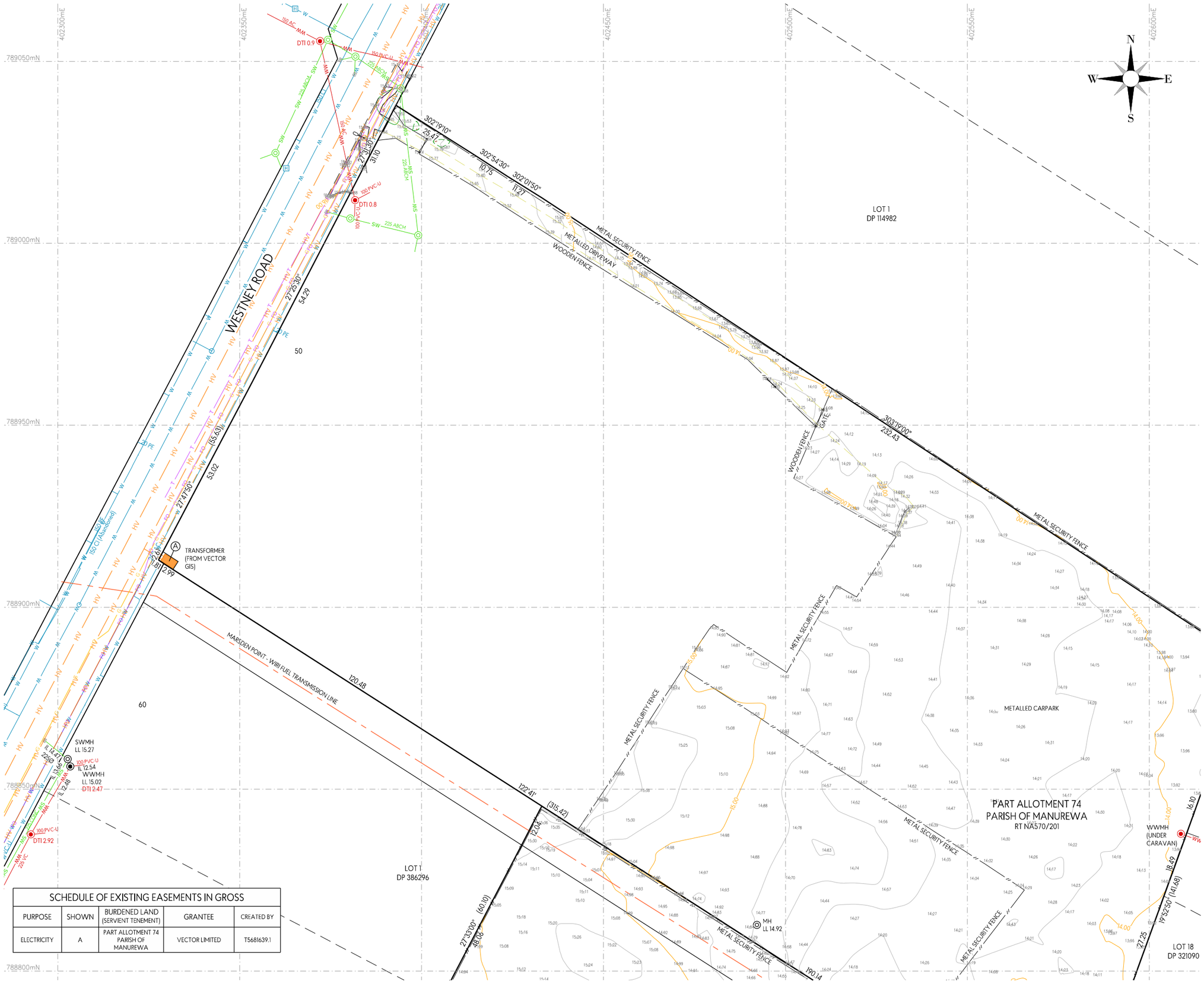
TITLE:

SITE SURVEY
OVERALL PLAN

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

SURVEYED: SRM
DRAWN: MJP
CHECKED: AP
PLOT DATE: 06-06-2024
SCALE A1: 1:1000
SCALE A3: 1:2000
STATUS: FOR INFORMATION

PROJECT No: 1636-02
DRAWING No: 060
REVISION: A



SCHEDULE OF EXISTING EASEMENTS IN GROSS				
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE	CREATED BY
ELECTRICITY	A	PART ALLOTMENT 74 PARISH OF MANUREWA	VECTOR LIMITED	T568639.1

LEGEND

- GIS WATER MAIN
- GIS SEWER MAIN
- GIS STORMWATER MAIN
- GIS HV POWER CABLE
- GIS LV POWER CABLE
- GIS GAS PIPE
- GIS FIBRE OPTIC CABLE
- GIS TELECOM CABLE
- GIS LIQUID FUEL TRANSMISSION PIPE
- EDGE OF SEAL
- CHANNEL
- FENCE
- TOP OF KERB
- EDGE OF CONCRETE
- WALL BOTTOM
- WALL TOP
- BUILDING OUTLINE
- CONTOUR MAJOR
- CONTOUR MINOR
- BOTTOM OF BANK
- TOP OF BANK
- GATE
- DRIPLINE
- CATCHPIT
- POWER POLE
- POWER TRANSFORMER
- WATER VALVE
- FIRE HYDRANT
- TREE
- MANHOLE - SURVEYED
- SITE BENCHMARK
- STREET LIGHT
- TREE TRUNK

NOTES:

SEE DRAWING 1636-02-060 FOR NOTES

REVISIONS:

REV	NOTES	BY	DATE
A	FOR INFORMATION	AP	06-06-2024

PROJECT:

ROTOKOHU INVESTMENTS LTD
50 WESTNEY ROAD
MANGERE

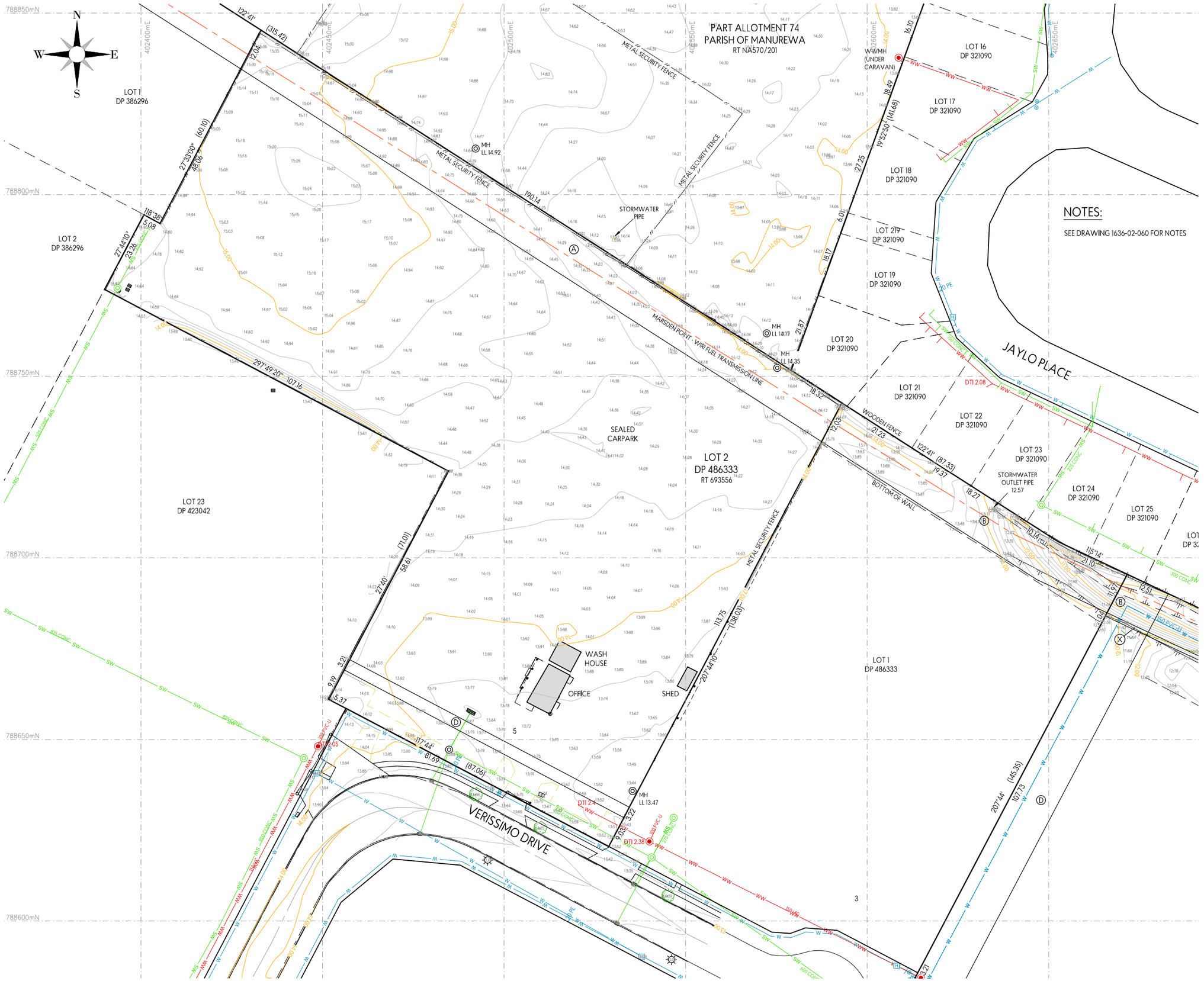
TITLE:

SITE SURVEY
SHEET 1 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

SURVEYED: SRM
DRAWN: MJP
CHECKED: AP
PLOT DATE: 06-06-2024
SCALE A1: 1:500
SCALE A3: 1:1000
STATUS: FOR INFORMATION

PROJECT No: 1636-02
DRAWING No: 061
REVISION: A



LEGEND

- GIS WATER MAIN
- GIS SEWER MAIN
- GIS STORMWATER MAIN
- GIS HV POWER CABLE
- GIS LV POWER CABLE
- GIS GAS PIPE
- GIS FIBRE OPTIC CABLE
- GIS TELECOM CABLE
- GIS LIQUID FUEL TRANSMISSION PIPE
- EDGE OF SEAL
- CHANNEL
- FENCE
- TOP OF KERB
- EDGE OF CONCRETE
- WALL BOTTOM
- WALL TOP
- BUILDING OUTLINE
- CONTOUR MAJOR
- CONTOUR MINOR
- BOTTOM OF BANK
- TOP OF BANK
- GATE
- DRIPLINE
- CATCHPIT
- POWER POLE
- POWER TRANSFORMER
- WATER VALVE
- FIRE HYDRANT
- TREE
- MANHOLE - SURVEYED
- SITE BENCHMARK
- STREET LIGHT
- TREE TRUNK

NOTES:

SEE DRAWING 1636-02-060 FOR NOTES

SCHEDULE OF EXISTING EASEMENTS IN GROSS

PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	CREATED BY
PIPELINE (NATURAL GAS) RIGHT	A	LOT 2 DP 486333	B325240.1
	B	LOT 1 DP 486333	
RIGHT TO CONVEY WATER	D	LOT 2 DP 486333	EI 8987826.8

REVISIONS:

REV	NOTES	BY	DATE
A	FOR INFORMATION	AP	06-06-2024

PROJECT:

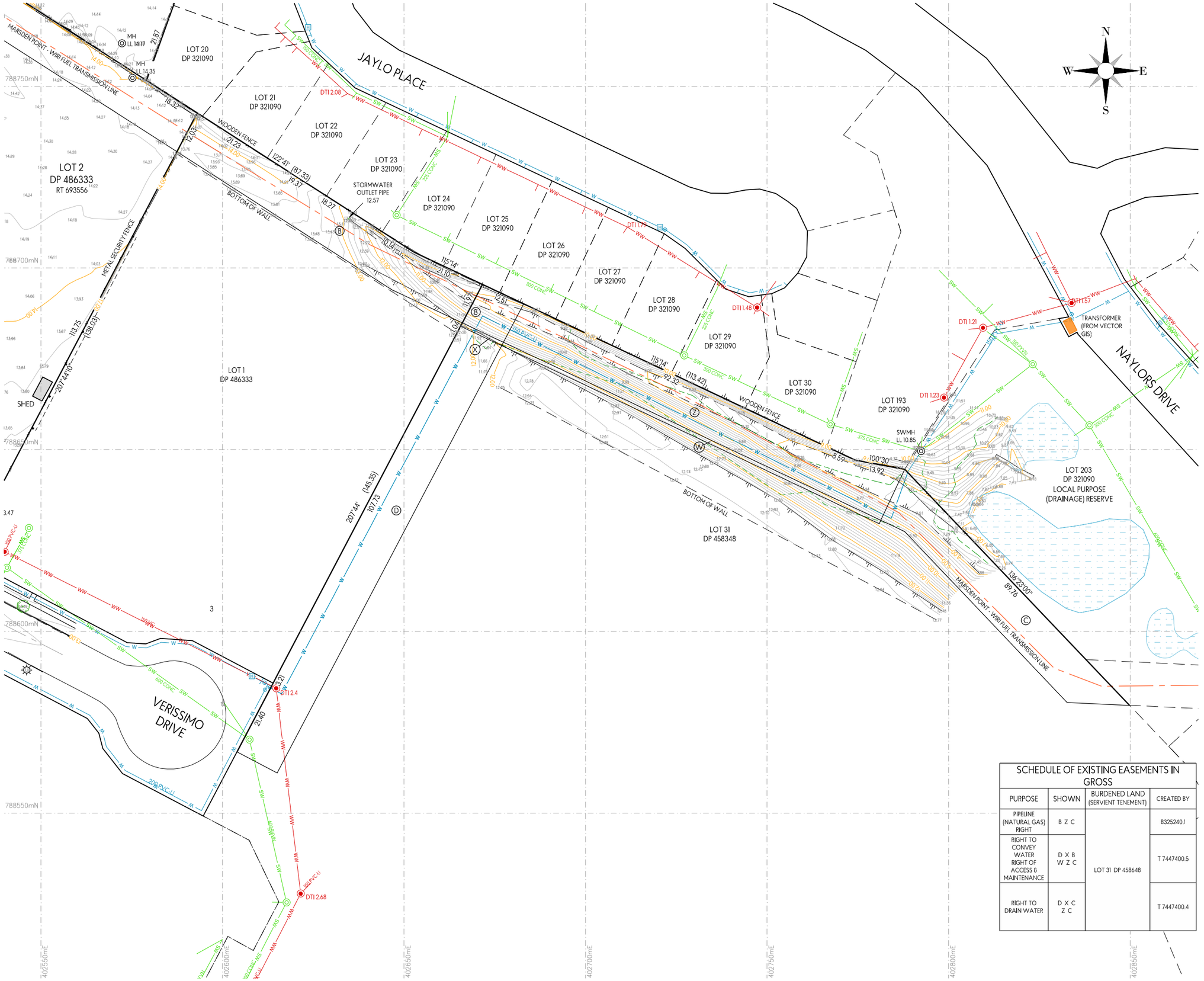
ROTOKOHU INVESTMENTS LTD
50 WESTNEY ROAD
MANGERE

TITLE:

SITE SURVEY
SHEET 2 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

SURVEYED: SRM	DRAWN: MJP
CHECKED: AP	PLOT DATE: 06-06-2024
SCALE A1: 1:500	SCALE A3: 1:1000
STATUS: FOR INFORMATION	
PROJECT No: 1636-02	DRAWING No: 062
	REVISION: A



LEGEND

- GIS WATER MAIN
- GIS SEWER MAIN
- GIS STORMWATER MAIN
- GIS HV POWER CABLE
- GIS LV POWER CABLE
- GIS GAS PIPE
- GIS FIBRE OPTIC CABLE
- GIS TELECOM CABLE
- GIS LIQUID FUEL TRANSMISSION PIPE
- EDGE OF SEAL
- CHANNEL
- FENCE
- TOP OF KERB
- EDGE OF CONCRETE
- WALL BOTTOM
- WALL TOP
- BUILDING OUTLINE
- CONTOUR MAJOR
- CONTOUR MINOR
- BOTTOM OF BANK
- TOP OF BANK
- GATE
- DRIPLINE
- CATCHPIT
- POWER POLE
- POWER TRANSFORMER
- WATER VALVE
- FIRE HYDRANT
- TREE
- MANHOLE - SURVEYED
- SITE BENCHMARK
- STREET LIGHT
- TREE TRUNK

NOTES:

SEE DRAWING 1636-02-060 FOR NOTES

SCHEDULE OF EXISTING EASEMENTS IN GROSS

PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	CREATED BY
PIPELINE (NATURAL GAS) RIGHT	B Z C	LOT 31 DP 458648	B325240.1
RIGHT TO CONVEY WATER RIGHT OF ACCESS & MAINTENANCE	D X B W Z C		T 7447400.5
RIGHT TO DRAIN WATER	D X C Z C		T 7447400.4

REVISIONS:

REV	NOTES	BY	DATE
A	FOR INFORMATION	AP	06-06-2024

PROJECT:

ROTOKOHU INVESTMENTS LTD
50 WESTNEY ROAD
MANGERE

TITLE:

SITE SURVEY
SHEET 3 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

SURVEYED: SRM
DRAWN: MJP
CHECKED: AP
PLOT DATE: 06-06-2024
SCALE A1: 1:500
SCALE A3: 1:1000
STATUS: FOR INFORMATION

PROJECT No: 1636-02
DRAWING No: 063
REVISION: A

APPENDIX B
EXISTING CATCHMENT PLANS

CATCHMENT A
AREA
9225.56m²

CATCHMENT B
AREA
3977.78m²

CATCHMENT C
AREA
6559.57m²

CATCHMENT D
AREA
8412.97m²

CATCHMENT E
AREA
15077.78m²

CATCHMENT F
AREA
104057.16m²

EXISITING
FORMED SWALE

WESTNEY ROAD

NAYLORS DRIVE

JAYLO PLACE

VERISSIMO DRIVE

1
DP 114982

1
DP 386296

2
DP 386296

23
DP 423042

13
DP 321090

14
DP 321090

15
DP 321090

16
DP 321090

17
DP 321090

18
DP 321090

19
DP 321090

20
DP 321090

21
DP 321090

22
DP 321090

23
DP 321090

24
DP 321090

25
DP 321090

26
DP 321090

27
DP 321090

28
DP 321090

29
DP 321090

30
DP 321090

31
DP 458348

203
DP 321090
LOCAL PURPOSE
(DRAINAGE) RESERVE

N
W
E
S

LEGEND:

- EXISTING OVERLAND FLOW PATH - FROM GIS
- EXISTING FORMED SWALE
- DIRECTION OF WATER FLOW
- SITE BOUNDARY

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

TITLE:

EXISTING OLFP
CATCHMENT PLAN

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
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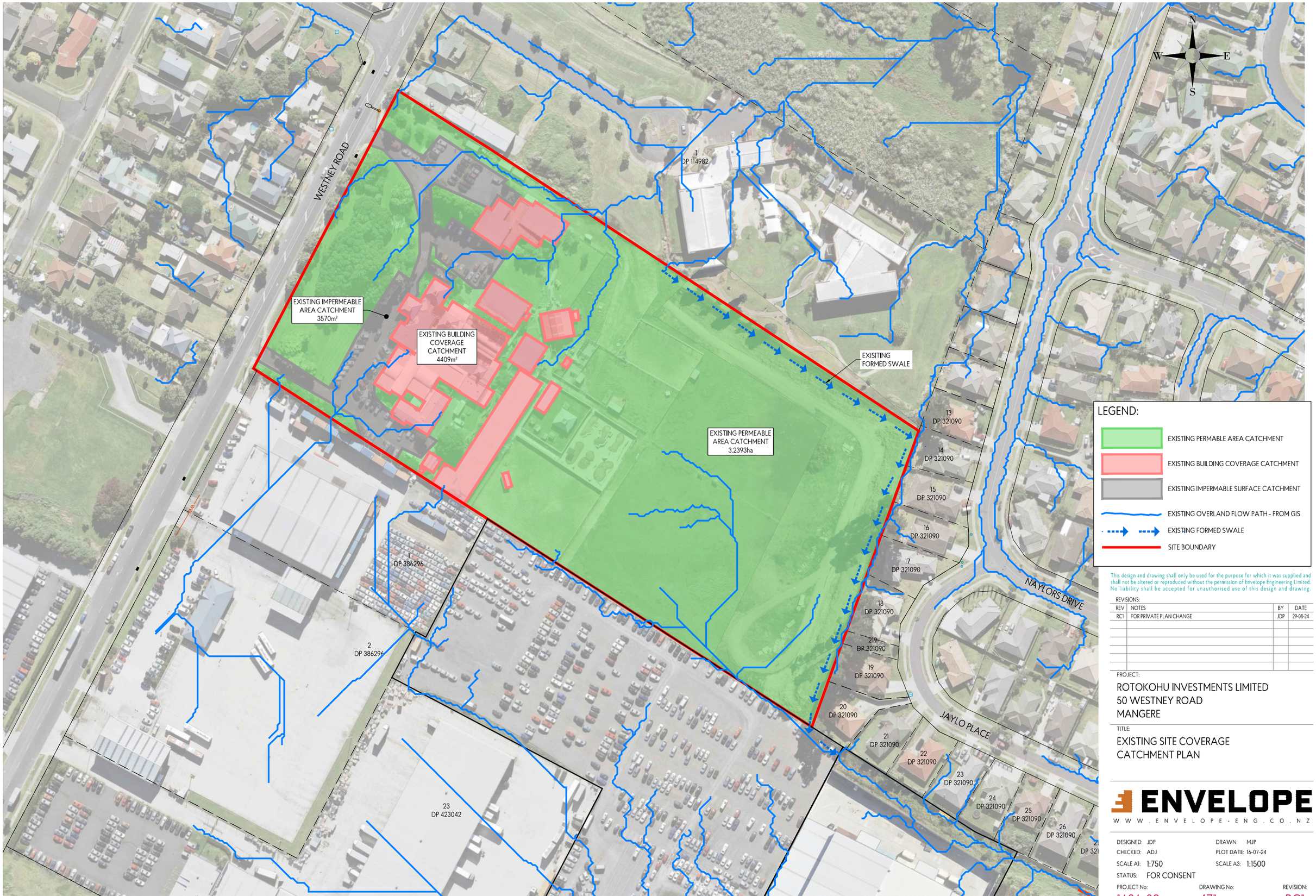
SCALE A3: 1:1500
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 470
REVISION: RC1



REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

TITLE:

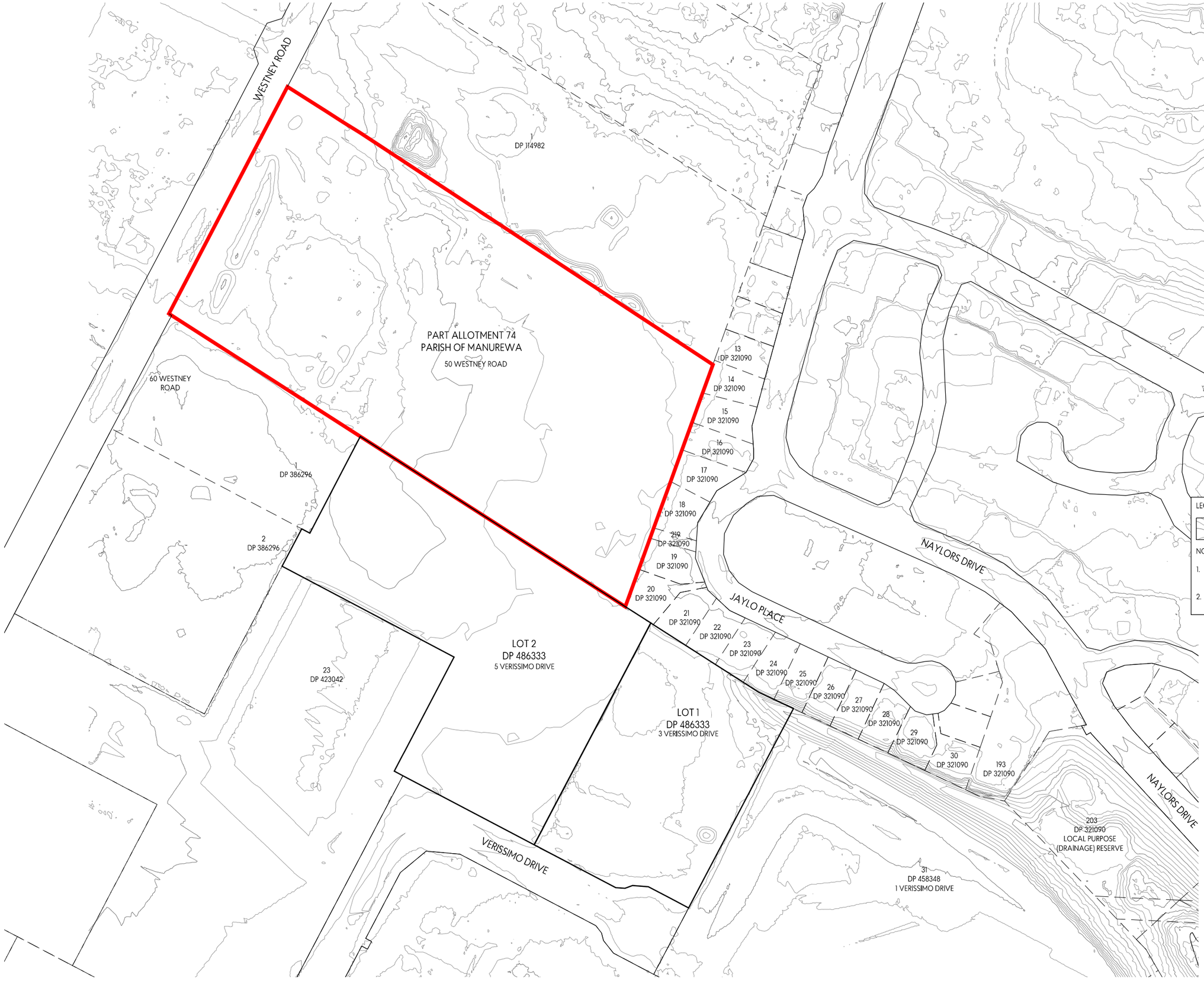
EXISTING SITE COVERAGE CATCHMENT PLAN

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:750
SCALE A3: 1:1500
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 471
REVISION: RC1

APPENDIX C
PROPOSED STORMWATER DRAINAGE PLANS



LEGEND:

EXISTING CONTOURS
SHOWN AT 0.5m INTERVALS

NOTES:

1. EXISTING CONTOURS ARE FROM SITE SURVEY CARRIED OUT BY ENVELOPE SURVEYING MAY 2024 COMBINED WITH LIDAR DEM.
2. LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016.

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

TITLE:

EXISTING CONTOURS
OVERALL PLAN

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:1000
SCALE A3: 1:2000
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 200
REVISION: RC1

WESTNEY ROAD

PART ALLOTMENT 74
PARISH OF MANUREWA
50 WESTNEY ROAD

60 WESTNEY ROAD

1
DP 114982

2
DP 386296

DP 386296

RL 13.67

13
DP 321090

14
DP 321090

15
DP 321090

16
DP 321090

17
DP 321090

18
DP 321090

219
DP 321090

N
W
E
S

LEGEND:

EXISTING CONTOURS
SHOWN AT 0.5m INTERVALS

NOTES:

1. EXISTING CONTOURS ARE FROM SITE SURVEY CARRIED OUT BY ENVELOPE SURVEYING MAY 2024 COMBINED WITH LIDAR DEM.
2. LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016.

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

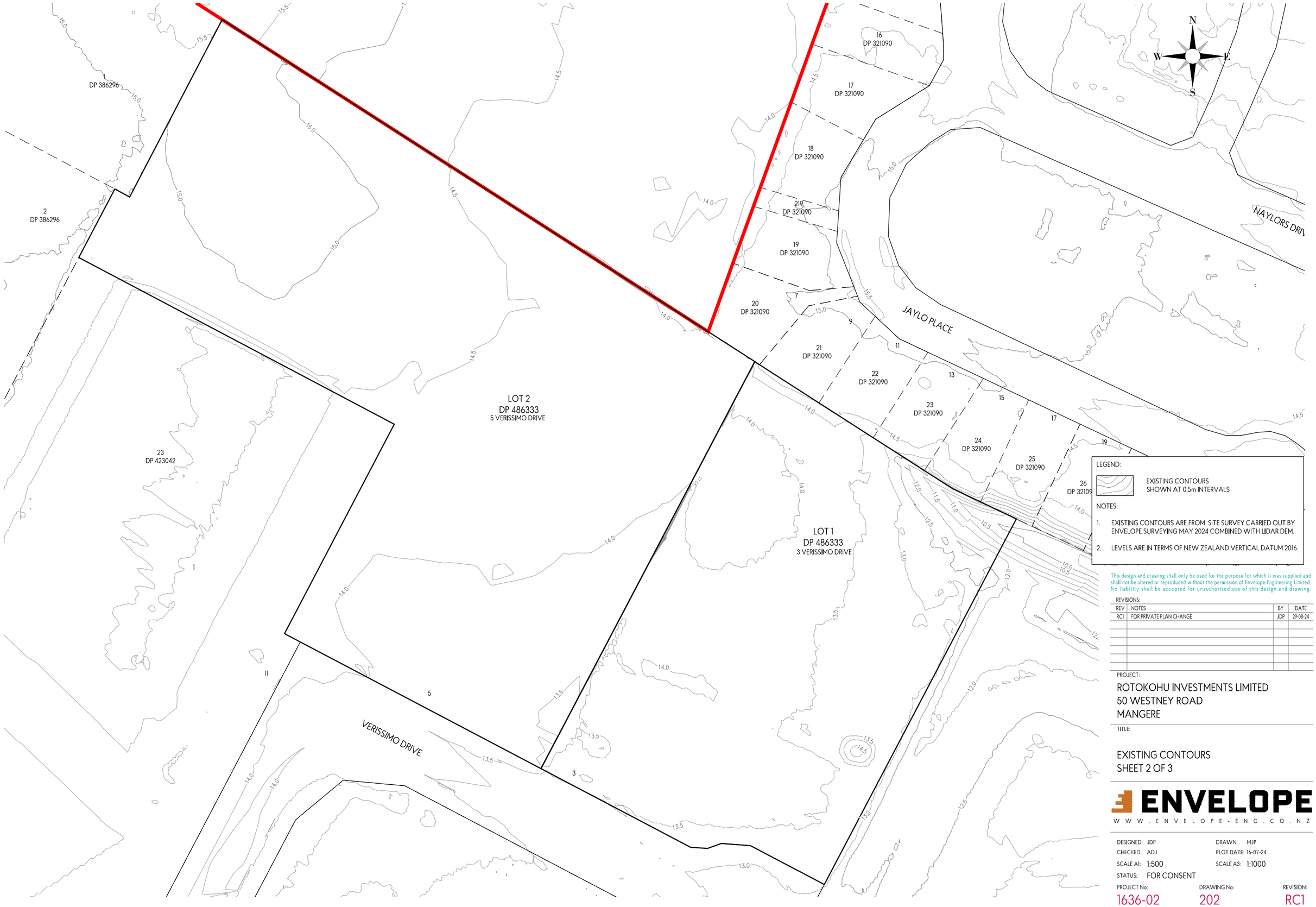
TITLE:

EXISTING CONTOURS
SHEET 1 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:500
SCALE A3: 1:1000
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 201
REVISION: RC1



REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

TITLE:

EXISTING CONTOURS
SHEET 2 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:500
SCALE A3: 1:1000
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 202
REVISION: RC1

LEGEND:

EXISTING CONTOURS
SHOWN AT 0.5m INTERVALS

NOTES:

1. EXISTING CONTOURS ARE FROM SITE SURVEY CARRIED OUT BY ENVELOPE SURVEYING MAY 2024 COMBINED WITH LIDAR DEM.
2. LEVELS ARE IN TERMS OF NEW ZEALAND VERTICAL DATUM 2016.

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

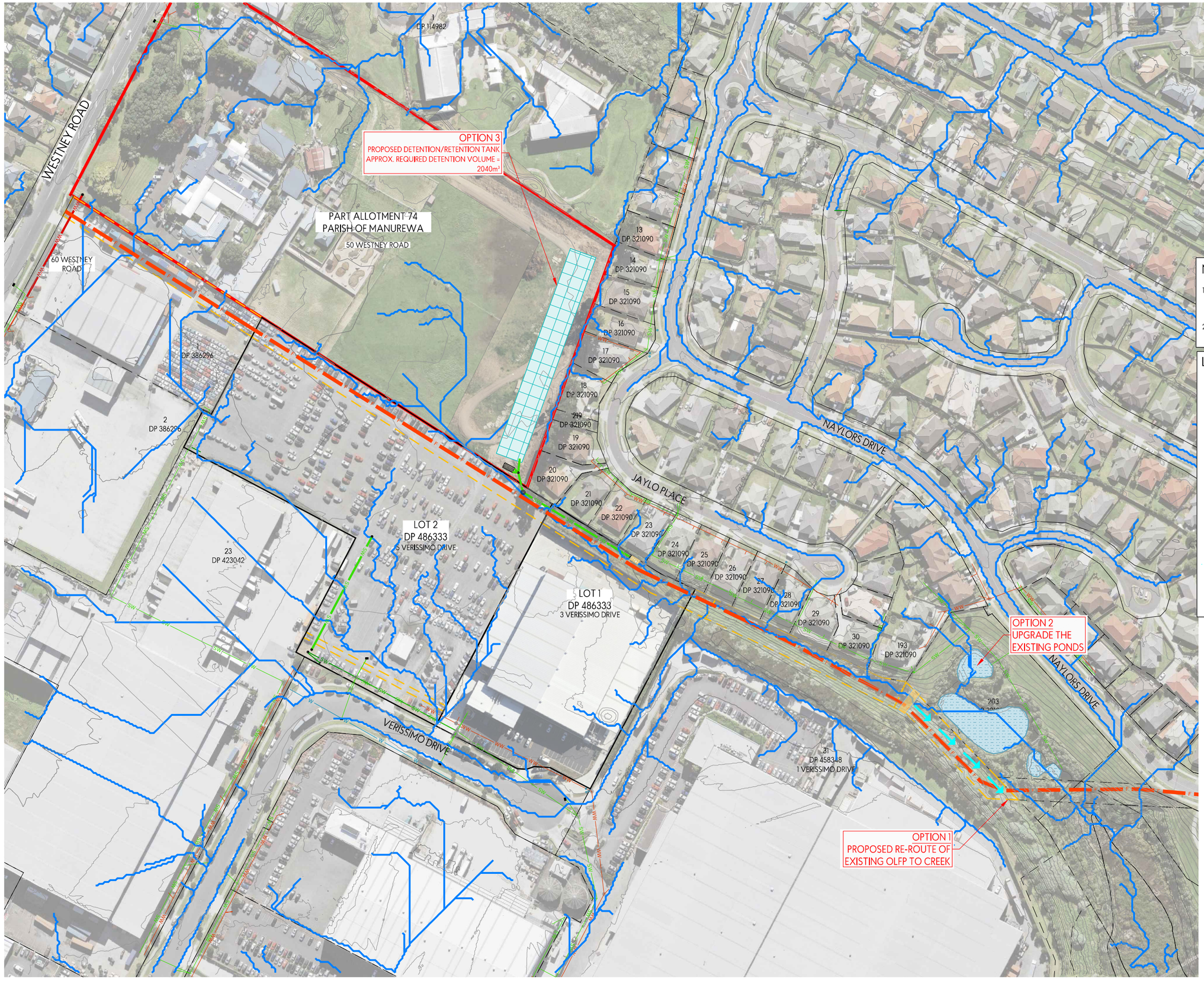
TITLE:

EXISTING CONTOURS
SHEET 3 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:500
SCALE A3: 1:1000
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 203
REVISION: RC1



NOTES:

1. THIS DRAWING HAS BEEN PREPARED WITH OPTIONS FOR DISCUSSION AND TO SELECT THE STORMWATER DISCHARGE LAYOUT.
2. DETAILED DESIGN TO BE CARRIED OUT ONCE THE LAYOUT HAS BEEN SELECTED.

LEGEND:

- EXISTING CONTOURS SHOWN AT 0.5m INTERVALS
- EXISTING PUBLIC STORMWATER
- PROPOSED PUBLIC STORMWATER
- EXISTING PUBLIC WASTEWATER
- PROPOSED PUBLIC WASTEWATER
- EXISTING OVERLAND FLOW PATH
- EXISTING FUEL TRANSMISSION LINE
- SITE BOUNDARY
- EXISTING EASEMENT BOUNDARY
- PROPOSED OVERLAND FLOW PATH
- PROPOSED TANK

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

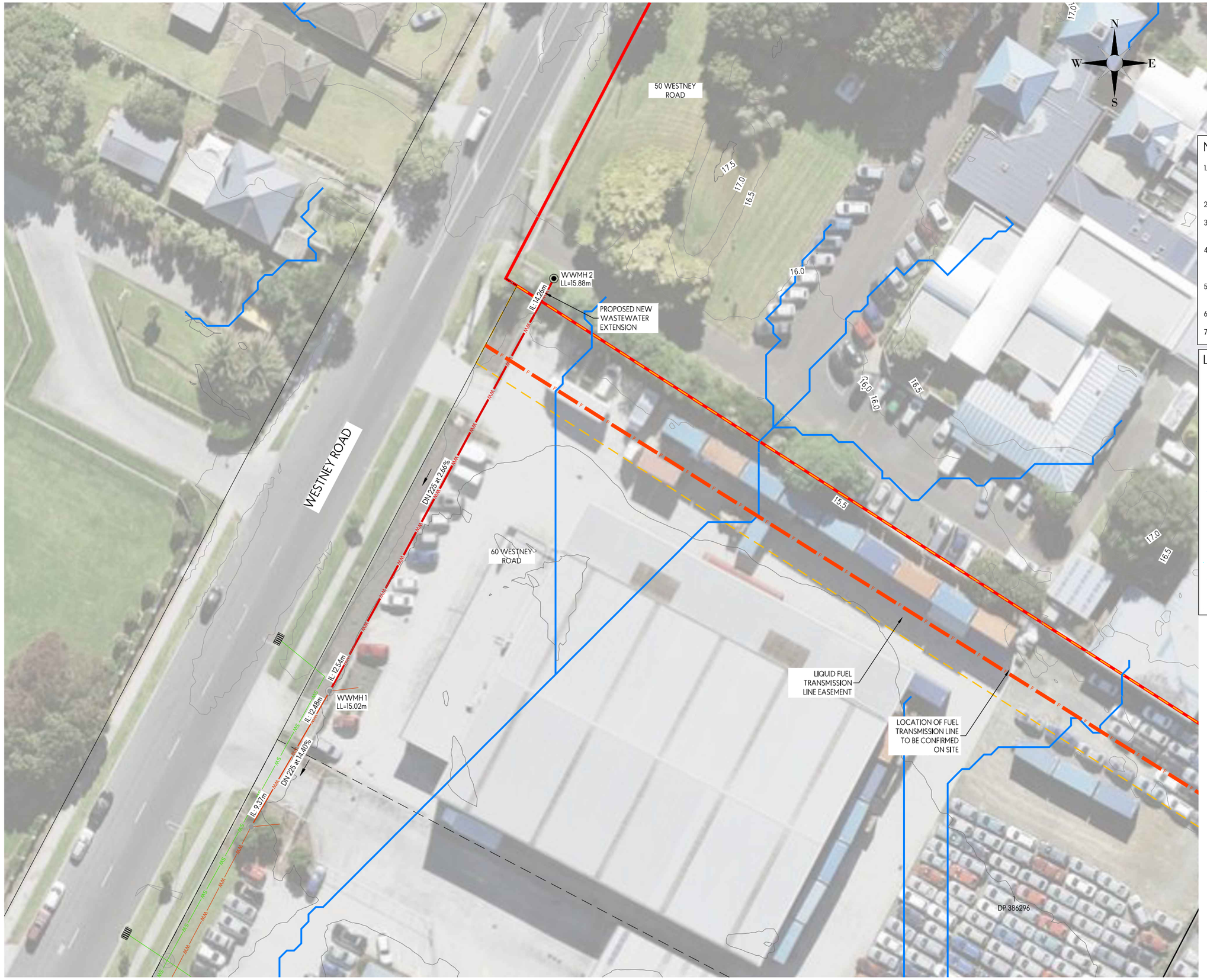
TITLE:

PROPOSED
DRAINAGE PLAN
OPTIONS 1 - 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED:	JDP	DRAWN:	MJP
CHECKED:	ADJ	PLOT DATE:	16-07-24
SCALE A1:	1:1000	SCALE A3:	1:2000
STATUS:	FOR CONSENT		

PROJECT No:	DRAWING No:	REVISION:
1636-02	400	RC1



NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL & WATERCARE STANDARDS UNLESS DETAILED OTHERWISE.
2. ALL WASTEWATER PIPES TO BE PVC-U SN16.
3. ALL STORMWATER MAIN PIPES TO BE RCRRJ CLASS 2 UNLESS NOTED OTHERWISE.
4. ALL CATCHPITS TO BE 675x450mm UNLESS NOTED OTHERWISE. SIZING AND LOCATION TO BE CONFIRMED AT DETAILED DESIGN STAGE.
5. ALL PRIVATE CATCHPIT LEADS TO BE DN300 RCRRJ CLASS 4 UNLESS NOTED OTHERWISE.
6. REFER TO SHEETS 430 & 450 FOR DRAINAGE LONGSECTIONS.
7. REFER TO SHEET 490 FOR STANDARD DRAINAGE DETAILS

LEGEND:

- EXISTING CONTOURS SHOWN AT 0.5m INTERVALS
- EXISTING PUBLIC STORMWATER
- PROPOSED PUBLIC STORMWATER
- EXISTING PUBLIC WASTEWATER
- PROPOSED PUBLIC WASTEWATER
- EXISTING OVERLAND FLOW PATH
- EXISTING FUEL TRANSMISSION LINE
- SITE BOUNDARY
- EXISTING EASEMENT BOUNDARY
- PROPOSED OVERLAND FLOW PATH
- PROPOSED TANK

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

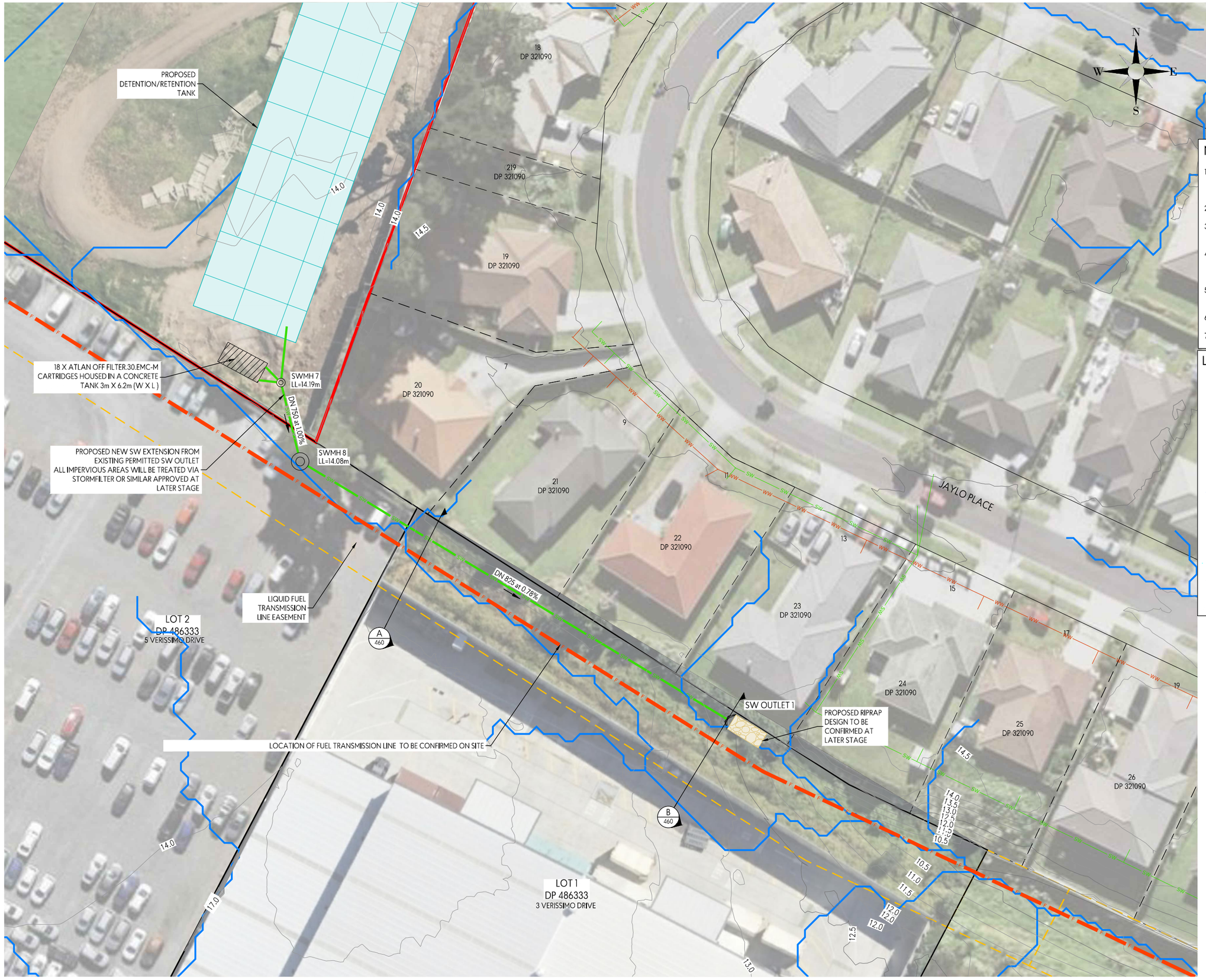
TITLE:

PROPOSED
DRAINAGE PLAN
SHEET 1 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:250
SCALE A3: 1:500
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 401
REVISION: RC1



NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL & WATERCARE STANDARDS UNLESS DETAILED OTHERWISE.
2. ALL WASTEWATER PIPES TO BE PVC-U SN16.
3. ALL STORMWATER MAIN PIPES TO BE RCRRJ CLASS 2 UNLESS NOTED OTHERWISE.
4. ALL CATCHPITS TO BE 675x450mm UNLESS NOTED OTHERWISE. SIZING AND LOCATION TO BE CONFIRMED AT DETAILED DESIGN STAGE.
5. ALL PRIVATE CATCHPIT LEADS TO BE DN300 RCRRJ CLASS 4 UNLESS NOTED OTHERWISE.
6. REFER TO SHEETS 430 & 450 FOR DRAINAGE LONGSECTIONS.
7. REFER TO SHEET 490 FOR STANDARD DRAINAGE DETAILS

LEGEND:

- EXISTING CONTOURS SHOWN AT 0.5m INTERVALS
- EXISTING PUBLIC STORMWATER
- PROPOSED PUBLIC STORMWATER
- EXISTING PUBLIC WASTEWATER
- PROPOSED PUBLIC WASTEWATER
- EXISTING OVERLAND FLOW PATH
- EXISTING FUEL TRANSMISSION LINE
- SITE BOUNDARY
- EXISTING EASEMENT BOUNDARY
- PROPOSED OVERLAND FLOW PATH
- PROPOSED TANK

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

TITLE:

PROPOSED
DRAINAGE PLAN
SHEET 2 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED:	JDP	DRAWN:	MJP
CHECKED:	ADJ	PLOT DATE:	16-07-24
SCALE A1:	1:250	SCALE A3:	1:500
STATUS:	FOR CONSENT		

PROJECT No:	DRAWING No:	REVISION:
1636-02	402	RC1

NOTES:

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL & WATERCARE STANDARDS UNLESS DETAILED OTHERWISE.
2. ALL WASTEWATER PIPES TO BE PVC-U SN16.
3. ALL STORMWATER MAIN PIPES TO BE RCRRJ CLASS 2 UNLESS NOTED OTHERWISE.
4. ALL CATCHPITS TO BE 675x450mm UNLESS NOTED OTHERWISE. SIZING AND LOCATION TO BE CONFIRMED AT DETAILED DESIGN STAGE.
5. ALL PRIVATE CATCHPIT LEADS TO BE DN300 RCRRJ CLASS 4 UNLESS NOTED OTHERWISE.
6. REFER TO SHEETS 430 & 450 FOR DRAINAGE LONGSECTIONS.
7. REFER TO SHEET 490 FOR STANDARD DRAINAGE DETAILS

LEGEND:

- EXISTING CONTOURS SHOWN AT 0.5m INTERVALS
- EXISTING PUBLIC STORMWATER
- PROPOSED PUBLIC STORMWATER
- EXISTING PUBLIC WASTEWATER
- PROPOSED PUBLIC WASTEWATER
- EXISTING OVERLAND FLOW PATH
- EXISTING FUEL TRANSMISSION LINE
- SITE BOUNDARY
- EXISTING EASEMENT BOUNDARY
- PROPOSED OVERLAND FLOW PATH
- PROPOSED TANK

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

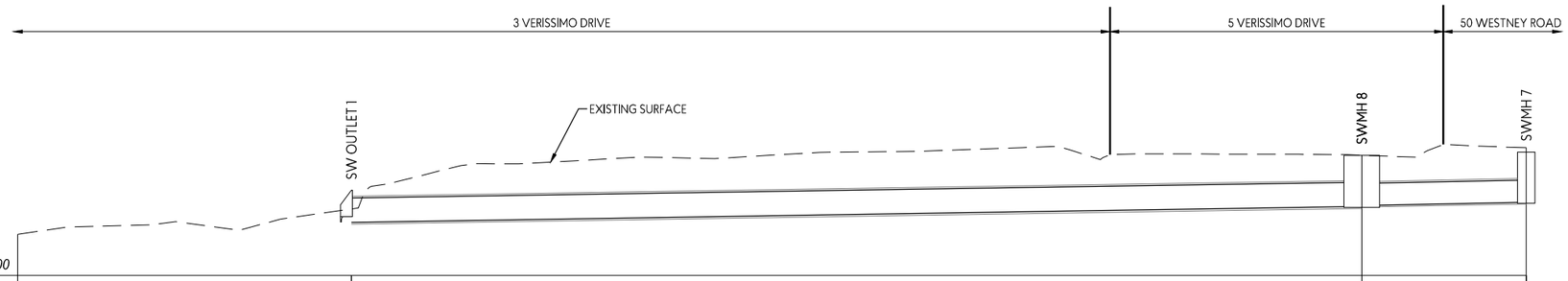
TITLE:

PROPOSED
DRAINAGE PLAN
SHEET 3 OF 3

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED:	JDP	DRAWN:	MJP
CHECKED:	ADJ	PLOT DATE:	16-07-24
SCALE A1:	1:250	SCALE A3:	1:500
STATUS:	FOR CONSENT		

PROJECT No:	DRAWING No:	REVISION:
1636-02	403	RC1



DEPTH TO INVERT		1.09	1.78	1.74
INVERT LEVEL		11.80	12.34 12.38	12.49
LID LEVEL		12.89	14.08	14.19
GRADIENT & PIPE SIZE		0.78% DN 825 RCRRJ Class 2		1.00% DN 750 RCRRJ Class 2
PIPE LENGTH & MH No.	SW OUTLET 1	68.7m	SWMH 8	11.2m SWMH 7

SW OP 1

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

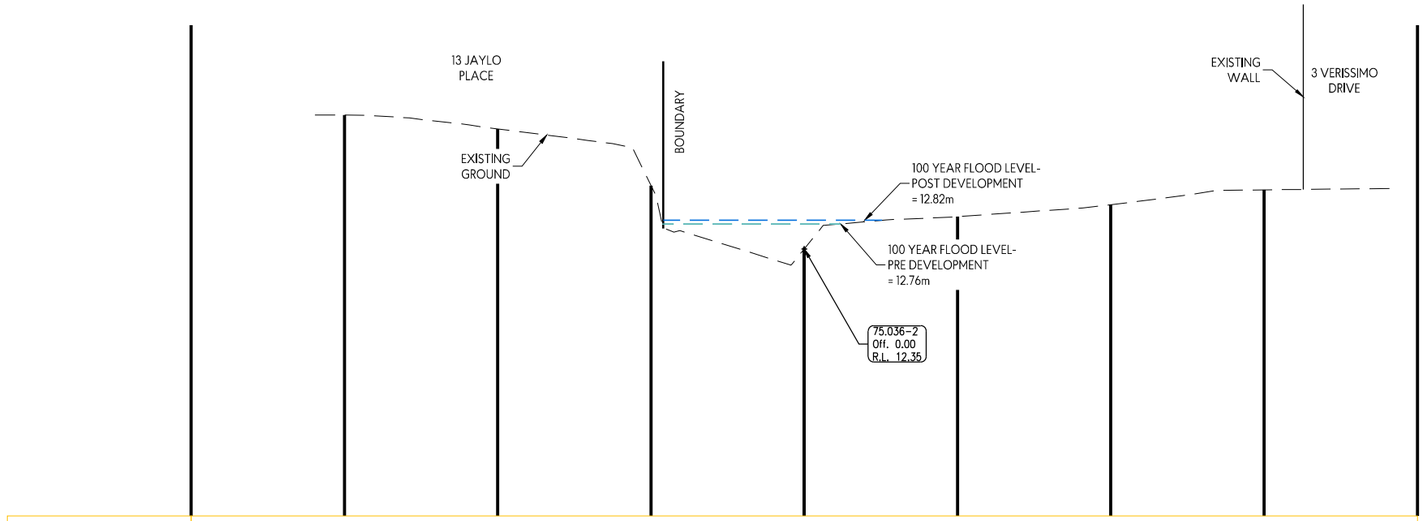
TITLE:

PROPOSED
STORMWATER LONG SECTION

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:200
SCALE A3: 1:400
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 430
REVISION: RC1



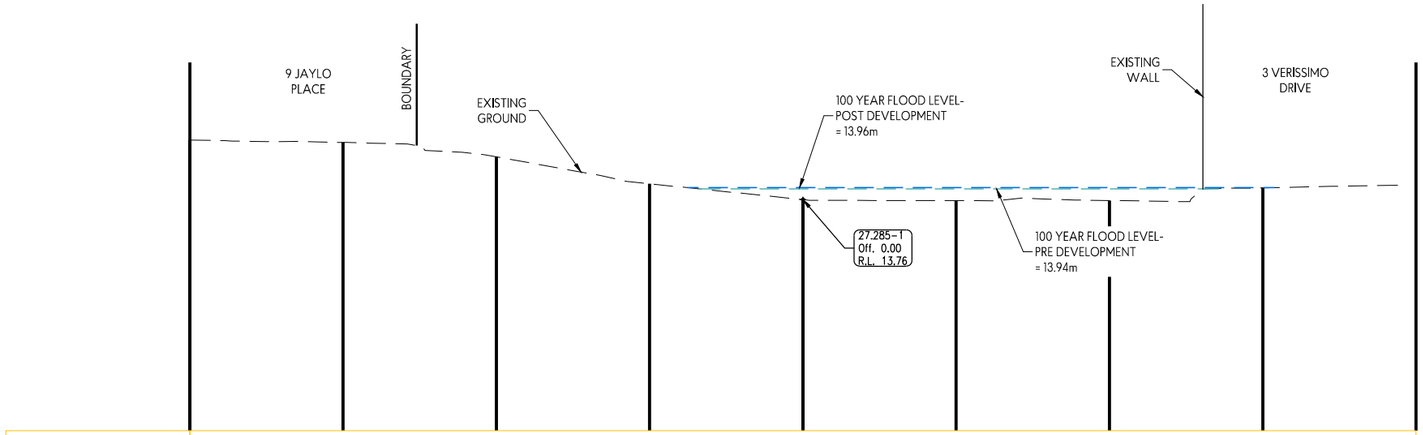
EXISTING LEVELS	14.53	14.53	14.31	13.39	12.88	13.07	13.32	13.34
OFFSETS	-7.98	-7.50	-5.00	-2.50	2.50	5.00	7.50	9.55

OLFP section: CH 75.04

B / 402

SECTION B - OVERLAND FLOW PATH
CH: 75.04

SCALE 1:50-A1 1:100-A3



EXISTING LEVELS	14.74	14.74	14.70	14.46	14.02	13.75	13.75	13.96	14.00
OFFSETS	-10.48	-10.00	-7.50	-5.00	-2.50	2.50	5.00	7.50	9.70

OLFP section: CH 27.29

A / 402

SECTION A - OVERLAND FLOW PATH
CH: 27.29

SCALE 1:50-A1 1:100-A3

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

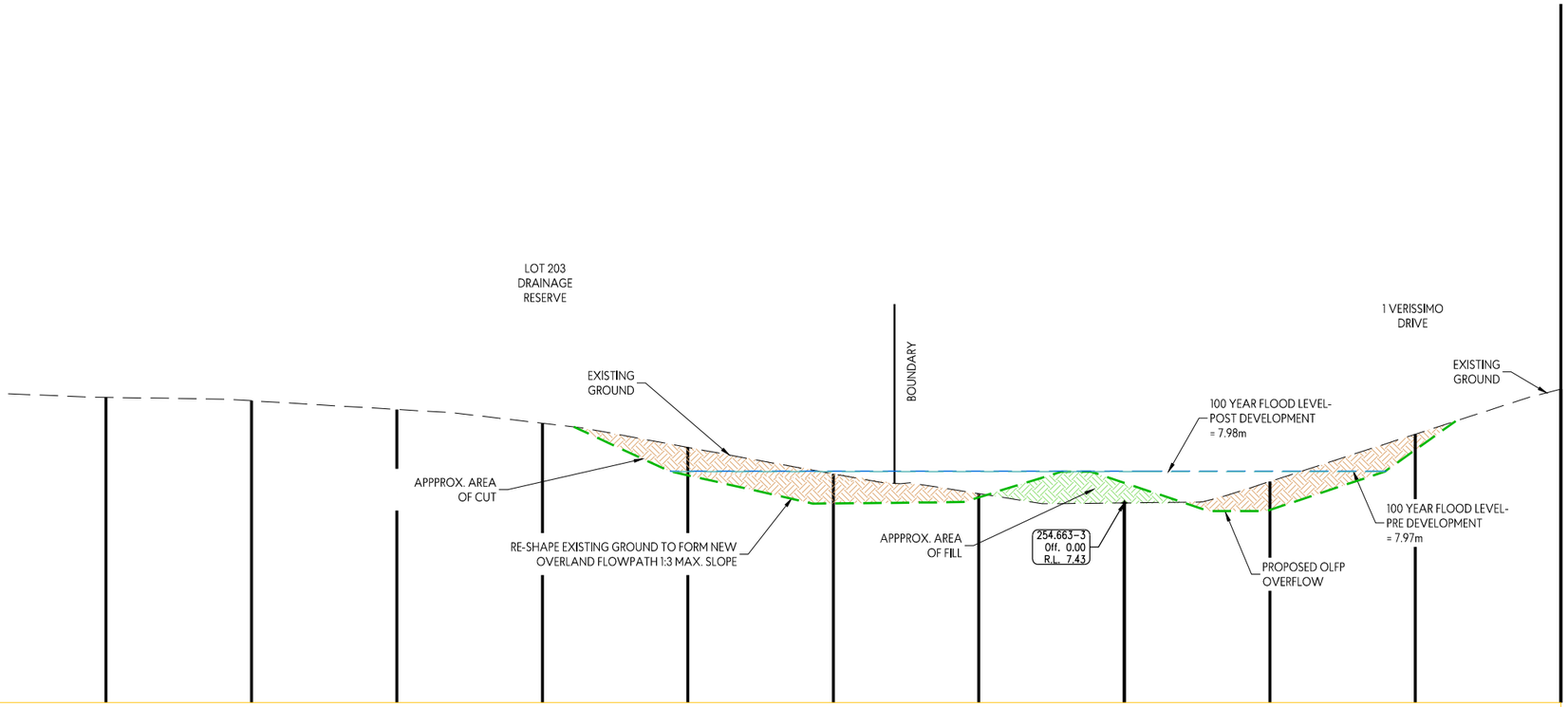
TITLE:

PROPOSED
OVERLAND FLOW PATH
SECTIONS - SHEET 1

ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:50
SCALE A3: 1:100
STATUS: FOR CONSENT

PROJECT No: 1636-02
DRAWING No: 460
REVISION: RC1



EXISTING LEVELS	9.30	9.24	9.18	9.03	8.80	8.38	7.93	7.59	7.80	8.61	9.38
OFFSETS	-19.18	-17.50	-15.00	-12.50	-10.00	-7.50	-5.00	-2.50	2.50	5.00	7.50

OLFP section: CH 254.66

SECTION C - OVERLAND FLOW PATH
CH: 254.66

C
403

SCALE 1:50-A1 1:100-A3

LEGEND:

- EXISTING GROUND LEVEL
- PROPOSED GROUND LEVEL
- 100 YEAR FLOOD LEVEL - POST DEVELOPMENT
- 100 YEAR FLOOD LEVEL - PRE DEVELOPMENT
- APPROXIMATE AREA OF CUT
- APPROXIMATE AREA OF FILL

REVISIONS:

REV	NOTES	BY	DATE
RC1	FOR PRIVATE PLAN CHANGE	JDP	29-08-24

PROJECT:

ROTOKOHU INVESTMENTS LIMITED
50 WESTNEY ROAD
MANGERE

TITLE:

PROPOSED
OVERLAND FLOW PATH
SECTIONS - SHEET 2

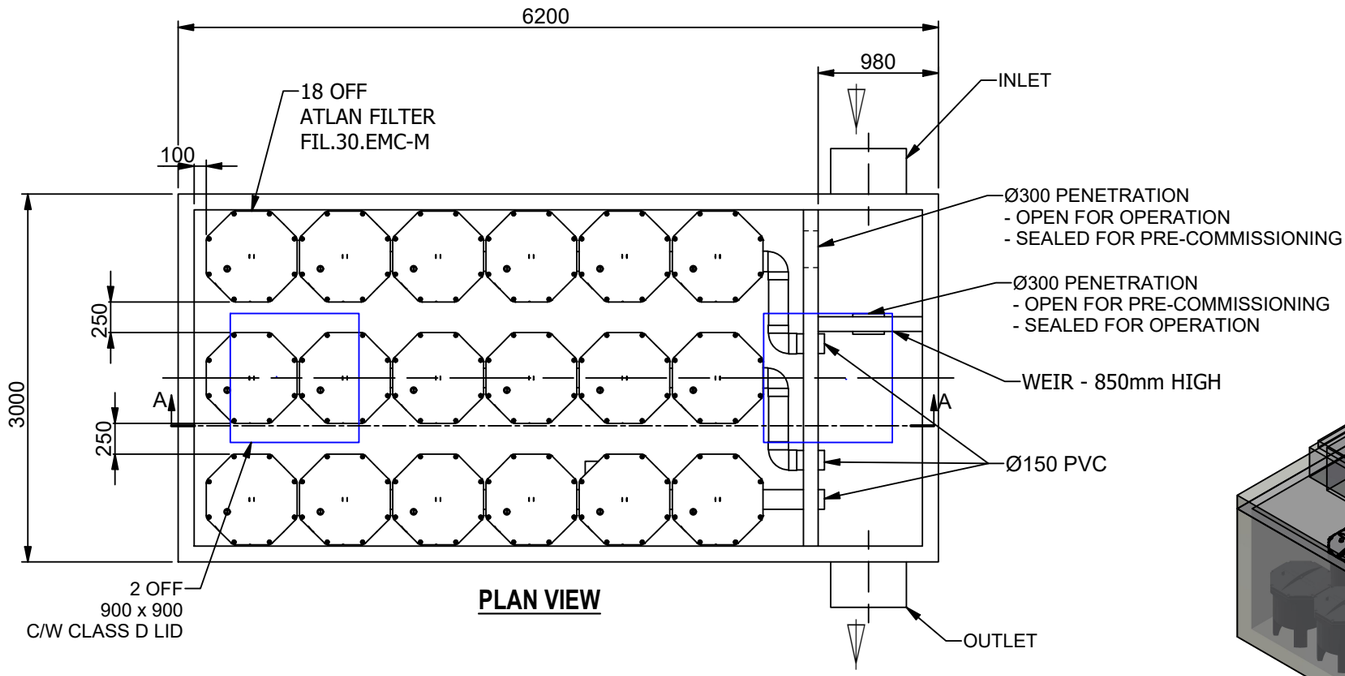
ENVELOPE
WWW.ENVELOPE-ENG.CO.NZ

DESIGNED: JDP
DRAWN: MJP
CHECKED: ADJ
PLOT DATE: 16-07-24
SCALE A1: 1:50
SCALE A3: 1:100
STATUS: FOR CONSENT

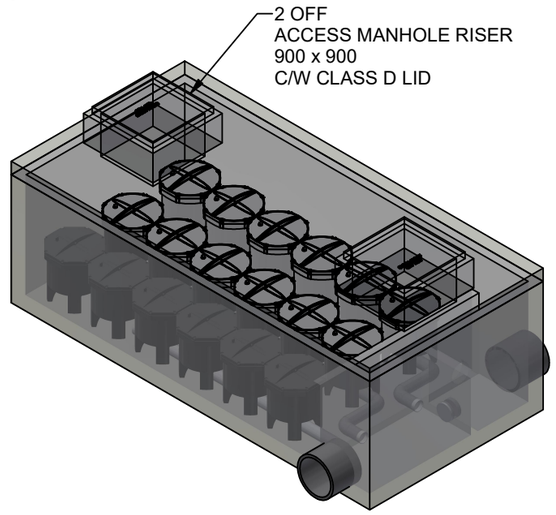
PROJECT No: 1636-02
DRAWING No: 461
REVISION: RC1

ISSUE FOR APPROVAL
NOT FOR CONSTRUCTION

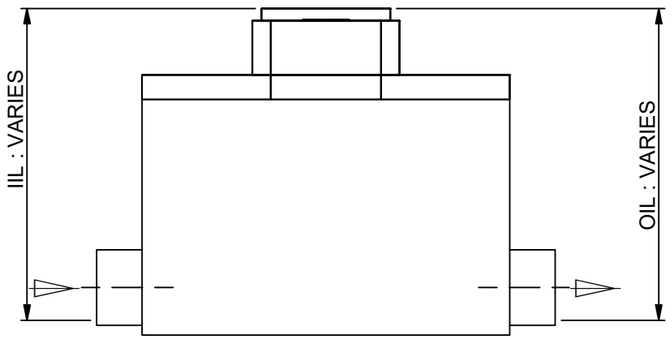
Site Level Confirmation	
Finished Surface Level (FSL)	RL:
Access Cover Thickness	mm
Inlet Invert Level	RL:
Outlet Invert Level	RL:
Company:	
Name:	
Date:	



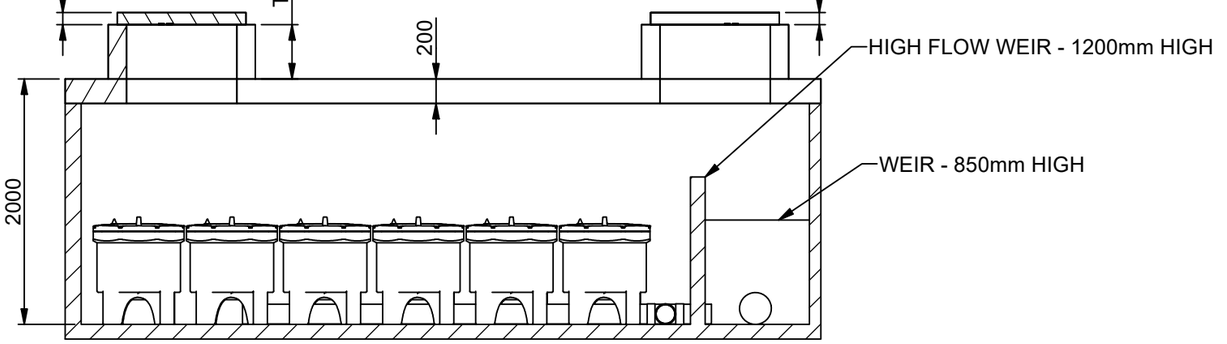
PLAN VIEW



ISOMETRIC VIEW



SIDE VIEW



SECTION A-A

TOLERANCE: All Dimensions to Closest 10 mm & +/- 30 mm

ALL INTERCONNECTING PIPEWORK, PITS AND ASSOCIATED DRAINAGE BY OTHERS

REV	DATE	BY	DESCRIPTION	CHK
1	29/08/2024	R.J.		

CLIENT:

Drawn	R.J.	Date 29/08/2024
Check		Date
Verified		Date
Approved		Date
Request No.		

Atlan STORMWATER

PROJECT :

TITLE
ATLAN FILTER SYSTEM
FIL.3062-1800.18-30.CON
GENERAL ARRANGEMENT

SCALE	SIZE	SHEET	REV
N.T.S	A3	1	1

CUSTOMER CODE :

DWG No. NZ-C.01.10,GA

C:\Users\smart\OneDrive\Documents\Vault\Designs\PRODUCT DEVELOPMENT\NZ ATLAN FILTERS - OFFLINE\14 ATLAN FILTERS 30LPS OFFLINE - 6230.idw

APPENDIX D
STORMWATER DESIGN CALCULATIONS

Site address: 50 Westney Road
Job No.: 1636-02
Designer: JDP
Date : 10/07/2024

TP108 Rainfall Method

TP108 Storm depth =

Figure A.1	2 yr ARI	(50% AEP)		mm
Figure A.2	5 yr ARI	(20% AEP)		mm
Figure A.3	10 yr ARI	(10% AEP)	**130**	mm
Figure A.4	20 yr ARI	(5% AEP)		mm
Figure A.5	50 yr ARI	(2% AEP)		mm
Figure A.6	100 yr ARI	(1% AEP)	186	mm

Climate change adjusted percentage increase:

Annual Exceedence Probability (AEP)	Percentage increase in 24-Hour Design Rainfall Depth Due to Future Climate Change	Climate adjusted rainfall depth (mm)
50%	15.1%	NA
20%	16.4%	NA
10%	17.0%	152.1
5%	31.2%	NA
2%	31.9%	NA
1%	32.7%	246.8

Conversion of Depth to intensity (peak Intensity)

Table 2.1 Normalised 24 hr Design (TP108)

Storm Depth	Corresponding 10 min storm intensity (mm/hr)
152.1	112
246.8	191

Site address: 50 Westney Road
Job No.: 1636-02
Designer: JDP
Date : 10/07/2024

ENVELOPE ENGINEERING
LAND
STRUCTURE
MANAGE

TP108 calculation - Proposed catchment:

		Pre Dev 50 Westney road 10Year	Pre Dev 50 Westney road 100 Year	Post Dev 50 Westney road 10 Year	Post Dev 50 Westney road 100 Year
Catchment number	→	A	b	C	D
Impervious Area	ha	0.798	0.798	4.036	4.036
Pervious Area	ha	3.238	3.280	0.000	0.000
Total area	ha	4.036	4.078	4.036	4.036
% Impervious		0.198	0.196	1.000	1.000
Catchment Slope (S_c)	m/m	0.05	0.05	0.05	0.05
Catchment Length (l)	km	0.30	0.30	0.03	0.30
Channelisation Factor (C)		0.6	0.8	0.6	0.8
Hydrological Soil Group		Group_C	Group_C	Group_C	Group_C
SCS Curve Number (CN)		74	74	74	74
24-Hour Rainfall Depth (P_{24})	mm	152.1	246.8	152.1	246.8
Weighted Curve Number		78.74	78.70	98.00	98.00
Initial Abstraction (Ia) weighted	mm	4.012	4.022	0.000	0.000
t_c	hours	0.17	0.17	0.17	0.17
t_p	hours	0.11	0.11	0.11	0.11
Storage (S)	mm	69	69	5	5
c*=(P24-2Ia)/(P24-2Ia+2S)		0.512	0.635	0.936	0.960
q* (from Fig. 6.1)	Approx!!	0.123	0.137	0.164	0.166
Peak Flowrate (q_p)	m3/s	0.753	1.380	1.008	1.654
Peak Flowrate (q_p)	L/s	752.70	1379.84	1008.35	1653.75
24 hour rainfall depth (Q_{24})	mm	101.2	189.2	147.1	241.7
24 hour runoff volume (V_{24})	m^3	4085	7715	5936	9755.94

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Jul 5 2024

Cross Section 1 - 100 Year - Post

User-defined

Invert Elev (m)	= 13.7310
Slope (%)	= 1.0000
N-Value	= 0.030

Calculations

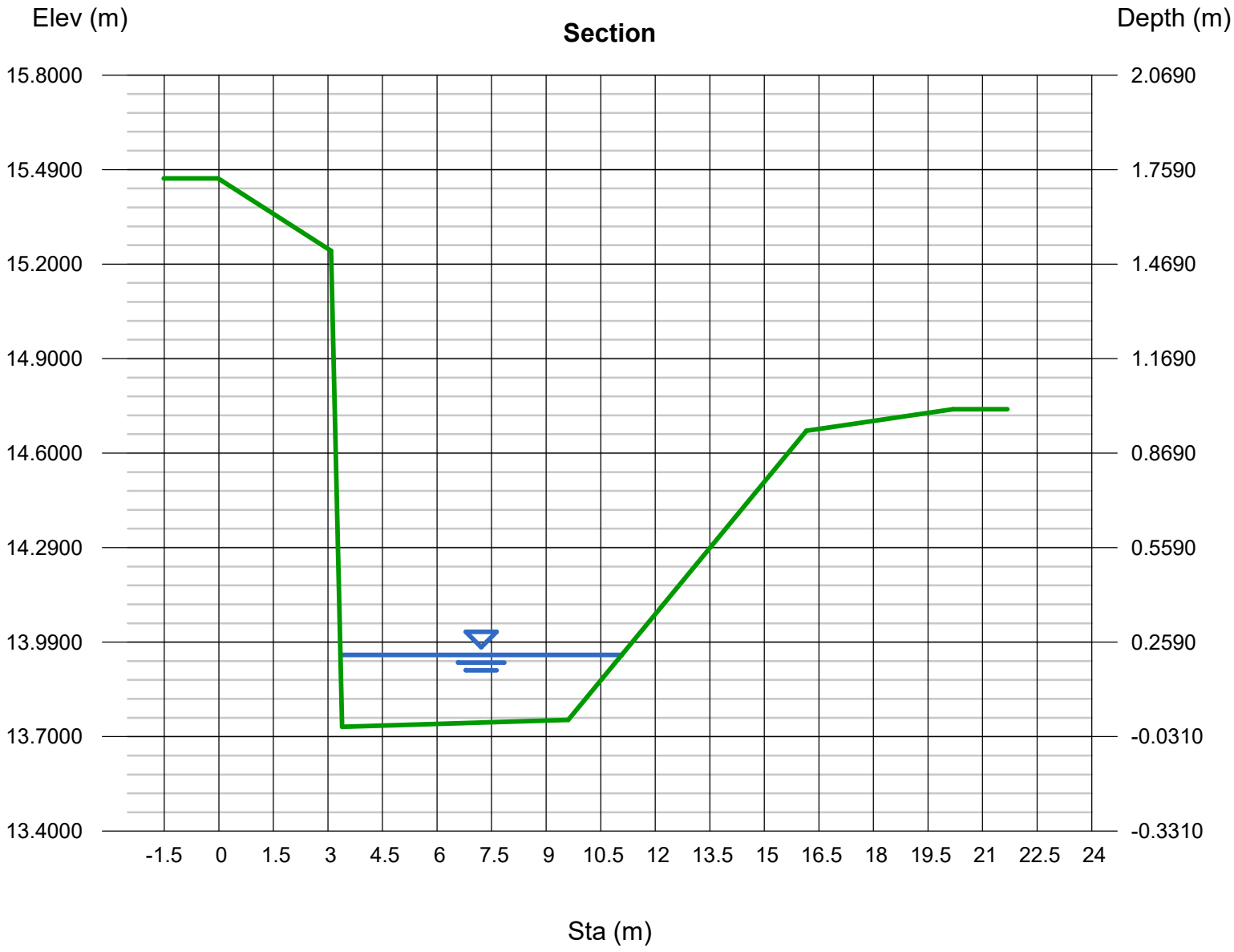
Compute by:	Known Q
Known Q (cms)	= 1.6540

Highlighted

Depth (m)	= 0.2286
Q (cms)	= 1.6540
Area (sqm)	= 1.5094
Velocity (m/s)	= 1.0958
Wetted Perim (m)	= 7.9345
Crit Depth, Yc (m)	= 0.2012
Top Width (m)	= 7.7332
EGL (m)	= 0.2898

(Sta, El, n)-(Sta, El, n)...

(-0.0170, 15.4720)-(3.0850, 15.2420, 0.030)-(3.3920, 13.7310, 0.030)-(9.6040, 13.7530, 0.030)-(16.1570, 14.6710, 0.030)-(20.1820, 14.7390, 0.030)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Jul 5 2024

Cross Section 1 - 100 Year - Pre

User-defined

Invert Elev (m)	= 13.7310
Slope (%)	= 1.0000
N-Value	= 0.030

Calculations

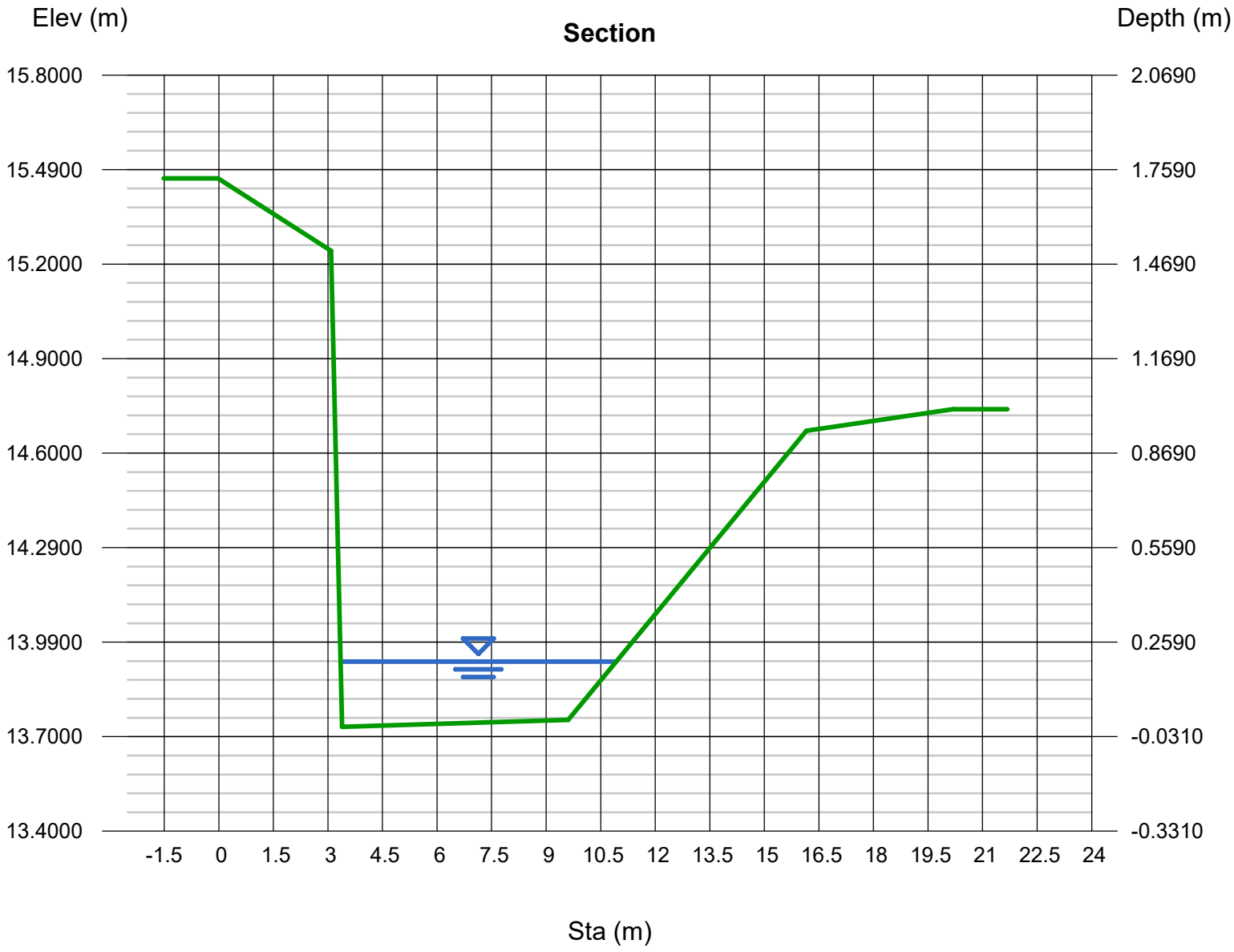
Compute by:	Known Q
Known Q (cms)	= 1.3800

Highlighted

Depth (m)	= 0.2073
Q (cms)	= 1.3800
Area (sqm)	= 1.3461
Velocity (m/s)	= 1.0252
Wetted Perim (m)	= 7.7589
Crit Depth, Yc (m)	= 0.1798
Top Width (m)	= 7.5766
EGL (m)	= 0.2609

(Sta, El, n)-(Sta, El, n)...

(-0.0170, 15.4720)-(3.0850, 15.2420, 0.030)-(3.3920, 13.7310, 0.030)-(9.6040, 13.7530, 0.030)-(16.1570, 14.6710, 0.030)-(20.1820, 14.7390, 0.030)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Jul 5 2024

Cross Section 2 - 100 Year - Pre

User-defined

Invert Elev (m)	= 12.0910
Slope (%)	= 1.0000
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cms)	= 1.3800

Highlighted

Depth (m)	= 0.6645
Q (cms)	= 1.3800
Area (sqm)	= 0.9408
Velocity (m/s)	= 1.4668
Wetted Perim (m)	= 3.2217
Crit Depth, Yc (m)	= 0.6035
Top Width (m)	= 2.7624
EGL (m)	= 0.7742

(Sta, El, n)-(Sta, El, n)...

(0.0000, 13.3380)-(1.4060, 13.3230, 0.030)-(2.8110, 13.3080, 0.030)-(9.2380, 12.7350, 0.030)-(9.7630, 12.0910, 0.030)-(11.7370, 12.6530, 0.030)-(12.1850, 14
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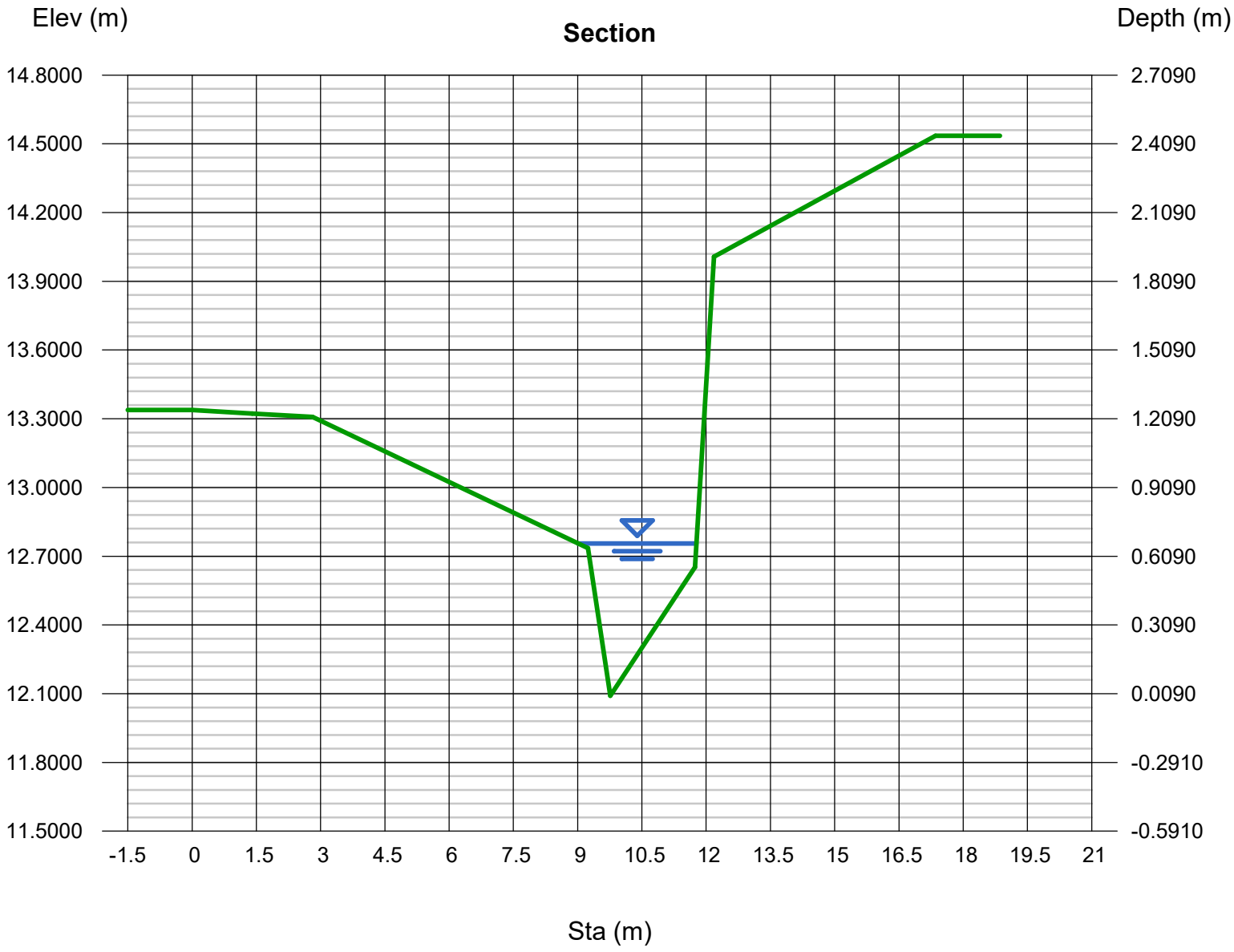


Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Jul 5 2024

Cross Section 2 - 100 Year - Post

User-defined

Invert Elev (m)	= 12.0910
Slope (%)	= 1.0000
N-Value	= 0.030

Calculations

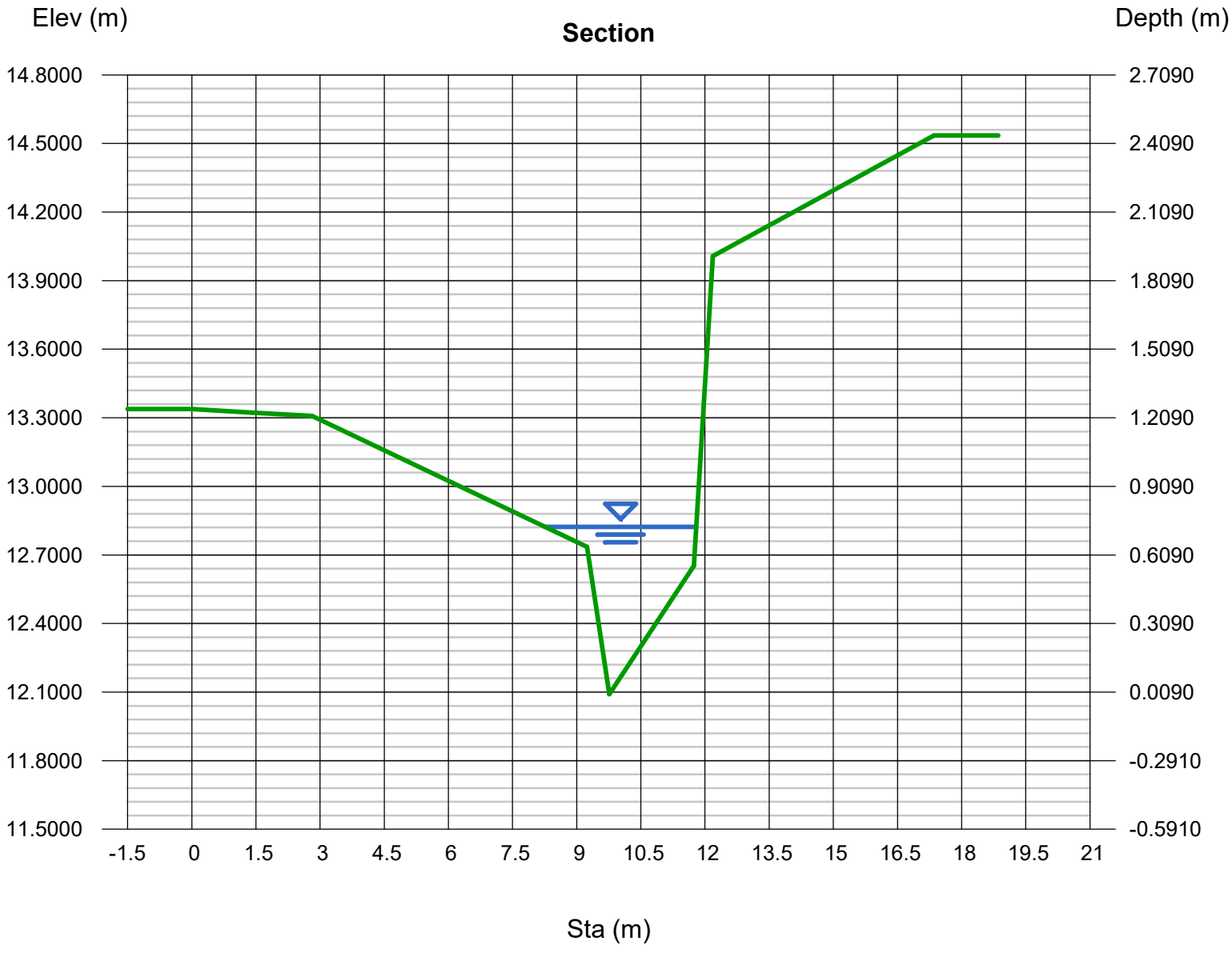
Compute by:	Known Q
Known Q (cms)	= 1.6540

Highlighted

Depth (m)	= 0.7315
Q (cms)	= 1.6540
Area (sqm)	= 1.1520
Velocity (m/s)	= 1.4357
Wetted Perim (m)	= 4.0474
Crit Depth, Yc (m)	= 0.6492
Top Width (m)	= 3.5367
EGL (m)	= 0.8367

(Sta, El, n)-(Sta, El, n)...

(0.0000, 13.3380)-(1.4060, 13.3230, 0.030)-(2.8110, 13.3080, 0.030)-(9.2380, 12.7350, 0.030)-(9.7630, 12.0910, 0.030)-(11.7370, 12.6530, 0.030)-(12.1850, 14
-(17.3560, 14.5350, 0.030)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Jul 5 2024

Cross Section 3 - 100 Year - Post

User-defined

Invert Elev (m)	= 7.4180
Slope (%)	= 1.0000
N-Value	= 0.030

Calculations

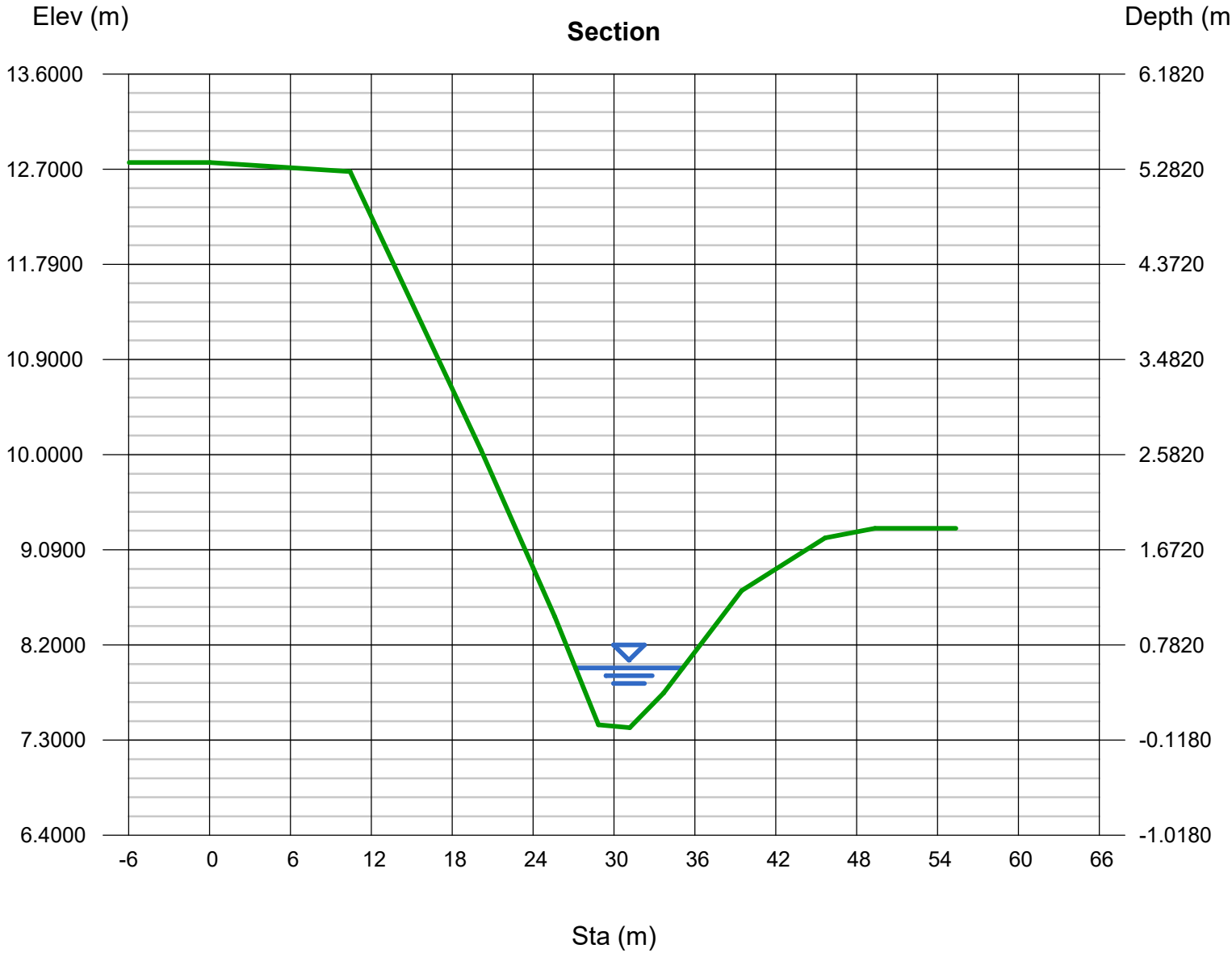
Compute by:	Known Q
Known Q (cms)	= 4.8840

Highlighted

Depth (m)	= 0.5639
Q (cms)	= 4.8840
Area (sqm)	= 2.9092
Velocity (m/s)	= 1.6788
Wetted Perim (m)	= 8.0699
Crit Depth, Yc (m)	= 0.5334
Top Width (m)	= 7.9456
EGL (m)	= 0.7076

(Sta, El, n)-(Sta, El, n)...

(0.0330, 12.7620)-(10.4170, 12.6760, 0.030)-(20.1180, 10.0470, 0.030)-(25.6170, 8.4670, 0.030)-(28.8450, 7.4440, 0.030)-(31.1730, 7.4180, 0.030)-(33.6770, 7
-(39.4770, 8.7150, 0.030)-(45.6590, 9.2120, 0.030)-(49.3660, 9.3040, 0.030)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Jul 5 2024

Cross Section 3 - 100 Year - Pre

User-defined

Invert Elev (m)	= 7.4180
Slope (%)	= 1.0000
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cms)	= 4.6100

Highlighted

Depth (m)	= 0.5486
Q (cms)	= 4.6100
Area (sqm)	= 2.7892
Velocity (m/s)	= 1.6528
Wetted Perim (m)	= 7.9271
Crit Depth, Yc (m)	= 0.5182
Top Width (m)	= 7.8064
EGL (m)	= 0.6880

(Sta, El, n)-(Sta, El, n)...

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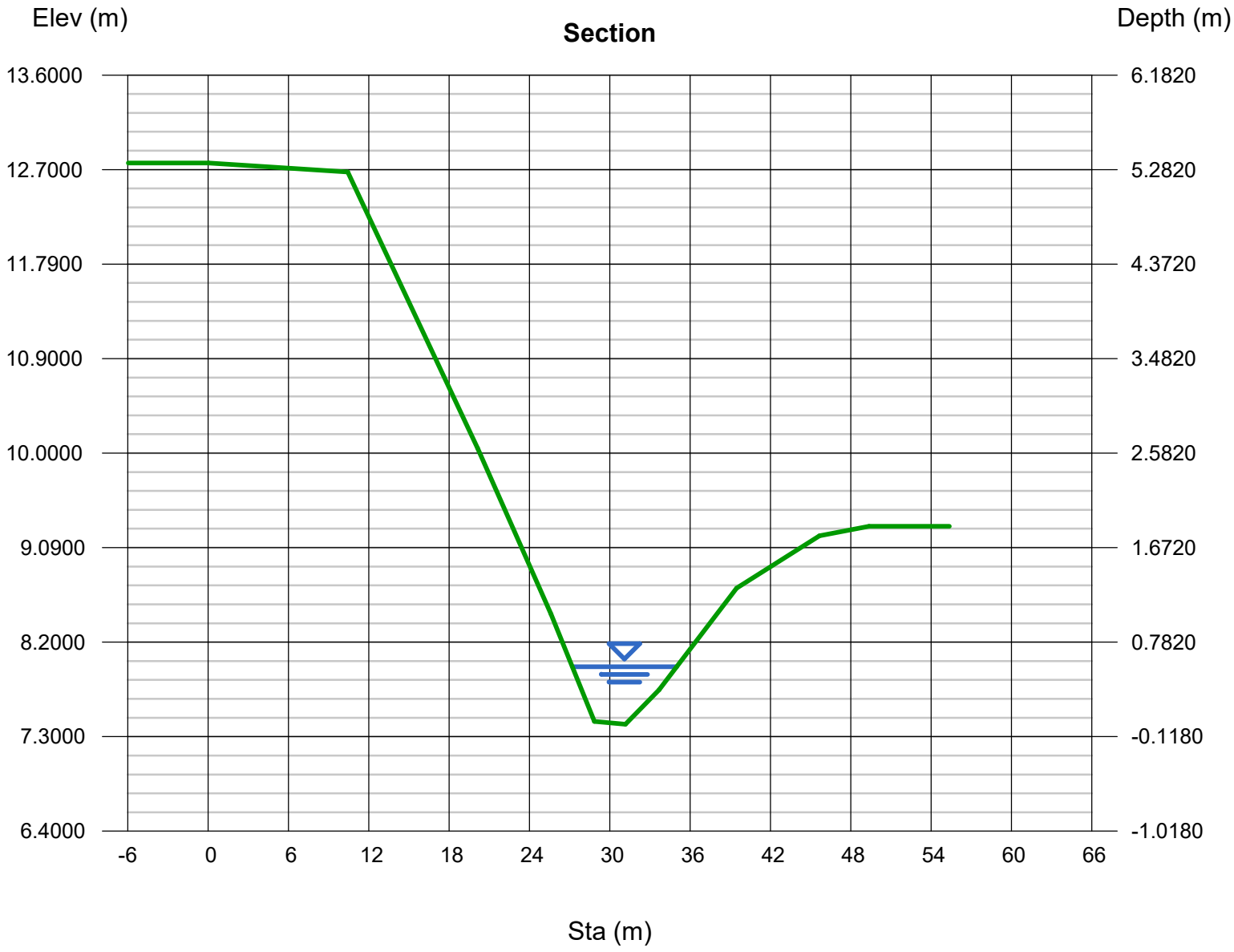
-(39.4770, 8.7150, 0.030)-(45.6590, 9.2120, 0.030)-(49.3660, 9.3040, 0.030)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Jul 5 2024

OLFP Diversion - 100 Year - Post

Trapezoidal

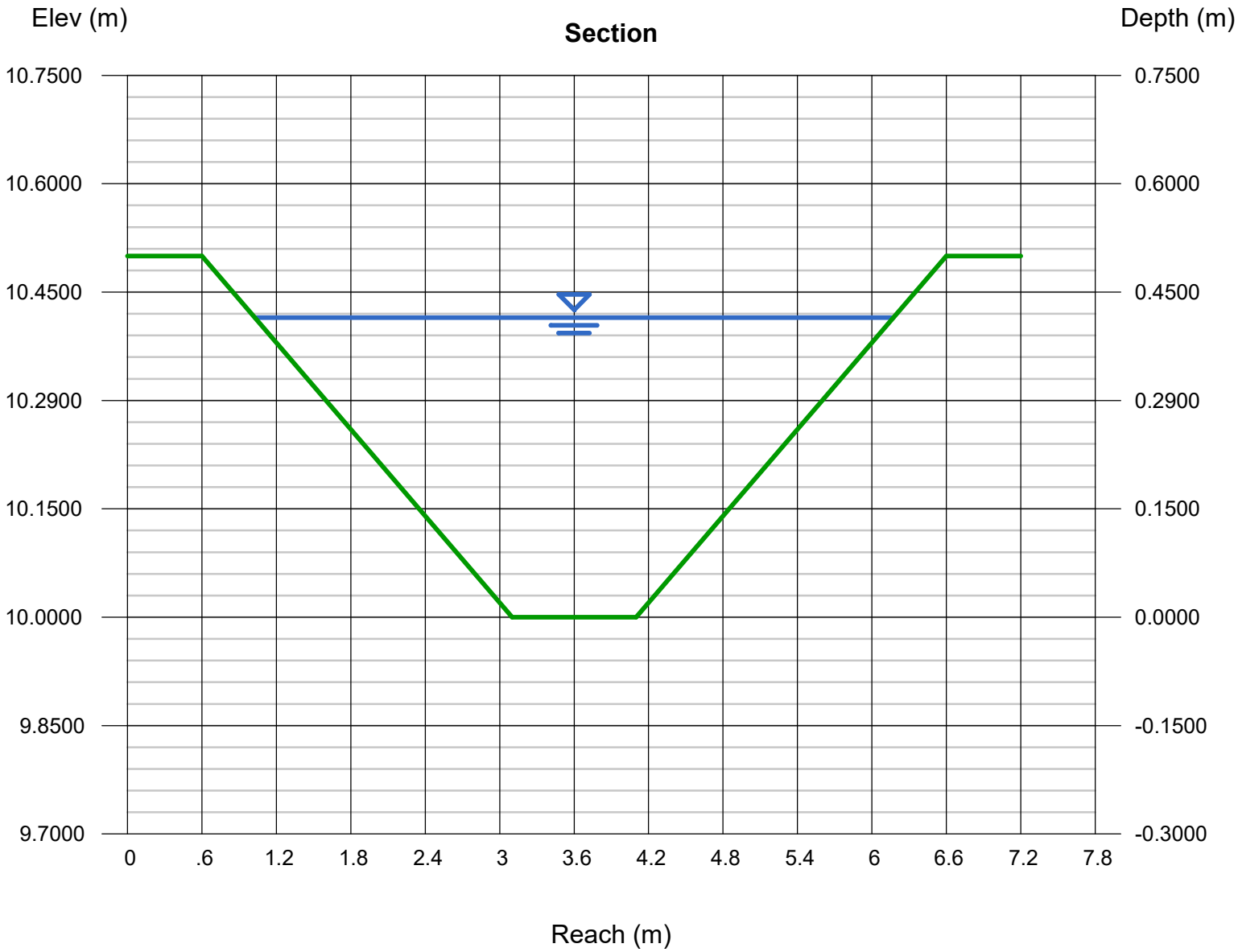
Bottom Width (m)	= 1.0000
Side Slopes (z:1)	= 5.0000, 5.0000
Total Depth (m)	= 0.5000
Invert Elev (m)	= 10.0000
Slope (%)	= 1.0000
N-Value	= 0.030

Calculations

Compute by:	Known Q
Known Q (cms)	= 1.6500

Highlighted

Depth (m)	= 0.4145
Q (cms)	= 1.6500
Area (sqm)	= 1.2737
Velocity (m/s)	= 1.2954
Wetted Perim (m)	= 5.2274
Crit Depth, Yc (m)	= 0.3810
Top Width (m)	= 5.1453
EGL (m)	= 0.5001



STORMWATER

09 930 7417 | www.atlan.co.nz

Date	Thursday, 29 August 2024
Client	Envelope Engineering
Project name	Carpark
Project address	50 Westney Road, Mangere

Area to flowrate calculator		
Impervious area	20,000	m²
Treatment rainfall	10	mm/h
Coefficient of area	0.95	
Treatment flow	52.78	l/sec

Filter selection		
Product used	Full size Atlan Filter (3l/sec)	
Flow per cartridge	3.0	l/sec
Cartridges required	17.59259259	
No. of cartridges selected	18	

Treatment rainfall/coefficient flow notes
Use 10mm/h for Auckland and 0.95 coefficient for 100% impervious areas
Use 5mm/h for Christchurch and 1.00 coefficient for 100% impervious areas
Use 10mm/h for everywhere else and 1.00 coefficient for 100% impervious areas

Cartridge selection notes
Wherever possible use the full size Atlan Filter. It has a high hydraulic drop of 850mm making it ideal for sites with reasonable fall. It backwashes at the end of every cycle and has a guaranteed media life of 5 years (conditions apply).
For sites with less fall where long media life if still required use the half size Atlan Filter. Hydraulic drop is 550mm and it still back washes at the end of every cycle and has the same media life guarantee of the full size SPELFilter.
For very flat sites use the Flowfilter. The hydraulic drop required is only 250mm and it can be used as a bubble up sump. Up to 3 of the 400 series cartridges can be fitted in a single sump and wherever more treatment flow is required use the 1500 series cartridges. Note the Flowfilter does not backwash at the end of every cycle which reduces media life and thus should be used only where the Atlan Filter cannot work.

APPENDIX E
OPERATION AND MAINTENANCE MANUAL

OPERATION & MAINTENANCE MANUAL

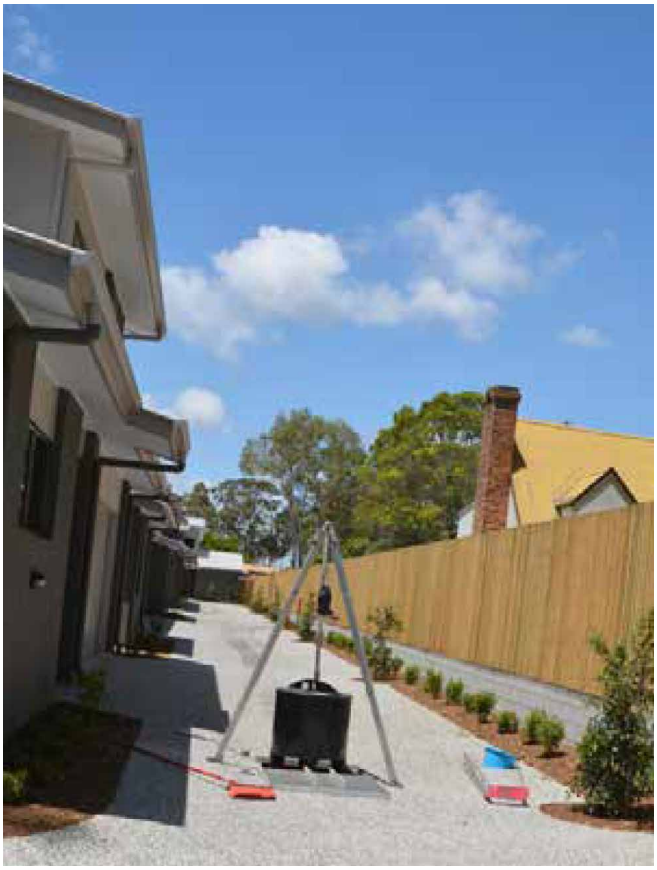
AtlanFilter

(Formerly SPELFilter)

atlan.com.au

Atlan
STORMWATER

CONTENTS



INTRODUCTION

Understanding how to correctly and safely maintain the AtlanFilter (formerly SPELFilter) is essential for the preservation of the filter's condition and its operational effectiveness. The AtlanFilter is a highly engineered stormwater filtration device designed to remove sediments, heavy metals, nitrogen and phosphorus from stormwater runoff.

The filters can be housed in either a concrete or fibreglass structure that evenly distributes the flow between cartridges.

Flow through the filter cartridges is gravity driven and self-regulating, which makes the AtlanFilter system a low maintenance, high performance stormwater treatment device.

This guide will provide the necessary steps that are to be taken to correctly and efficiently ensure the life of the AtlanFilter product.

Figure 1 - AtlanFilters in a concrete chamber / vault

FEATURES

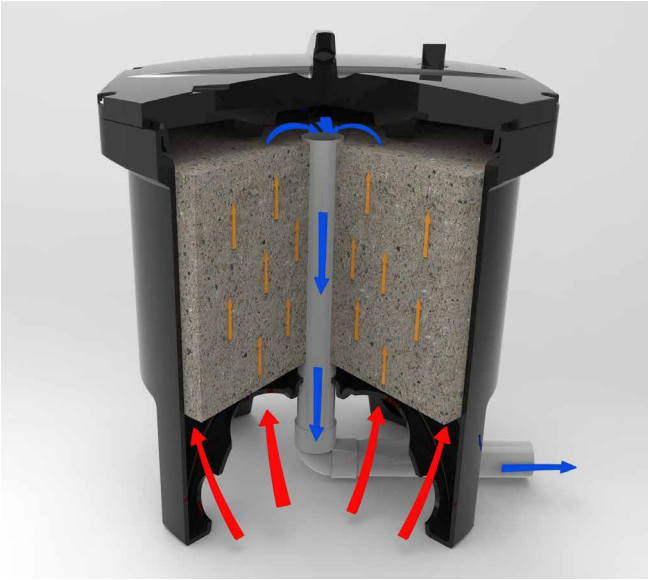


Figure 2 - Diagram of water flow through AtlanFilter

The AtlanFilter has a patented design that facilitates influent flow over the entire surface area of the media, providing consistent pollutant removal within a small footprint.

The AtlanFilter provides highly effective media filtration using gravity flow conditions, without the need for moving parts or floating valves. This eliminates the risk of mechanical failure, such as stuck valves and seizing components during its service life. This provides highly robust treatment performance.

Hydraulic head provided by a suitably sized weir in the filter vault forces stormwater through the filter media via the inlet ports underneath the filter cartridge.

Refer to the table below for minimum head required for the AtlanFilter cartridges to assist in sizing the weir.

The water to be treated enters the AtlanFilter cartridge via an upwards direction as the water level builds up around the AtlanFilter. This ‘up flow’ reduces the amount of sediment that could enter the media cartridge, as the sediment is allowed to drop to the vault floor under gravity. Any remaining sediment in the water is introduced through the filter media under hydraulic pressure and is filtered.

Water is filtered through the media, where dissolved and particulate Total Nitrogen and Total Phosphorus are removed via reaction with the media, in addition to the removal of Total Suspended Solids / sediment.

AtlanFilter Media Self-Backwash feature

A one-way air release valve located at the top of the filter cartridge allows air to escape as the cartridge fills up with water. This creates a siphonic flow condition as the air is completely evacuated from inside the AtlanFilter cartridge. Siphonic flow conditions are maintained until such time the water level outside of the cartridge falls beneath the inlet ports underneath the filter. At this moment, the water level inside the AtlanFilter cartridge is higher than the surrounding water level.

The water inside the AtlanFilter cartridge is then expelled upon the break of the siphon, and the water flows down and out of the inlet ports under gravity, onto the vault floor.

This is a highly effective backwash of the media and allows the expulsion of a high proportion of sediment out from the AtlanFilter media. The expelled sediment can be removed either manually or with a vacuum from the vault floor.

This backwash effect allows the media to remain highly conductive and is the key to the industry leading longevity of the AtlanFilter cartridge system, which does not need replacement for at least 5 years, and typically will achieve up to 6-8years of service, subject to the AtlanFilter being regularly maintained in accordance with this guideline and in accordance with the specific needs of the catchment.

Figure 3 - Typical Outlet Weir Wall

FEATURES

Self Supporting Feet

Each AtlanFilter cartridge stands on 4 feet, which negates the need for the construction of a false floor in the vault. The feet are bolted to the vault floor with the supplied stainless steel angles and M10 bolts. The feet allow a clear height from the vault floor up to the inlet ports of 240mm. The absence of a false floor allows plenty of room for backwashed sediment to evacuate from underneath the cartridges and thereby avoid blocking the inlet ports to the AtlanFilter from sediment buildup. It is for this reason that Atlan recommended the sediment buildup not exceed 150mm above the vault floor, so as to avoid blocking the inlet ports of the AtlanFilter. Blockage of the inlet ports due to sediment accumulation in the vault floor will cause the AtlanFilter to go into bypass and be ineffective. Hence it is important to keep up to date with monitoring and maintaining the AtlanFilter vault.

Figure 4 - Bolting the feet.

Figure 5 - Underside of the AtlanFilter showing the screened inlet ports and the connection for the outlet pipe in the middle.

Figure 6 - the top of the AtlanFilter showing the location of the one way air valve.

SIZES

Atlan Stormwater manufactures two height cartridges for varying site constraints as shown below. Each cartridge is designed to treat stormwater at a flow rate of 1.5 litres per second and 3.0 litres per second for the half height cartridge (model no. FIL-1.5) and full-height cartridge (model no. FIL-3.0) respectively.

	Full Height FIL-3.0	Half Height FIL-1.5
AtlanFilter total height	860mm	660mm
AtlanFilter Diameter	740mm	740mm
Minimum Head required	850mm	550mm
Treatment flow rate	3.0 L/s	1.5 L/s
Height of inlet ports above vault floor	250mm	250mm
Filtered water collection pipe diameter	50mm	50mm

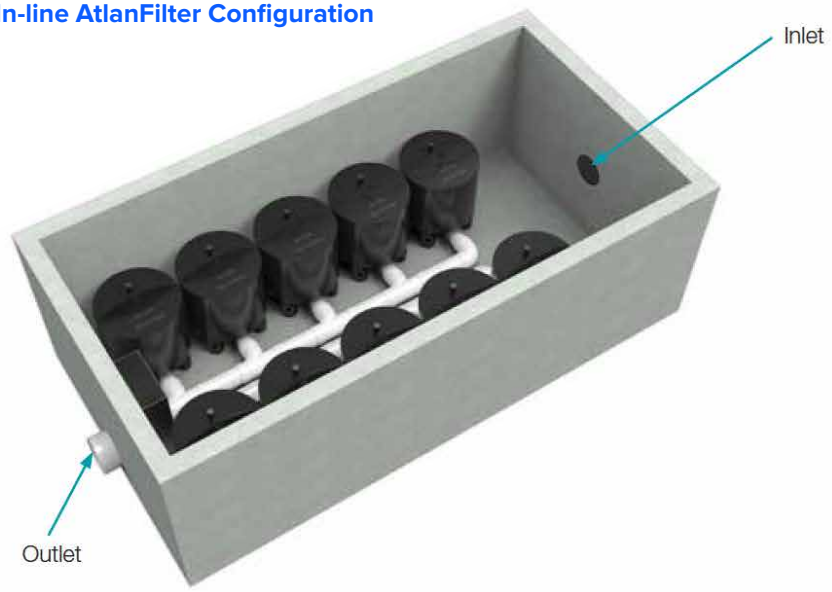
AtlanFilter Full Height - FIL-3.0

AtlanFilter Half Height - FIL1.5

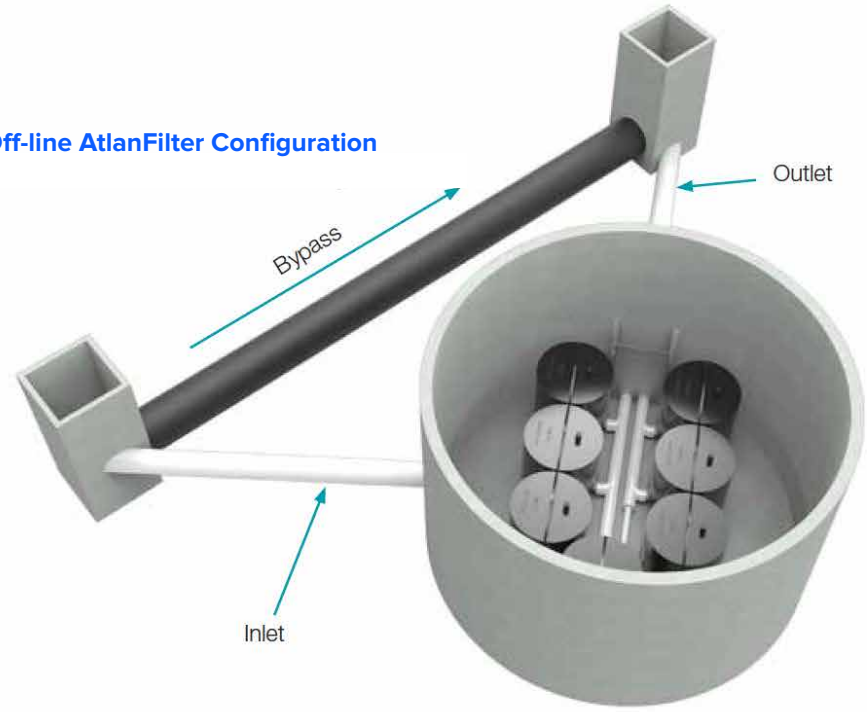
SYSTEM CONFIGURATION

AtlanFilter cartridges are installed in concrete or fibreglass tanks commonly referred to as ‘vaults’. The vault selection and configuration are based on site characteristics and/or constraints; computational stormwater quality modelling; and selected AtlanFilter models. Typical AtlanFilter system configurations are shown below.

In-line AtlanFilter Configuration



Off-line AtlanFilter Configuration



HEALTH AND SAFETY

A. Personal health & safety

When carrying out the necessary installation operations of the AtlanFilter all contractors and staff personnel must comply with all current workplace health and safety legislation.

The below measures should be adhered to as practically as possible.

- Comply with all applicable laws, regulations and standards.
- All those involved are informed and understand their obligations in respect of the workplace health and safety legislation.
- Ensure responsibility is accepted by all employees to practice and promote a safe and healthy work environment.

B. Personal protective equipment/safety equipment

When carrying out the necessary installation operations of the AtlanFilter, wearing the appropriate personal protective equipment and utilising the adequate safety equipment is vital to reducing potential hazards.

Personal protective equipment / safety equipment in this application includes:

- Eye protection
- Safety apron
- Fluorescent safety vest
- Form of skin protection
- Puncture resistant gloves
- Steel capped safety boots
- Ear muffs
- Hard hat/s
- Sunscreen

C. Confined space

In the event access is required into the vault, confined space permits will be required which is not covered in this Guide. Typical equipment required for confined space entry include:

- Harness
- Gas detector
- Tripod
- Spotter

D. Traffic Control

It is not uncommon for Atlan Filter cartridges to be installed underneath trafficable areas. Minimum traffic control measures will need to be put in place in accordance with traffic control plans set out by respective local and state road authorities.

Vaults are to be treated as confined space.

Entry by permit only.

Monitor weather conditions prior to operation maintenance. Do not enter a vault during an episode of heavy rain as this can create a risk of drowning.

MAINTENANCE FREQUENCY

The AtlanFilter's design allows for a greater life span when frequently maintenance. Maintenance is broken up into three categories which include:

- Standard inspection
- General cleaning
- Cartridge replacement.

Standard Inspection

Standard inspections are conducted at regular four month intervals. At this time, an approved trained maintenance officer or Atlan representative shall undertake all measures outlined in Maintenance Procedure, Standard Inspection.

General Cleaning

At the end of each standard inspection, trigger measures will identify if general cleaning is required.

General cleaning will need to be executed immediate during standard inspections if the follow triggers are satisfied:

- Build-up of debris/pollutants within the vault greater than 150mm;
- Accumulation of debris/pollutants on the outlet chamber of the AtlanFilter vault;
- After large storm events, tidal or flooding impacts at the request of the owner;

Cartridge Replacement

Stormwater treatment is dependent on the effectiveness of the AtlanFilter cartridge system. As the AtlanFilter ages, pollutants will inundate the cartridge and ultimately reduce the treatment flow rate. At this point, a AtlanFilter flow test apparatus will be utilities to determine if replacement cartridges are required.

Based on the [site] concept modelling (MUSIC) and previous industry experience, we estimate the life of the AtlanFilter to be between 6 - 8 years. As a minimum requirement, each AtlanFilter cartridge should be replaced within 10 years.

The life cycle of the AtlanFilter can be impacted if standard inspections and general maintenance is not undertaken in accordance with this operation and maintenance Guide.

Other factors that will affect the above life cycle of the AtlanFilter include:

- Installation of cartridge system during construction phase and impacted by construction sediment loads;
- Neglecting to install pre-treatment using an industry approved GPT or a surface inlet pit trash bag such as the Atlan StormSack.
- Unforeseen environmental hazards affecting the AtlanFilter functionality.

MAINTENANCE PROCEDURES

Stormwater pollutants captured and retained by the AtlanFilter system need to be periodically removed to ensure environmental values are upheld. All associated maintenance works is heavily dependent on the site's operational activities and generated stormwater pollutants. To ensure the longevity of the installed AtlanFilter treatment system, it is imperative that the procedures detailed in this Guide are followed and all appropriate measures are actioned immediately.

Standard inspection

The standard inspection requires personal experience of Atlan products to visual inspection the vault and filter conditions.

Confined space requirements may not be required if a full inspection and assessment of each AtlanFilter can be achieved at surface level without being deemed a confined space entry.

The standard inspection requires personal experience of Atlan products to visual inspection the vault and filter conditions.

Confined space requirements may not be required if a full inspection and assessment of each AtlanFilter can be achieved at surface level without being deemed a confined space entry.

Site Inspection Procedures

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free. (Refer to figure 4.)

2. Set-up gantry tripod above manhole

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the Atlan Filters.

Perform safety procedures ie. Attach harnesses etc. (if confined space).

3. Open manhole lid

Once you have set up the Gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

4. Conduct gas tests

(If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space

6. AtlanFilter system assessment

Perform a review of the AtlanFilter system using the AtlanFilter assessment report/checklist. Sign off and forward a copy of the report to property manager and Atlan representative.

7. Reinstate AtlanFilter system and disposal

At the completion of the site inspection, ensure the site is reinstated back to its initial state and all pollutants are removed from the site in line with pollutant disposal procedures.

8. Sign off and forward a copy of the report to property manager and Atlan representative

GENERAL CLEANING

Vacuum out of Filter tank, removal, and disposal of pollutants at the completion of a standard inspection, general cleaning may be deemed necessary immediately or scheduled for a future date. Steps undertaken for general cleaning should be in general accordance with the procedure outlined below but not limited.

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free. (Refer to figure 4.)

2. Set-up gantry tripod above manhole

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the AtlanFilters.

Perform safety procedures ie. attach harnesses etc. (if confined space).

3. Open manhole lid

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6. AtlanFilter system assessment

Perform a review of the AtlanFilter system using the AtlanFilter assessment report/checklist.

7. Pollutant removal from tank

Perform clean-up using a licenced vacuum truck contractor or wet/dry vacuum, depending on level of sediment built up and/or tank size.

8. Reinstate AtlanFilter system and disposal

At the completion of the site inspection, ensure the site is reinstated back to its initial state and all pollutants are removed from the site in line with pollutant disposal procedures.

9. Sign off and forward a copy of the report to property manager and Atlan representative

CARTRIDGE RECYCLING AND REPLACEMENT

AtlanFilter cartridges can be swapped out for new cartridges. The spent AtlanFilter cartridges can be collected from site and sent to Atlan Stormwater's facilities, where the spent media will be removed from the cartridge in factory conditions and disposed of in accordance with environmental regulations.

The AtlanFilter cartridge will be recharged with new media, thereby recycling and repurposing the cartridge.

AtlanFilter replacement procedures may vary depending on the configuration of the AtlanFilters, the type of vault and engineers' specs. Replacement instructions for manhole AtlanFilter systems and precast vault AtlanFilter systems are contained in this section.

At the completion of a standard inspection, AtlanFilter replacement may be deemed necessary immediately or scheduled for a future date. Steps undertaken for cartridge replacement should be in general accordance with the procedure outlined below but not limited.

1. Implement pre-start safety measures

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected.

Area in which work is to be carried out must be clean, safe and hazard free.

2. Set-up gantry tripod above manhole

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the AtlanFilters.

Perform safety procedures ie. attach harnesses etc. (if confined space).

3. Open manhole lid

Once you have sent up the gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

4. Conduct gas tests

(If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space procedures are followed.

6. Remove exhausted cartridges

Disconnect all internal pipe work from inside the vault. Unbolt anti-floatation measures and remove cartridges from the vault using Gantry Tripod method.

7. Pollutant removal

Using a wet/dry vacuum or sucker truck, suck out all the residual pollutant from the vault.

8. Install pipework and AtlanFilters

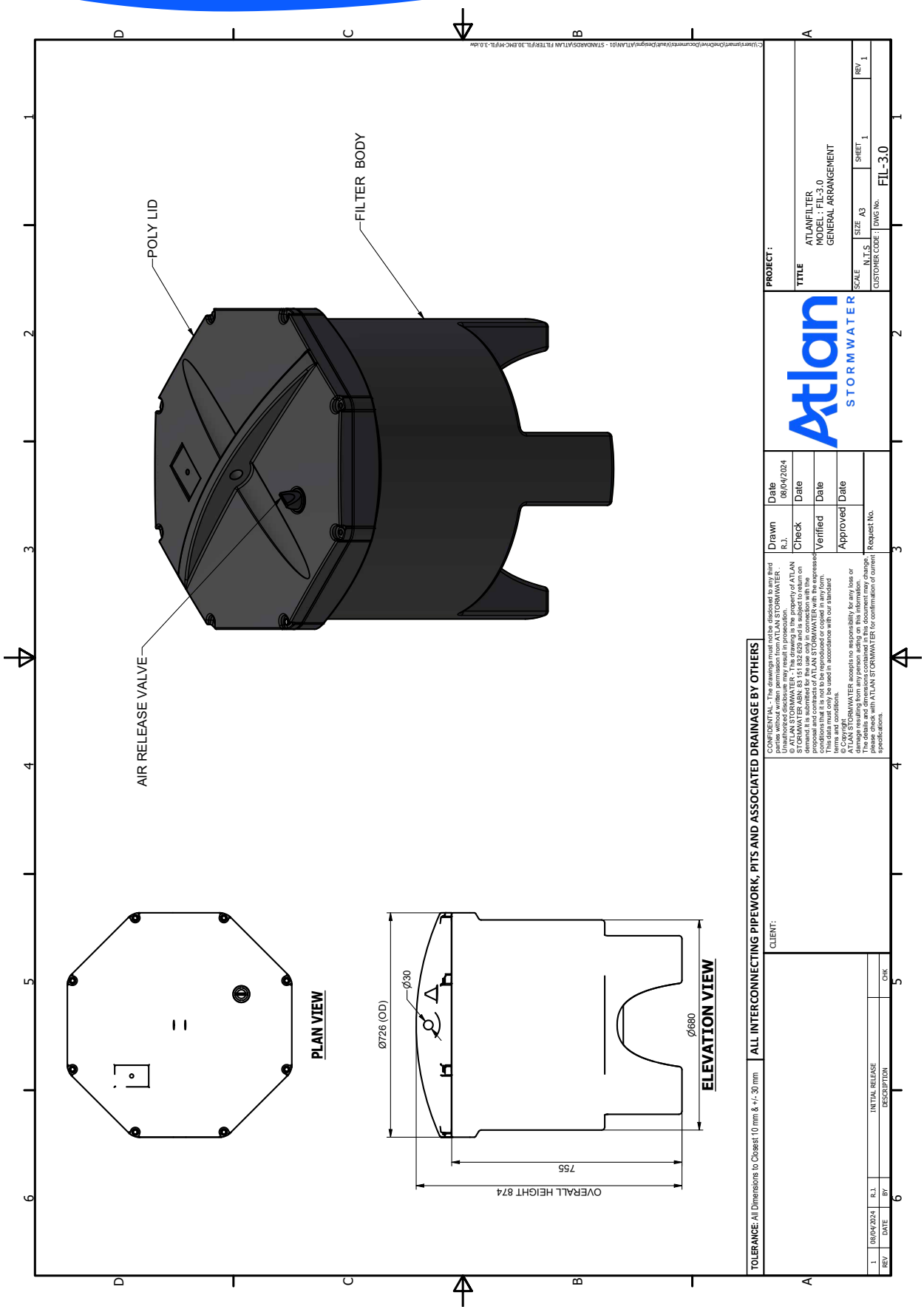
Please refer to the below standard install diagrams for the AtlanFilters. Then refer to your site specific drawings, as site requirements may require something different to the standard layout. Lower filters into tank, position into place, connect filter outlet pipework with the supplied fittings.

9. Install anti–floatation system

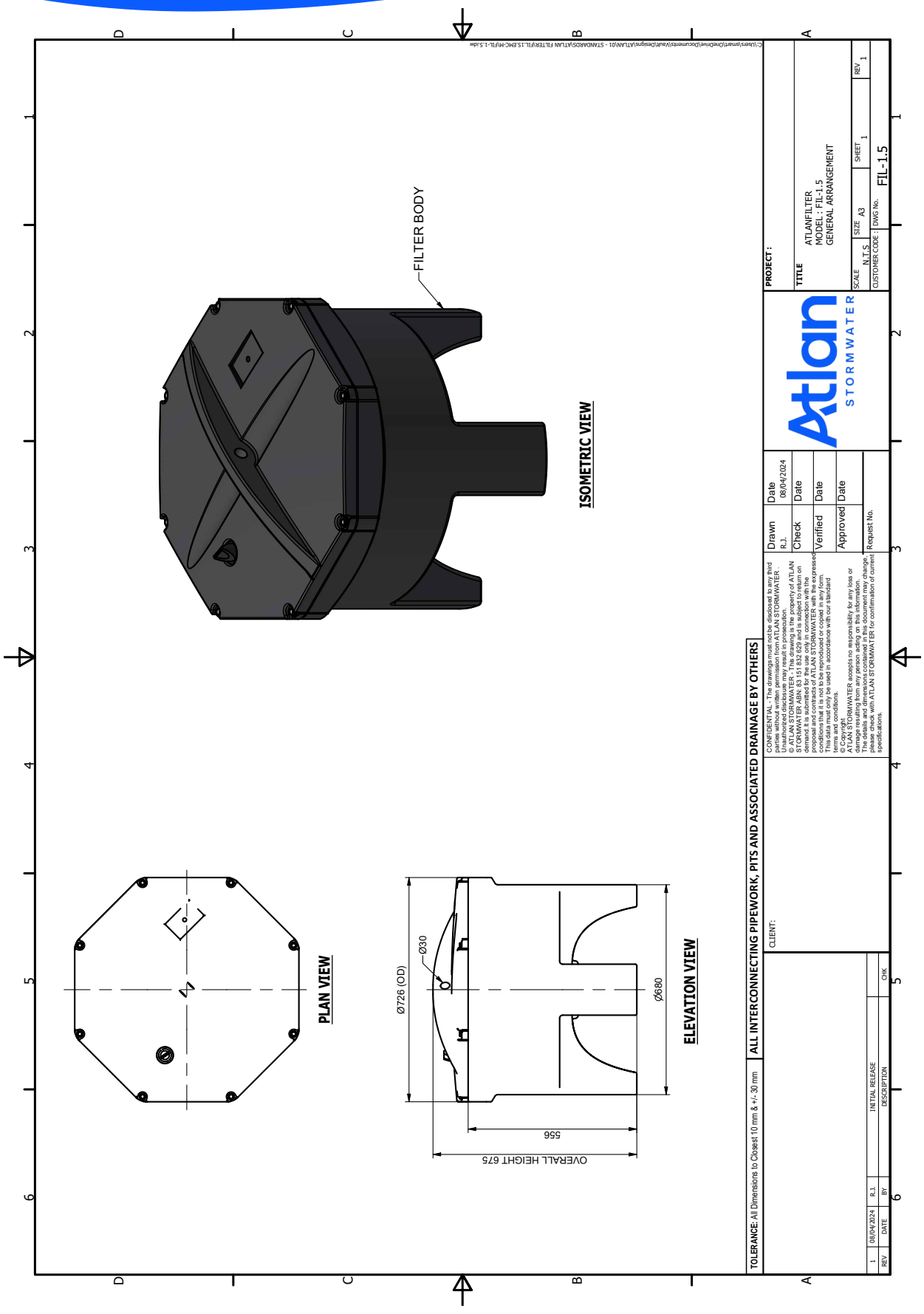
Please refer to the detailed drawings showing how the anti-floatation (anchor) bars are to be installed.

10. Sign off and forward a copy of the report to property manager and Atlan representative

Drawing
Full Height



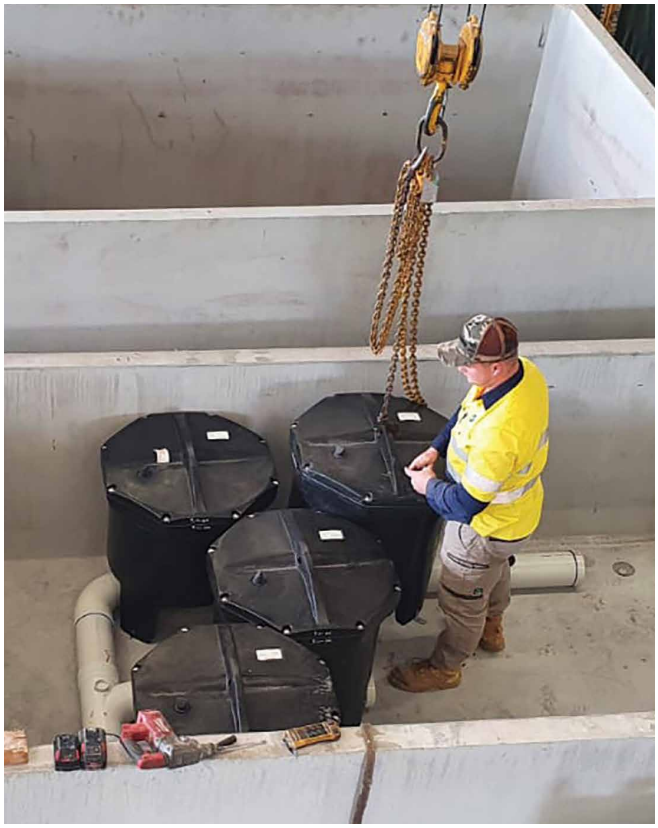
Drawing
Half Height



SITE EXIT & CLEAN UP

At the end of the scheduled maintenance, approved contractors or Atlan maintenance crew are required to reinstate the site to pre-existing conditions. Steps included but limited to are:

- Ensure all access covers are securely inserted back into their frames;
- Remove and dispose collected pollutants from the site in accordance with local regulator authorities;
- Retrieve all traffic control measures and maintenance tools; and
- Return all exhausted and/or damaged Atlan products to Atlan Stormwater to begin recycling program.



Joy in water

‘We believe clean waterways are a right not a privilege and we work to ensure a Joy in Water experience for you, with your children and grandchildren.’

Andy Hornbuckle

Atlan
STORMWATER

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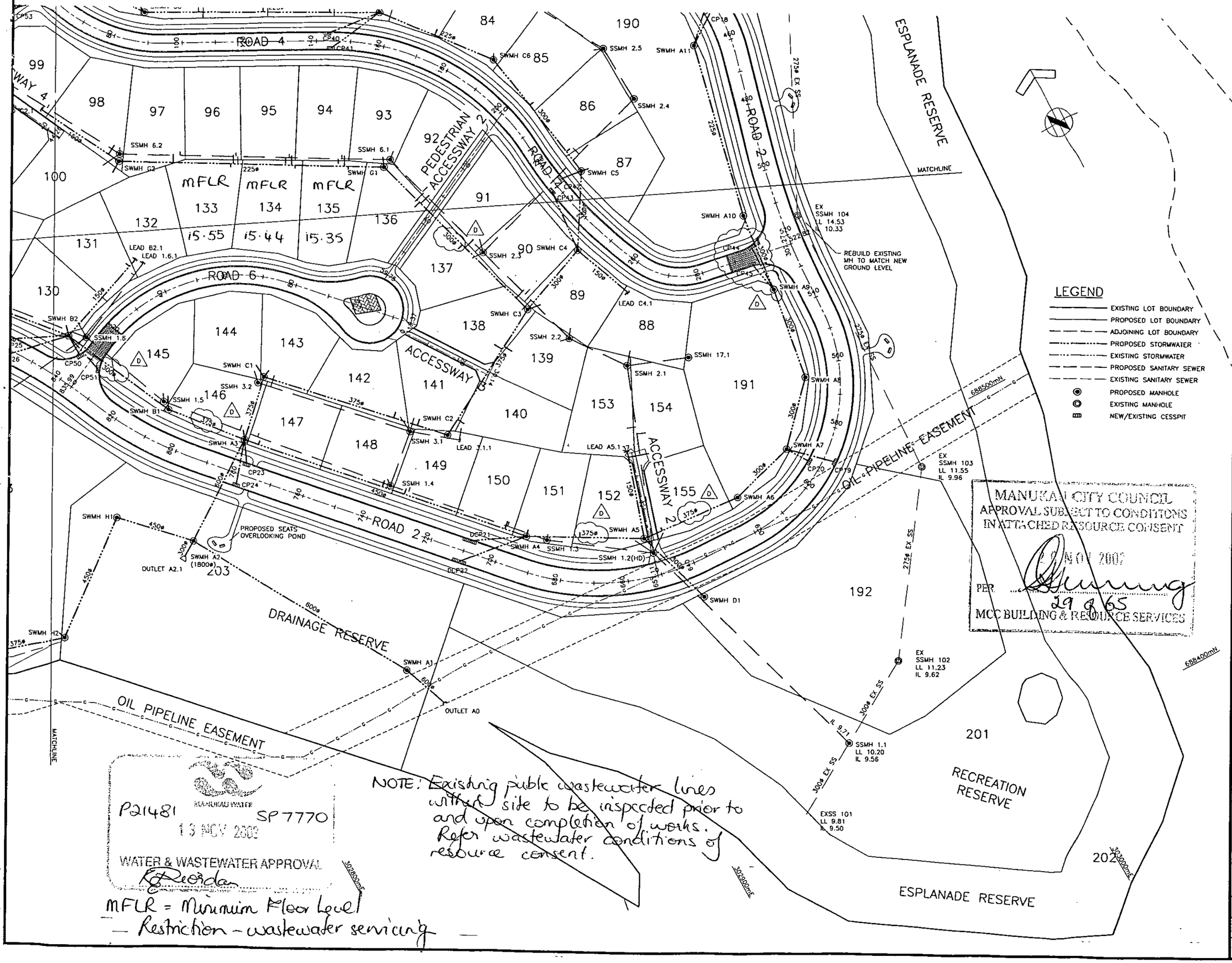
sales@atlan.com.au
100 Silverwater Rd,
Silverwater NSW 2128
atlan.com.au

0524

APPENDIX F
PROPERTY FILE RECORD



GENERAL NOTES

1. ALL LEVELS ARE IN TERMS OF LANDS AND SURVEY DATUM 1946
2. THESE CONTRACT DRAWINGS DO NOT NECESSARILY SHOW ALL EXISTING SERVICES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ACCURATELY LOCATE AND PROTECT ALL EXISTING SERVICES BEFORE EXCAVATION AND TAKE ALL CARE TO PROTECT DURING THE FULL CONSTRUCTION PERIOD.
3. ALL WORKS SHALL BE IN ACCORDANCE WITH MANUKAU CITY COUNCIL STANDARDS.
4. ALL STORMWATER LINES SHALL BE RCRRJ CLASS X.
5. ALL SANITARY SEWER LINES SHALL BE 150ø uPVC SEHC UNLESS SHOWN OTHERWISE
6. SW AND SS CONNECTIONS TO BE 100ø uPVC SEHC.
7. ALL CESSPIT LEADS TO HAVE A MINMUM COVER OF 1.2m IN BERMS TO ALLOW FOR SERVICES INSTALLATION.
8. STUBS FROM MANHOLES SHALL BE A MINIMUM OF 2.0m LONG, OR 1.0m INSIDE AN ADJACENT BOUNDARY.
9. APPROVED HARDFILL SHALL BE USED WHEN BACKFILLING ALL ROAD CROSSINGS.
10. REFER TO LONGSECTIONS FOR DETAILS OF JUNCTION DISTANCES FROM MANHOLES.
11. ALL MODIFICATIONS TO EXISTING DRAINS ARE TO BE CARRIED OUT BY A MANUKAU CITY COUNCIL APPROVED LICENCED CONTRACTOR.

D	AMENDMENT AS CLOUDED	SW	
C	AMENDMENT AS CLOUDED	SW	05.10.02
B	AMENDMENT AS CLOUDED	SW	23.09.02
A	ORIGINAL ISSUE	SW	09.08.02
	Amendments	Name	Date

Contractor To:
Verify all dimensions on site before commencing any work.
Refer to all figured dimensions DO NOT SCALE
Refer all discrepancies to Drawing Office.

	Name	Date
Surveyed		
Designed		
Drawn	S WANG	MAY 02
Traced		
Checked		
Approved		

MANUKAU CITY COUNCIL
APPROVAL SUBJECT TO CONDITIONS IN ATTACHED RESOURCE CONSENT
29 NOV 2002
PER
29 9 65
MCC BUILDING & RESOURCE SERVICES

MANUKAU WATER
P21481 SP 7770
19 NOV 2002
WATER & WASTEWATER APPROVAL

NOTE: Existing public wastewater lines within site to be inspected prior to and upon completion of works. Refer wastewater conditions of resource consent.

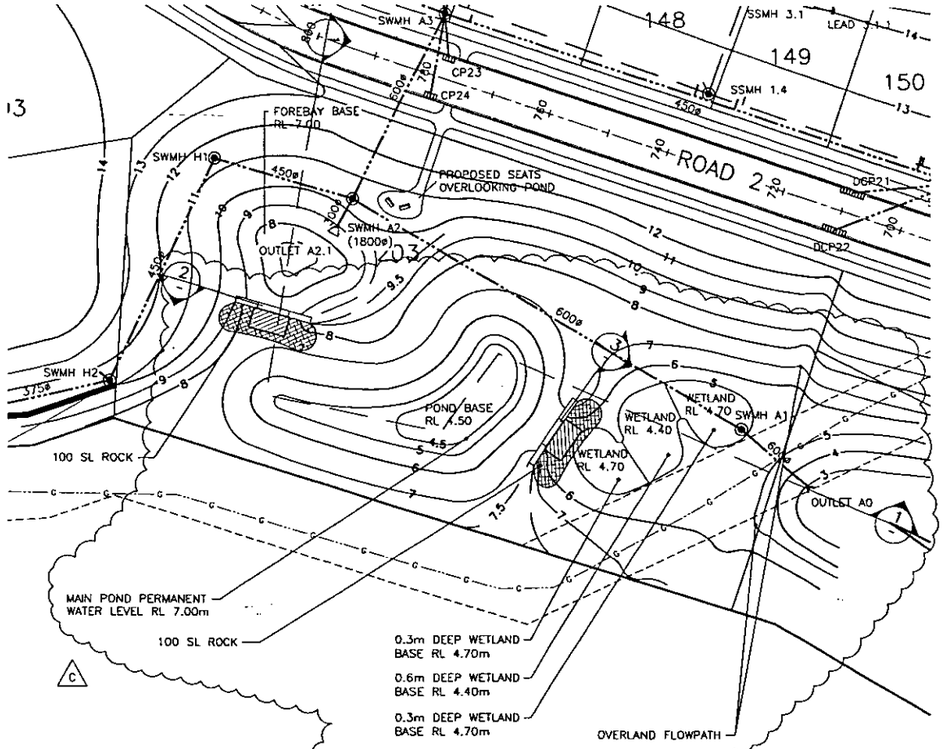
MFLR = Minimum Floor Level
— Restriction - wastewater servicing —

Tse
Tse Group Limited
ARCHITECTS - ENGINEERS - INTERIOR DESIGNERS
SURVEYORS - TOWN PLANNERS - VALUERS
Auckland 485 Gt Sth Rd PO Box 6504 Tel 525 2214
Wellington 23 Tarenaki St PO Box 6643 Tel 384 2029
Facsimile Auckland 525 2241 Wellington 384 5065

Job Title
AMBERLY LTD
752 MASSEY ROAD
MANGERE
MANUKAU CITY

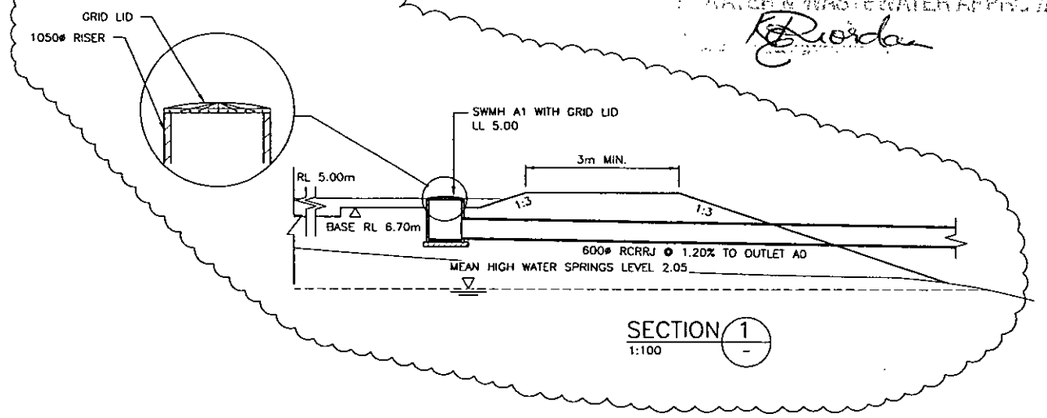
Sheet Title
DRAINAGE PLAN
SHEET 4 OF 4

Project	Aspect	Drawing
5296-01		403
Cad Ref. File		Sheet
403--d		
Scale (A1 Original)		Amendment
1:500		D

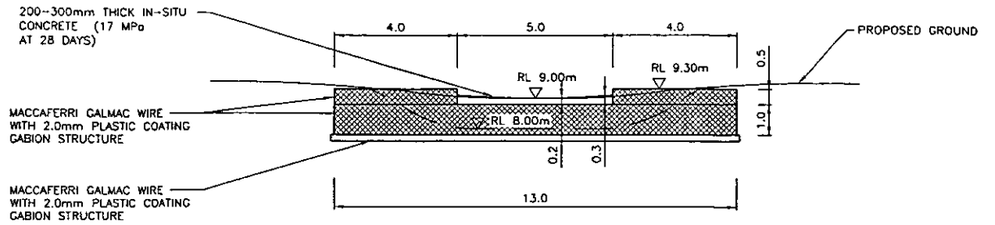


LEGEND

- UNDERLYING LOT BOUNDARY
- PROPOSED LOT BOUNDARY
- PROPOSED STORMWATER
- EXISTING STORMWATER
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER
- PROPOSED CONTOURS
- EXISTING CONTOURS
- PROPOSED MANHOLE
- EXISTING MANHOLE



SECTION 1 (1:100)



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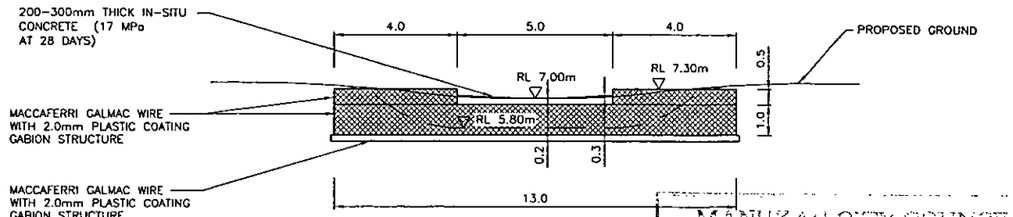
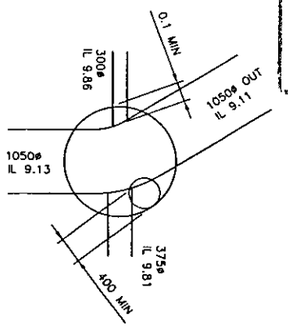


SECTION 3 (1:100)

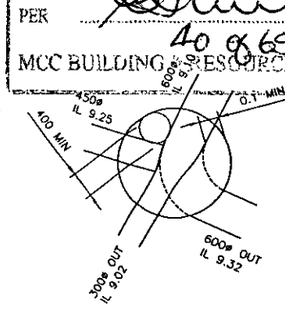
P21481 SP 7770

WATER & WASTEWATER APPROVED

MANUKAU CITY COUNCIL
APPROVAL SUBJECT TO CONDITIONS IN ATTACHED RESOURCE CONSENT
PER 40 965
MCC BUILDING & RESOURCE SERVICES

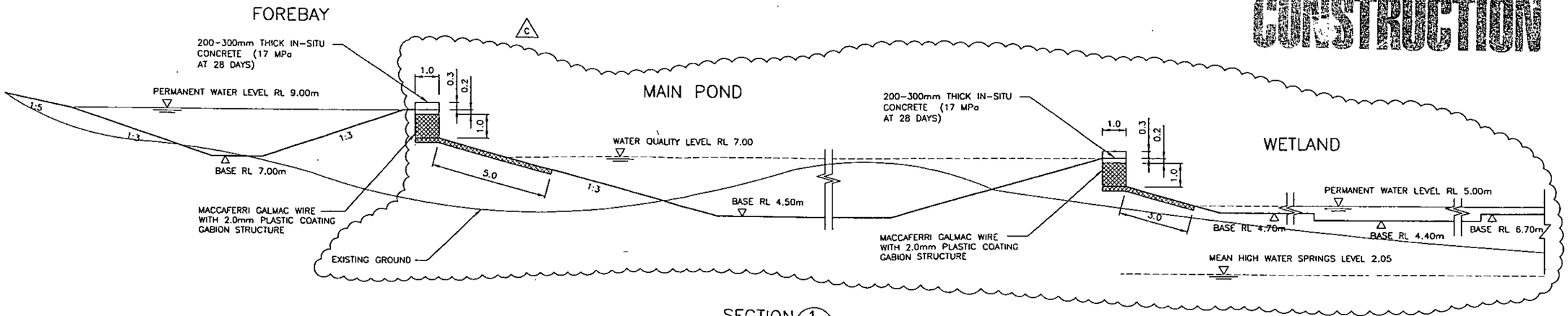


SWMH P1 1800ø (1:50)



SWMH A2 1800ø (1:50)

CONSTRUCTION



SECTION 1 (1:100)

GENERAL NOTES

C	REVISED POND	SW	
B	REVISED CONTOUR	SW	23.09.02
A	ORIGINAL ISSUE	SW	09.08.02
	Amendments	Name	Date

Contractor To:
Verify all dimensions on site before commencing any work.
Refer to all figured dimensions DO NOT SCALE
Refer all discrepancies to Drawing Office.

	Name	Date
Surveyed		
Designed		
Drawn	S WANG	JUN 02
Traced		
Checked		
Approved		15/10/02

Tse
Tse Group Limited
ARCHITECTS - ENGINEERS - INTERIOR DESIGNERS
SURVEYORS - TOWN PLANNERS - VALUERS
Auckland 485 Gt Sth Rd PO Box 6504 Tel 525 2214
Wellington 23 Taranaki St PO Box 6643 Tel 384 2029
Facsimile Auckland 525 2241 Wellington 384 5065

Job Title
AMBERLEY LTD
752 MASSEY ROAD
MANGERE
MANUKAU CITY

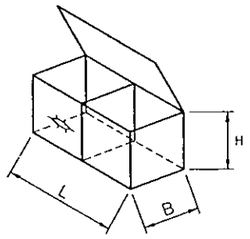
Sheet Title
STORMWATER QUALITY POND DETAILS

Project Aspect	Drawing
5296–01	413
Cad Ref. File: 413–c	Sheet
Scale (A1 Original): AS SHOWN	Amendment: C

REFER TO MACCAFERRI FOR FULL PRODUCT AND CONSTRUCTION SPECIFICATIONS
ALL UNITS CONSIST OF DOUBLE TWISTED, HEXAGONAL WOVEN WIRE MESH OF ZINC/ALUMINIUM (GALMAC®) WIRE ACCORDING TO INTERNATIONAL STANDARDS A S.T.M.856. POLYMER PRODUCTS HAVE THE SAME ZINC/ALUMINIUM (GALMAC) WIRE WHICH IS SHEATHED WITH A 0.5mm THICK POLYMER COATING

MACCAFERRI® GABIONS

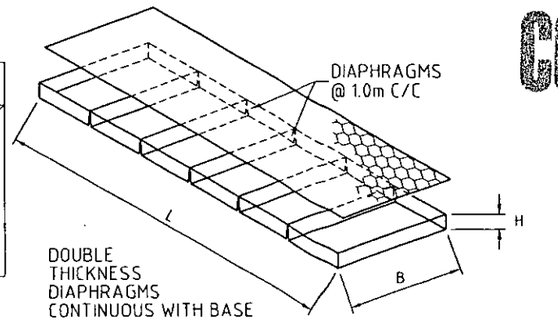
LxBxH (m)	NOMINAL MESH SIZE	BODY WIRE DIAMETER
2 x 0.5 x 0.5 2 x 1 x 0.5 2 x 1 x 1 1.5 x 1 x 1	80 x 100mm 80	Ø 2.7mm POLYMER ZN/AL ZN/AL



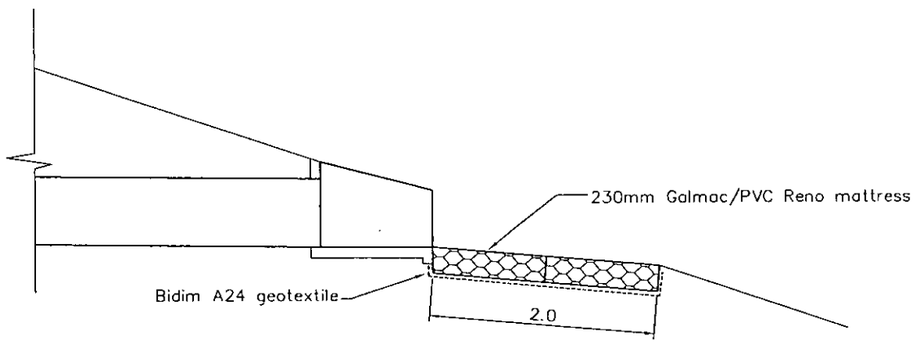
HORIZONTAL MESH ON GABION FRONT FACE

CASTORO RENO® MATTRESS

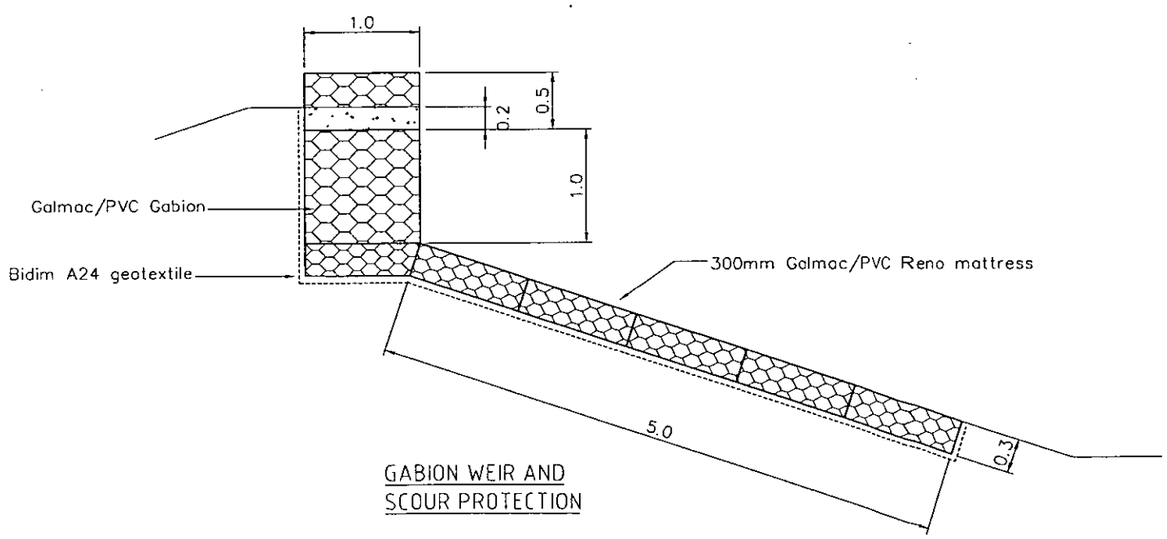
LxBxH (m)	NOMINAL MESH SIZE	BODY WIRE DIAMETER
6 x 2 x 0.17 6 x 2 x 0.23 6 x 2 x 0.30	60 x 80mm 60	Ø 2.0mm POLYMER ZN/AL ZN/AL



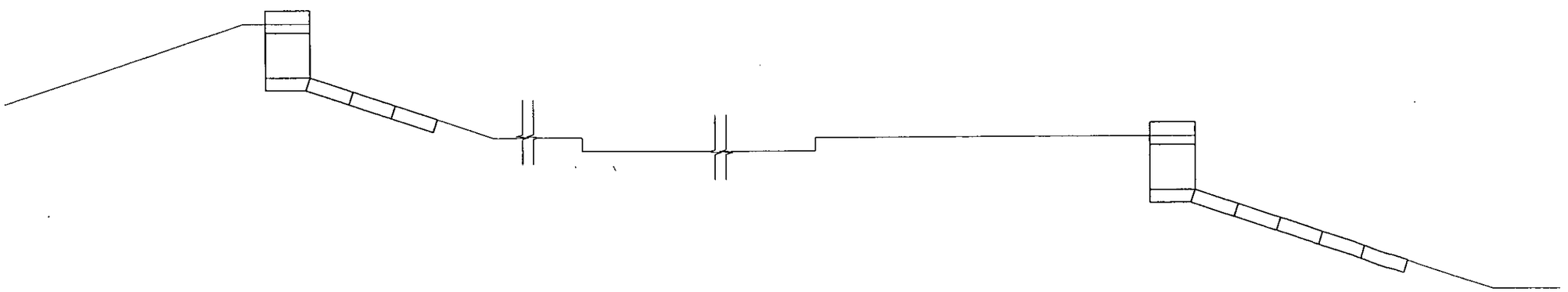
DOUBLE THICKNESS DIAPHRAGMS CONTINUOUS WITH BASE



SCOUR PROTECTION FOR HYNDS PRECAST OUTLET



GABION WEIR AND SCOUR PROTECTION



GENERAL NOTES

CONSTRUCTION

A	ORIGINAL ISSUE	SW	
	Amendments	Name	Date

Contractor To.
Verify all dimensions on site before commencing any work.
Refer to all figured dimensions DO NOT SCALE
Refer all discrepancies to Drawing Office.

	Name	Date
Surveyed		
Designed		
Drawn	S WANG	JUN 02
Traced		
Checked		
Approved		

Tse Group Limited
ARCHITECTS - ENGINEERS - INTERIOR DESIGNERS
SURVEYORS - TOWN PLANNERS - VALUERS
Auckland 485 Gt Sth Rd PO Box 6504 Tel 525 2214
Wellington 23 Taranaki St PO Box 6643 Tel 384 2029
Facsimile Auckland 525 2241 Wellington 384 5065

Job Title

AMBERLEY LTD
752 MASSEY ROAD
MANGERE
MANUKAU CITY

Sheet Title

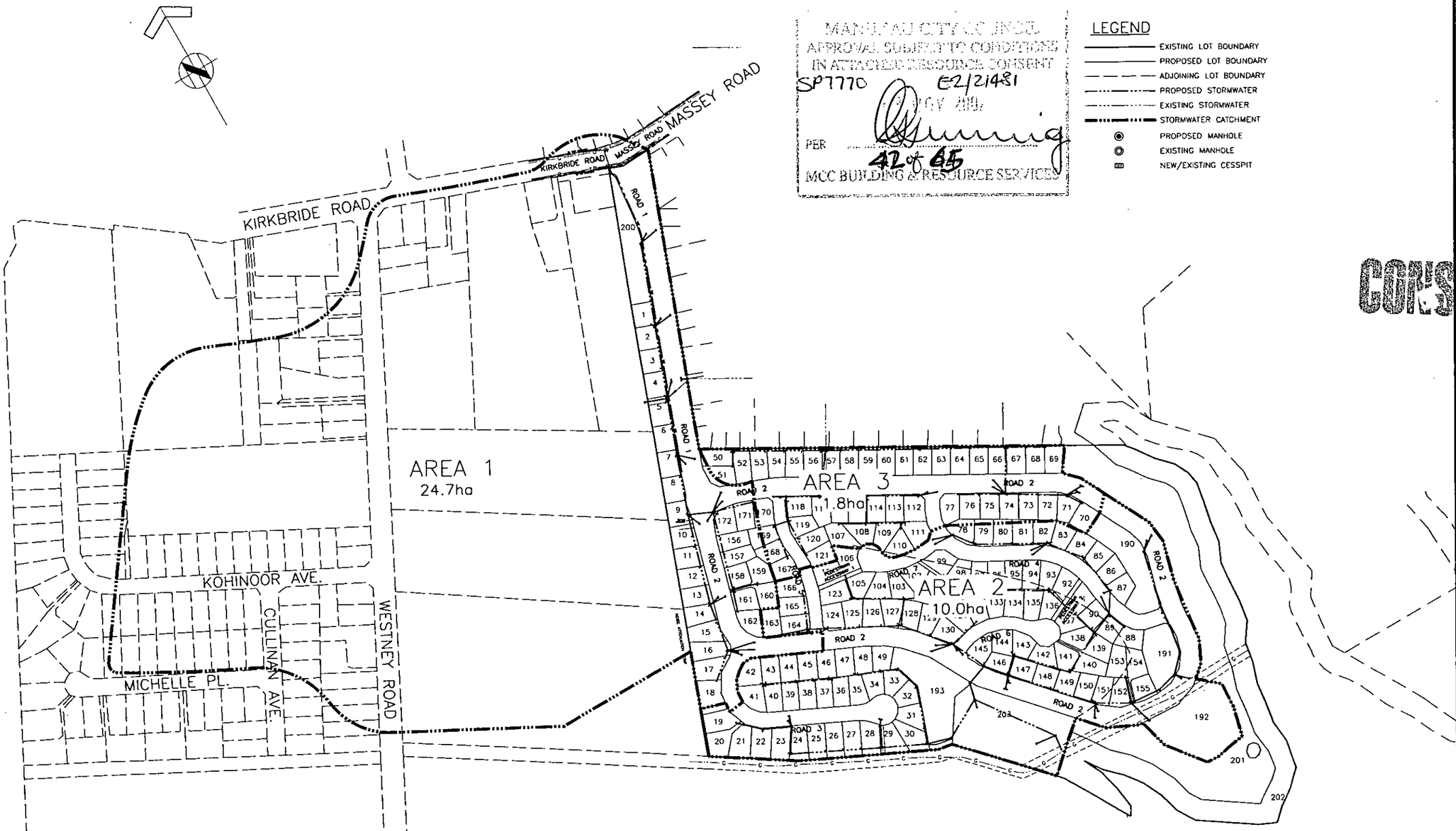
MACCAFERRI
PRODUCT DETAILS

Project Aspect	Drawing
5296-01	415 Sheet
Cad Ref. File: 415-a	
Scale (A1 Original): NOT TO SCALE	Amendment: A

MANUKAU CITY COUNCIL
APPROVAL SUBJECT TO CONDITIONS
IN ATTACHED RESOURCE CONSENT
SP7770 E2/21481
DATED 20/
PER
42 of 65
MCC BUILDING & RESOURCE SERVICES

LEGEND

- EXISTING LOT BOUNDARY
- PROPOSED LOT BOUNDARY
- ADJOINING LOT BOUNDARY
- PROPOSED STORMWATER
- EXISTING STORMWATER
- STORMWATER CATCHMENT
- PROPOSED MANHOLE
- EXISTING MANHOLE
- NEW/EXISTING CESSPIT



GENERAL NOTES

1. THESE CONTRACT DRAWINGS DO NOT NECESSARILY SHOW ALL EXISTING SERVICES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ACCURATELY LOCATE AND PROTECT ALL EXISTING SERVICES BEFORE EXCAVATION AND TAKE ALL CARE TO PROTECT DURING THE FULL CONSTRUCTION PERIOD.

CONSTRUCTION

	Amendments	Name	Date
A	ORIGINAL ISSUE	SW	

Contractor To:
Verify all dimensions on site before commencing any work.
Refer to all figured dimensions DO NOT SCALE
Refer all discrepancies to Drawing Office.

	Name	Date
Surveyed		
Designed		
Drawn	S WANG	MAY 02
Traced		
Checked		9/5/02
Approved		9/5/02

Tse Group Limited
ARCHITECTS - ENGINEERS - INTERIOR DESIGNERS
SURVEYORS - TOWN PLANNERS - VALUERS
Auckland 485 Gt Sth Rd PO Box 6504 Tel 525 2214
Wellington 23 Taranaki St PO Box 6643 Tel 384 2029
Facsimile Auckland 525 2241 Wellington 384 5065

Job Title

AMBERLEY LTD
752 MASSEY ROAD
MANGERE
MANUKAU CITY

Sheet Title

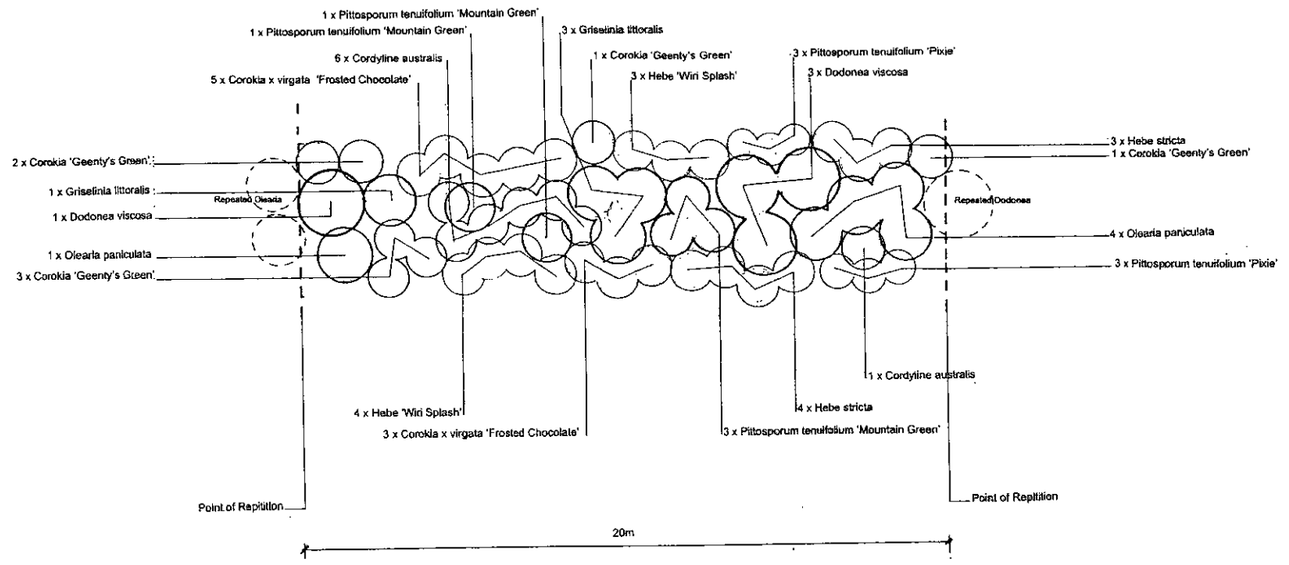
STORMWATER
CATCHMENT PLAN

Project Aspect	Drawing
5296-01	416 Sheet
Cad Ref. File: 416-a	
Scale (A1 Original): 1:2000	Amendment: A

42

A

BUFFER STRIP
20m Strip to Be Repeated



Buffer Strip Planting Schedule per 20m Section					
Botanical Name	Common Name	Spacing	Pb Size	Min Size (mm)	Quantity
Cordyline australis	Cabbage Tree	1000	5	300	7
Corokia 'Geenty's Green'	Corokia	1000	5	300	6
Corokia x virgata 'Frosted Chocolate'	Corokia	1500	5	300	8
Dodonea viscosa	Ake Ake	2000	5	300	4
Griselinia littoralis	Kapuka	1750	5	300	4
Hebe stricta	Hebe	1000	5	300	7
Hebe 'Wiri Splash'	Hebe	1000	5	300	7
Olearia paniculata	Olearia	2000	5	300	5
Pittosporum tenuifolium 'Mountain Green'	Pittosporum	1500	5	300	5
Pittosporum tenuifolium 'Pixie'	Pittosporum	1000	5	300	6
Total					69

LA4
LANDSCAPE ARCHITECTS
LEVEL 12, 29 WATERLOO QUADRANT
PO BOX 5669, WELLESLEY ST
AUCKLAND
PHONE: (09) 358 0904
FAX: (09) 358 0895
E MAIL: la4@nznet.gen.nz

PROJECT:
Amberly Ltd
752 Massey Road
Mangere

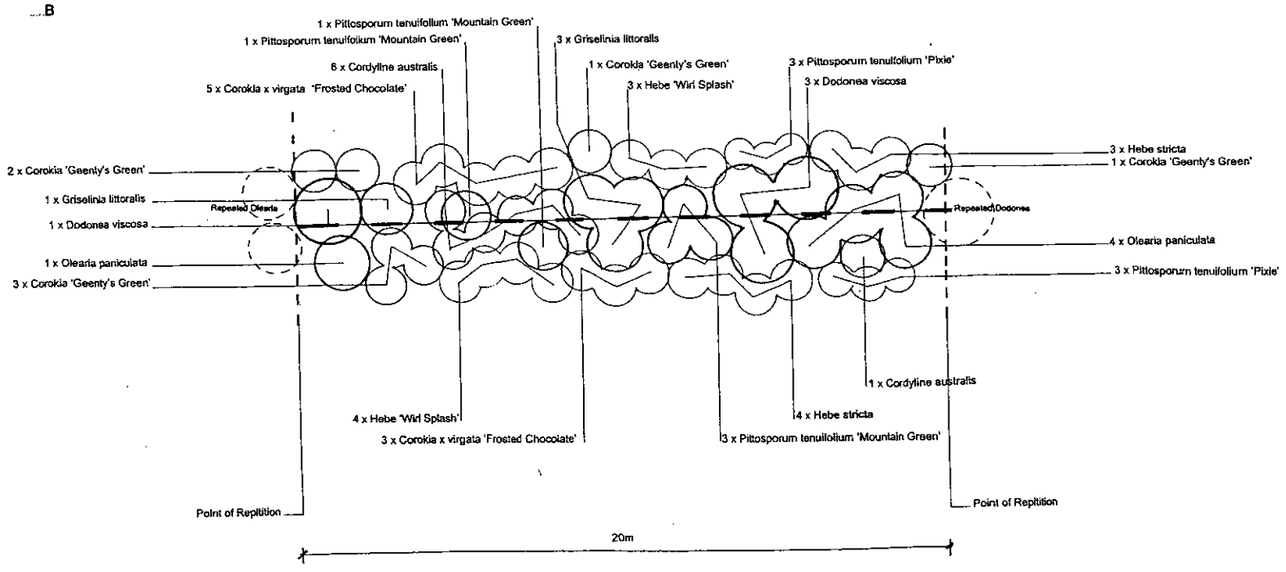
DRAWING TITLE:
Planting Plan
West and South
Boundary

SCALE: 1:100 @ A1
DATE: 21.08.02
REF No: 02 352 Plan 1
DRAWN BY: NGP

AMENDMENT:

NOISE ATTENUATION STRIP
20m Strip to Be Repeated

B

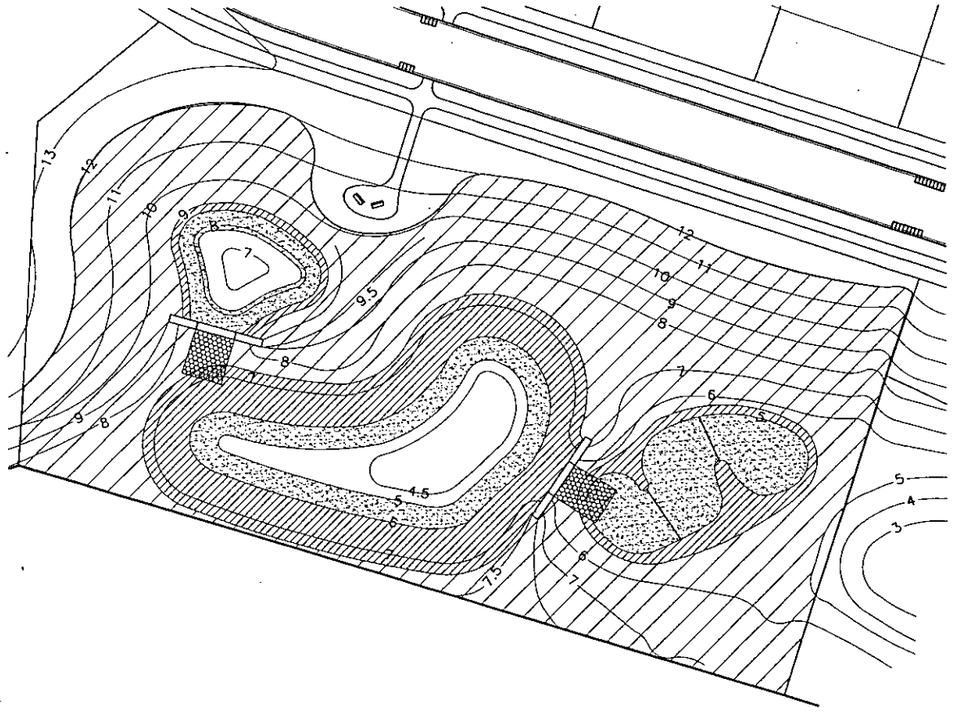


Noise Attenuation Strip Planting Schedule per 20m Section					
Botanical Name	Common Name	Spacing	Pb Size	Min Size (mm)	Quantity
Cordyline australis	Cabbage Tree	1000	5	300	7
Corokia 'Geenty's Green'	Corokia	1000	5	300	6
Corokia x virgata 'Frosted Chocolate'	Corokia	1500	5	300	8
Dodonea viscosa	Ake Ake	2000	5	300	4
Griselinia littoralis	Kapuka	1750	5	300	4
Hebe stricta	Hebe	1000	5	300	7
Hebe 'Wiri Splash'	Hebe	1000	5	300	7
Olearia paniculata	Olearia	2000	5	300	5
Pittosporum tenuifolium 'Mountain Green'	Pittosporum	1500	5	300	5
Pittosporum tenuifolium 'Pixie'	Pittosporum	1000	5	300	6
Total					59

CONSTRUCTION

GP

CONSTRUCTION



Stormwater Pond Planting Schedule						
Botanical Name	Common Name	Pb Size	Spacing	Min Size	Quantity	Key
PREDOMINATELY SUBMERGED SPECIES						
Baumea articulata	Jointed Twig Rush	three quarters	600	200	726	
Baumea juncea	Rush / Sedge Tussock	three quarters	600	200	726	
Leptocarpus simplex	Oioi	three quarters	600	200	408	
PERIODIC INUNDATION						
Carex germinata	Cutty Grass	three quarters	1200	250	108	
Carex secta	Niggerhead	three quarters	1000	250	158	
Carex virgata	Swamp Sedge	three quarters	1000	250	158	
Coprosma tenuicaulis	Swamp Coprosma	three quarters	1000	250	158	
Cordyline australis	Cabbage Tree	three quarters	700	300	229	
Cyperus ustulatus	Umbrella Sedge	three quarters	1000	450	158	
Phormium cookianum	Mountain Flax	three quarters	1500	900	69	
NO INUNDATION						
Aristotelia serrata	Wineberry	3	2000	900	121	
Cordyline australis	Cabbage Tree	3	700	300	900	
Coprosma robusta	Karamu	3	2000	900	121	
Hebe stricta	Koromiko	3	1200	300	486	
Myrsine australis	Mapou	3	2000	900	121	
Phormium tenax	Flax	3	1500	900	214	
Pseudopanax arboreus	Five finger	3	2000	900	36	
Total						4912

Predominantly Submerged

Forbay RL 8.0 – 8.25m
Wetland Below RL 7.0
Main Pond RL 4.2 – 3.8m

Periodic Inundation

Forbay RL 9.5 – 9.0
Wetland RL 7.5 – 7.0
Main Pond RL 6.0 – 4.2

No Inundation

Refer to plan for area

LA4
LANDSCAPE ARCHITECTS
LEVEL 17, 20 WATERLOO QUADRANT
PO BOX 3669, WELLESLEY ST
AUCKLAND
PHONE: (09) 358 0804
FAX: (09) 358 0895
E MAIL: la4@xtra.co.nz

PROJECT:
Amberly Ltd
752 Massey Road
Mangere

DRAWING TITLE:
Planting Plan
Stormwater Pond

SCALE: 1:500 @ A1
DATE: 21.08.02
REF No: 02 352 Plan 3
DRAWN BY: NGF

AMENDMENT:

CITY COUNCIL RESERVE

ALLOT 366
SO 46259

RECREATION RESERVE

D P 5 0 9 1 0

DP 188231

LEGEND

- EXISTING LOT BOUNDARY
- PROPOSED LOT BOUNDARY
- ADJOINING LOT BOUNDARY
- PROPOSED FENCE LINE
- PROPOSED STREET LIGHT
- PROPOSED TREE

KIRKBRIDE ROAD

MASSEY ROAD

Refer Plan 4

PROPOSED WALL

LANDSCAPE REFER TO LA4

Pt
ALLOT 74
SO 1340

ROAD 1

RECREATION RESERVE

1.8m HIGH TIMBER FENCE

MANUKAU CITY COUNCIL RESERVE

Street Tree Planting					
Botanical Name	Common Name	Spacing	Pb Size	Min Size (mm)	Quantity
Magnolia grandiflora 'Ferruginea'	Magnolia	20000	95	1500	159
Total					159*

* excludes trees in Street Gardens

Reserve Planting					
Botanical Name	Common Name	Spacing	Pb Size	Min Size (mm)	Quantity
Metrosideros excelsa	Pohutakawa	n/a	95	1500	14
Vitex lucens	Puriri	n/a	95	1500	13
Total					27

DP 198960

D P 1 8 8 2 3 1

D P 1 8 8 2 3 1

Refer Plan 1 fig A

Refer Plan 2 fig D

Refer Plan 2 fig A

Refer Plan 1 fig B

Refer Plan 2 fig B

Refer Plan 2 fig C

Refer Plan 3

Refer Plan 1 fig A

ROAD 1

ROAD 2

ROAD 3

ROAD 4

ROAD 5

ROAD 6

ROAD 7

Pt ALLOT 74
SO 1340
SLAMIC FOUNDATION
AND DAWAH TRUST

LOT 1
DP 114982
ISLAMIC FOUNDATION
& DAWAH TRUST

Pt ALLOT 74
SO 1340
SOCIETY FOR
THE PREVENTION
OF CRUELTY
TO ANIMALS

LOT 1
DP 196236
D.G. & J.I. CAMERON
& E.J. EYRE

1.8m HIGH TIMBER FENCE ON TOP OF NOISE ATTENUATION STRIP

1.8m HIGH TIMBER FENCE

1.2m HIGH TIMBER FENCE

2 X REMOVABLE BOLLARDS

PEDESTRIAN ACCESSWAY 1

PEDESTRIAN ACCESSWAY 2

PEDESTRIAN ACCESSWAY 3

RESERVE BOLLARDS

OIL LINE EASEMENT

PLANTING OF BUFFER STRIP & NOISE ATTENUATION STRIP REFER LA4 PLANT.8m HIGH TIMBER FENCE

DRAINAGE RESERVE

RECREATION RESERVE

ESPLANADE RESERVE

2 x Vitex lucens

3 x Metrosideros excelsa

3 x Vitex lucens

3 x Metrosideros excelsa

3 x Vitex lucens

3 x Metrosideros excelsa

2 x Vitex lucens

3 x Vitex lucens

2 x Metrosideros excelsa

MANUKAU CITY COUNCIL
APPROVAL SUBJECT TO CONDITIONS
IN ATTACHED RESOURCE CONSENT

PER

63 of 65

MCC BUILDING & RESOURCE SERVICES

LA4
LANDSCAPE ARCHITECTS
LEVEL 12, 20 WATERLOO QUADRANT
PO BOX 5449, WELLESLEY ST
AUCKLAND
PHONE: (09) 353 0904
FAX: (09) 309 8895
E MAIL: la4@xtra.co.nz

PROJECT:
Amberly Ltd
752 Massey Road
Mangere

DRAWING TITLE:
Location Plan

SCALE: 1:1000 @ A1
DATE: 21.08.02
REF No: 02.352
DRAWN BY: NGP

AMENDMENT:

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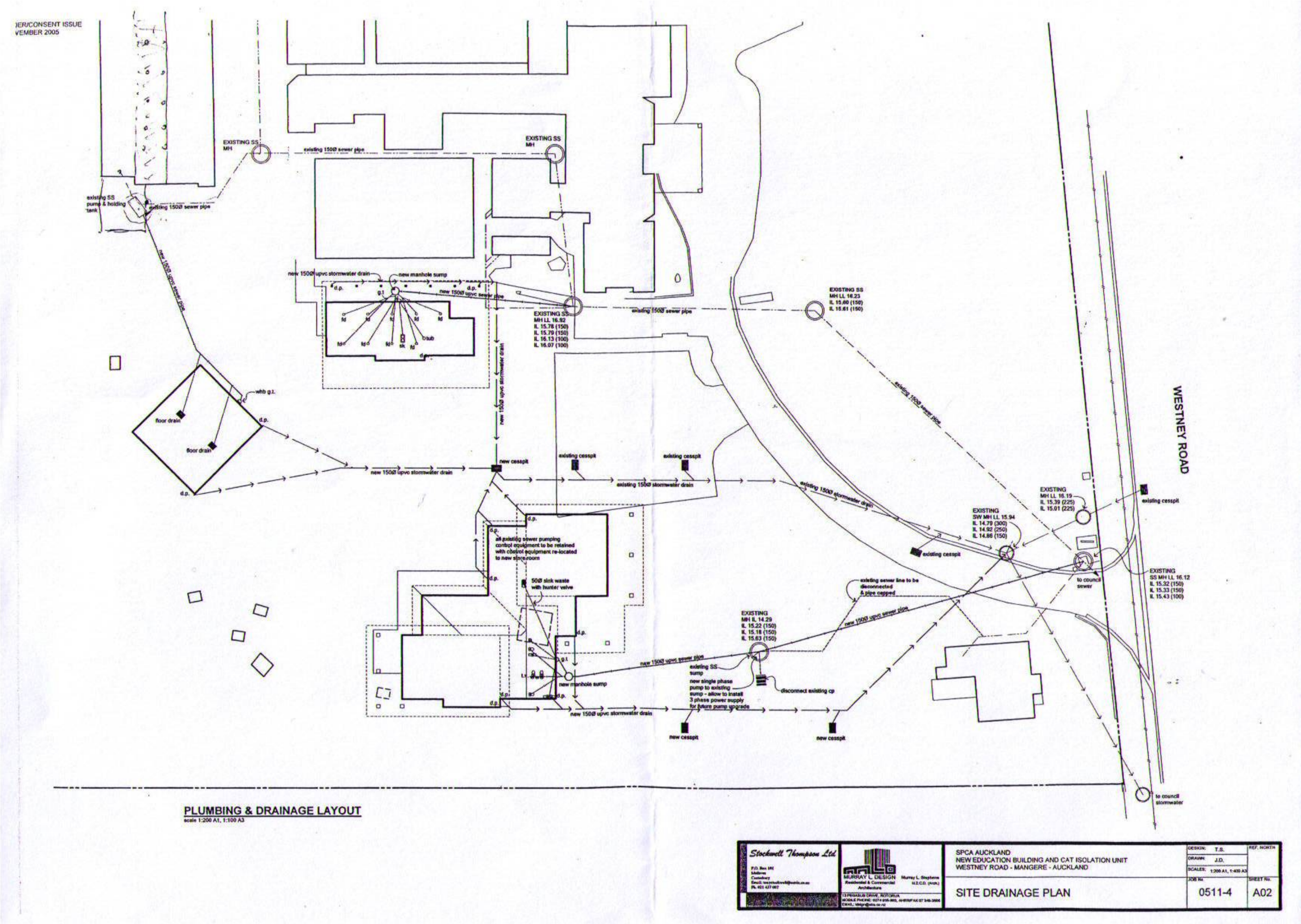
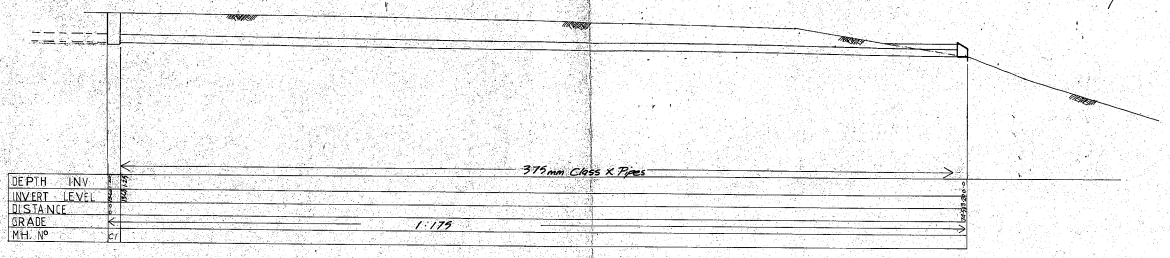
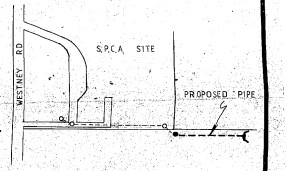

ER/CONSENT ISSUE
VEMBER 2005
EXISTING SS MH
existing 150Ø sewer pipe
existing SS pump & holding tank
new 150Ø upvc sewer pipe
new 150Ø upvc stormwater drain
new manhole sump
new 150Ø upvc sewer pipe
EXISTING SS MH LL 16.92 IL 15.78 (150) IL 15.79 (150) IL 16.13 (100) IL 16.07 (100)
existing 150Ø sewer pipe
EXISTING SS MH LL 16.23 IL 15.60 (150) IL 15.61 (150)
floor drain
floor drain
new cesspit
existing cesspit
existing cesspit
existing 150Ø stormwater drain
all existing sewer pumping control equipment to be retained with control equipment re-located to new store room
50Ø sink waste with hunter valve
new manhole sump
EXISTING MH IL 14.29 IL 15.22 (150) IL 15.18 (150) IL 15.63 (150)
existing SS sump
new single phase pump to existing sump - allow to install 3 phase power supply for future pump upgrade
disconnect existing cp
existing sewer line to be disconnected & pipe capped
new 150Ø upvc sewer pipe
new 150Ø upvc stormwater drain
new cesspit
new cesspit
existing cesspit
EXISTING SW MH LL 15.94 IL 14.79 (300) IL 14.92 (250) IL 14.86 (150)
EXISTING MH LL 16.19 IL 15.39 (225) IL 15.01 (225)
existing cesspit
to council sewer
EXISTING SS MH LL 16.12 IL 15.32 (150) IL 15.33 (150) IL 15.43 (100)
WESTNEY ROAD
to council stormwater
PLUMBING & DRAINAGE LAYOUT
scale 1:200 A1, 1:100 A3
Stockwell Thompson Ltd
MURRAY L. DESIGN
Residential & Commercial Architecture
Murray L. Stephens
SPCA AUCKLAND
NEW EDUCATION BUILDING AND CAT ISOLATION UNIT
WESTNEY ROAD - MANGERE - AUCKLAND
SITE DRAINAGE PLAN
DESIGN: T.S.
DRAWN: J.D.
SCALES: 1:200 A1, 1:400 A3
JOB No. 0511-4
SHEET No. A02
REF. NORTH

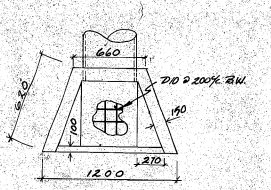
D.G. Camer
28.9.82



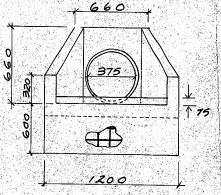
LONG — SECTION Scale Horz. 1:200 Vert 1:100



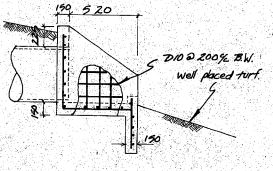
LOCALITY PLAN



PLAN



END ELEVATION



SIDE ELEVATION N.T.S

APPROVED
R.S.C. Rudd
28/9/82.

ISSUE	DATE	REVISION	BY

JOB TITLE
S.P.C.A. ANIMAL VILL.
HANGERE

SHEET TITLE
PIPING OF EXISTING OPEN DRAIN.

CHAMBERS & RUDD CONSULTING ENGINEERS
PAPAKOTIOE OFFICE phone 278 1272, 278 2185
PAPAKURA OFFICE phone 298 7226

SCALE As shown
DESIGN
DRAWN PAE
CHECKED
DATE Sept 81

JOB NO 106-859.
SHEET NO 1
REVISION

DO NOT SCALE. FIGURED DIMENSIONS ONLY TO BE USED.
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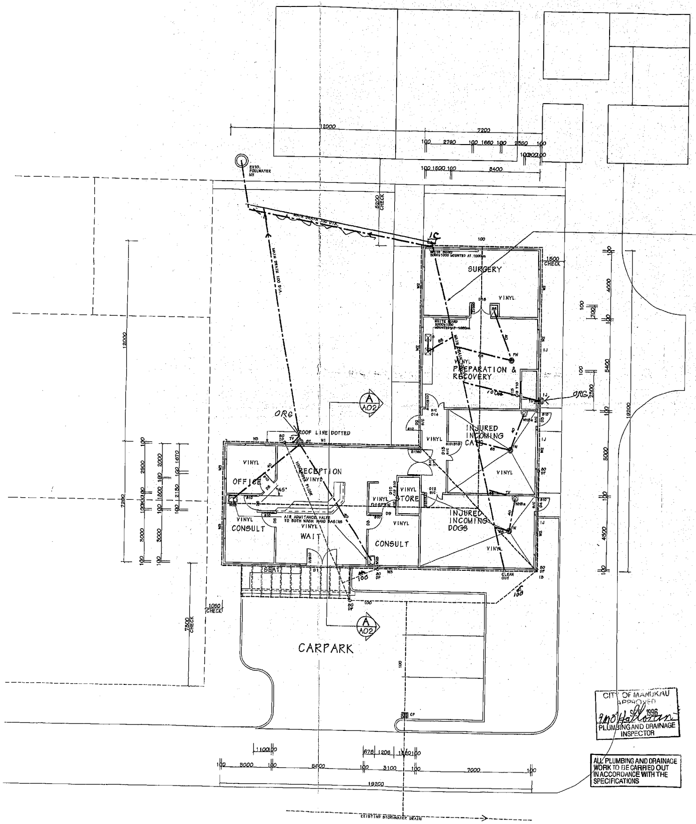

NOTES:

1. ALL NEW DRAINAGE TO COMPLY WITH THE NZ BUILDING CODE AND COUNCIL REQUIREMENTS
2. ALL TIMBER FRAME CONSTRUCTION TO COMPLY WITH NZS 3604
3. CONTRACTOR TO REMOVE SOIL SPOILS CREATED DURING CONSTRUCTION REGRADE AND RE-GRASS
4. CREATE FALLS IN CONCRETE SLAB AS SHOWN IN INJURED INCOMING CATS AND DOGS TO FLOOR WASTE
5. SLAB TO BE SET DOWN 20mm AT DOOR THESHOLDS TO INCOMING CATS AND DOGS THEN FALLS CREATE AS DRAWN PROVIDING A WATER THRESHOLD
6. REFER TO SPECIFICATION FOR BRACING DETAILS

PLUMBING FIXTURES

SS	FABRICATED STAINLESS STEEL SCRUB UP TROUGH WITH ELBOW TAPS CLIENT SUPPLIED
S	FABRICATED STAINLESS STEEL SINKS x2 WITH BASKET HAIR TRAPS TAPS 1. SHOWER MIXER MOUNTED IN STAINLESS STEEL UPSTAND WITH BATH SPOUT WITH RUFF FOR FITTING A RUBBER HOSE 2. WALL MOUNTED FAUCET SWIVEL SPOUT AND CROSS HEAD TAPS
TD	FABRICATED STAINLESS STEEL BENCH TOP WITHDRAIN OUTLET TO DRAIN INTO STAINLESS STEEL TUN DISH WALL MOUNTED SINGLE COLD WATER TAP WITH RUFF TO FIT RUBBER HOSE
WHBs	STAINLESS STEEL WASH HAND BASIN TAP 1. HOT AND COLD CROSS HEAD TAPS 2. HOSE TAP SITUATED UNDER WASH HAND BASIN
WHB	CERAMIC WASH HAND BASIN WITH CUPBOARD CABINET UNDER LAQCURED FINISH
FW	4.5 LITRE 'PLASTIC SYSTEMS' TRAPPED FLOOR GULLEY

100x50 TIMBER STUD WALL TO UNDER SIDE OF ROOF PROFILE TO HAVE ACOUSTIC BATTS AND 1 LAYER OF 9.5mm GIB BOARD TO EACH SIDE (EXCEPT OUTSIDE WALLS)

CEILING SPACE TO BE FITTED OUT WITH ACOUSTIC BATTS

NEW FOULWATER DRAINAGE

NEW STORMWATER DRAINAGE

S/C SOLID CORE DOOR
REFER ELEVATION FOR VISION PANEL DETAILS
D11, D12, D13, D14, D16

ExTRA DOWNPIPES MAYBE REQUIRED,

CITY OF MANUKAU APPROVED
PLUMBING AND DRAINAGE INSPECTOR

ALL WATERMAINS into Buildings to be inspected by PLUMBING DRAINAGE Inspector before backfilling.

ALL PLUMBING AND DRAINAGE WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE SPECIFICATIONS

DODD PATERSON + BUKOWSKI-REHM
ARCHITECTS
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CONSULTANTS

CLIENT: S.P.C.A AUCKLAND

PROJECT: PROPOSED ANIMAL HOSPITAL AUCKLAND ANIMAL VILLAGE WESTNEY ROAD MANGERE

SHEET: FLOOR PLAN DRAINAGE PLAN

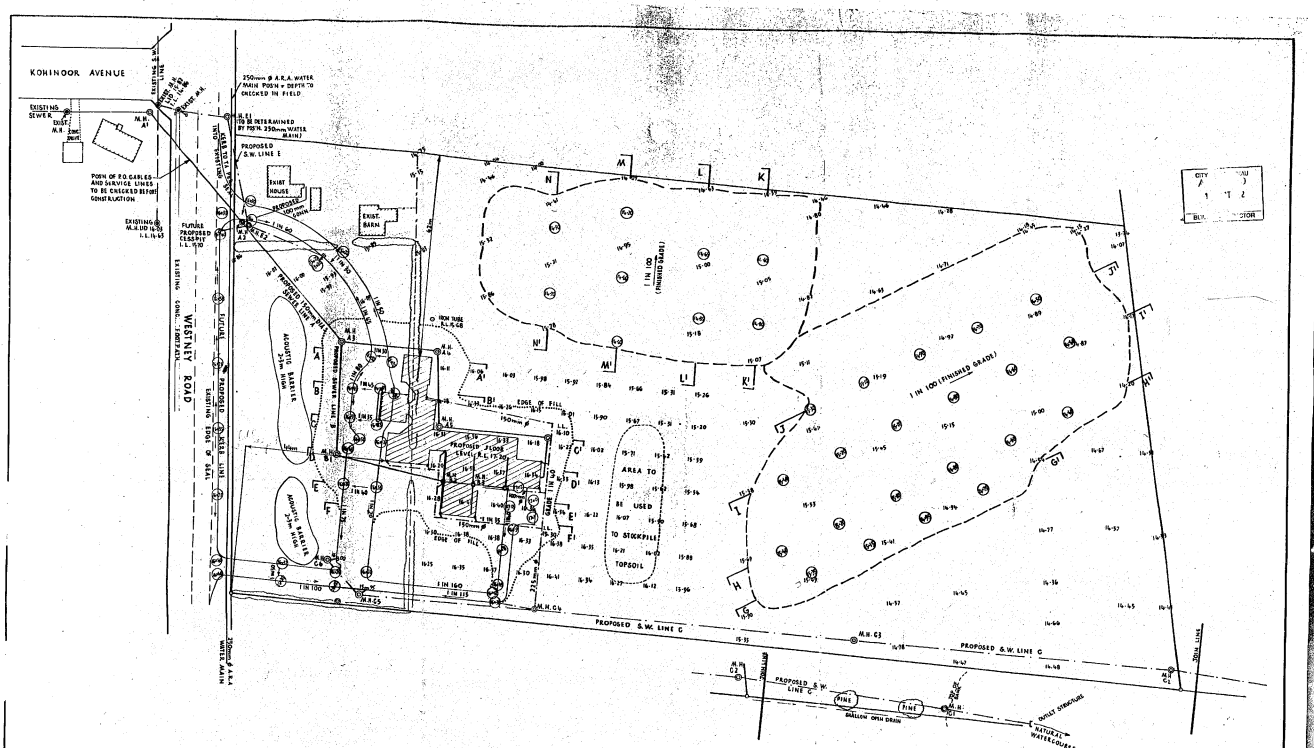
SCALES: 1:100

DATE: SEPT. 1996

DRAWN: AM CHECKED

JOB NO. 9562 SHEET NO. AO2-A

REVISIONS
A. DIFFERENT ROUTES STORMWATER AND FOULWATER



MANGERE ANIMAL VILLAGE FOR THE S.P.C.A.

SHEET C1 SITE PLAN, EARTHWORKS, SEWER AND STORMWATER LAYOUT

PROVISIONAL PRINT

D.F. McKAY AND ASSOCIATES
REGISTERED SURVEYORS
ENGINEERING SURVEYORS
TOWN PLANNERS
LAND DEVELOPMENT

PROPOSED SITE WORKS ON PT. ALLOT. 74 PARISH OF MANUREWA

NOTES: (I) LEVELS IN TERMS OF MANUKAU CITY COUNCIL DATUM - ORIGIN IRON SPIKE 180 R.L. 16.28
(II) FINISHED LEVELS SHOWN R.L. (68)
(III) EXISTING LEVELS SHOWN R.L. 67

SHEET 1 OF 6

CHECKED D.F.M.
DATE MARCH 1981
SCALES 1:500
SERIES OF
REF. M 69-9

A2
14-8

APPENDIX G
RELEVANT CORRESPONDENCE

Memo

(Type date here**)**

To: Mark Benjamin – Mt Hobson Group
Jay Panchani – Envelope Engineering

From: Leslie Lai – Healthy Waters Specialist
Gemma Chuah – Healthy Waters Principal – Resource Management

Subject: Private Plan Change: 50 Westney Road, Mangere - Stormwater

The applicant has described the proposal and the following information:

1. The current site is and proposed rezoning from the existing Residential – Mixed Housing Suburban with Mangere 1 Sub-Precinct, to Business – Light Industry Zone, as such will remove the required impervious area standard of 60% net site area to enable a 100% impervious area net site area.

2. The applicant holds an existing private stormwater discharge consent for discharge from the site to a private outfall on 3 Verissimo Drive, with a private wing wall and 375mm pipe.

3. The applicant holds consent for the development of 5 Verissimo Drive including a small road extension towards the shared boundary of the subject site for future use.

4. The applicant proposes to utilise the existing stormwater network within the northern extent of the site and existing paved areas. For the southern part of the site, stormwater discharge is proposed through a manhole and new outfall point which discharges through an overland flow path (OFP) to the rear of 3 and 5 Verissimo Drive.

5. A gas pipeline runs along a similar alignment to the OFP which is a constraint to the stormwater design.

The applicant and Council have the following discussion points, and concluded the following:

1. The 225mm stormwater pipe at the northern extent is small and cannot cater to future development. Auckland Council Healthy Waters recommends exploring stormwater upgrades to existing, or new networks fit to suit the site requirements.

2. The discharge to the south along the overland flow path needs to consider the potential for flooding to neighbouring properties and localised channel erosion. this information needs to be included in the SMP and plan change application.

    a. Need to confirm if the overland flow path bypasses the HW stormwater pond asset or passes through it. If the OFP passes through the pond, the pond may be able to be upgraded to provide for additional water quality treatment capacity.

    b. Need to investigate the capacity and condition of the OFP channel.

    c. Modelling is required to demonstrate the existing 1% scenario discharge.

3. The site will need water quality devices to treat stormwater from all impervious areas. Treatment devices be explored to be either on-site or off-site.

4. Mana whenua may request for water reuse which should be explored. Retention and detention were explored to assist in reducing flows back to pre-development capacity, in conjunction to ensure any new network flows do not cause adverse effects downstream.

5. The bund surrounding the southeastern boundary of the site has already been removed. This was for noise dampening of the previous SPCA use of the site.

6. Future ownership of outfall – due to the location of the outfall and that it services only the subject site this could either remain as a private asset or (in accordance with eh code of practice) be vested to Healthy Waters. Healthy Water's preference is to keep the outfall and discharge private and managed through easements for access and conveyance. Even though the code of practice specifies that this should be a public asset, exceptions can be made where most practical.

7. If the discharge is to remain private, then it will need to be authorised under the AUP chapter E8 rather than Healthy Waters NDC. However, an SMP prepared in accordance with the NDC will cover all of the matters needed for future resource consent and it is still recommended to have an approved SMP to streamline the plan change process rather than reviewed at the resource consenting stage.

NGĀTI TAMAOHO TRUST
WHĀTAPAKA, MANGATANGI & NGĀ HAU E WHĀ MARAE

Beau White
Environmental Officer
Ngati Tamaoho
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Mark Benjamin
50 Westney Road
Mangere

Tena Koe Mark,

Thank you for giving me the opportunity to meet with you on site. Ngāti Tamaoho appreciates the opportunity to be involved and to have input in the process for the application at 50 Westney Road.

Proposal: The current proposal is a private plan change at 50 Westney Road from Residential - Mixed Housing Suburban zone to a Business - Light Industry Zone.

Physical Landscape: The SPCA currently operates at the western end with a parking/storage area at the eastern end of the project area. The topography of the site is almost entirely flat, with bunding on the northern end.

Cultural Landscape: Māngere is an important area for Ngāti Tamaoho both now and throughout history. The current project sits very close to Te Pane O Mataoho (Māngere Mountain. This maunga has been and still is very important to our people and to Te Waiohua.

Te Manukanuka o Hoturoa (Manukau Harbour) and the surrounding area were settled as early as the 14th century. The volcanic cones in the area were ideal places for settlement and very quickly became inhabited with gardens and communities. In the 18th century, Te Pane o Mataoho became a very important pā for Te Waiohua where it provided protection, food, and a community for thousands of people.

In more recent history, Māngere became an important site during the early European contact period. European settlers arrived in the region in the 19th century, resulting in significant changes to the Māori way of life. The land was gradually acquired by European settlers, leading to the displacement of Māori communities and their traditional practices.

Despite these challenges, Ngāti Tamaoho strives to protect Māngere today which involves

engaging with developers to promote sensible development with sustainable outcomes.

Ngāti Tamaoho is opposed to this application as it stands unless the following cultural and sustainable recommendations are provided for:

- We recommend accidental discovery protocols for any artefacts, features, or koiwi that may be found in the area.
- We recommend water tanks for the reuse of the rainwater off the roofs. Rain tanks are pivotal to easing the water shortage in Auckland due to the intensification of housing going on. The issue of where water will come from in the future is not being accounted for with such intense developments around Tāmaki Makaurau.
- We recommend enviropods. Cesspits alone are no longer acceptable due to their maintenance issues. If council does not maintain the cesspit, they overflow and end up in our waterway.
- We recommend sediment and silt controls for this project that go over and above GD05 requirements.
- We recommend a planting palette that reflects the original flora and fauna of the area.

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