



Soil, Water and Leachate Management Plan

**For
Banksmeadow Transfer Terminal**

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QUALITY INFORMATION

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Definitions/Abbreviations

AEP	Annual Exceedance Probability
ARTC	Australian Rail Track Corporation
BTT	Banksmeadow Transfer Terminal
BGL	Below Ground Level
CEMP	Construction Environmental Management Plan
EIS	Environmental Impact Statement
ERP	Emergency Response Plan
EPL	Environment Protection Licence
GPT	Gross Pollutant Trap
L	Litres
ML	Megalitres
NIMS	National Integrated Management System
OEMP	Operational Environment Management Plan
OSD	On Site Detention
POEO	Protection of the Environment Operations (Act and Regulation)
The Vault	Veolia's Incident and Compliance Management System
SMCMA	Sydney Metropolitan Catchment Management Authority
SWLMP	Soil Water and Leachate Management Plan
Veolia	Veolia Australia and New Zealand
WSUD	Water Sensitive Urban Design

SECTION 1 INTRODUCTION

1.1 Overview

Veolia Australia and New Zealand (Veolia) operates the Banksmeadow Transfer Terminal (BTT), which is located at 14 Beauchamp Road and 34-36 McPherson Street, Banksmeadow (refer to site plans in OEMP Appendix A).

The BTT facility has been approved receive up to 500,000 tonnes per annum (TPA) of waste (including 400,000 TPA of putrescible waste and 100,000 TPA of non putrescible waste) from within the Sydney Region. The waste will be containerised and loaded onto rail wagons for transportation by rail to the Woodlawn Eco Project Site (owned and operated by Veolia) in the Southern Tablelands (approximately 250 kilometres southwest of Sydney) for treatment, recycling and energy recovery.

The BTT includes the following infrastructure:

- An access road for waste trucks entering and exiting the facility from Beauchamp Road.
- Incoming and outgoing weighbridges to check the waste type and weight of the waste being delivered to the facility.
- An enclosed building for the unloading and handling of waste, with environmental controls such as dust suppression and odour control systems.
- A hardstand area for temporary storage and manoeuvring of full and empty sealed shipping containers prior to loading on to trains.
- Rail sidings for the loading of containers onto trains for rail transport to Woodlawn.

The NSW Department of Planning and Environment (DPE) assessed the State Significant development (SSD 5855) and granted Development Consent for the 'State Significant' development on 28 April 2015, in accordance with section 89 (e) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

In addition, an Environmental Protection Licence (EPL) has been issued under the *Protection of the Environment Operations Act 1997* (POEO Act) by the NSW Environment Protection Authority (EPA).

This Soil, Water and Leachate Management Plan (SWLMP) has been prepared in accordance with the requirements of the Conditions of Development Consent (the Consent Conditions) and the Environmental Protection Licence (EPL) issued for the BTT. The SWLMP details control strategies for effective erosion and sediment control, conservation of water quality and management of groundwater, surface water and storm water during the operation of the BTT.

The SWMLP incorporates the Leachate Management Plan, Stormwater Management Plan and Surface Water, Groundwater and Leachate Response Plan.

1.2 Scope and Objectives

The purpose of this SWLMP is to provide soil, water and leachate management procedures to form part of the BTT Operational Environmental Management Plan (OEMP), in accordance with the Consent Conditions, EPL, relevant legislation and as part of Veolia's National Integrated Management System (NIMS).

The OEMP is the working environmental management tool for the operation of the BTT, concentrating on key environmental issues, including supporting detailed plans for the management of water quality, waste, traffic, air quality, greenhouse gas, noise, landscape and vegetation and emergency response.

The objectives of the SWLMP are to:

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- Provide a comprehensive plan for the management of soil, water and leachate management during operation of the BTT
- Protect water quality, by preventing storm and surface water flows impacting on sensitive receptors;
- Prevent surface water pollution from surface discharges of any contaminated water from the BTT; and
- Comply with the relevant regulatory requirements.

1.3 Legal and Other Requirements

The following regulatory framework applies to this SWLMP:

- Development Consent (DA SSD 5855) issued under the *Environmental Planning and Assessment Act 1979*
- Environment Protection Licence (EPL 20581) issued under the *Protection of the Environment Operations Act 1997* (POEO Act) and particularly the POEO (Clean Air) Regulation 2002

1.3.1 Conditions of Development Consent

Consent conditions 9 to 13 of Schedule 3 relate to soil, water and leachate management; and in particular, Condition 10 requires the preparation and implementation of a Soil, Water and Leachate Management Plan. The requirements considered relevant to this SWLMP are detailed in Table 1.1 below.

Table 1.1 Operation Consent Requirements

Relevant Condition	Requirement	SWLMP Reference
10	The Applicant shall prepare and implement a Soil, Water and Leachate Management Plan for the Development in consultation with the City of Botany Bay Council, NOW and the EPA and to the satisfaction of the Secretary. This plan must be prepared and implemented by a suitably qualified and experienced person and be submitted for approval prior to commencement of construction. The plan must include:	Noted
10(a)	a site water balance that: <ul style="list-style-type: none"> • identifies the source of all water collected or stored on site, including rainfall, stormwater and groundwater; • includes details of all water use on site and any discharges; and • describes the measures that will be implemented to minimise water use on site. 	Refer to Section 3.1.4
10(b)	an erosion and sediment control plan that: <ul style="list-style-type: none"> • is consistent with the requirements in the latest version of the Blue Book Volume 1 and Volume 2B; • identifies the activities on site that could cause soil erosion and generate sediment; and • describe the measures that will be implemented to: <ul style="list-style-type: none"> ○ minimise soil erosion and the transport of sediment to downstream waters, including the location, function and capacity of any erosion and sediment control structures and maintain these structures over time; ○ ensure that any topsoil stockpiles on site are suitably managed to ensure that the topsoil in these stockpiles can be beneficially used in the proposed revegetation and rehabilitation of the site. 	Not applicable to operations
10(c)	a leachate management plan that: <ul style="list-style-type: none"> • includes final detailed design specifications of the leachate management and 	Refer to Section 4.3

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	collection system on site.	
10(d)	<p>a stormwater management plan that:</p> <ul style="list-style-type: none"> • is consistent with the guidance in the latest version of the Blue Book Volume 1 and Volume 2B; • includes final detailed design specifications for the stormwater management and collection system; and • demonstrates how the requirements of Condition C11 of this schedule has been addressed. 	Refer to Section 4.2
10(e)	<p>a surface water, groundwater and leachate monitoring program that includes:</p> <ul style="list-style-type: none"> • baseline data; • details of the proposed monitoring network; and • the parameters for testing and respective trigger levels for action under the surface water, groundwater and leachate response plan. 	Refer to Section 5.1
10(f)	<p>a surface water, groundwater and leachate response plan that:</p> <ul style="list-style-type: none"> • includes a protocol for the investigation, notification and mitigation of any exceedances of the respective trigger levels; and • describes the measures that could be implemented to respond to any surface or groundwater contamination that may be caused by any development. 	Refer to Section 6

1.3.2 Mitigation Measures

In addition, the operational mitigation measures appended to the Consent Conditions for soil, water and leachate management are presented below.

Table 1.2 Operational Mitigation Measures Requirements

	Mitigation Requirement	SWLMP Reference
Soils and contamination		
1	A site Environmental Management Plans (SEMP) would be prepared and implemented for the Keith Engineering land, with provisions for on-going regular inspection and maintenance of the capped contaminated soils. The SEMP's would be reviewed and approved by a NSW EPA accredited site auditor.	Noted and Refer Section 4.1
2	Appropriate mitigation measures for stormwater runoff detention would be implemented, reducing the risk of erosion and sedimentation as a result of excessive runoff.	N/A for operations
3	The diesel tank will be self-bunded and compliant with AS - 1940-2004 <i>The storage and handling of flammable and combustible liquids</i> . The diesel fuel tank and refuelling area would be appropriately bunded and all refuelling would take place within this area.	Refer Section 4.4
4	An Incident Response Plan (IRP) will be developed for operation of the site. The plan would specify the procedure to be followed in the event of a spill, including the notification requirements and use of absorbent material to contain the spill. A spill kit will be provided onsite at all times.	Refer ERP and Section 6
5	A refuelling procedure will be developed and implemented for all refuelling activities undertaken. Any fuel, lubricant, or hydraulic fluid spillages will be collected using absorbent material and the contaminated material disposed of to a licensed waste facility	Refer Section 4.4

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Hydrology and Flooding		
2	The leachate management system will be designed to maintain separation between rainfall run-off and leachate at all times. A minimum 20 kL self-bunded tank will be provided for collection of leachate from the transfer terminal building and compactor area.	Refer Section 4.3
3	The compactor areas will be fully covered to limit the generation of leachate. A to facilities the transport of leachate to the Woodlawn Eco-Project Site.	Refer Section 4.3
4	OSD will be provided onsite to achieve Botany Bay City Council's requirement of 20% AEP 'natural condition' detention and to offset the calculated flood storage volume of 810 m ³ .	Refer Section 4.2.1
5	WSUD measures will be included within the detailed design for the BTT and will include the provision of bioretention basins and oil and grease interceptors within the new drainage pits.	Refer Section 4.2
6	A 40 KL tank for stormwater storage will be provided beneath the terminal building for the purposes of washdown, toilet flushing and irrigation to minimise potable water demand at the facility.	Refer Section 4.2
7	All excess leachate from the BTT will be disposed of in accordance with legislative requirements, through either a trade waste agreement or pumped out and disposed of at an appropriately licensed facility.	Refer Section 4.3
8	The diesel fuel tank and refuelling area will be appropriately bunded. All refuelling will take place within this area.	Refer Section 4.4
9	An Incident Response Plan (IRP) will be developed for the Site and will form a sub-plan to the OEMP. The IRP will contain a 'spill response procedure'.	Refer Section 6 and ERP

1.3.3 Environment Protection Licence

EPL No. 20581 stipulates the environmental obligations for Veolia under s120 of the POEO Act to make all efforts to control the pollution of water from the BTT.

Conditions E2 and E3 set out requirements in relation to the management of spills and other liquid discharges on site as detailed in Table 1.3 below.

Table 1.3 Environment Protection Licence Requirements

Relevant Conditions	Requirement	SWLMP Reference
E2.1	While the licensee's premises are being used for the purpose to which the licence relates, the licensee must: (a) Clean up any spill, leak or other discharge of any waste(s) or other material(s) as soon as practicable after it becomes known to the licensee or to one of the licensee's employees or agents. (b) In the event(s) that any liquid and non-liquid waste(s) is unlawfully deposited on the premises, such waste(s) must be removed and lawfully disposed of as soon as practicable or in accordance with any direction given by the EPA. (c) Provide all monitoring data as required by the conditions of this licence or as directed by the EPA.	Noted. Refer Section 6
E2.2	In the event of an earthquake, storm, fire, flood or any other event where it is reasonable to suspect that a pollution incident has occurred, is occurring or is likely to occur, the licensee (whether or not the premises continue to	Refer to Section 6

	<p>be used for the purposes to which the licence relates) must:</p> <p>(a) Make all efforts to contain all firewater on the licensee’s premises;</p> <p>(c) Make all efforts to contain any discharge, spill or run-off from the licensee’s premises;</p> <p>(d) Make all efforts to prevent flood water entering the licensee’s premises;</p> <p>(e) Remediate and rehabilitate any exposed areas of soil and/or waste;</p> <p>(f) Lawfully dispose of all liquid and solid waste(s) stored on the premises that is not already securely disposed of;</p> <p>(g) At the request of the EPA monitor groundwater beneath the licensee’s premises and its potential to migrate from the licensee’s premises;</p> <p>(h) At the request of the EPA monitor surface water leaving the licensee’s premises;</p>	
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1.4 Stakeholder Consultation

As part of an ongoing commitment to stakeholder engagement, Veolia has implemented a program of communication and consultation during the preparation of this SWLMP. Veolia has consulted with government agencies and other key stakeholders.

The key issues raised during consultation for soil, water and leachate impacts included accidental spills or leaks, flooding capacity and discharge levels and leachate contamination causing pollution on surrounding areas.

1.4.1 Government Bodies

The following government bodies have been consulted with in relation the requirements of this SWLMP:

- NSW Department of Planning and Environment;
- NSW Environment Protection Authority;
- City of Botany Bay Council
- NSW Office of Water

1.4.2 Community

Veolia aims to ensure that the local community remains informed of the progress of the project in a pro-active and responsive manner. Veolia’s communication may include the following where applicable:

- public notices and announcements;
- meetings and correspondence with appropriate regulatory authorities; and
- discussions with adjoining land owners / neighbours who may be affected by the BTT.

The key objectives of the community focused communication and consultation program include:

- Educating stakeholders regarding key aspects of the BTT; and
- Informing community groups and neighbours to help Veolia understand concerns.

The following avenues provide availability of information about the BTT:

- Dedicated Veolia webpage:

<http://www.veolia.com.au/sustainable-solutions/community-development/banksmeadow-transfer-terminal>

- Community telephone line:

Location	Contact
BTT 24 hour feedback line	1800 298 981

- Dedicated email address:

banksmeadow@veolia.com.au

- Published monitoring data:

<http://www.veolia.com.au/sustainable-solutions/environmental-compliance/nsw-environmental-monitoring-data>

SECTION 2 GOALS OF SWLMP

The goals of this SWLMP are to:

- To confirm that, following construction of the BTT, all residual soil management issues have been addressed and confirm any on-going monitoring requirements for the facility with respect to soil management
 To protect water quality, by preventing contaminated storm and surface water impacting on sensitive receptors;
- To prevent surface water pollution due to contaminated surface water discharges from the BTT;
- To confirm the detailed design of the leachate management and collection system on site; and
- To ensure that on-site systems for leachate management operate according to design and are maintained to ensure on-going effectiveness in managing all on-site leachates.

2.1 Roles and Responsibilities

Responsibilities for implementation of this SWLMP are summarised in Table 2.1 below.

Table 2.1 Summaries of Responsibilities – SWLMP

Action	Responsibility	Timing
Overall implementation of the SWLMP	Facility Manager	Ongoing
Induct site personnel on the site safety and environmental requirements of the SWLMP prior to commencing any work on site	Facility Manager or nominee	Commencement of operations and site inductions for new employees
Coordinate site environmental monitoring, compile reports and maintain internal records	Facility Manager or nominee	As per monitoring schedule
Identify Non Conformances and notify BTT Management/ Veolia Safety Health Environment Quality Representative	Facility Manager or nominee	As Required
Authorise and confirm the implementation of mitigation measures	Facility Manager or nominee	Annual
Training and communication	Facility Manager or nominee	Ongoing
Monitoring the effectiveness of the control measures	Facility Manager or nominee	As per monitoring schedule
Environmental compliance monitoring	Technical and Engineering Team	As per monitoring schedule

SECTION 3 EXISTING ENVIRONMENT AND OPERATIONAL IMPACTS

3.1 Existing Environment

The BTT site is located in the Springvale Drain catchment in a low-lying area approximately 800m from Botany Bay. The high level of urbanisation within the catchment has resulted in large areas of impervious surfaces, connecting them directly to waterways via stormwater infrastructure. Accordingly, the Botany Bay catchment generates approximately 292,435 megalitres (ML) of stormwater runoff each year.

Very little flow from external catchments enters the BTT as the site catchment is highly constrained by the following structures and developments:

- To the east the BTT is constrained by the Botany Industrial Park, which diverts stormwater to the south-east, away from the BTT.
- The Botany Goods Line to the east and north of the BTT is raised and would prevent the entry of stormwater onto the BTT.
- The Banksmeadow Recycling Centre located centrally to the BTT is bounded by retaining walls, which prevent the flow of stormwater onto the site, as it discharges directly into the drainage system connecting to McPherson Street.

3.1.1 Soil and groundwater

The BTT EIS (Hyder, 2014) provided details regarding the soil and groundwater, which included the following description:

The soil of the BTT site are generally characterised as being highly disturbed to depths of at least 1 m, with the original soils having been removed or buried, which overlay either compacted mottled clay or transported fills. The disturbed nature of the soil is reflective of the history of industrial uses and development that has occurred in the area. Prior to development of the site, surface soils were likely to have been organic, peaty soils. However, most of this cover has been removed.

The adjacent Tuggerah soil type is typically characterised as having bleached loose sand to depths of over 100 cm, overlaying black soft sandy organic pan and brown soft sandy iron pan materials (Chapman and Murphy, 2004). These soil types are typically highly permeable, with low fertility, low pH and a permanently high water table.

An investigation of the BTT site (Douglas Partners, 2013; Douglas Partners, 2012) identified the soil profile within the site as follows:

- *Surface soils, from 0.2 m to 2.4 m below ground level (BGL) comprised hardstand and fill material, that is predominantly crushed concrete and road based gravel,*
- *Between 2.4 m and 9.7 m BGL soils comprise alluvial sands, typically ranging from medium density to high density. The alluvial sands also contain thin layers of organic sand, silty sand and organic clay (peaty sand and peaty clay) with a high organic content and typically very loose to loose/soft and wet.*
- *Between 9.7 m and 12.9 m below ground level soils comprise hard clay.*

The water table at the site occurs at variable depths across the site, ranging from 1.71 m BGL and greater than 5.14 m BGL. The site is located within the Botany Sands Aquifer and the 'Botany Sands Aquifer Interference zone'. The groundwater

levels within the Botany Sands Aquifer have been observed to range by up to 2 m (Hyder 2014).

3.1.2 Catchments

The Civil Engineering Report (Costin Roe, 2015) provided the following definition of the regional catchment:

The site is located within the Springvale Drain catchment and, following discharge from the site into the local sub-catchment, stormwater flows are conveyed to the Springvale Drain, which is located some 250m to the west of the site. The Springvale Drain has an overall catchment area of approximately 246.7 Ha and travels south across parks, residential areas and industrial areas. The Springvale Drain consists of a series of open channels and underground culverts and pipes which convey stormwater runoff through the catchment to Botany Bay.

The site drains towards the existing kerb inlet pipe at the low point in McPherson Street. The low point is located at the cul-de-sac head of McPherson Street on the eastern site of the existing railway tracks. A contributing upstream external catchment with an area of approximately 12.84 Ha also drains towards the low-point in McPherson Street.

3.1.3 Flood Storage

The BTT EIS (Hyder, 2014) notes the following regarding flood storage:

Flood modelling undertaken for the City of Botany Bay Council indicates that the peak flood depth at the BTT during the 1% annual exceedance probability (AEP) event is in the range of 0m – 0.5m, with peak flow velocities below 0.6m/s (BMT WBM, 2013), thus, flood hazard at the site is considered low.

This shows that even during ‘extreme’ events the flood is relatively minor. During any flood event that may affect the Springvale Drain and Botany Bay catchment any floodwater at the BTT would be classified as part of the ‘flood fringe’.

3.1.4 Water balance

A water balance was prepared as part of the BTT EIS (Hyder 2014) to describe the source of water collected or stored at the BTT, as well as the likely site demand and discharge limits associated with operation of the Proposal. It assessed whether water demand can be offset by water harvesting or water reuse strategies.

Water balance was calculated as follows:

$$\text{Water demand} - \text{water supply} = \text{net water balance}$$

This information has been used to design and construct the water management infrastructure that will:

- (i) achieve the storage capacity;
- (ii) comply with regulatory requirements; and
- (iii) sustain on site water usage during the BTT operation stage, while minimising the use of potable water.

For the purposes of the water balance the demand portion of the balance was assumed to consist of any water usage where potable water quality wouldn't normally be. This included:

- Toilet flushing.
- Washdown water.

To offset these water demands rainwater harvesting was investigated and was calculated based on the transfer terminal building and office building roof areas, with a run-off coefficient of 0.95, to account for any run-off that may not reach the gutter system.

Average monthly rainfall was sourced from the Randwick Racecourse weather station.

The table below (drawn from Table 8-30 of the EIS [Hyder 2014]) provides a monthly summary of water demand and supply for non-potable water on the BTT site.

Table 3.1 Monthly net water balance

Month	Demand (kL)	Supply (kL)	Balance (kL)
Jan	71.11	420.42	349.30
Feb	64.23	465.97	401.73
Mar	71.11	518.75	447.63
Apr	68.82	443.49	374.67
May	71.11	463.34	392.23
Jun	68.82	571.90	503.08
Jul	71.11	295.90	224.79
Aug	71.11	320.86	249.75
Sep	68.82	223.11	154.29
Oct	71.11	287.44	216.33
Nov	68.82	346.84	278.02
Dec	71.11	269.94	198.83
TOTAL	837.28	4627.96	3790.65

It is noted that where there is a positive water balance this does not guarantee supply at every stage during the month. Rainfall variability and storage capacities would determine whether there is a positive water balance at any given time.

Figure 3.1, from the BTT EIS (Hyder 2014) provides the difference between the potential for water harvesting and water demand for the BTT over the course of a year.

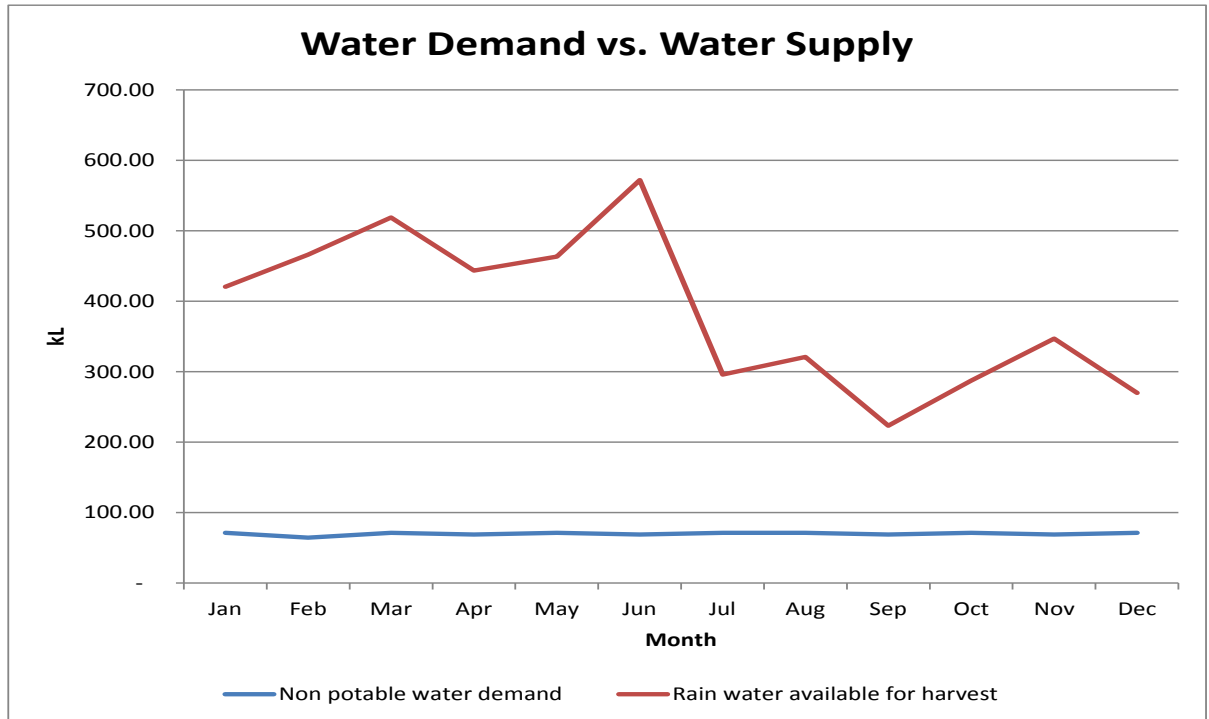


Figure 3.1 Water supply vs. water demand

The water balance assessment concluded that the equivalent of 40 kL of rainwater storage would accommodate the non-potable water demand for the BTT operations.

3.2 Predicted Soil, Water and Leachate Impacts

The EIS identified potential site contamination and water quality impacts and associated risks associated with the operation of the BTT.

Table 3.2 lists these impacts and risks. This risk assessment determined the level of mitigation required for those impacts.

Table 3.2 Soil and Water Impact Risk Rating

Issue	Potential Impact	Source	Risk Ranking	Control required and reference, where applicable
Soils and groundwater contamination	BTT contamination and risk of human and environmental health risks from exposure.	The BTT site is located within the area of an Approved Voluntary Management Proposal (20101714) and Declaration of Remediation BTT (21074) and therefore must address SEPP 55.	Very High	No. Should any further excavation works be required that may encounter contaminated soil and groundwater at the facility, the BTT CEMP

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				Construction Site Contamination Management Plan would be triggered.
	Discharge of contaminated groundwater from the BTT.	The BTT site is located within the Botany Sands aquifer Groundwater Extraction Exclusion Area, due to the high likelihood of groundwater contamination due to previous activities on adjoining sites.	Very High	No. Should any further excavation works be required that may encounter contaminated soil and groundwater at the facility, the BTT CEMP Construction Site Contamination Management Plan would be triggered.
Hydrology and flooding	Alterations to hydrology on-site and discharge levels from BTT, resulting in increased flood levels downstream.	The BTT operations would result in an increase in impervious surfaces at the site and consequently an increase in the stormwater runoff generated. This has the potential to cause flooding downstream of the BTT.	High	Yes Refer to Section 4.2
	Release of leachate from putrescible waste to stormwater causing pollution of surface water.	Putrescible waste handled at the BTT has the potential to generate leachate which, if not contained, has the potential to reach surface or groundwater and cause pollution.	High	Yes Refer to Section 4.3
	Flood impacts on-site from Springvale drain.	Modelling undertaken by Botany Bay City Council has identified the potential for portions of the BTT to be flood affected.	High	Yes Refer to Section 4.2

Based on this information, the following are the predicted impacts relate to soil contamination or water quality impacts at the BTT:

3.2.1 Soils and groundwater

Soil contamination could occur through the use of oils, fuel, lubricants and other chemical substances required for the operation of vehicles, plant and machinery during within the BTT.

Accidental spills or leaks within the site and rail corridor have the potential to result in the transportation of contaminants into the surrounding environment including groundwater. This risk of soil contamination is highest in the maintenance area, where

the majority of chemicals would be stored, and associated with a diesel storage tank located in the maintenance area.

In the unlikely event that further excavations works are required within the BTT site, there would be a risk that the work may encounter contaminated soil and groundwater, including within the Botany Sands aquifer.

3.2.2 Stormwater

Alterations to hydrology on-site, flood storage capacity and discharge levels from BTT could result in increased flood levels downstream. However, as discussed in Section 3.1.2, the catchment within the BTT site is highly constrained and very little stormwater flow from external catchments enters the BTT site.

Construction of the BTT has resulted in an increase in impervious surfaces within the site. Consequently there is a potential for an increase in the stormwater runoff generated onsite. This has the potential to cause additional stormwater flows downstream of the BTT. Modelling undertaken by the City of Botany Bay Council has also identified the potential for portions of the BTT to be at risk of being flood affected.

These constraints mean that stormwater drainage requirements on the BTT are largely independent of external flows and, but are dependent on the amount of rain falling directly on the property (refer to Stormwater Catchment Plan (CO12589.00-C40) in Appendix A).

3.2.3 Leachate

Leachate is any liquid that has come into contact with waste or waste processing areas. It is generated through the management of waste delivered to the site.

Putrescible waste handled at the BTT can generate leachate that, if not contained, has the potential to reach surface or groundwater and cause pollution.

Predicted impacts from leachate include:

- Accidental release of leachate from the leachate storage tank;
- Release of leachate from putrescible waste to stormwater that may then cause pollution of surface water.

SECTION 4 SOIL, WATER AND LEACHATE MANAGEMENT MEASURES

4.1 Erosion and Sediment Control Plan

Potential soil impacts have been mitigated at the BTT through the construction of the BTT hardstand, buildings, roadway, site drainage and detention facilities or rail corridor, across most of the site.

Consequently there is no residual risk of soil erosion on site during the operation stage.

Ongoing regular inspection and maintenance of the hardstand area will form part of the checks for the BTT site.

Should any further excavations works be required at the facility that may encounter contaminated soil and groundwater, the Long Term Environmental Management Plan (Appendix E) would be triggered.

4.2 Stormwater Management Plan

The drainage strategy for the BTT facility is generally to maintain the existing flow paths on the BTT, while providing for adequate on site detention (OSD) to meet the City of Botany Bay Council's *Stormwater Management Technical Guidelines*.

The BTT stormwater management system has been designed in consultation with the City of Botany Bay Council to achieve Council's requirement of 20% AEP 'natural condition' detention.

The system provides adequate on site detention capacity to offset the calculated flood storage volume of 810 m³, as infiltration systems are not permitted on site due to the high groundwater level.

The system has the capacity to manage runoff generated under a range of conditions, and to be effective in the capture of sediment and gross pollutants. It also has capability for management of oils/greases and fuel spills.

This system provides for the management of stormwater separate from the management of leachate, while also controlling water quality.

The stormwater management system includes the following key elements:

- Minor (in-ground) drainage system designed to convey the 1 in 20 year ARI storm event
- Major (overland) drainage system designed to safely convey the 1 in 100 year ARI storm event via dedicated overland flow paths to the point of discharge for the site on McPherson Street
- Stormwater quantity managed by a number of storage locations through the site
- Rainwater collected and re-used for washdown, toilet flushing and irrigation to meet City of Botany Bay Council requirements

Refer to Appendix A for a set of drawings showing the details of the stormwater management system (CO12589.00-C40 to CO12589.00-C48).

4.2.1 Treatment

Potential stormwater quality impacts have been mitigated by incorporating treatment solutions into the stormwater management system based the approach in the NSW EPA document *Managing Urban Stormwater: Treatment Techniques*. This approach ensures that the design incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by the City of Botany Bay Council.

WSUD measures have been incorporated into the OSD areas to attenuate stormwater flows and treat run-off for gross pollutants, suspended solids and nutrients before entering the drainage system.

Oil and grease interceptors are installed in all new drainage pits to ensure that 95% of oils and grease are captured before entering the off-site drainage system.

Components of the treatment solution include:

- Primary treatment to parking and hardstand areas via a Humeceptor hydrodynamic separation system
- Treatment of the rail siding area via a second Humeceptor hydrodynamic separation system
- Tertiary treatment of a portion of roof via rainwater reuse tanks.

The remainder of the roof water catchment, which is generally considered to contain small levels of pollution, bypasses the main treatment measures. Removal of gross pollutants is via a trash screen within the OSD system.

4.2.2 On Site Detention

Due to the high groundwater level at the BTT, On Site Detention (OSD) devices are required to offset the existing flood storage at the site

Two OSD components have been provided on the Keith Engineering land and one OSD permanent sediment basins has been provided on the Asciano land. The location of all OSD system components are shown on the Stormwater Drainage Plan (CO12589.00-C41 (Refer to Appendix A).

Stormwater quantity will be managed by a number of storage locations. The storage locations can be described as follows:

- OSD 1 (207m³): In-ground tank located on the south-east corner of the building managing roof water catchment (Refer to Drawing CO12589.00-C41 and CO12589.00-C47, Appendix A);
- OSD 2 (158m³): In-ground tank located to the south-west of the building under the car park, managing car park and a portion of the fire access road catchments (Refer to Drawing CO12589.00-C41 and CO12589.00-C47, Appendix C);
- OSD 3 (635 m³): above ground storage open based basin in the northern extent between the concrete hardstand and the rail sidings area. This basin is open based allowing for infiltration into the Botany aquifer (Refer to Drawing CO12589.00-C48, Appendix).

Consequently, the BTT includes the provision of approximately 1,000 m³ of OSD sufficient to offset the calculated flood storage volume of 810 m³ as required.

4.2.3 Operation of the BTT Stormwater System

Rainfall that collects to the west of the rail sidings flows into a stormwater pipe. This conveys the water to the northern portion of the BTT and into OSD3. This then transfers the water into a gross pollutant trap (GPT) for discharge via a pipe located on the west of Keith Engineering in a southerly direction, towards McPherson Street.

Bunding along the western boundary of the BTT ensures that no flows from the BTT enter the Botany Goods Line. In addition, bunding or kerbing installed along the western boundary of the site prevents stormwater from entering ARTC's land.

OSD 3 is located at the northern portion of the BTT. It captures overland flow run-off. The layout of the system ensures that on-site run-off can be stored for a period of time while smaller flows are released into the drainage infrastructure before connecting into the Council drain in McPherson Street.

4.2.4 Rainwater Harvesting

Rainwater harvesting has been incorporated into the site, with the collection of stormwater from roof areas for re-use in non-potable applications.

This water is used on site for toilet flushing, washing down area, such as cleaning of the compactor pit, and irrigation. These uses all contribute to minimising the potable water demand on site.

The rainwater harvesting system consists of an in-line tank, which is located beneath the transfer terminal building. Water is pumped from the tank for distribution throughout the site in a dedicated non-potable water reticulation system.

The system enables rainwater to pass through the tank if it is full and continue to be discharged via gravity into the stormwater drainage system.

The tank is connected to the mains water supply to allow for replenishment during extended dry periods. A float switch will turn a pump on when the tank capacity reaches 10% and will switch off once the capacity reaches 20%. All pumps associated with the rainwater harvesting system have been installed in accordance with the City of Botany Bay Council requirements.

4.3 Leachate Management Plan

The leachate management system for the BTT is independent of the stormwater system for the site, ensuring that separation between rainfall run-off and leachate is maintained at all times. The compactor areas are fully covered to limit the generation of leachate.

The BTT leachate management strategy for the BTT focuses on the operation of bunded areas within the terminal building where waste is transferred from trucks to the shipping containers for transport to the Woodlawn site.

Two leachate tanks, each of 32kL capacity, have been installed below the transfer terminal building. These will capture all leachate from the tipping floor, around the compactors and wash-down water. The location of the leachate tanks and associated infrastructure is provided in the Hydraulic Services Warehouse Plan H-200 (refer to Appendix A).

All excess leachate from the operations will be disposed of in accordance with regulatory requirements. Leachate will be pumped into a dedicated ISO tanker that will be loaded and transported to Woodlawn or be pumped and transported from site and disposed in an appropriately licenced facility.

4.4 Other control measures

The design of the BTT facility includes a self-bunded diesel fuel storage facility to mitigate risks associated with this facility and its use. All refuelling takes place within this area. The fuel tank is located to the north of the compaction area, as shown in the Architectural Plan A200 (Refer to Appendix A).

The design of the BTT also incorporates a dedicated area and a method for managing hot loads. This specification is shown in the Specifications for Management of Hot Loads (Refer to Appendix C)

SECTION 5 SOIL, WATER AND LEACHATE MONITORING AND REPORTING

5.1 Monitoring Program

Inspection, testing and monitoring will be undertaken at the BTT, in accordance with the site specific inspection and testing register. The outcomes of monitoring will be recorded in appropriate forms/checklists as detailed in Section 5.1.1 of the OEMP.

There will be ongoing and regular inspection and maintenance of the hardstand area on the BTT site to ensure that the integrity of the stand is intact and that capped soils beneath the stand are not at risk of disturbance.

Inspection and monitoring checklists for water quality management and infrastructure during the operational phase of the BTT will be held on Veolia's document management system. This will ensure that all monitoring activities can be used to minimise the potential impact of any emissions.

Baseline water monitoring data is provided in Appendix D.

5.1.1 Stormwater Monitoring

The Facility Manager is responsible for monitoring the effectiveness of all environmental measures in place to manage stormwater quality and infrastructure on site. The Technical and Engineering team will undertake environmental compliance monitoring, if required.

No uncontrolled stormwater discharges off-site will be permitted unless the design capacity for the sediment basins is exceeded during intensive rainfall events.

Based on the EPL limits all controlled water releases off-site must meet the following stormwater runoff requirements prior to discharge as show in

Table 5.1.

Table 5.1 Stormwater Runoff Discharge Requirements

Parameter	Unit of Measure	100 percentile limit	Frequency
Biological Oxygen Demand	mg/L	10	As required, or following a rainfall event after each 6 monthly maintenance check
Nitrogen (Ammonia)	mg/L	1	
Oil & Grease	mg/L	10	
pH	pH	6 – 8.5	
Total Suspended Solids	mg/L	50	

Stormwater infrastructure is also monitored on a regular basis to ensure that each component is properly operated and maintained. The frequency of inspections may vary depending on site specific attributes and rainfall patterns. Details of the stormwater maintenance schedule are provided in Appendix B. In addition to the nominated frequencies, inspections will also be undertaken following large storm events.

5.1.2 Groundwater Monitoring

Previous groundwater monitoring shows that groundwater chemical results for the site are consistent with the expected regional background concentrations associated with the Orica plume as the site is located in zone 1 of the Botany Groundwater Management Zone. The Botany Bay aquifer and receiving environments are disturbed and highly modified in nature.

The validation report prepared by DLA Environmental for the remediation works undertaken during construction of the facility concluded that groundwater is not considered to represent a significant risk of exposure to receptors for the following reasons:

- The risk of the interaction between on-site receptors and the groundwater is greatly reduced under the non-sensitive commercial/industrial land use of the site
- Current and future access to groundwater at the site is limited due to the restriction placed on abstraction of groundwater for any use
- The site has been capped by the development, including raising site levels

Three groundwater monitoring wells have been installed at the site (refer to Appendix F). Monitoring of these wells is completed in accordance with the Table 5.2 below.

Table 5.2 Groundwater Monitoring Program

Monitoring Locations	Parameters	Unit	Frequency	Sampling Method
GW1,GW2 & GW3	EC	µS/cm	Six monthly	Grab sample
	pH	pH		
	Total Dissolved Solids, TDS	mg/L		
	Ammonia	mg/L		
	BOD	mg/L		
	Water Level	M		

5.1.3 Leachate Monitoring

Details of the leachate management system are provided in Section 4.3, including the transport and disposal of leachate off site for disposal at an appropriately licensed facility. Any testing or monitoring required by the disposal facility will be undertaken to ensure the leachate will meet the requirements of the disposal facility.

As a part of the weekly site inspection checklist, the leachate tank levels are monitored and the areas of the site where leachate is generated or stored are inspected.

Further, the containers are inspected to ensure seals are in good working order and that any full containers remain closed and intact. Any containers identified as potentially being compromised, will be cleaned & isolated for further inspection, and maintenance will be done as required.

5.2 Performance Reporting and Review

Annual management reviews of the environmental performance of the BTT will assess the continuing suitability, adequacy and effectiveness of the on-site environmental management measures implemented. This review will include performance against the goals of the SWLMP.

Where performance reporting is required under the Consent Conditions or EPL, all relevant environmental monitoring data and information will be recorded and maintained on site. This will include, but not be limited to, the following:

- Sampling dates, times and name of sampler;
- Chain of Custody, analysis and results;
- Complaints received and corrective actions taken; and
- Copy of the EPL, development consent and other relevant approvals.

Veolia will use monitoring data to review and identify any exceedances against the adapted goals with the appropriate corrective actions applied as discussed below.

Details of compliance reporting requirements are provided in Section 5.1.2 of the OEMP.

5.3 Exceedances and Corrective Actions

Details of exceedances and corrective action for any soil, water or leachate related incidents are provided as part of the response plan detailed in section 6 of the SWLMP.

5.4 Publishing of Monitoring Data

Where required, Veolia publishes the results of any environmental monitoring required under the EPL on the following website:

<http://www.veolia.com.au/sustainable-solutions/environmental-compliance/nsw-environmental-monitoring-data>

SECTION 6 SURFACE WATER, GROUNDWATER AND LEACHATE RESPONSE PLAN

In line with the regulatory requirements, a response plan has been prepared detailing the measures to be implemented in response to any surface or groundwater contamination that may be arise through operation of the BTT, as well as a protocol for the investigation, notification and mitigation of any exceedances of the respective trigger levels.

Table 6.1 below describes the actions to be taken in the event that there is an exceedance of the trigger levels for surface water listed in the monitoring program in Section 5.1.

Table 6.1 Exceedance Trigger and Actions

Location	Parameter	Criteria/ Performance Measure/Trigger	Action	Responsibility
Surfacewater	As per the table 5.1	As per the table 5.1	Follow incident process Where applicable, report exceedance to DPE, City of Botany Bay Council and any other relevant government agency	Environmental representative/ Facility Manager/SHEQ
Groundwater	As per BTT Site analytes testing regime	Existing groundwater network performance against baseline	Review groundwater monitoring results; Identify exceedance, consider resampling and/or continue periodic monitoring to gauge any upward trends; Where applicable, report exceedance to DPE, City of Botany Bay	Environmental representative/ Facility Manager/SHEQ

PLAN
Soil, Water and Leachate Management

			Council and any other relevant government agency	
--	--	--	--	--

Handling of any soil, water and leachate related incidents will be managed in accordance with the process outlined in Section 4.4 of the OEMP. The Facility Manager, or their site nominee, will record and manage all incidents in accordance with Veolia's incident notification and reporting procedures.

Incidents will be managed in accordance with Veolia's Non Conformance Procedure (PRO-COL-000-137). Investigations will be undertaken in accordance with the NSW Incident Investigation Procedure (PRO-NSW-000-130) or on a case by case basis depending on the severity of the incident as described Section 5.1.1 of the OEMP.

At completion of any investigation, any corrective actions required will be recorded in the Vault and managed in accordance with the NSW Corrective Action Procedure (PRO-NSW-000-132) in a timely manner.

An Emergency Response Plan (ERP) has been developed for the BTT site and is appended to the OEMP. The ERP (refer Appendix D7), identifies the procedures to be followed in the event of an emergency and is to be used as the protocol in the event of an exceedance. The process for dealing with potential incidents and emergencies at the BTT is summarised in Figure 6.1.

Emergency and Environmental Incident Response Flow-Chart

This flowchart provides a basic guideline to emergency response. As such it cannot predict every emergency situation that could occur. Never place yourself or others at risk when following these procedures. Refer to your site Emergency Response Plan for further information.

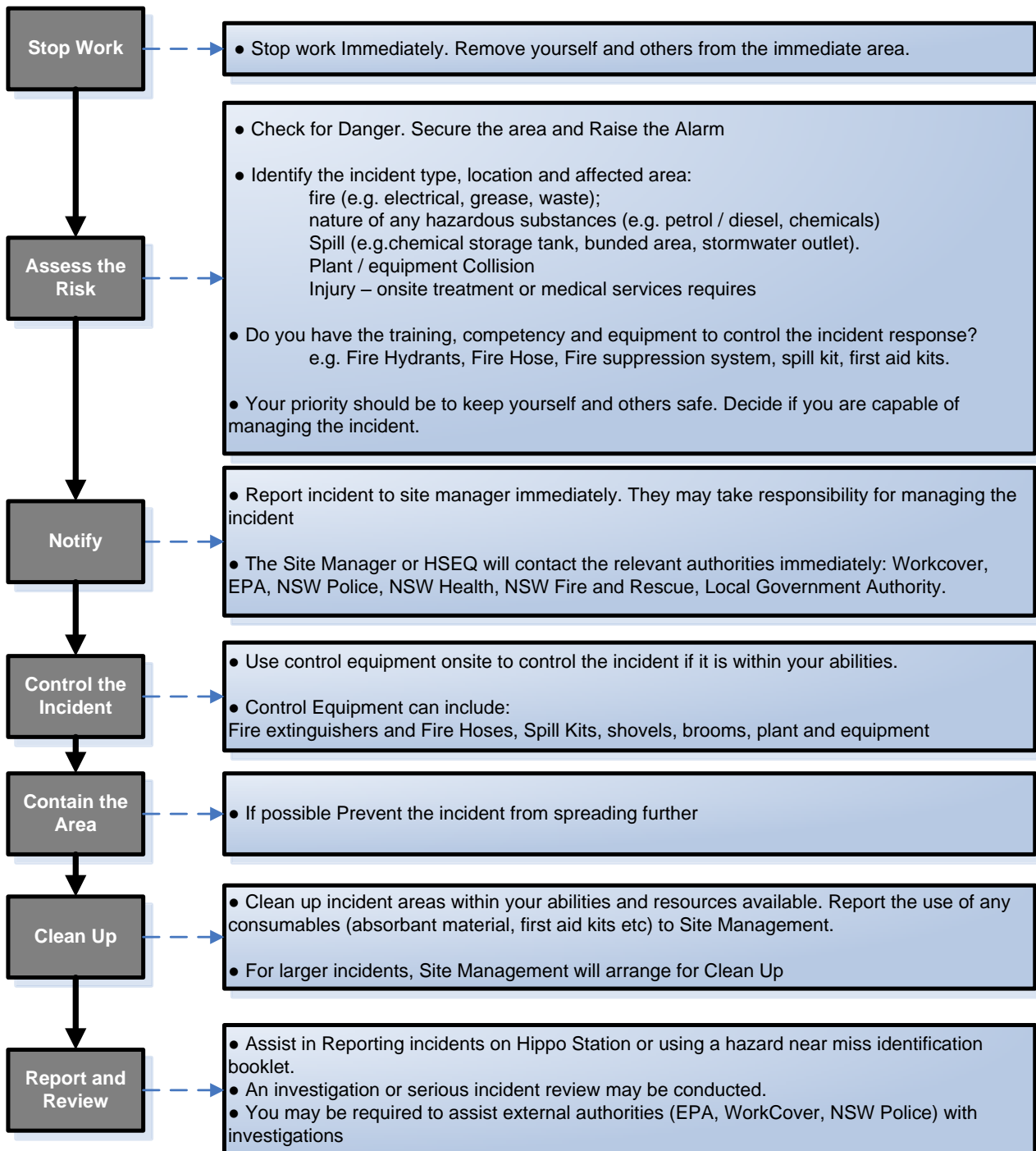


Figure 6.1 Emergency and Environmental Incident Response Flow Chart

This process guides any response to surface water, groundwater or leachate contamination through such incidents as spills or discharges, which may include the use of absorbent material to contain the spill/discharge.

Spill kits are available onsite at all times and training in their use is provided to all BTT personnel.

Any fuel, lubricant, or hydraulic fluid spillages is contained through the design of site bunding, and any excess material is collected using absorbent material, with contaminated material disposed of to a licensed waste facility.

A typical spill response procedure to be followed by Veolia is summarised in Figure 6.2 below.

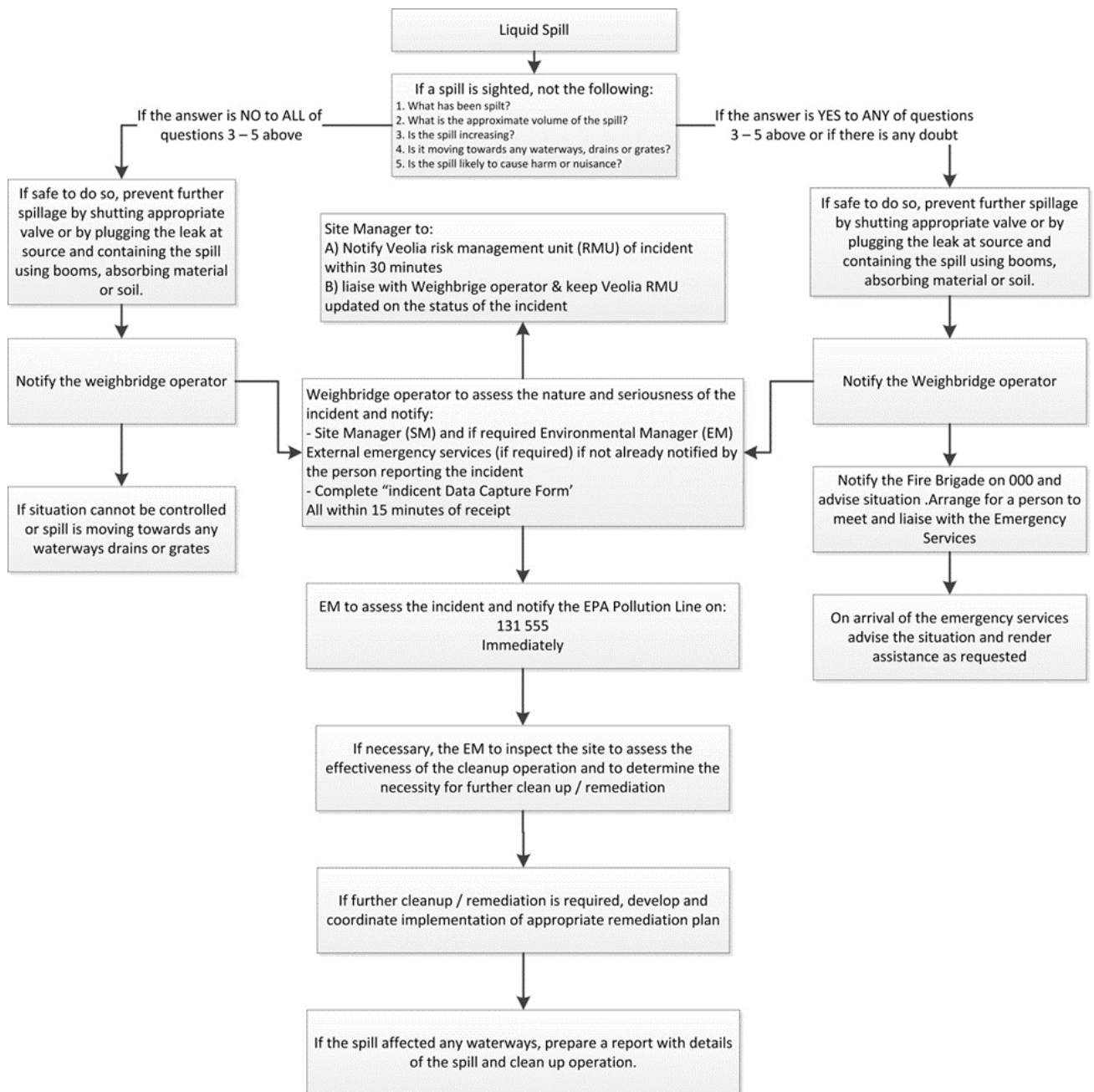


Figure 6.2 Typical Spill Response Flow Chart

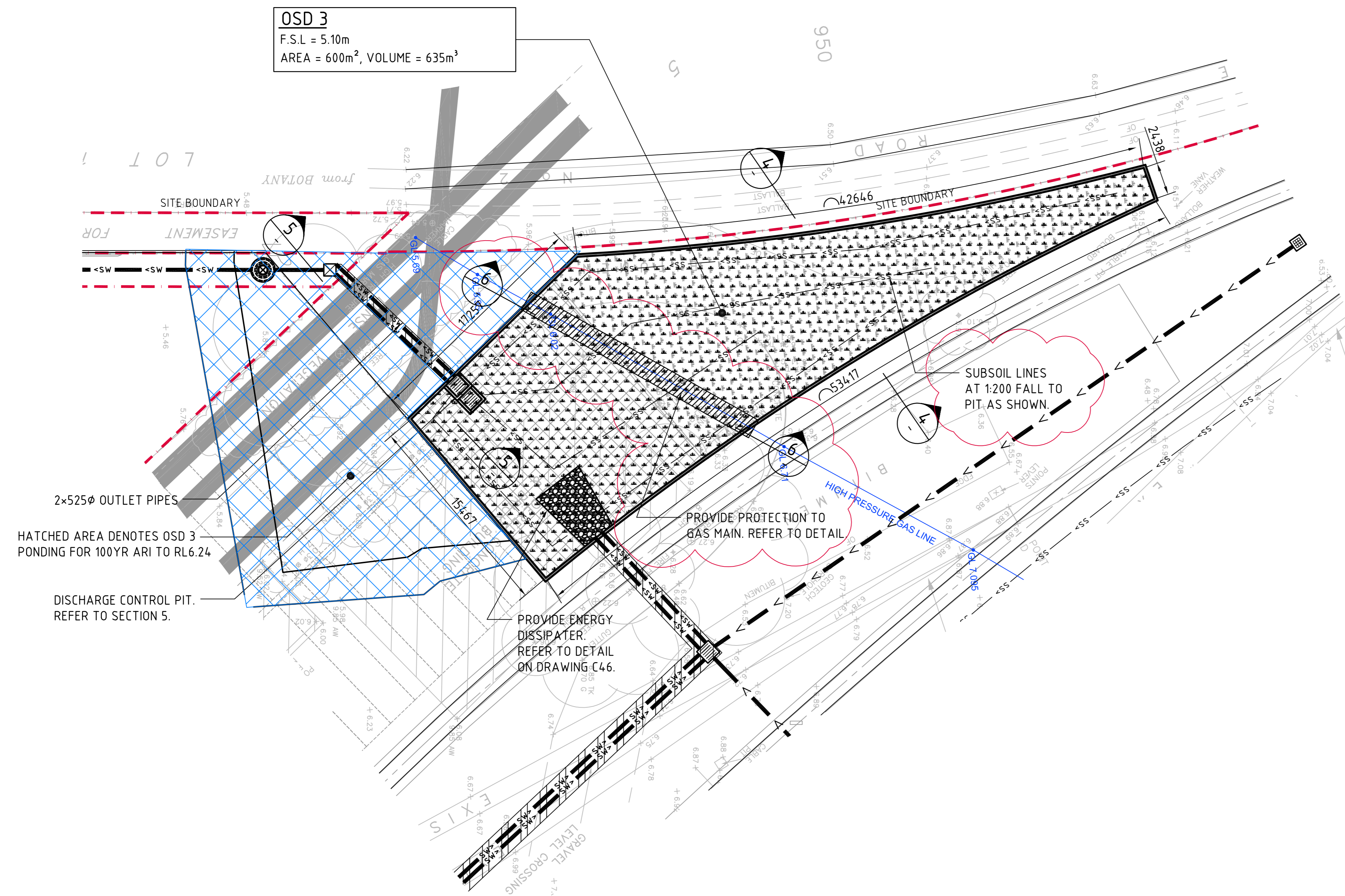
SECTION 7**REFERENCES**

- ANZECC, 2000, *The Australian Water Quality Guidelines for Fresh and Marine Waters*
- Landcom (2004), *Managing Urban Stormwater*, 4th Edition.
- City of Botany Bay Council, (2013), *Stormwater Management Technical Guidelines*.
- Costin Roe Consulting Pty Ltd, (2015), *Civil Engineering Report*.
- Hyder Consulting Pty Ltd, (2014), *Banksmeadow Transfer Terminal Response to Submissions*.
- Hyder Consulting Pty Ltd, (2014), *Banksmeadow Transfer Terminal Environmental Impact Statement*.
- NSW EPA (1997), *Managing Urban Stormwater: Treatment Techniques*.

APPENDICES

Appendix A Site Plans

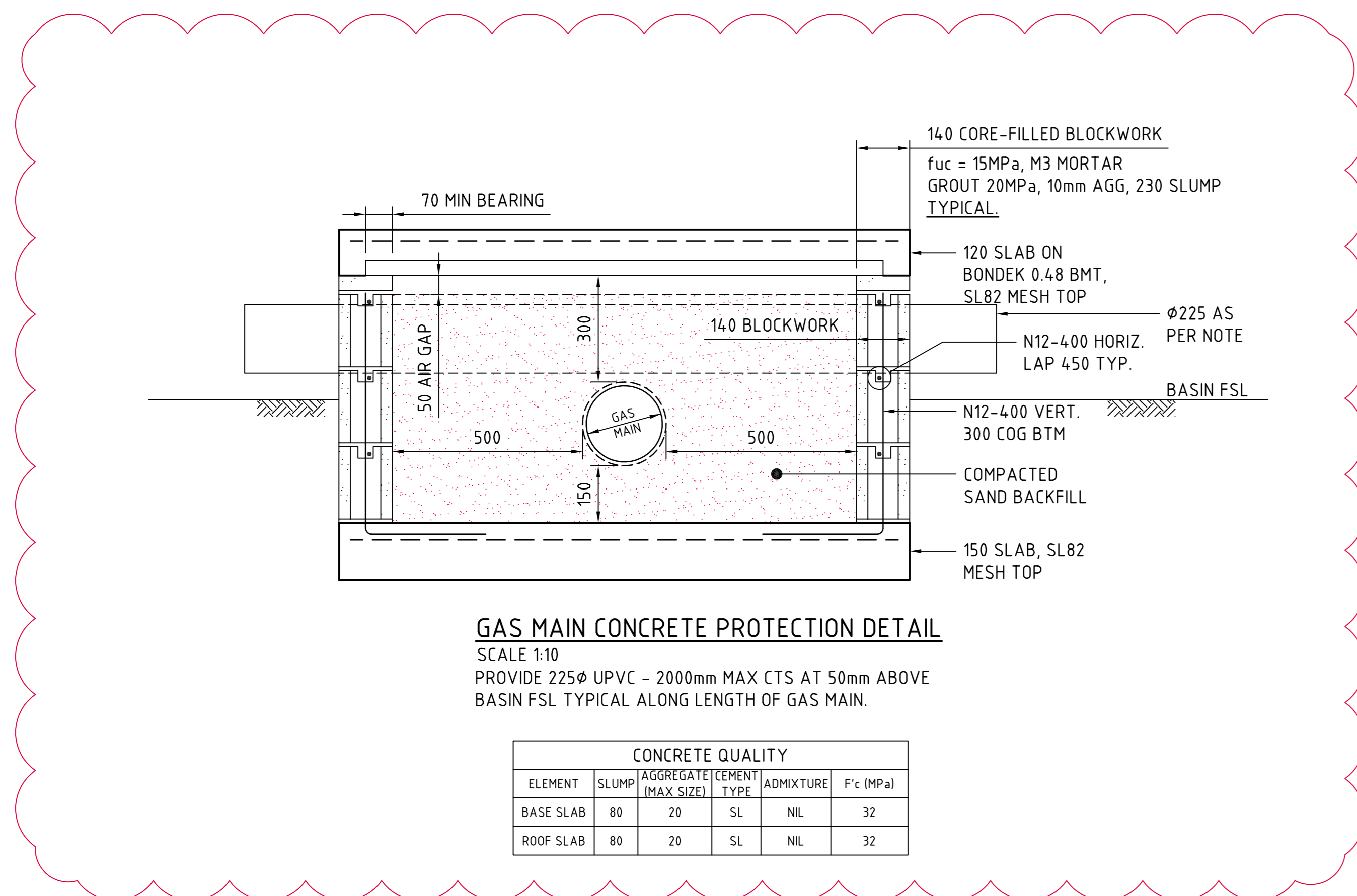
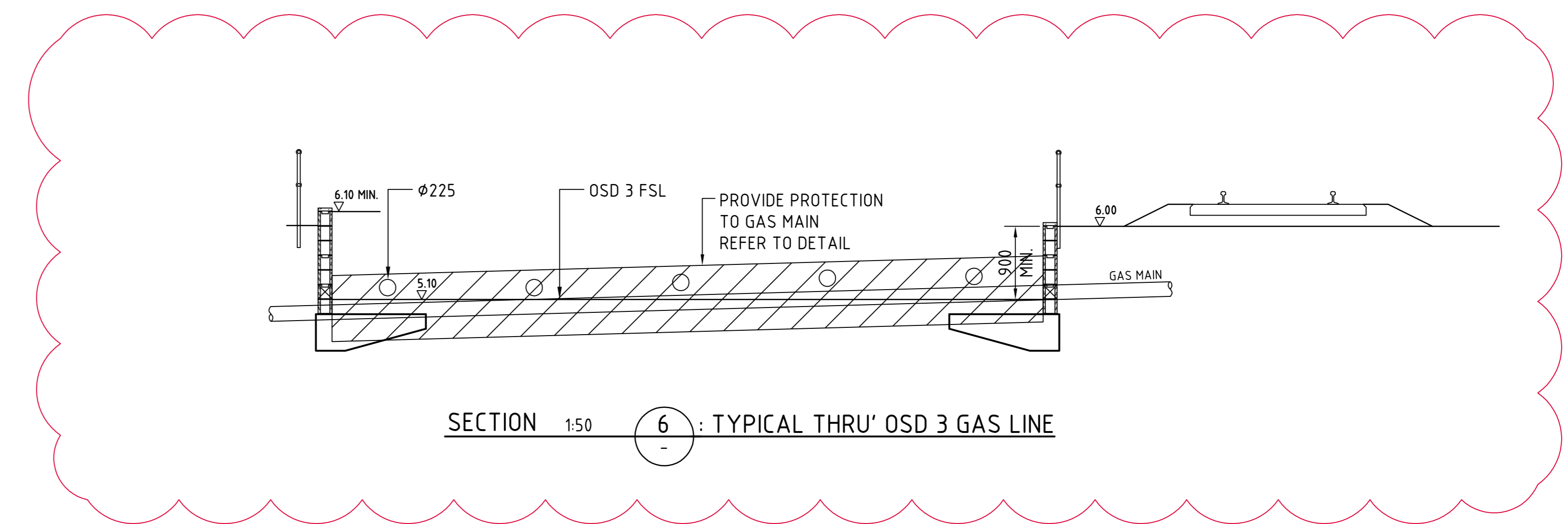
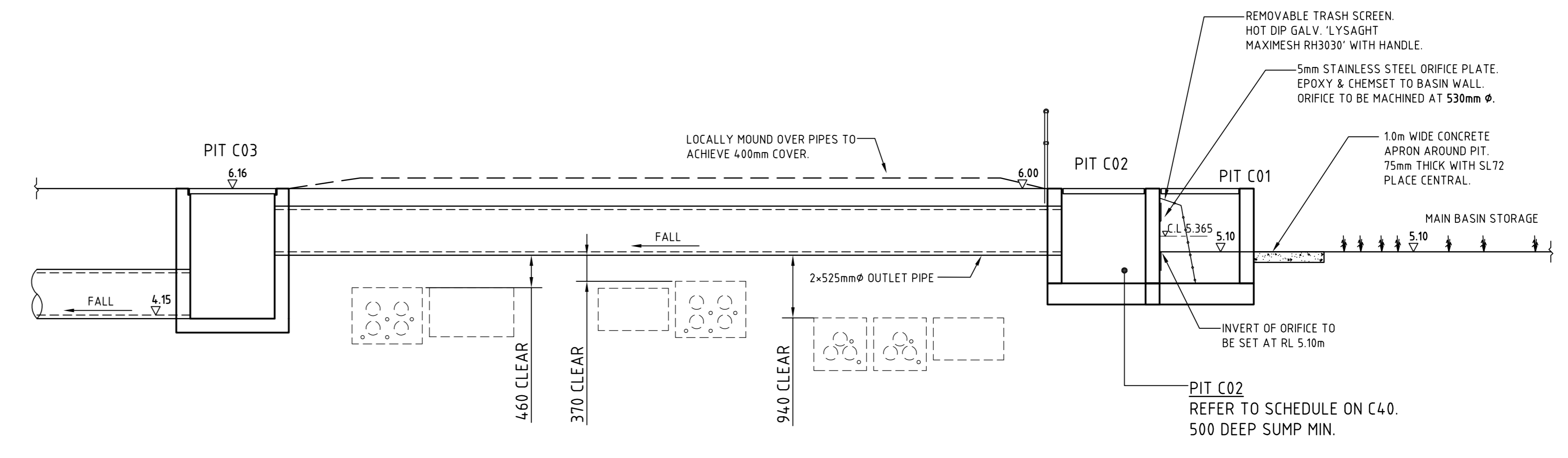
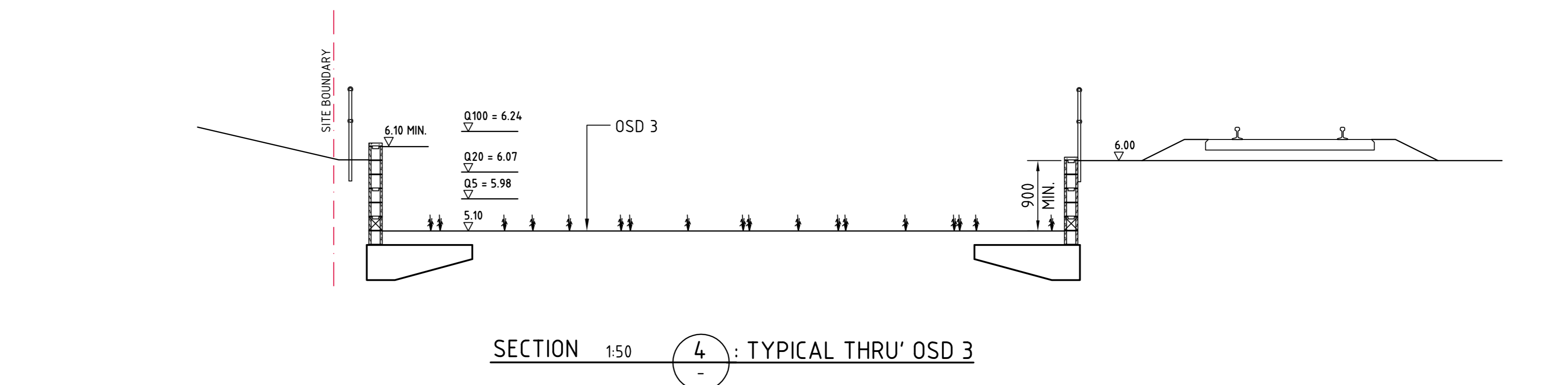
Stormwater Management System CO12589.00 C40 to CO12589.00 C48
Hydraulic Services Warehouse Plan H-200 (Leachate tanks)
Architectural Plan A200 (Fuel tank)



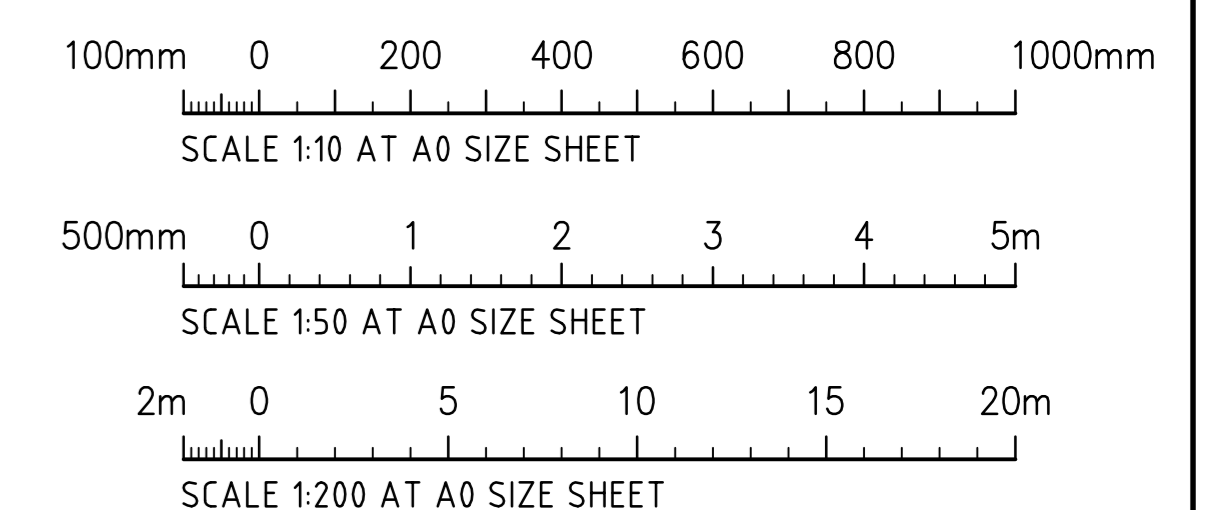
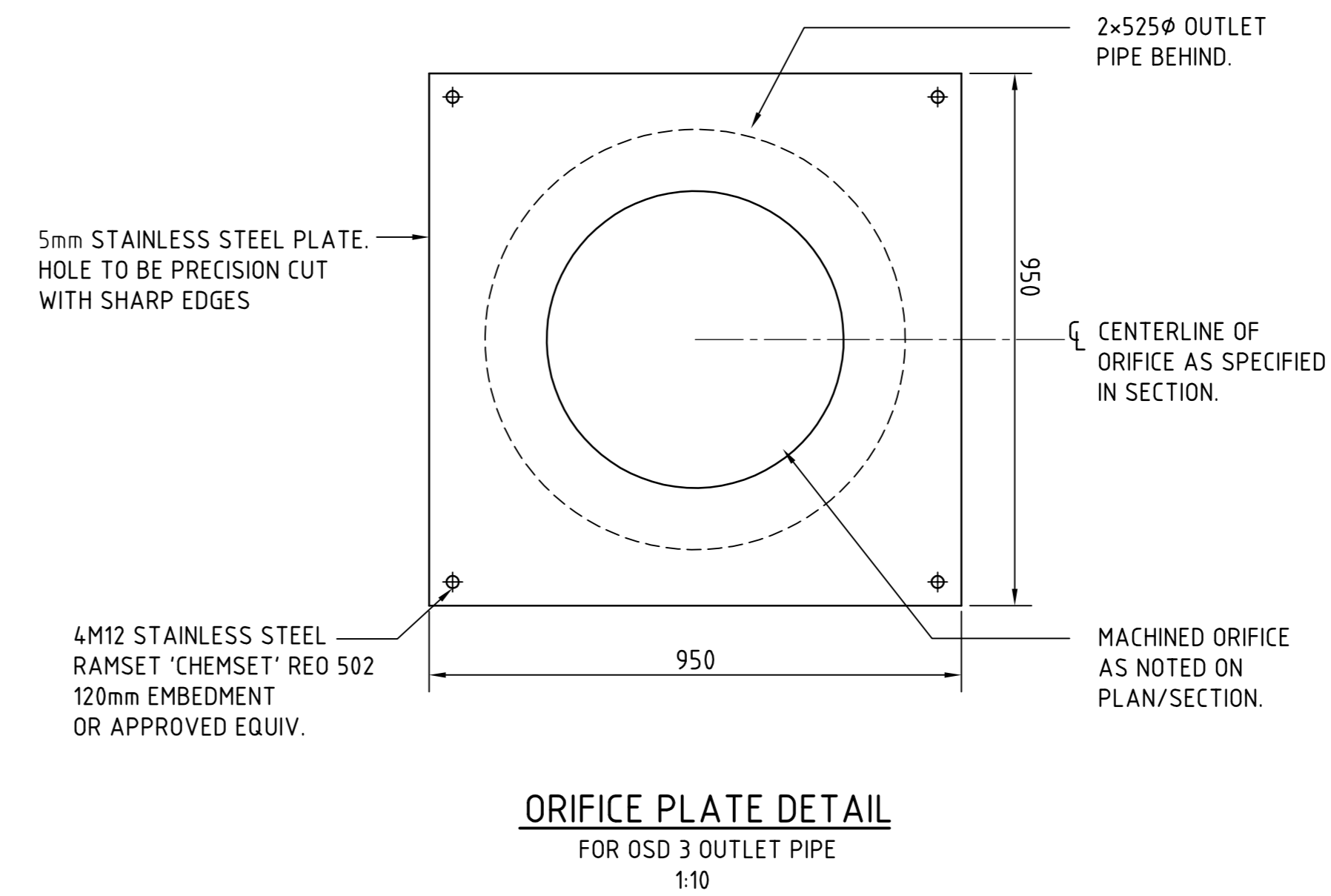
OSD 3
 F.S.L. = 5.10m
 AREA = 600m², VOLUME = 635m³

OSD BASIN '3' PLAN
 SCALE 1:200

OSD '3' DETAILS	
SITE AREA DRAINING TO STORAGE	2.323 ha
STORAGE VOLUME OSD PROVIDED (BASED DRAINS ILSAX MODEL)	635m ³
INTERNAL BASIN DIMENSIONS	0.9m VARIES



CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX SIZE)	CEMENT TYPE	ADMIXTURE	F _c (MPa)
BASE SLAB	80	20	SL	NIL	32
ROOF SLAB	80	20	SL	NIL	32



FOR CONSTRUCTION CERTIFICATE

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
REVISED GAS MAIN PROTECTION & ADDED SECTION 6	11.02.16	F			
REVISED AS CLOUDED FOR GAS MAIN AND INLET PIPES	07.12.15	E			
DRAWING REVISED	26.10.15	D			
ISSUED FOR CONSTRUCTION CERTIFICATE	02.06.15	C			
OSD 4 & 5 REVISED AS CLOUDED	01.06.15	B			
ISSUED FOR INFORMATION	22.05.15	A			



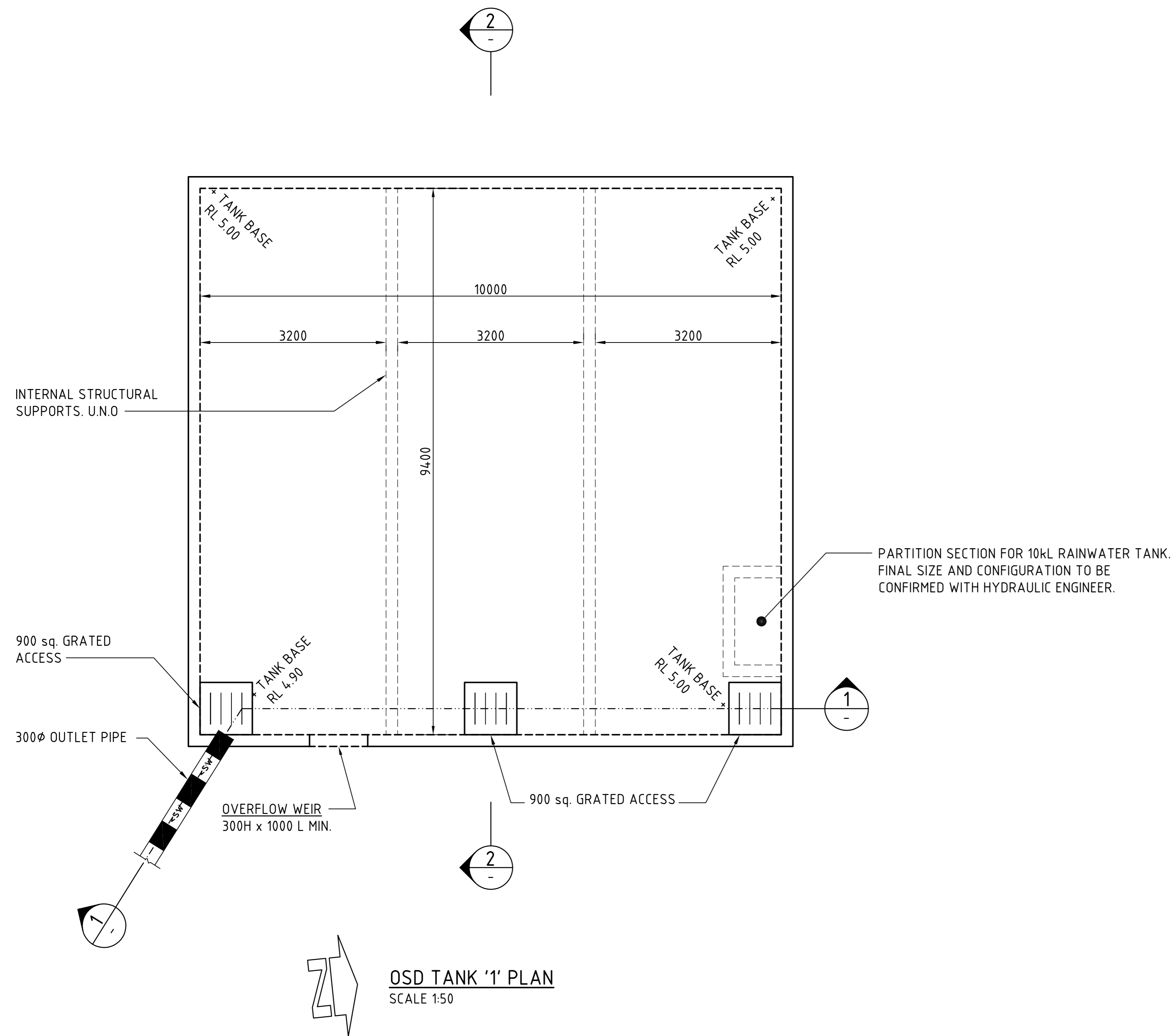
PROJECT
VEOLIA TERMINAL
 McPHERSON STREET, BANKSMEADOW



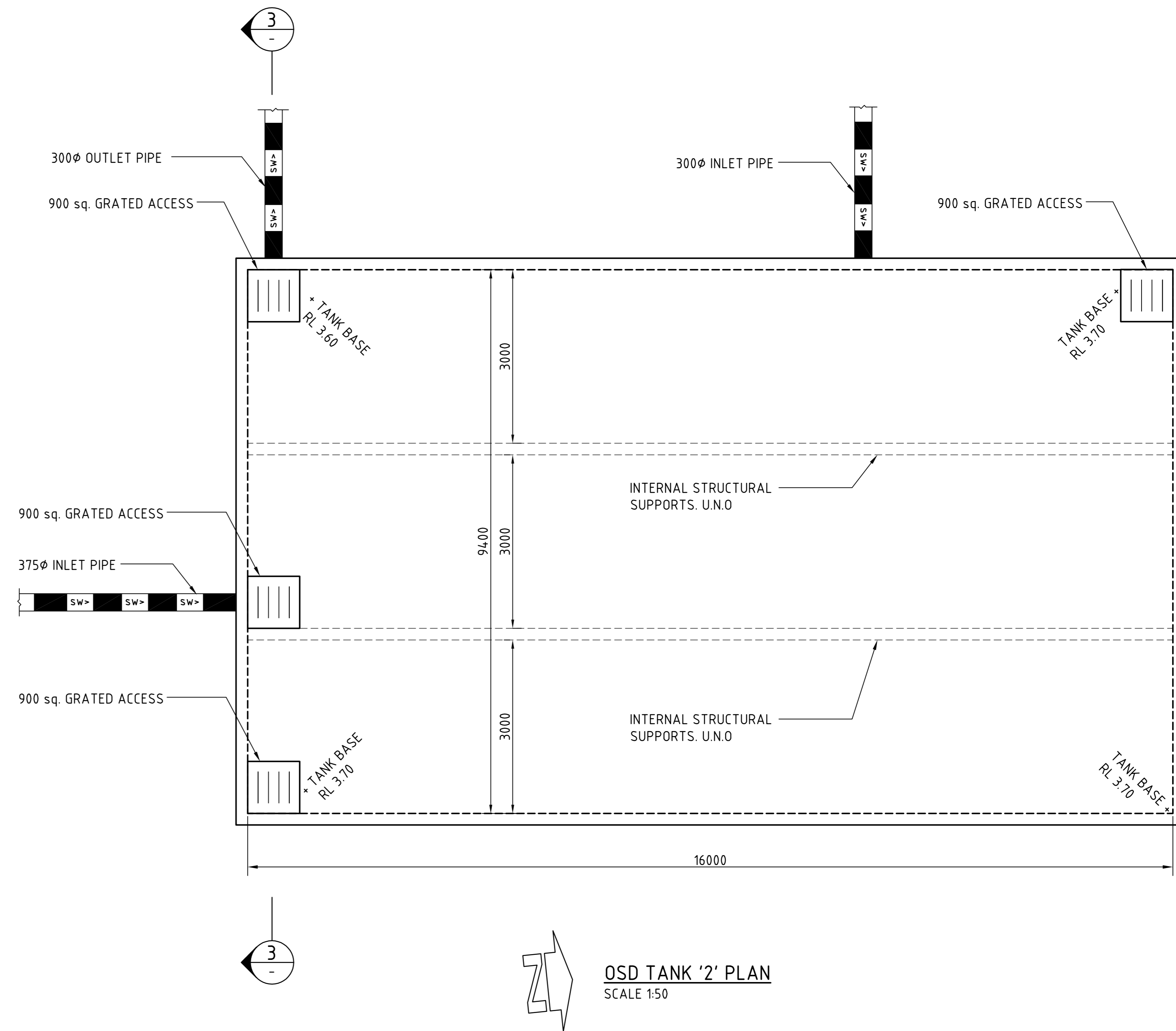
Costin Roe Consulting Pty Ltd.
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 Level 1, 8 Windmill Street
 Walsh Bay, Sydney NSW 2000
 Tel: (02) 9251-7899 Fax: (02) 9241-3721
 email: mail@costinroe.com.au

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 Value in Engineering and Management

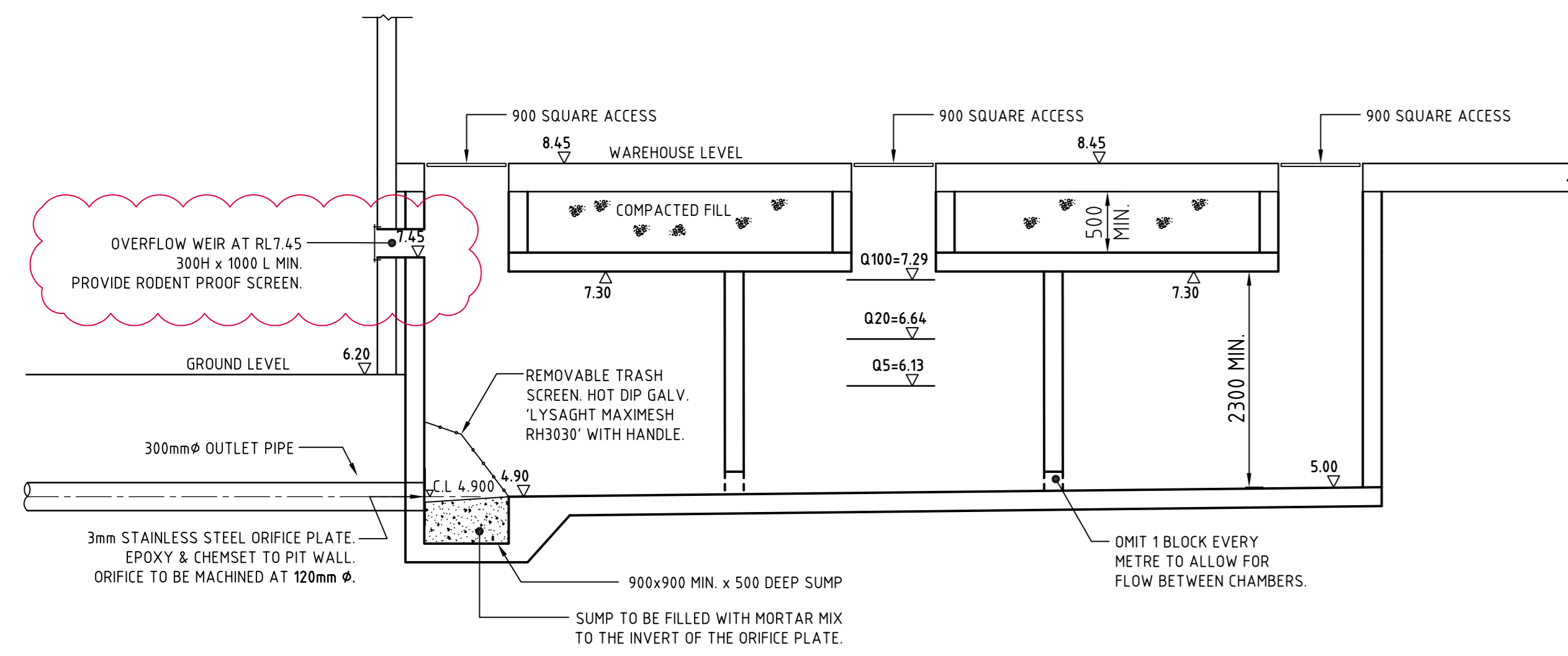
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OSD TANK DETAILS SHEET 2
 DRAWING No. **C012589.00- C48** ISSUE **F**



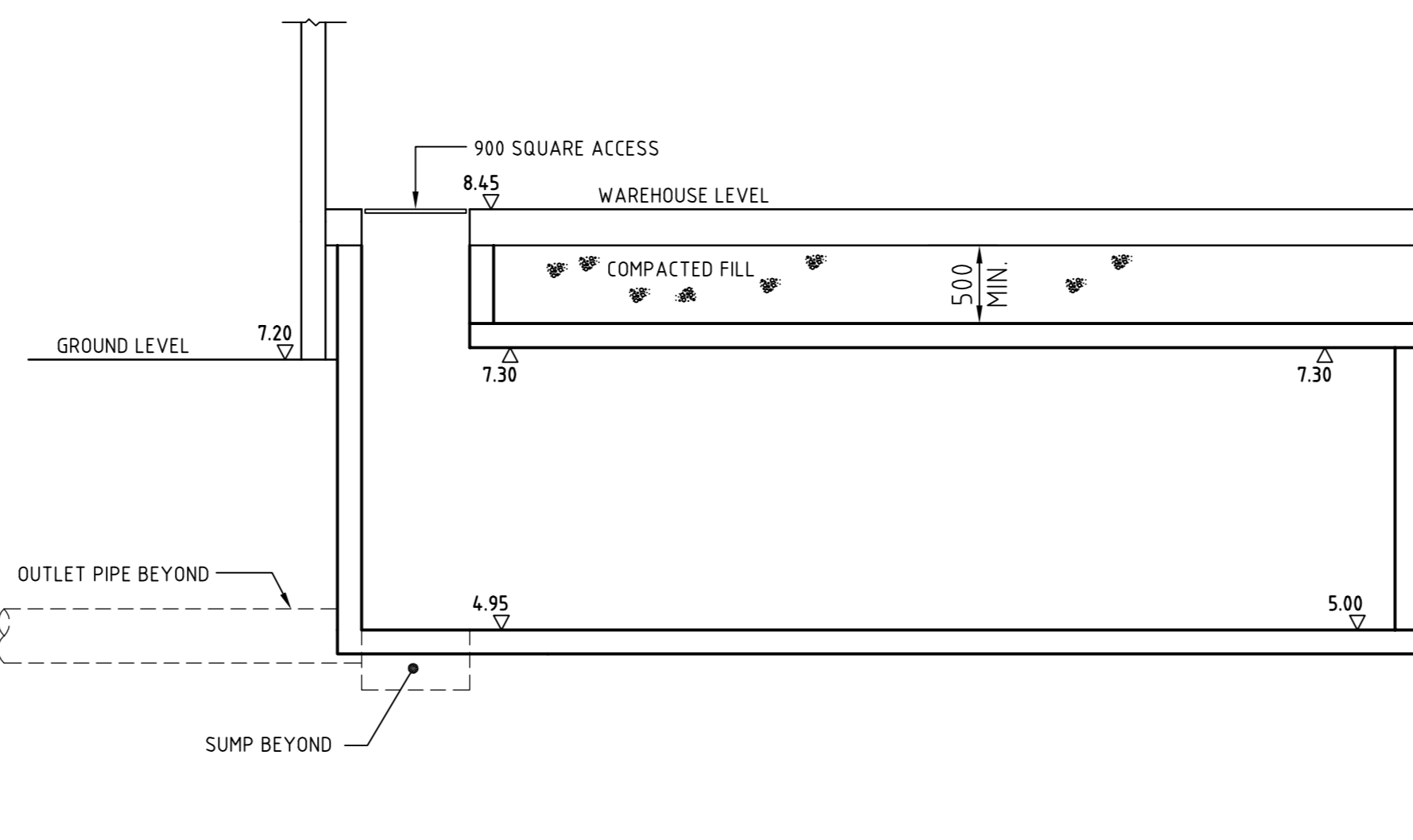
OSD TANK '1' PLAN
SCALE 1:50



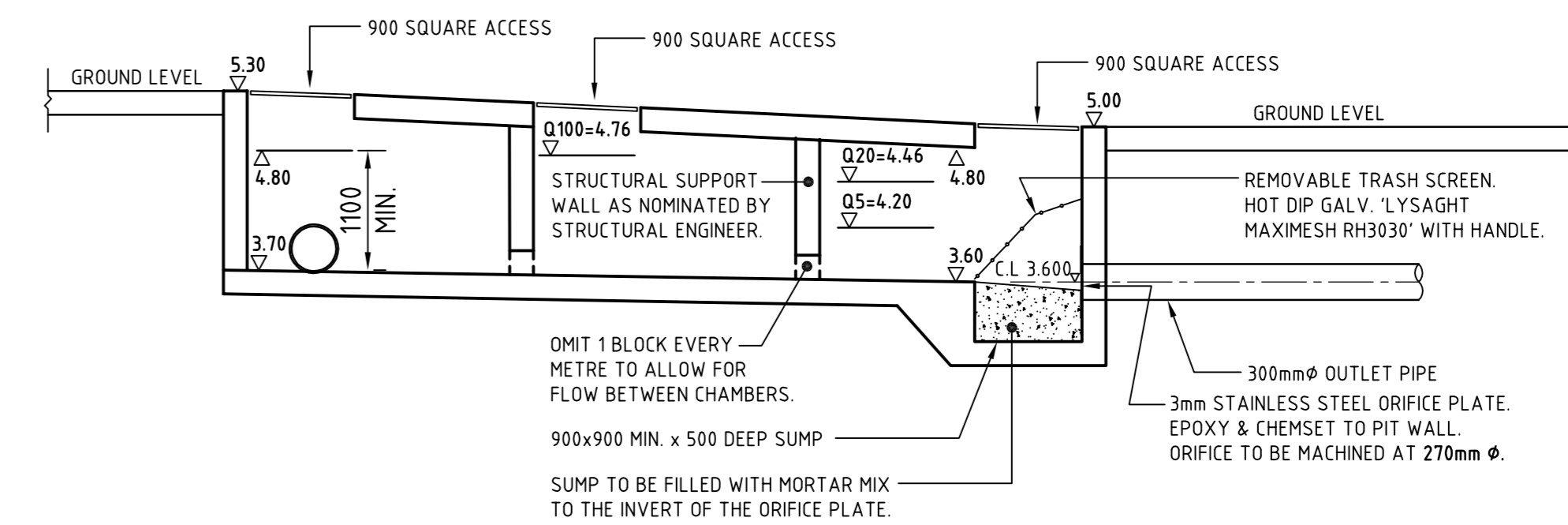
OSD TANK '2' PLAN
SCALE 1:50



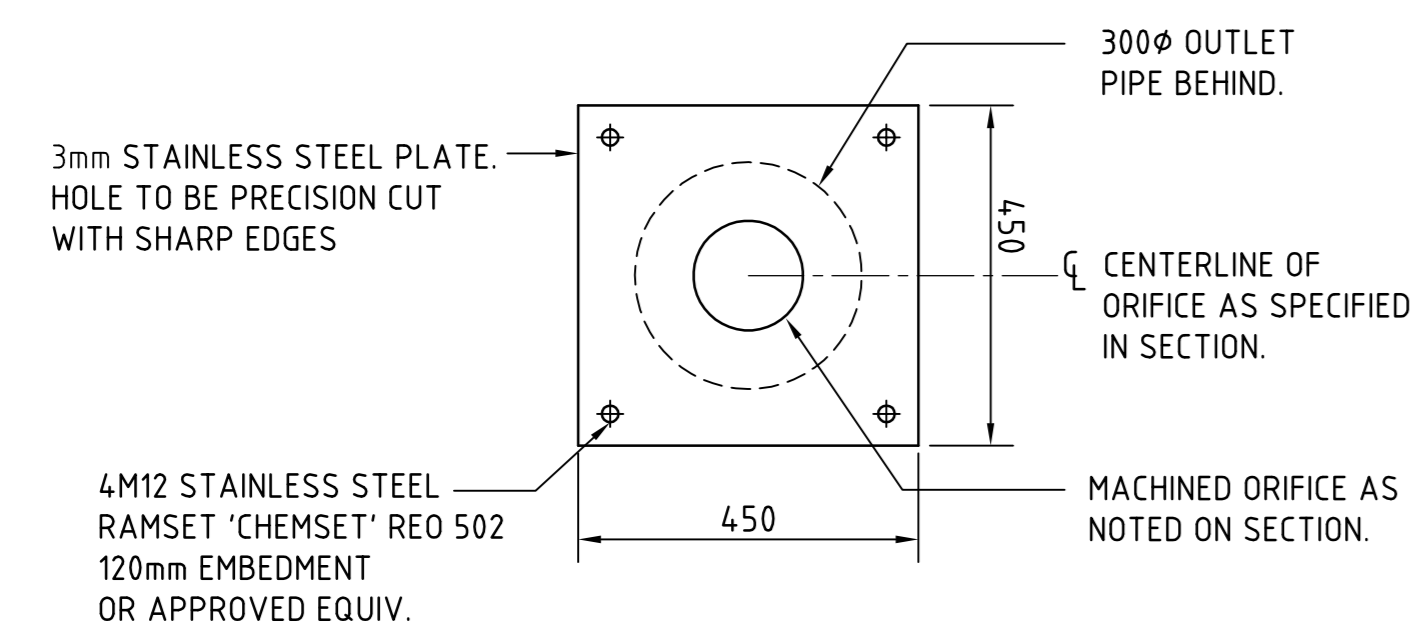
SECTION 1:50 (1) : TYPICAL THRU' OSD 1 OUTLET



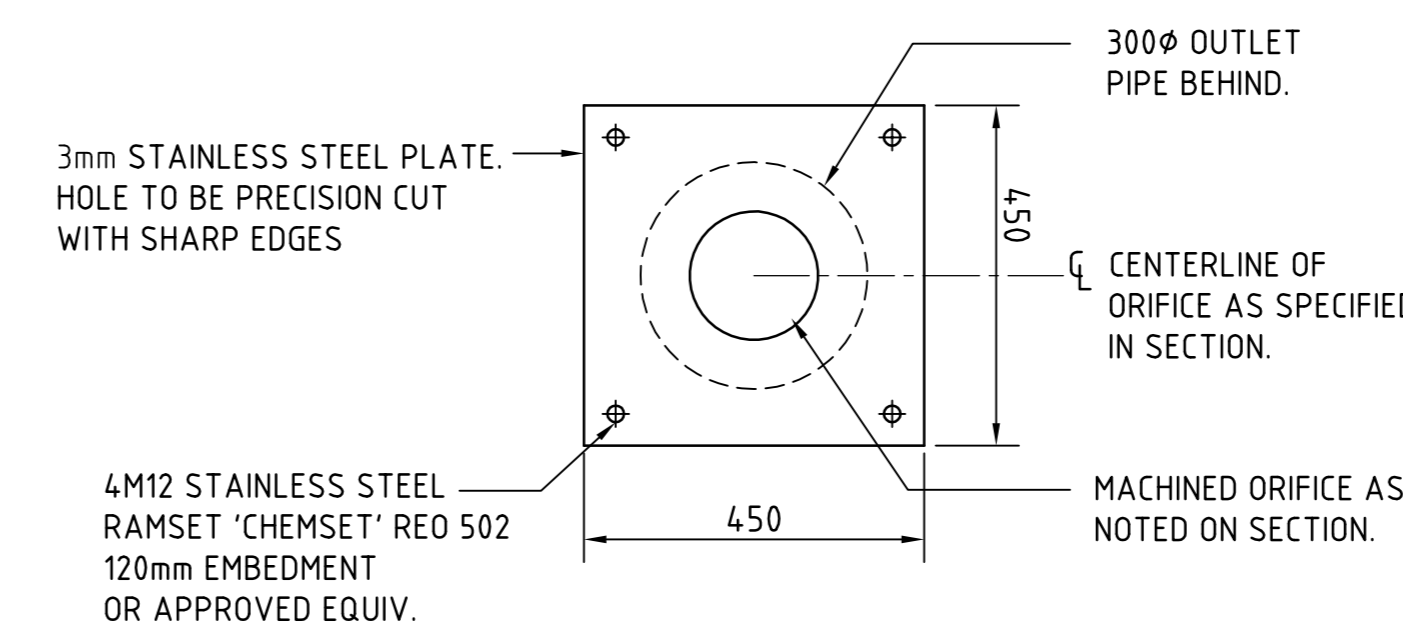
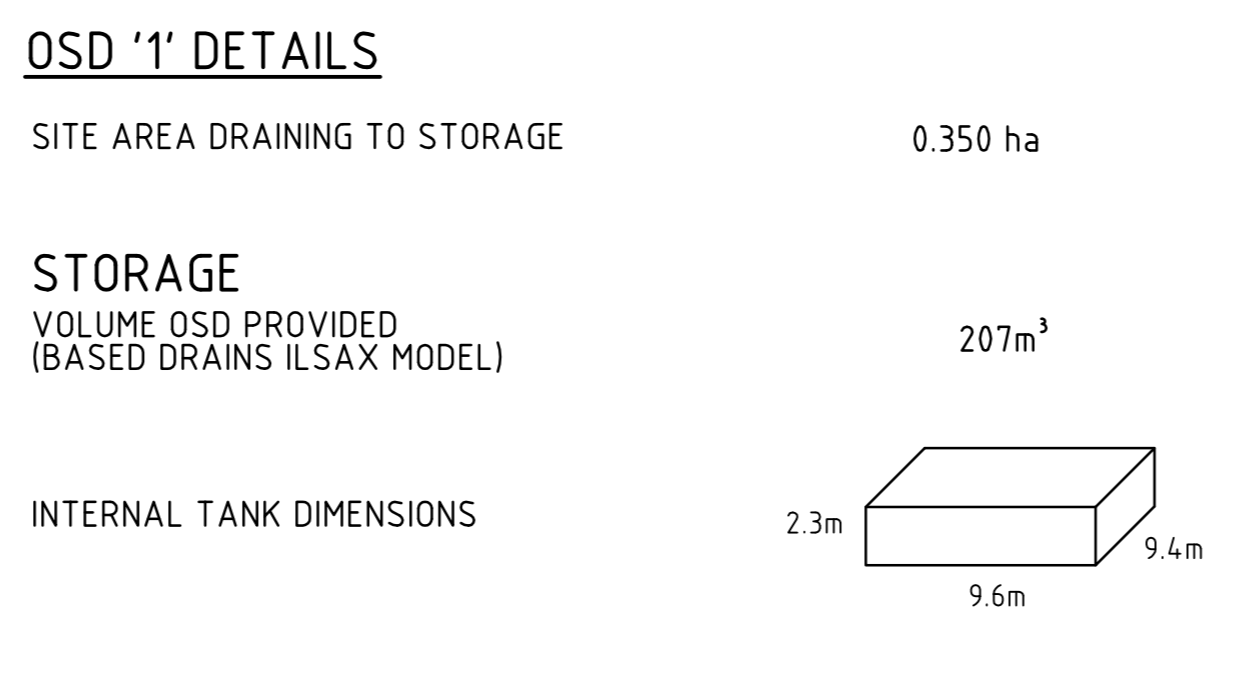
SECTION 1:50 (2) : TYPICAL THRU' OSD 1



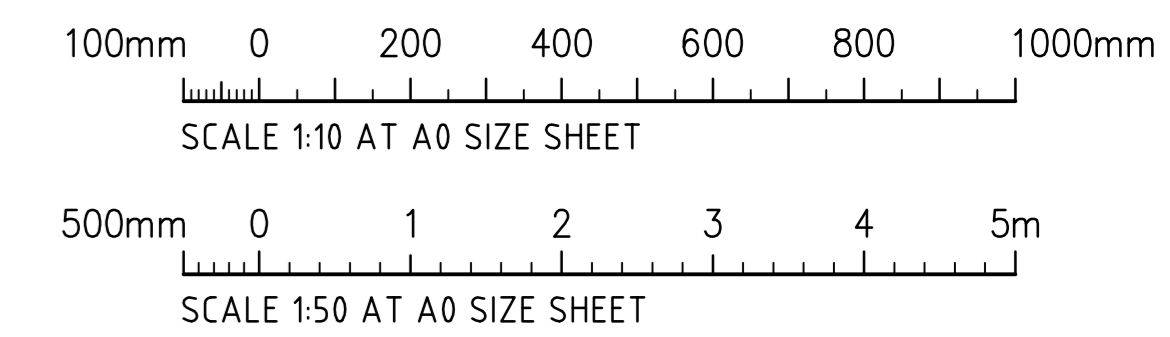
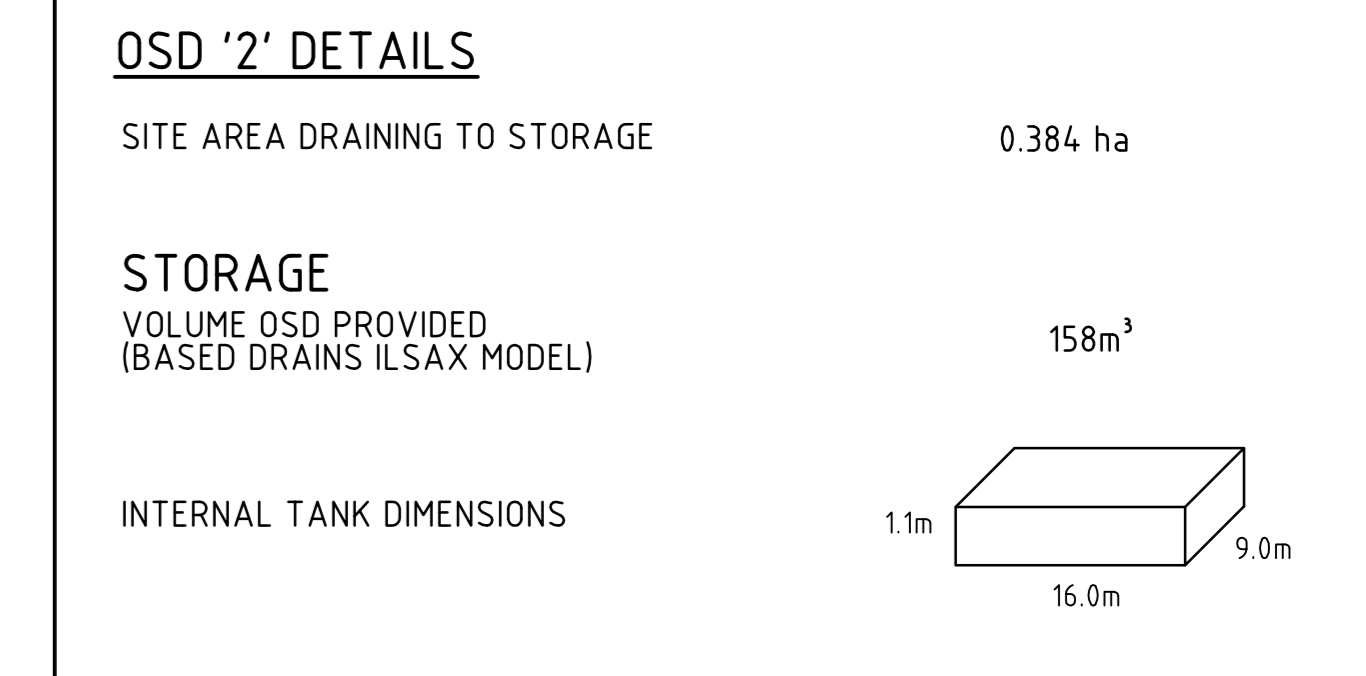
SECTION 1:50 (3) : TYPICAL THRU' OSD 2 OUTLET



ORIFICE PLATE DETAIL
FOR OSD 1 OUTLET PIPE
1:10



ORIFICE PLATE DETAIL
FOR OSD 2 OUTLET PIPE
1:10



FOR CONSTRUCTION CERTIFICATE

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
OSD 1 WEB RL REVISED AS CLOUDED	07.12.15	C			
ISSUED FOR CONSTRUCTION CERTIFICATE	12.05.15	B			
ISSUED FOR INFORMATION	22.05.15	A			



PROJECT
VEOLIA TERMINAL
MCPHERSON STREET, BANKSMEADOW



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email: mail@costinroec.com.au

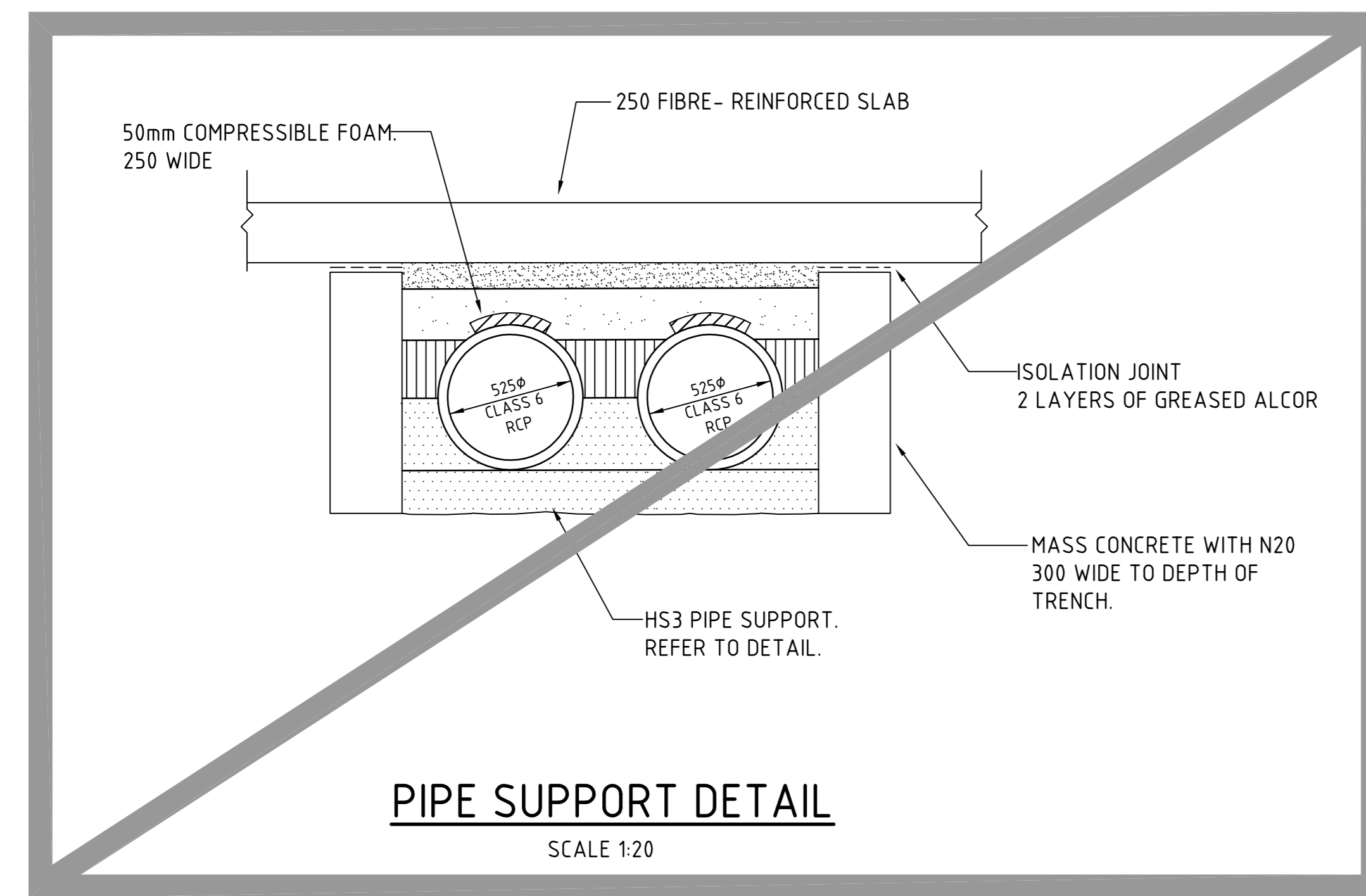
CostinRoe Consulting

DRAWING TITLE
OSD TANK DETAILS SHEET 1

Value in Engineering and Management

DRAWING No. **C012589.00 - C47**

**PIPE SUPPORT
SUBSTITUTED WITH
CONCRETE ENCASEMENT
SHOWN BELOW.**

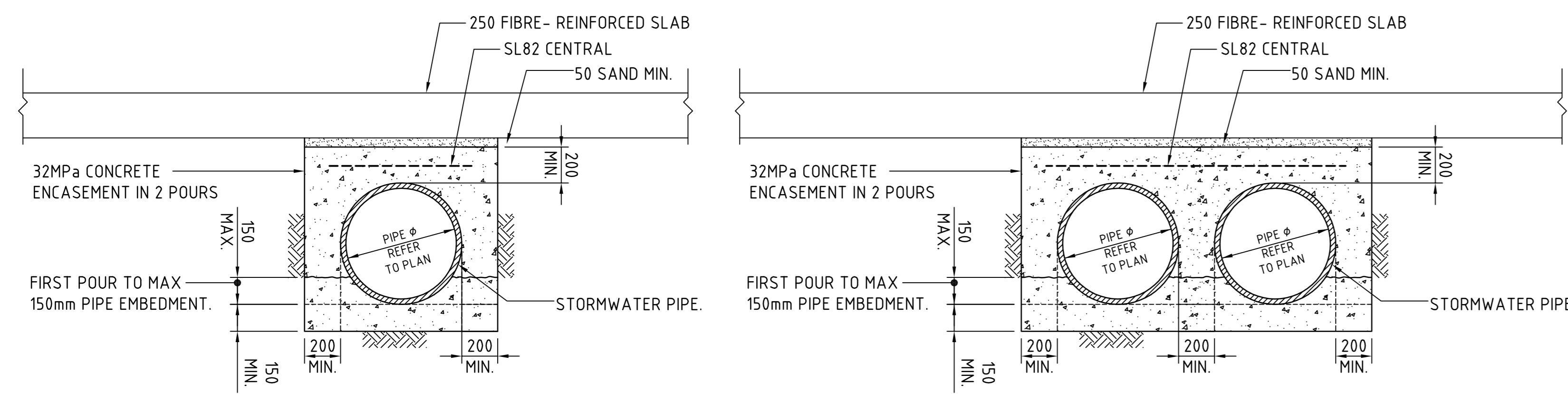


PIPE SUPPORT DETAIL

SCALE 1:20

NOTE:

PIPE SUPPORT DETAIL SHOWN ABOVE MAY BE SUBSTITUTED BY CONCRETE ENCASEMENT DETAIL SHOWN BELOW. CONTRACTOR TO CONFIRM TO ENGINEER PRIOR TO COMMENCEMENT OF WORKS.



SINGLE PIPE ARRANGEMENT

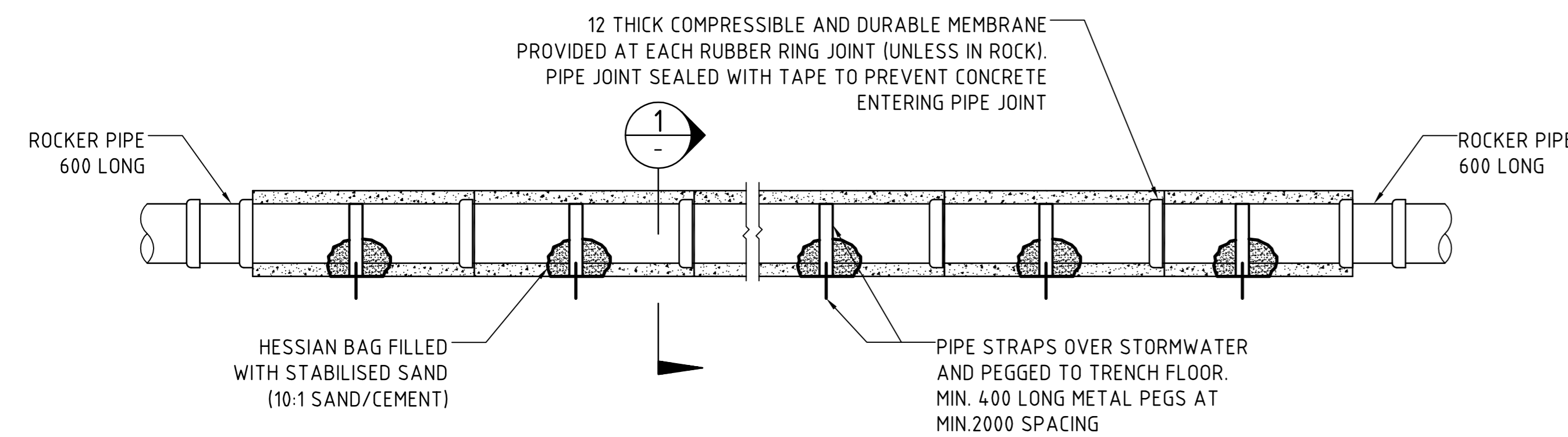
MULTIPLE PIPES ARRANGEMENT

CONCRETE ENCASEMENT DETAIL

SCALE 1:20

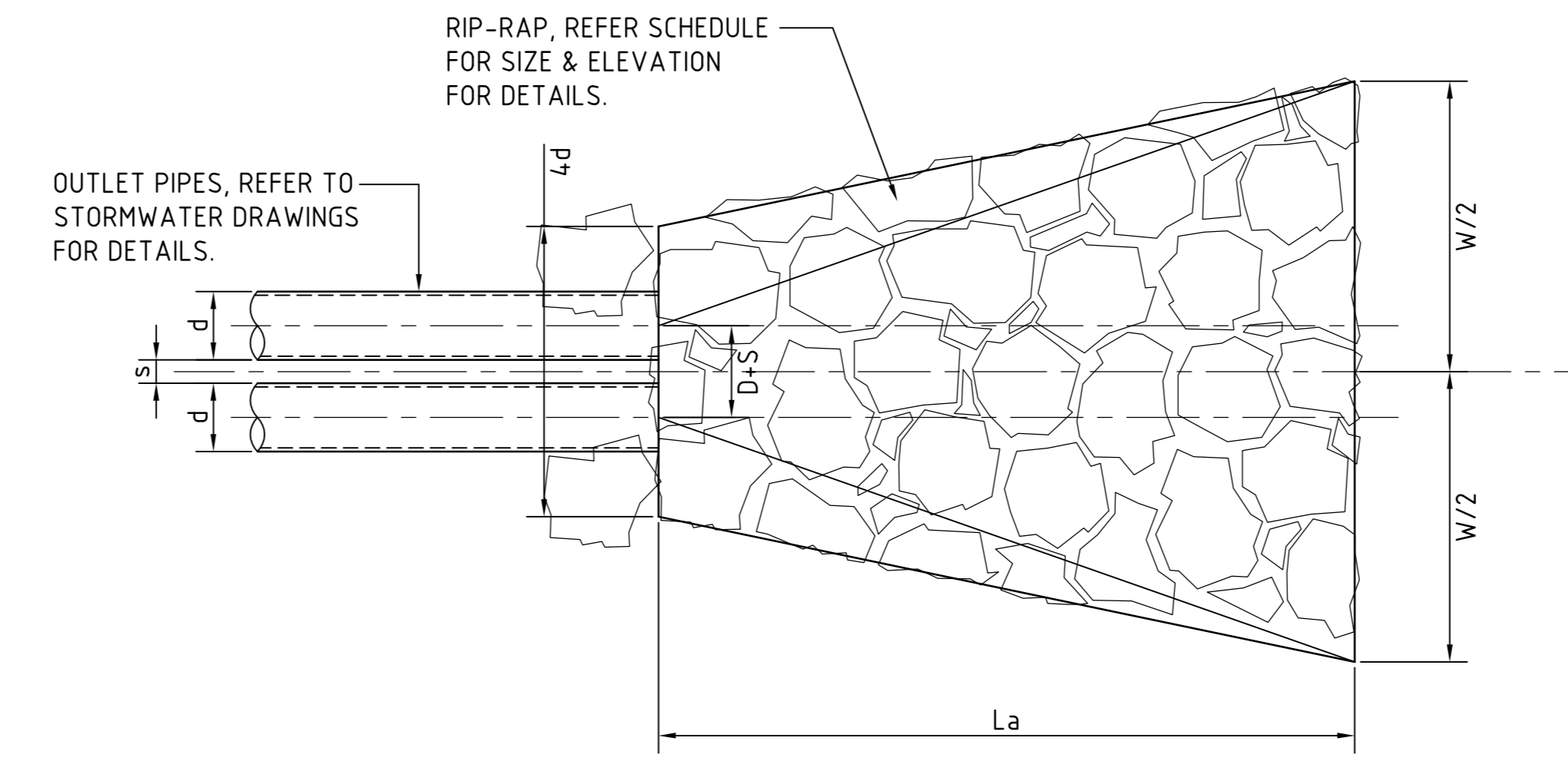
NOTE:
DURING THE ENCASEMENT PROCESS THE CONTRACTOR IS TO PROVIDE SUPPORT TO THE PIPE TO PREVENT PIPE MOVEMENT AND/OR FLOAT.
CONCRETE ENCASEMENT TO BE INSTALLED IN 2 POURS.

SECTION 1:20

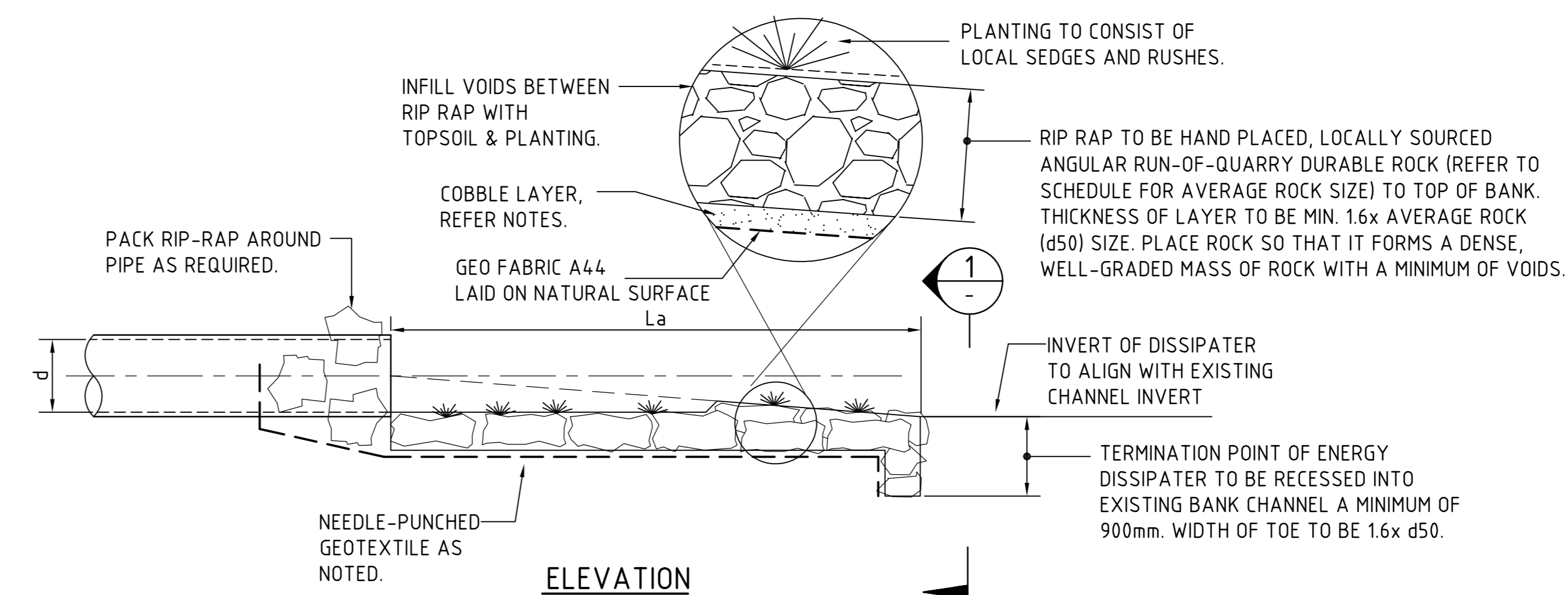


CONCRETE ENCASEMENT TYPICAL DETAIL

SCALE 1:50



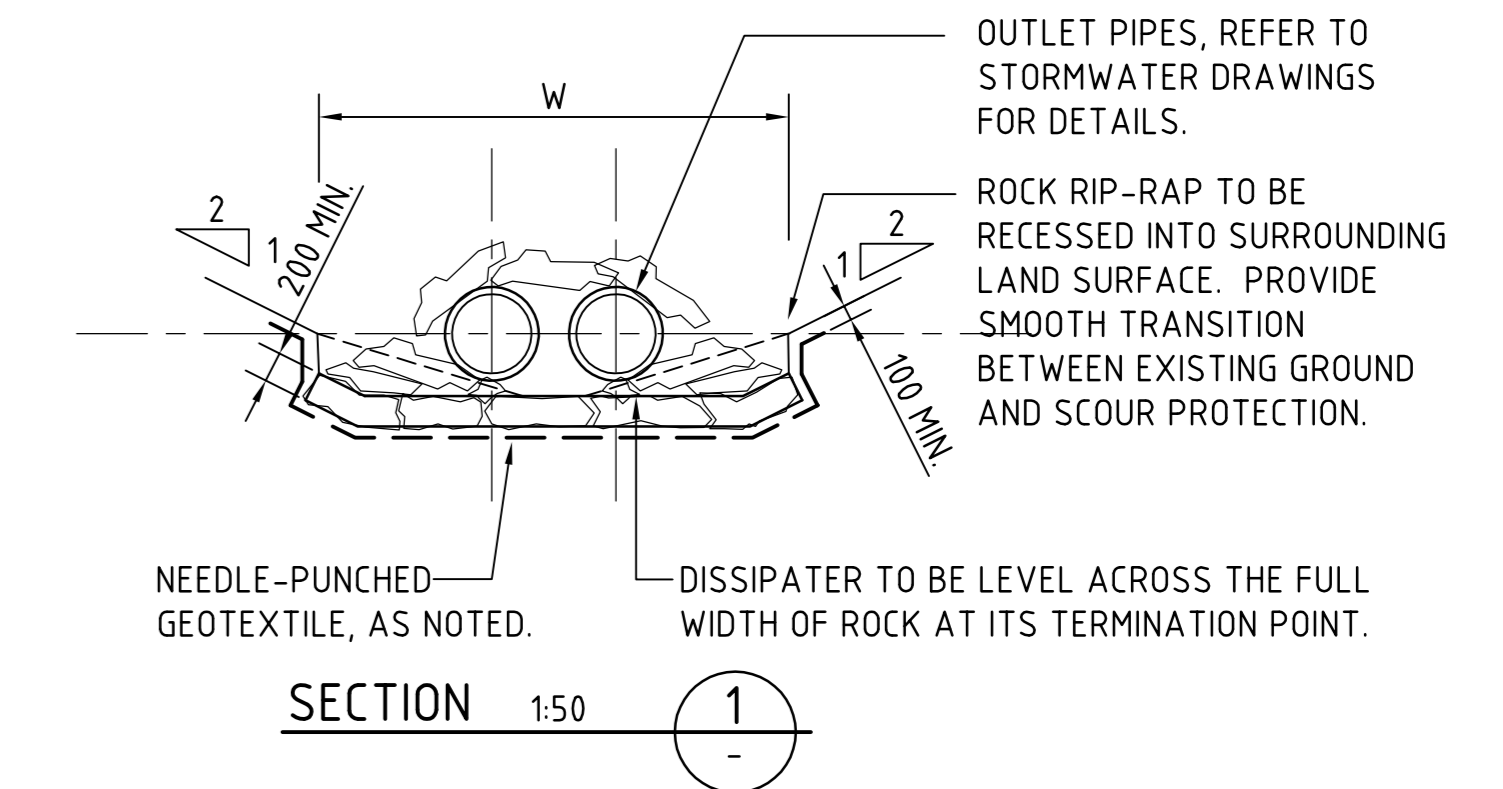
PLAN VIEW



ELEVATION

STORMWATER OUTLET DISSIPATER

SCALE 1:50



SECTION 1:50

DISSIPATER NOTES:

- ALIGN STRUCTURE EVENLY WITH BANK.
- LOCATE STRUCTURE AT INVERT LEVEL OF STREAM AND POINT IN A DOWNSTREAM DIRECTION.
- PIPE TO REST ON, AND BE PACKED IN, BY RIP-RAP (SIZE AS NOTED).
- DISCHARGE INTO STREAM WHERE BEDROCK IS PRESENT, OTHERWISE SCOUR PROTECT AS REQUIRED.
- SCOUR PROTECT THE OPPOSITE BANK AS REQUIRED. SCOUR PROTECTION TO BE PROVIDED WHERE OPPOSITE BANK IS WITHIN 12-14 TIMES THE PIPE DIAMETER.
- RIP-RAP TO CONSIST OF ANGULAR RUN-OF-QUARRY ROCK (d50=150mm MINIMUM) AS NOTED IN THE SCHEDULE. RIP-RAP TO BE MINIMUM THICKNESS OF RIP-RAP LAYER TO BE 1.6x AVERAGE ROCK SIZE (d50).
- RIP-RAP IS TO BE PLACED OVER A 200mm LAYER OF 140mm COBBLES OVER NEEDLE-PUNCHED GEOFAB A44.
- PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE FINISHED RIP-RAP SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS.
- GAPS IN RIP-RAP TO BE HAND PACKED WITH TOPSOIL & PLANTED WITH NATIVE SEDGES & RUSHES TO PROVIDE. THE INTENT IS FOR THERE TO BE NO VOIDS BETWEEN RIP-RAP Boulders.
- ENSURE THE FINISHED ROCK SURFACE BLENDS WITH THE SURROUNDING GROUND LEVELS. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
- ENSURE THAT STORMWATER FROM SURROUNDING GROUND IS FREE TO ENTER THE STRUCTURE WITHOUT CAUSING UNDESIRABLE PONDING OR SCOUR.

DISSIPATER SCHEDULE

DISCHARGE POINT	d	La	W	RIP-RAP (d50)
INLET TO OSD 3	2 x Ø525	5000	4000	200

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SIZE SHEET

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SIZE SHEET

FOR CONSTRUCTION CERTIFICATE

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
REVISD AS CLOUDED	11.02.16	C			
REVISED FOR CONC ENCASEMENT OPTION & ENERGY DISSIPATER	07.12.15	B			
ISSUED FOR CONSTRUCTION CERTIFICATE	26.10.15	A			



PROJECT	VEOLIA TERMINAL McPHERSON STREET, BANKSMEADOW
DESIGNED	M.W.
DRAWN	X.C.
DATE	
CHECKED	
SIZE	A0
SCALE	AS SHOWN
CAD REF:	12589.00-44



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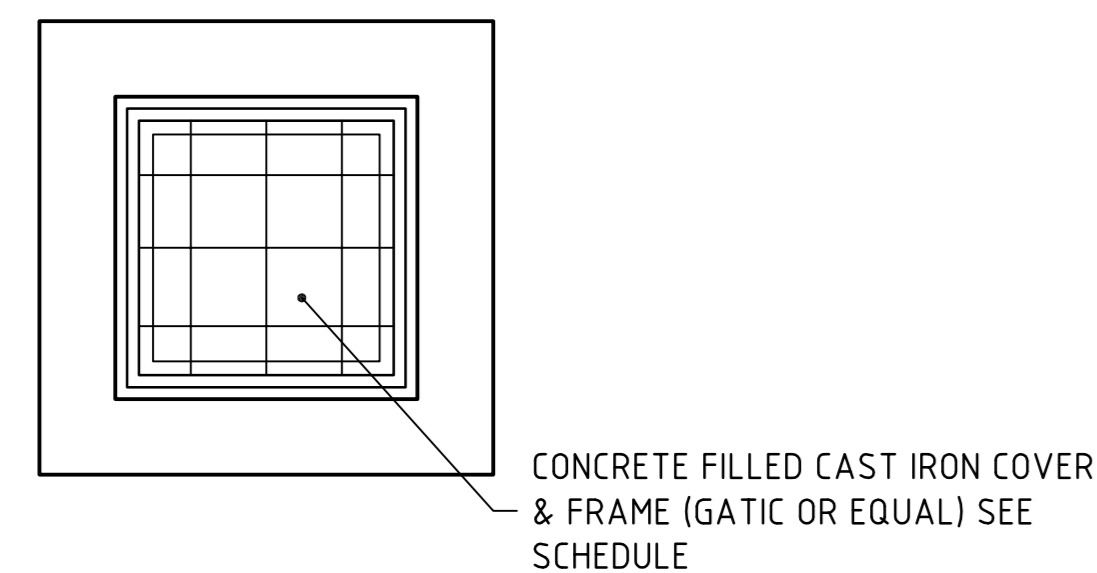
CostinRoe Consulting

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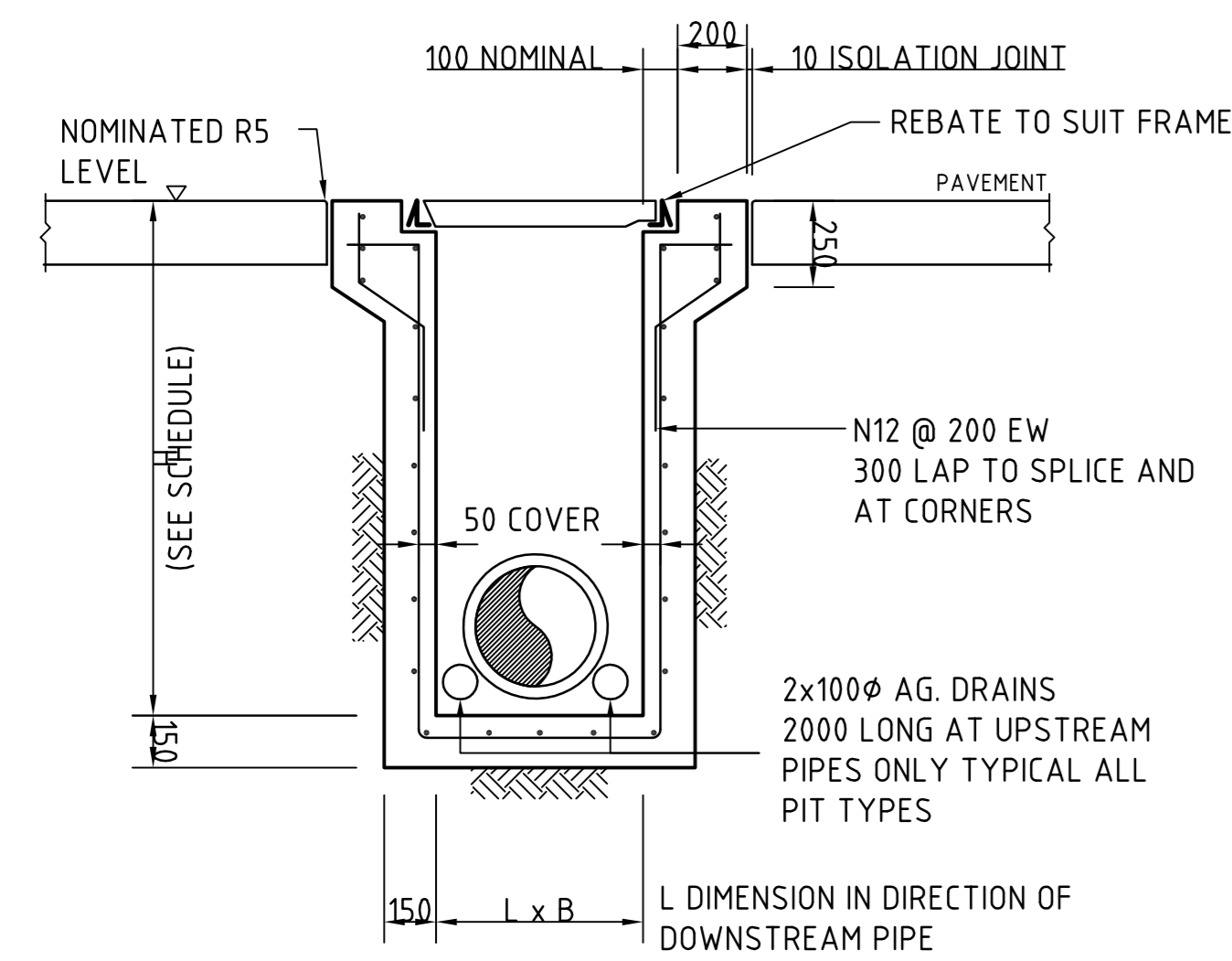
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**STORMWATER DRAINAGE
DETAILS - SHEET 2**

DRAWING No. **C012589.00- C46**

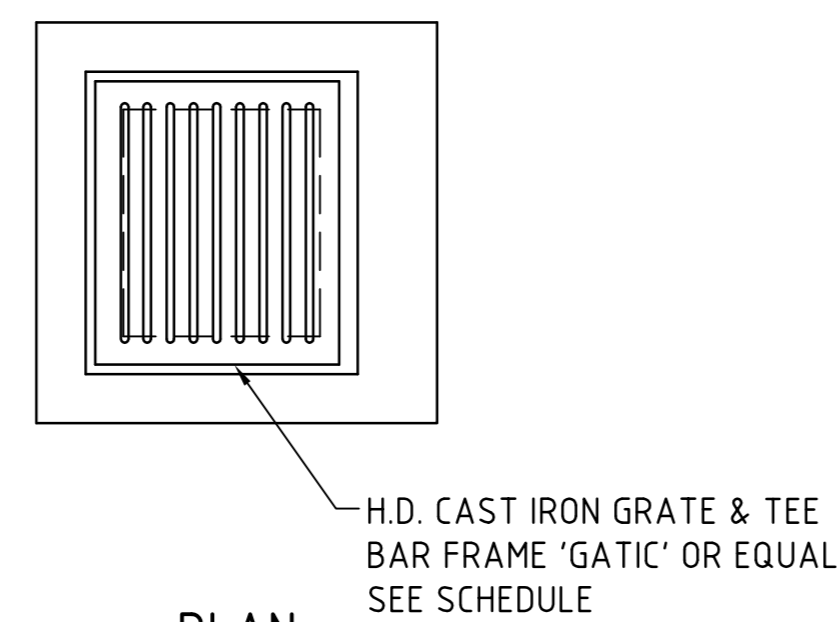
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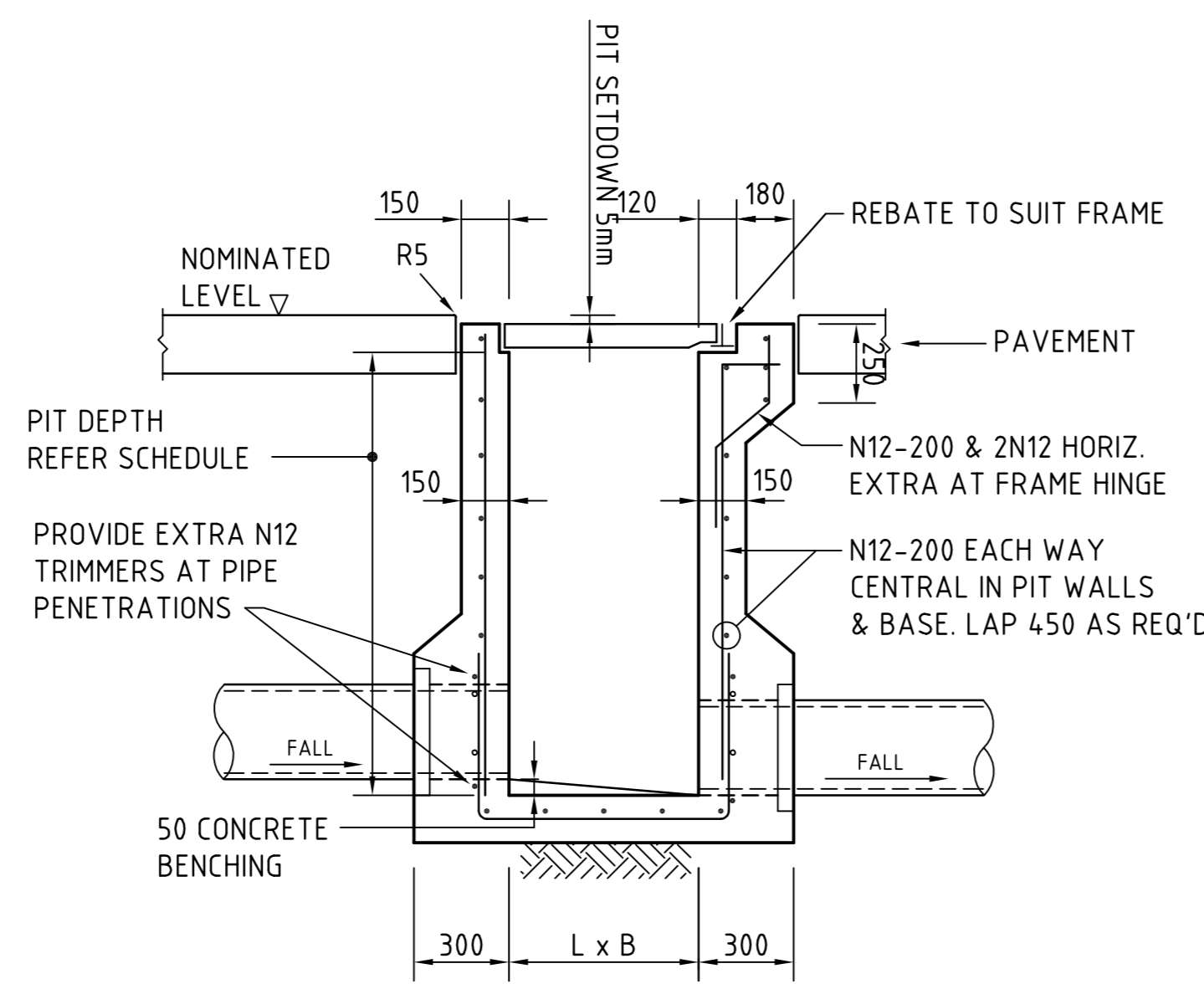
PLAN
SCALE 1:20



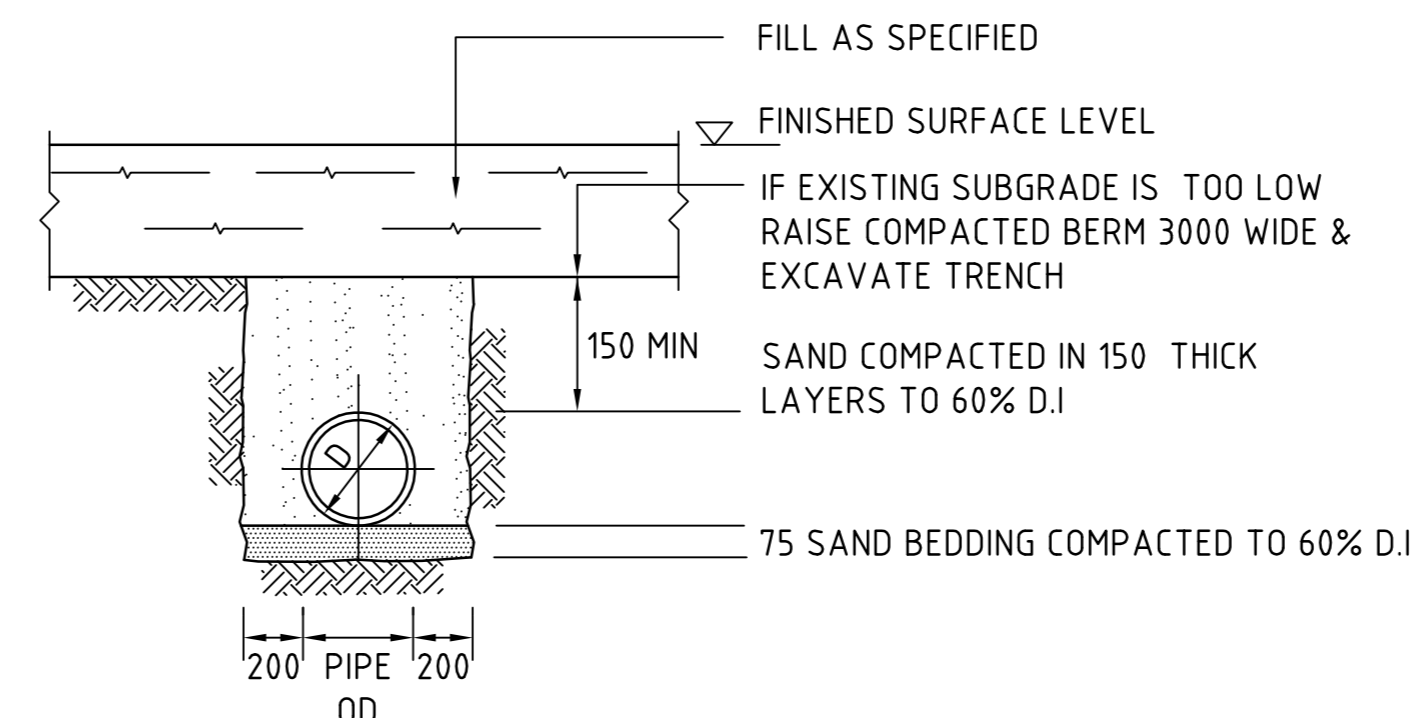
SEALED PIT - SP



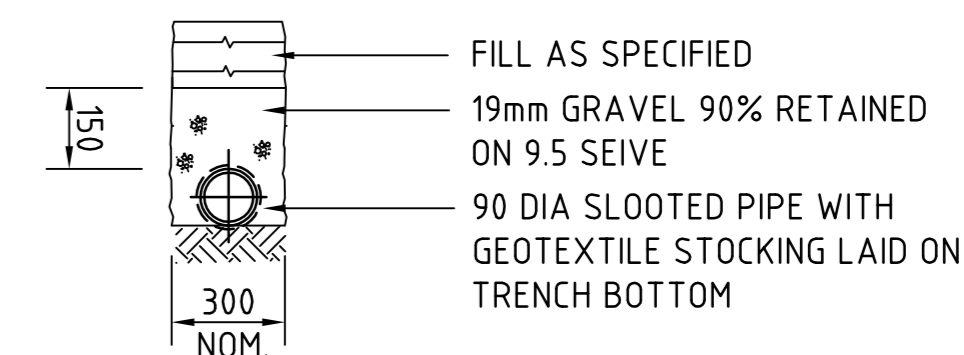
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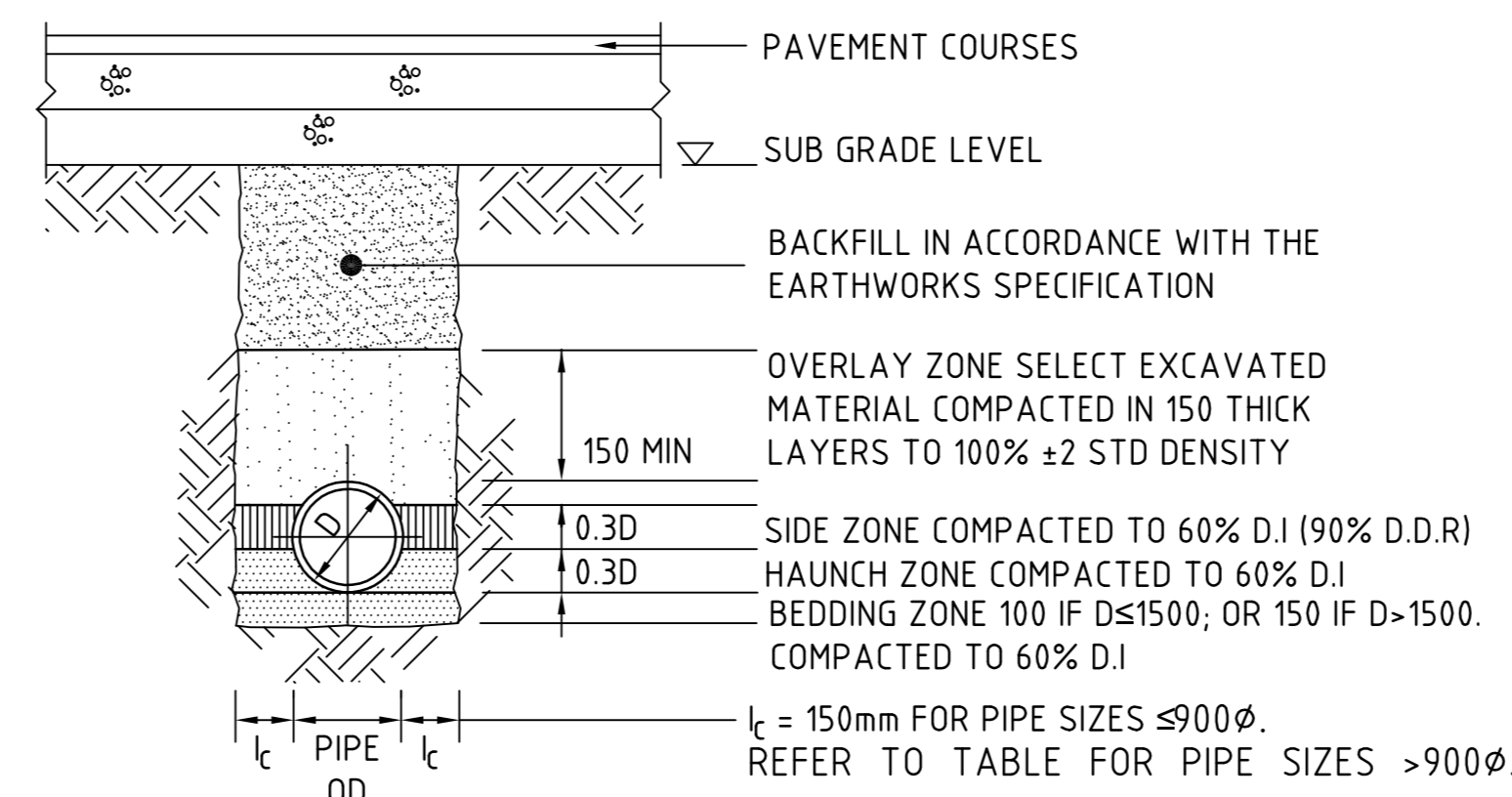
SINGLE GRATED GULLY PIT - SGGP



SUPPORT TO uPVC PIPES

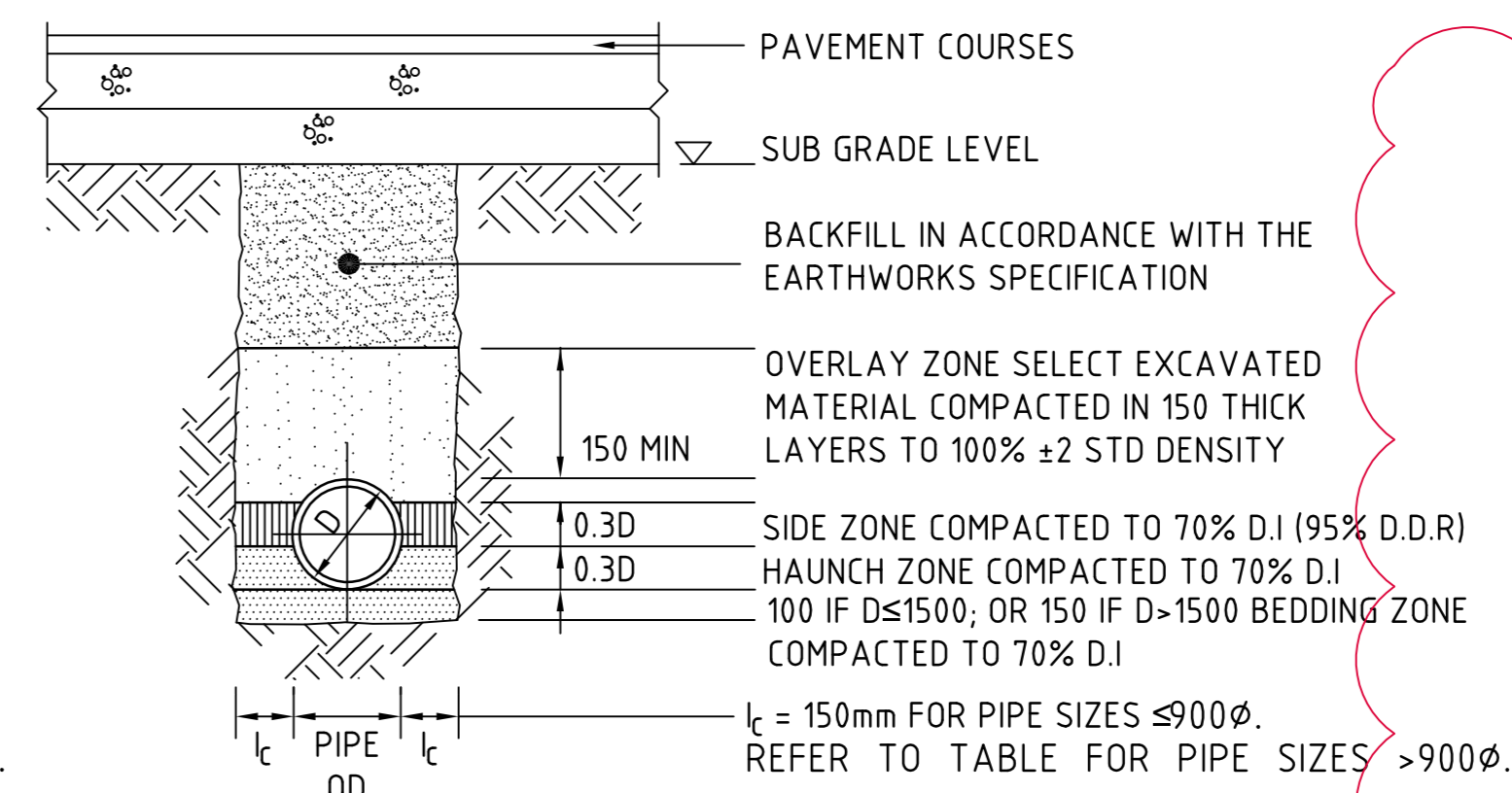


SUPPORT TO AG. DRAIN



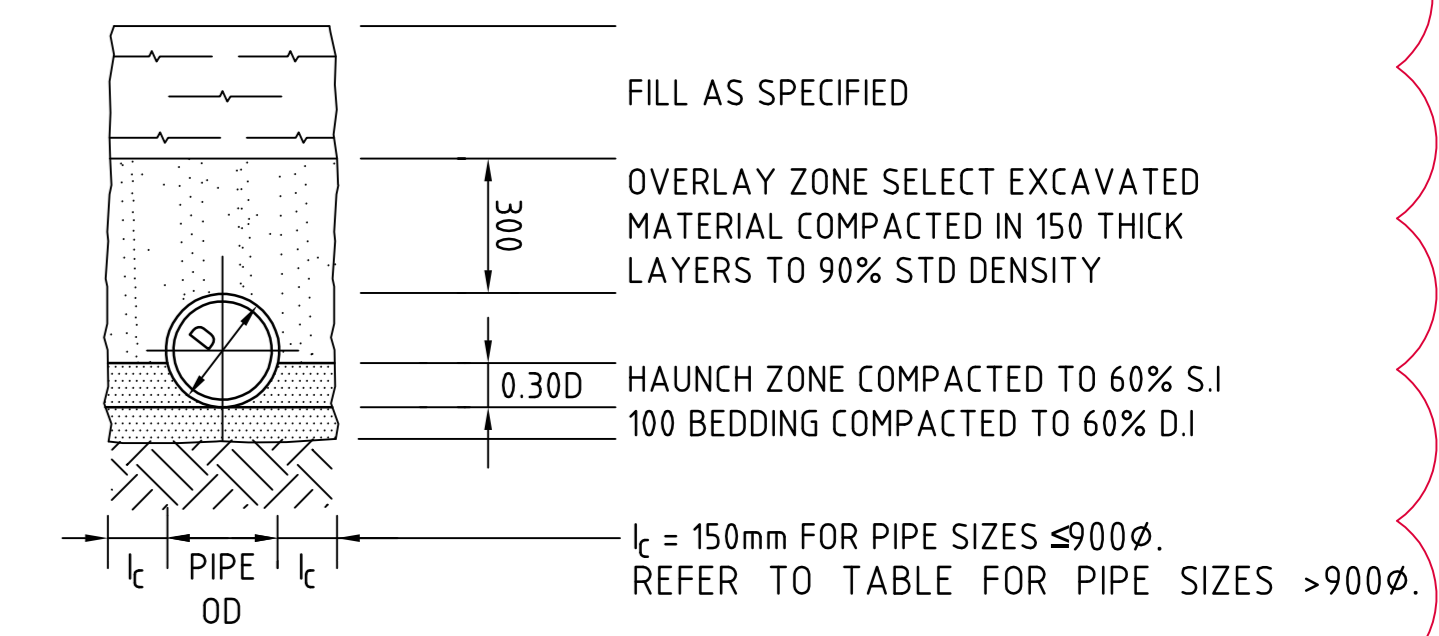
TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

D ≤ 1350, MAX FILL = 4.0m
D > 1350, MAX FILL = 3.0m



TYPE HS3 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

D ≤ 1050, MAX FILL = 6.0m
D > 1050, MAX FILL = 4.80m



TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS

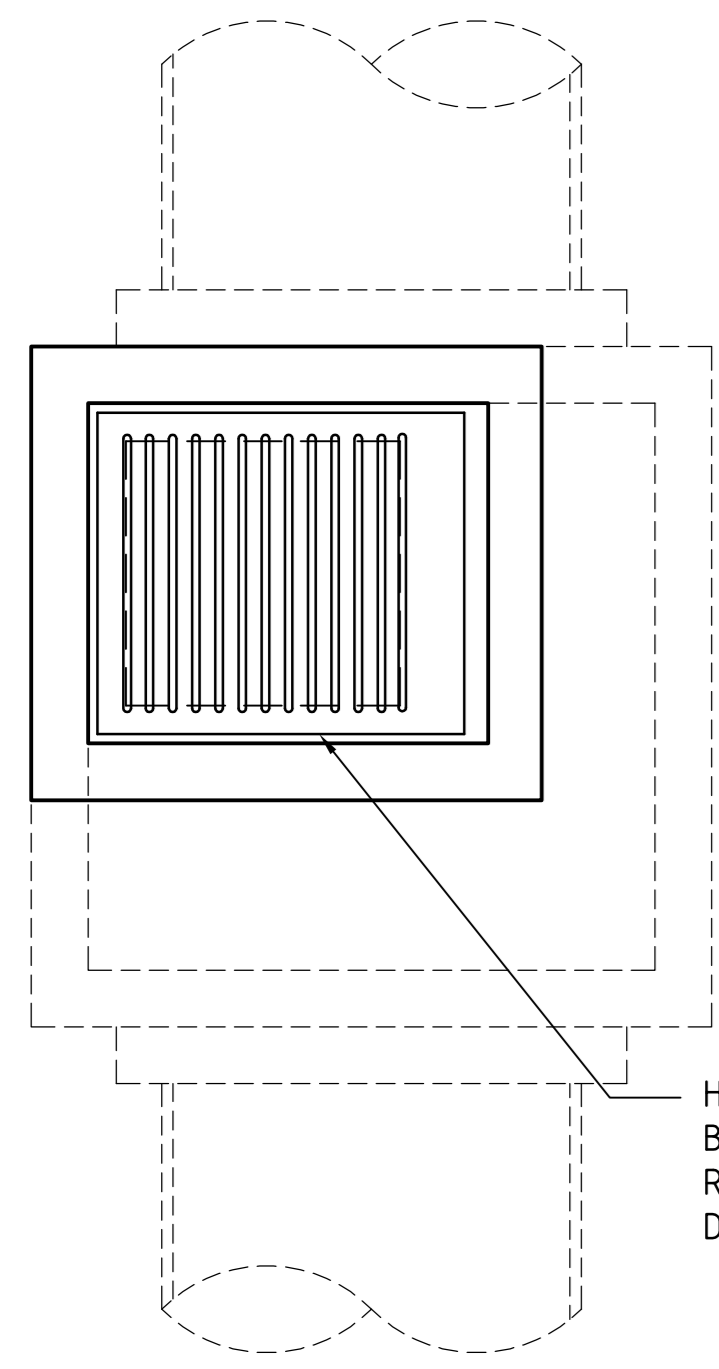
BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE	WEIGHT PASSING(%)
19	100
2.36	100 TO 50
0.60	90 TO 20
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE	WEIGHT PASSING(%)
75	100
9.5	100 TO 50
2.36	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

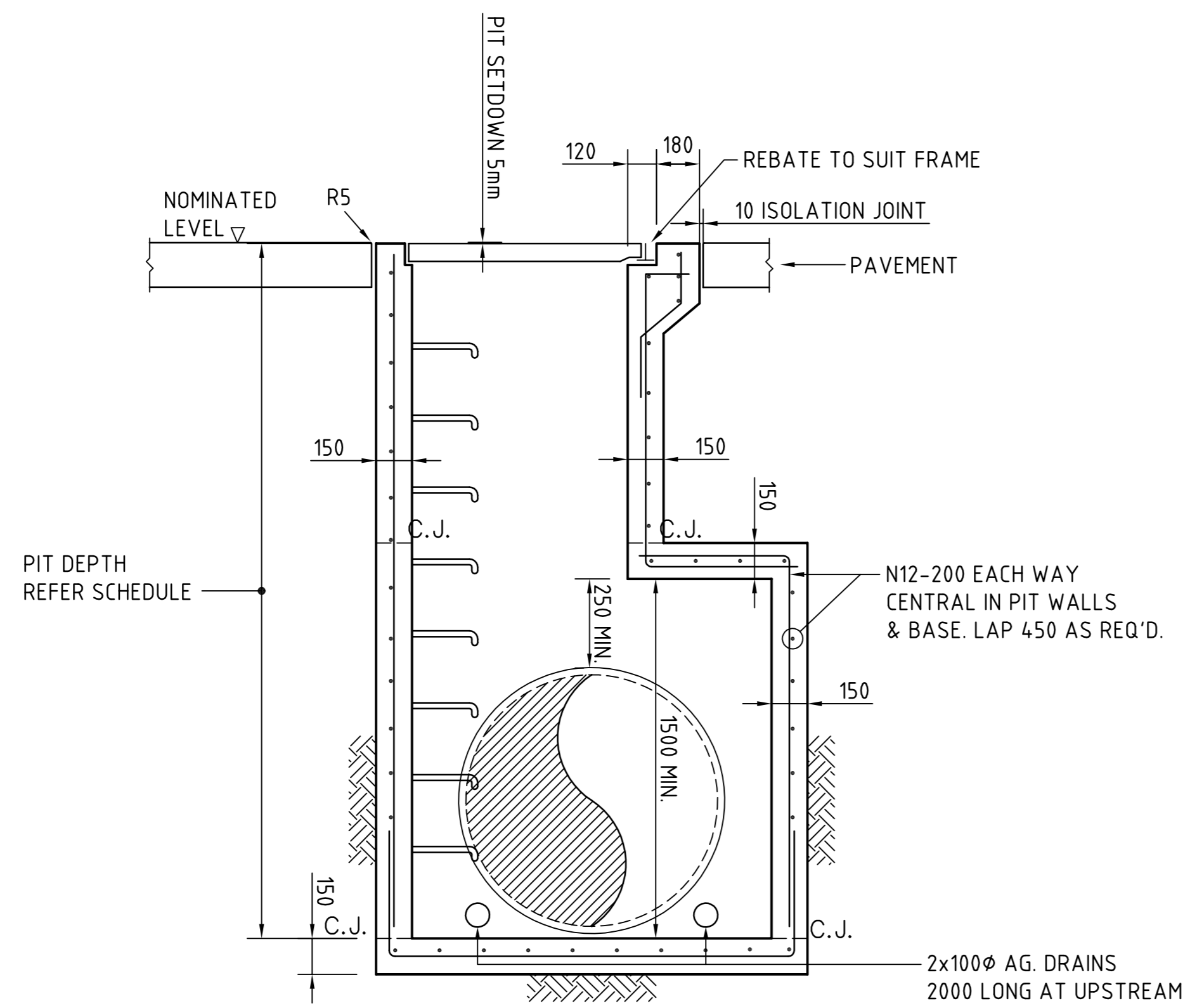
SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725

SIDE ZONE WIDTH	
PIPE SIZE	k (mm)
≤900φ	150
1050φ	175
1200φ	200
1350φ	225
1500φ	250
1650φ	275
1800φ	300

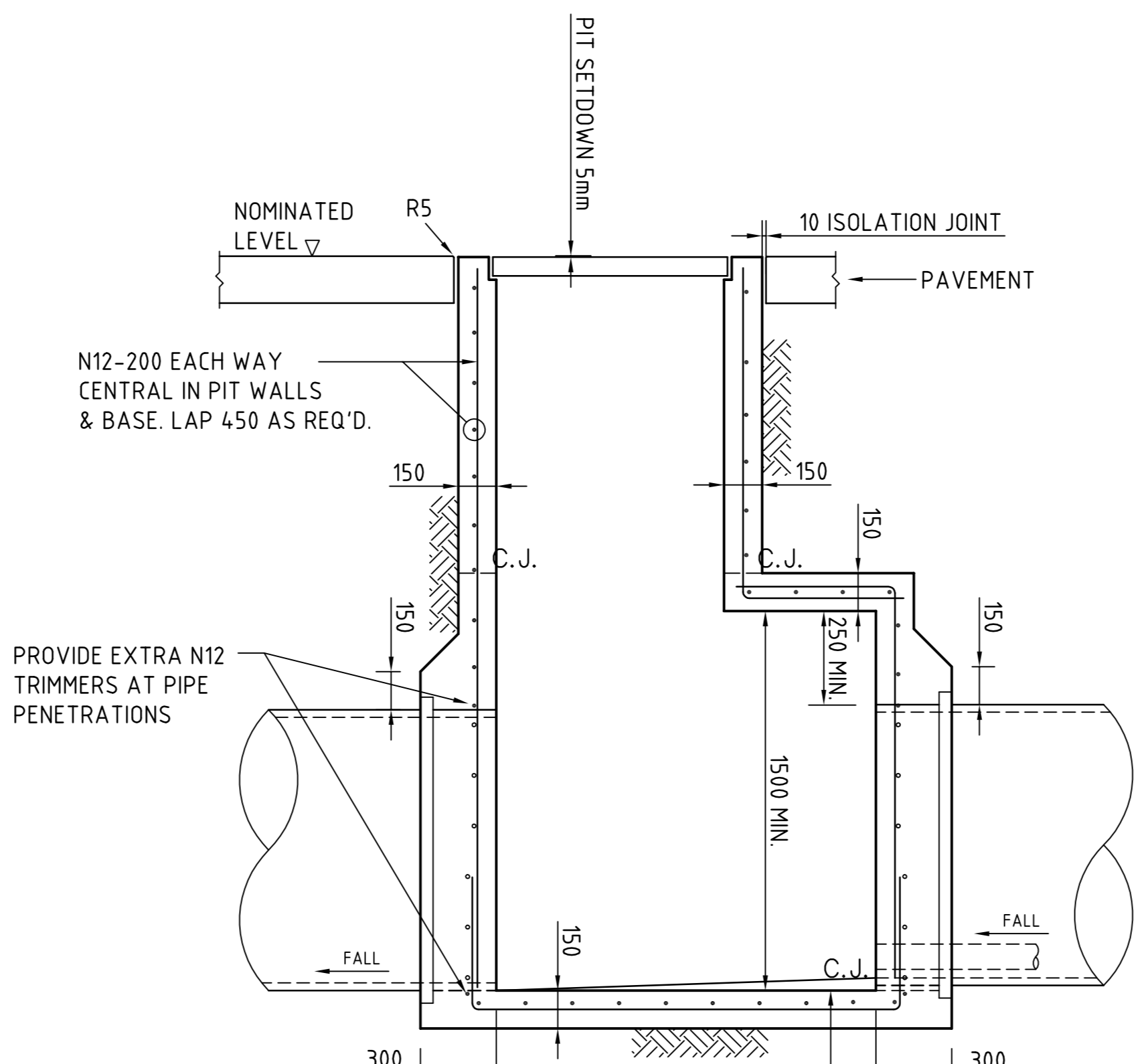
REFER TO ENGINEER FOR TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800φ



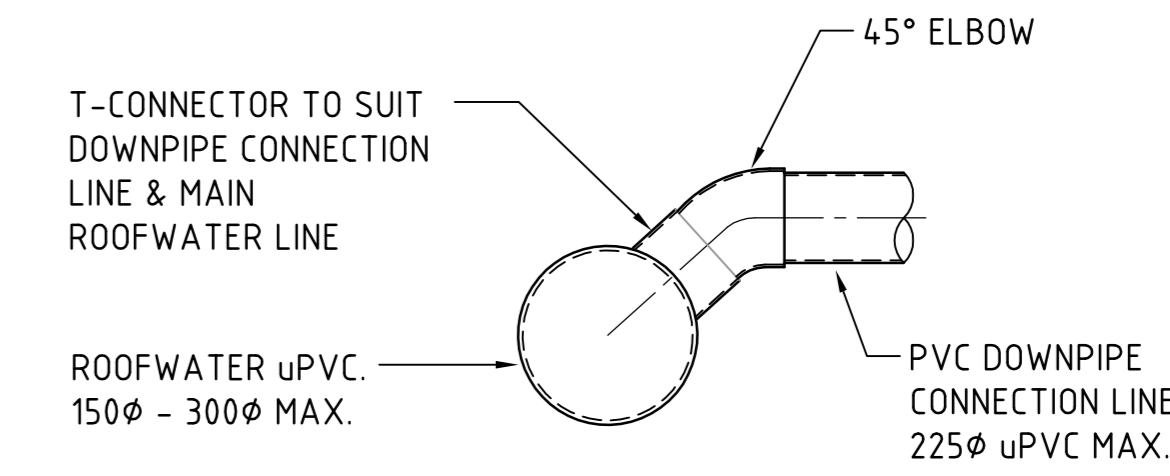
PLAN
SCALE 1:20



SECTION
SCALE 1:20



SECTION
SCALE 1:20



- PROPRIETARY T-PIECE CONNECTORS SHALL BE USED TO WHERE DIRECT CONNECTIONS ARE REQUIRED TO uPVC PIPES.
- ALL JOINTS TO BE SEALED WITH SOLVENT WELDED JOINTS.
- THE PVC PIPE SHALL NOT PROTRUDE BEYOND THE INNER SURFACE OF THE STORMWATER PIPE.

DOWN PIPE CONNECTION DETAILS
SCALE 1:20

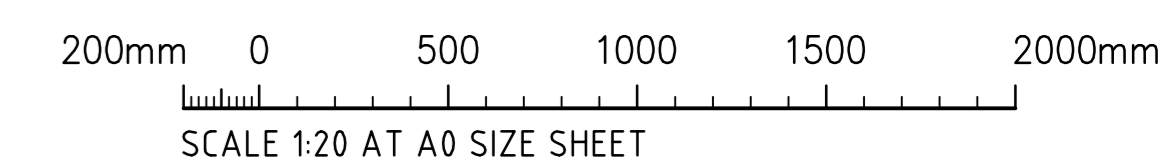
- NOTES:**
- WHERE GULLY PIT IS LOCATED ON KERB RETURNS OR BULB OF CUL-DE-SACS PROVIDE CURVED PRECAST CONCRETE LINTELS.
 - SAG PITS SHALL HAVE LINTEL PLACED CENTRALLY ABOUT THE GRATE.
 - ALL REINFORCING TO HAVE 30 MIN. CLAEER CONCRETE COVER.
 - FOR PITS DEEPER THAN 1200mm CLIMB RAILS SHALL BE PROVIDED.

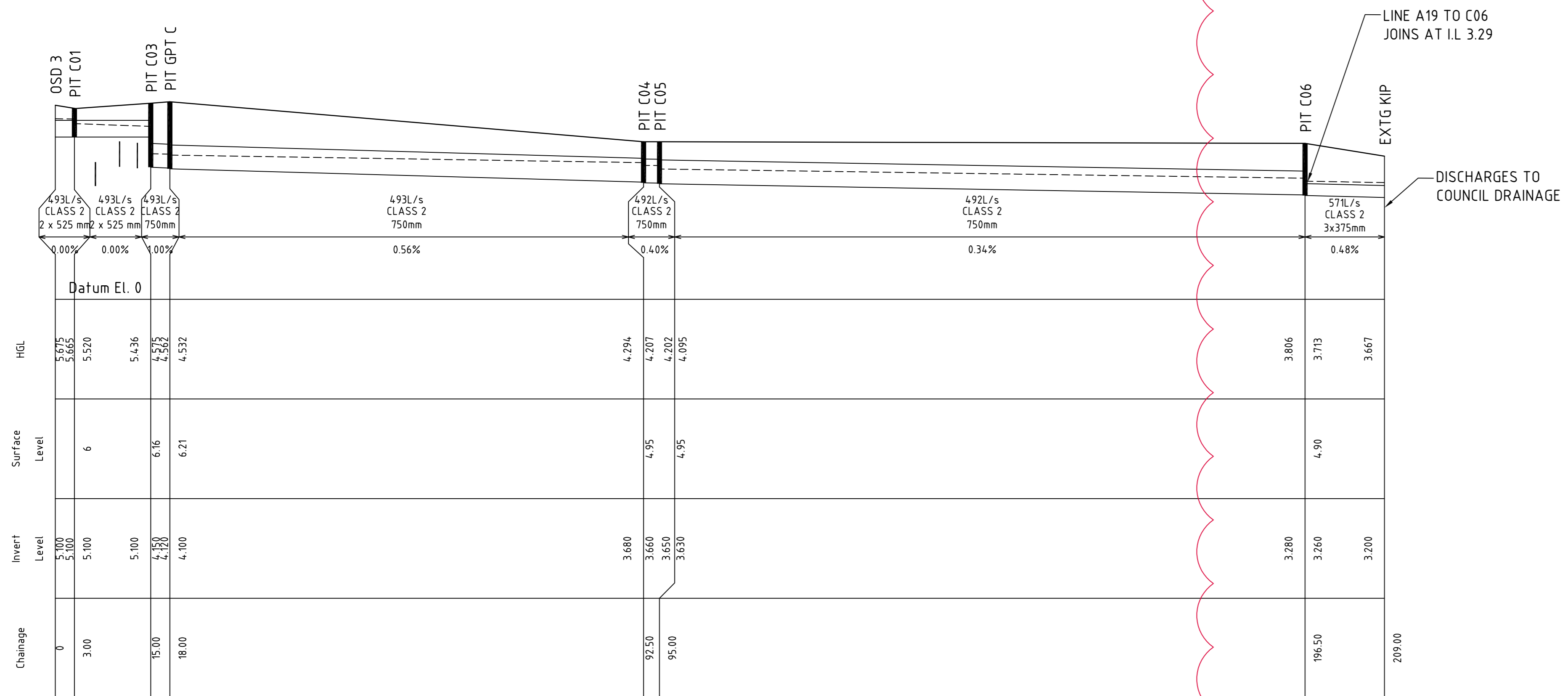
TAPERED SINGLE GRATED GULLY PIT - SGGP

TAPERED SEALED JUNCTION PIT - SJP SIMILAR

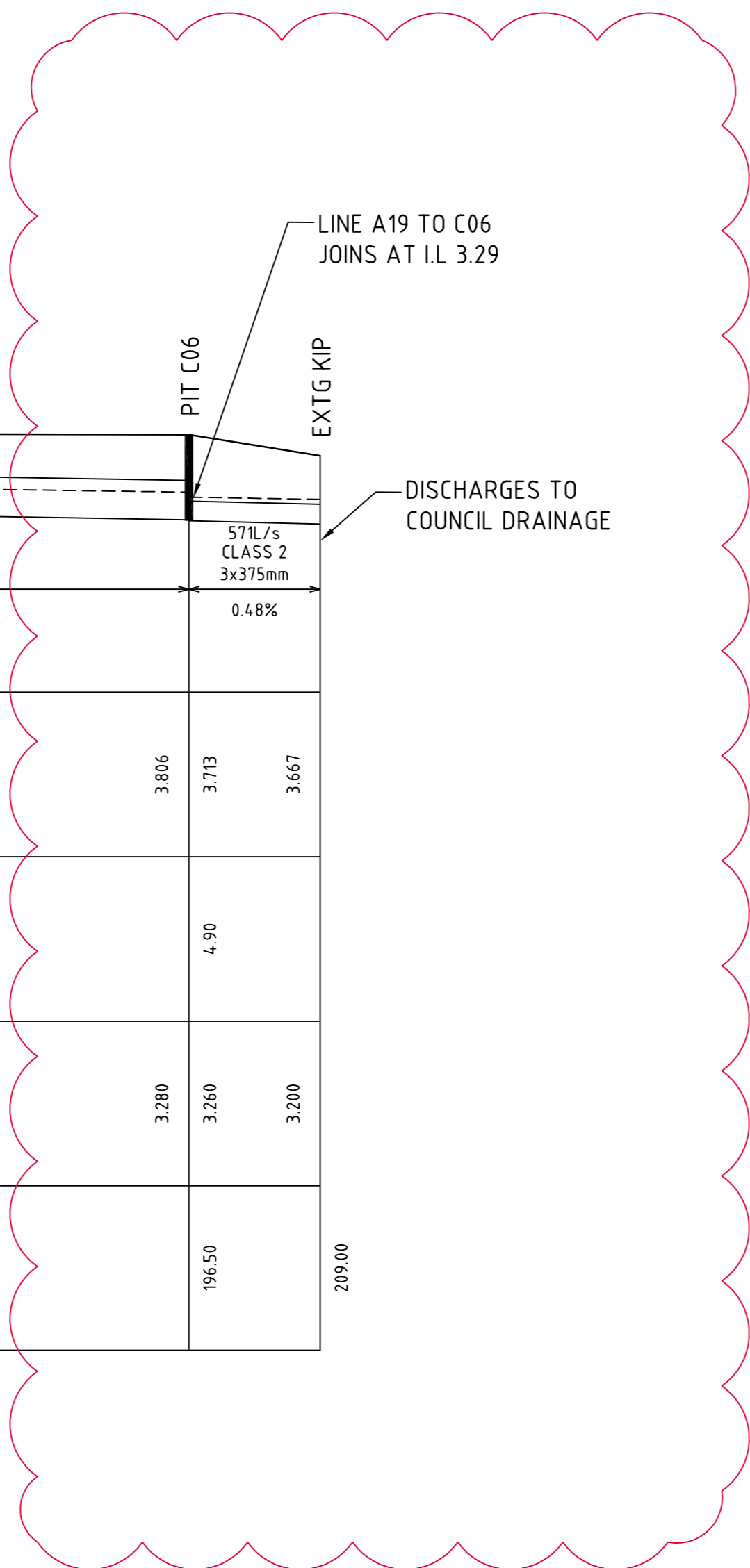
ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm. REFER TO STORMWATER NOTE 10 ON DRG C40.

FOR CONSTRUCTION CERTIFICATE

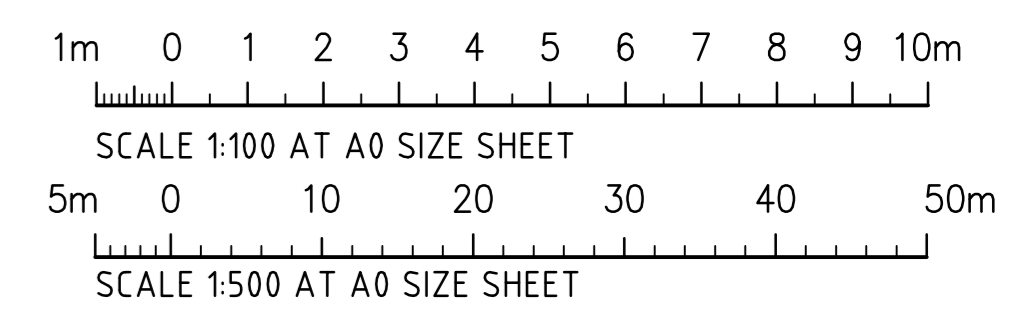




LONG SECTION - PIT C01 TO OUTLET
 SCALE 1:500 HORIZONTAL
 1:100 VERTICAL



NOTE:
 H.G.L & FLOWRATE SHOWN FOR Q20 A.R.I STORM EVENT UNO



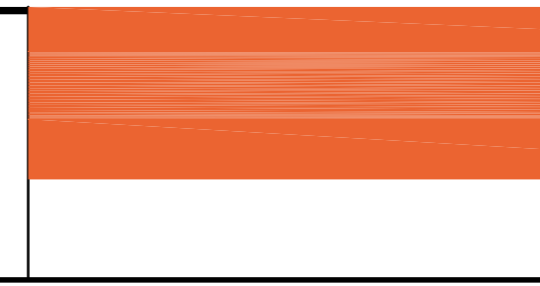
FOR CONSTRUCTION CERTIFICATE

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	22.05.15	A			
ALL LONGSECTIONS REVISED	01.06.15	B			
ISSUED FOR CONSTRUCTION CERTIFICATE	12.06.15	C			
LONGSECTIONS REVISED	26.10.15	D			
REVISED AS CLOUDED	11.02.16	E			



DESIGNED	M.W.	DRAWN	X.C.	DATE	13.05.15	CHECKED	A.O.	SCALE	AS SHOWN	CAD REF.	12589.00-C44
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PROJECT
VEOLIA TERMINAL
 McPHERSON STREET, BANKSMEADOW

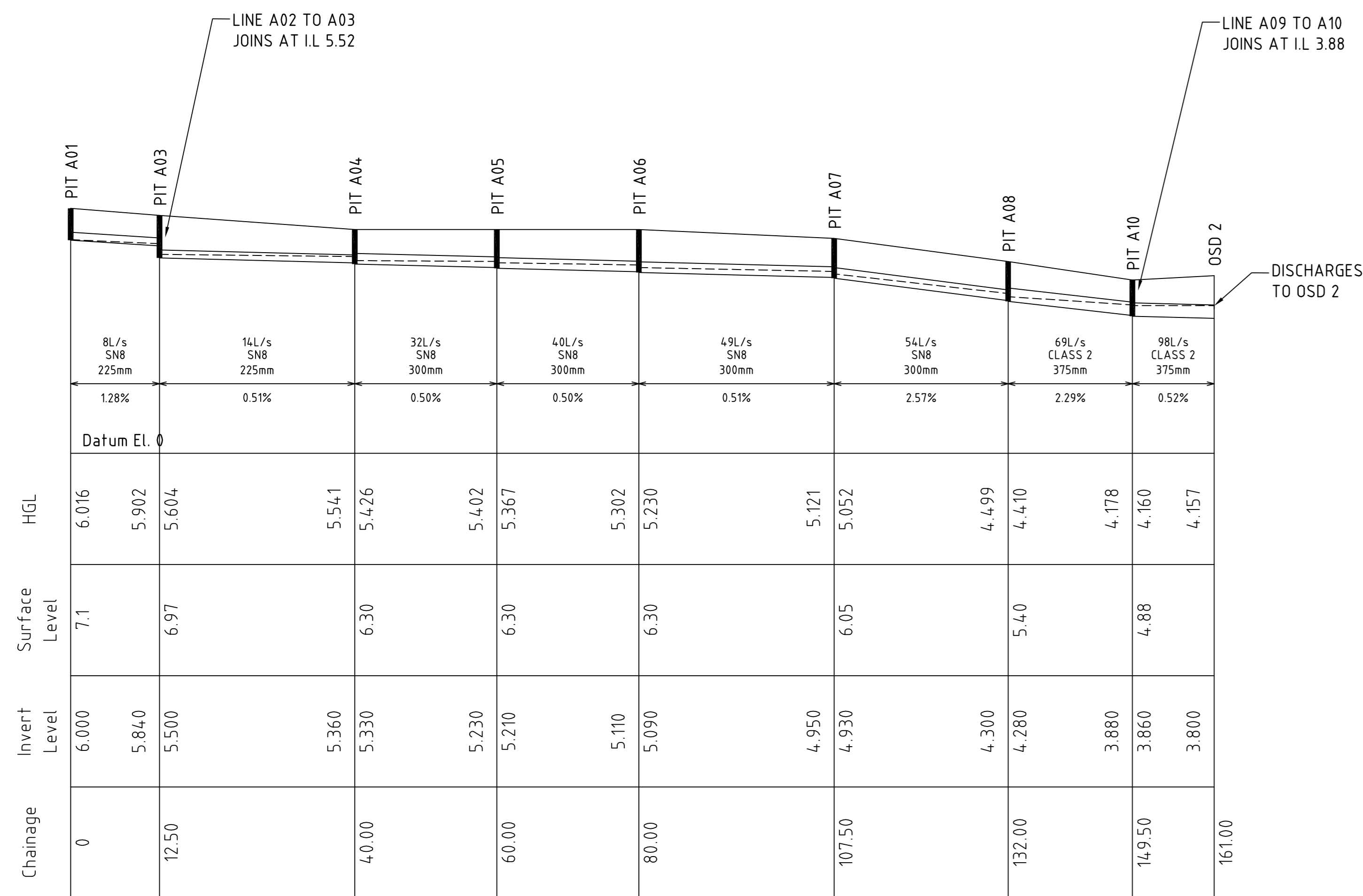


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 Walsh Bay, Sydney NSW 2000
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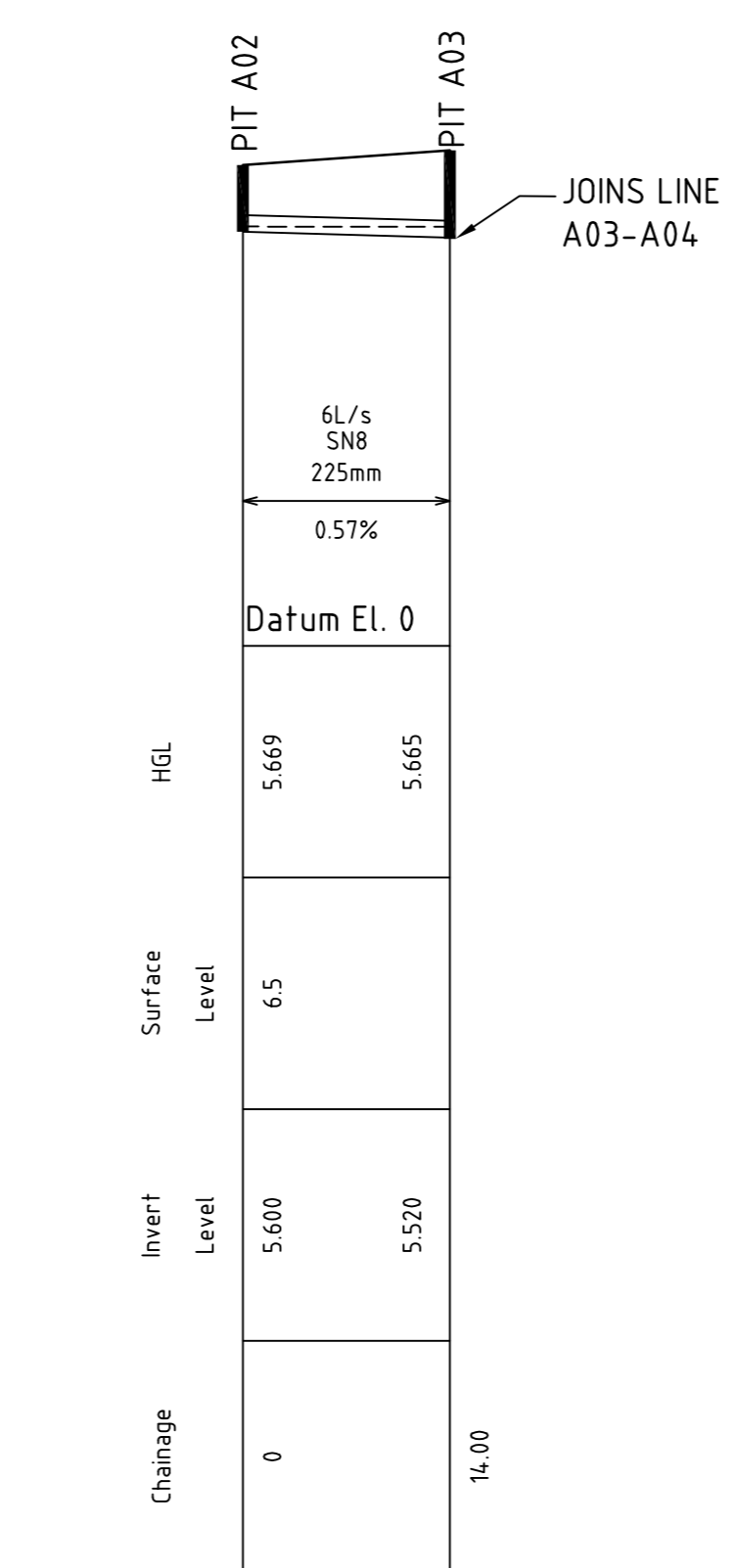


DRAWING TITLE	STORMWATER DRAINAGE LONGSECTIONS - SHEET 2	ISSUE	E
DRAWING No.	C012589.00- C44		

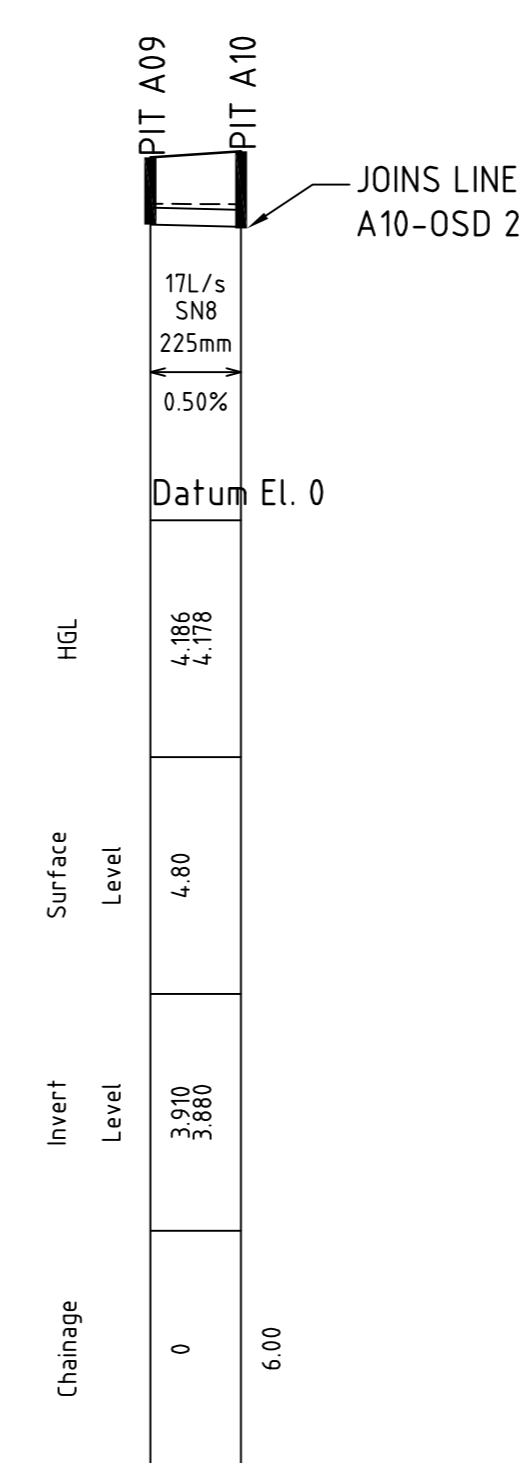
Value in Engineering and Management



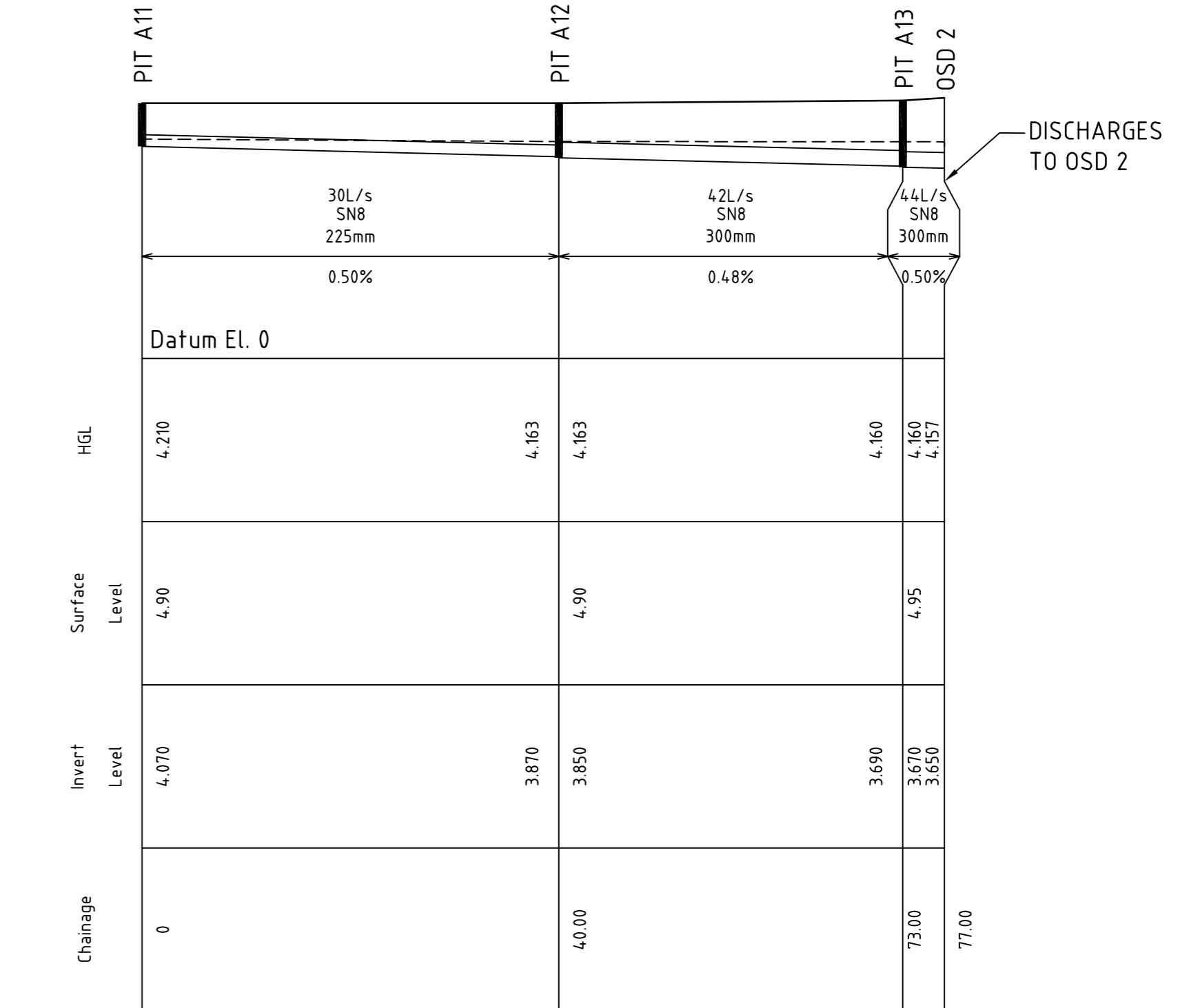
LONG SECTION - PIT A01 TO OSD 2
SCALE 1:500 HORIZONTAL
1:100 VERTICAL



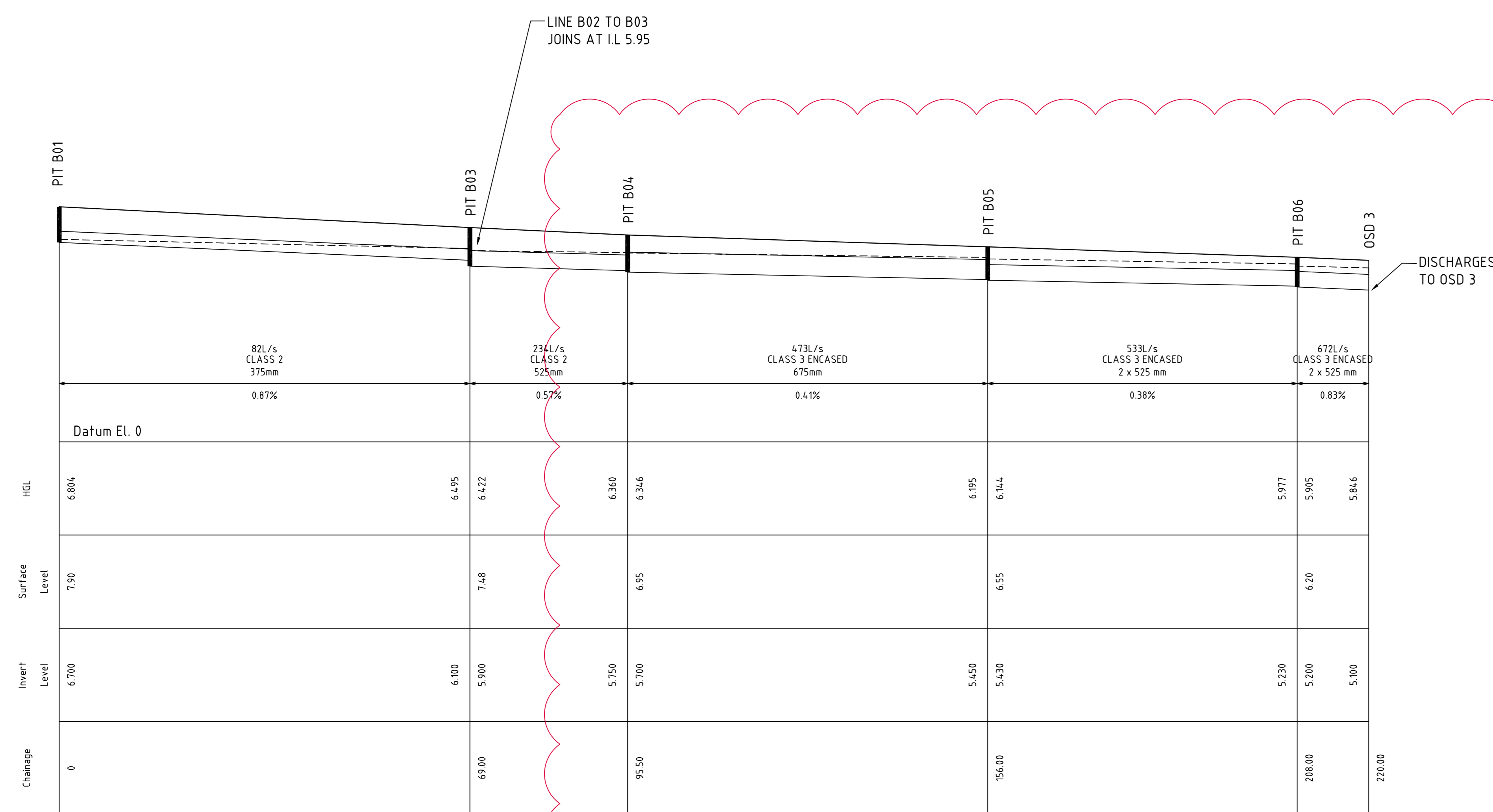
LONG SECTION - PIT A02 TO PIT A03
SCALE 1:500 HORIZONTAL
1:100 VERTICAL



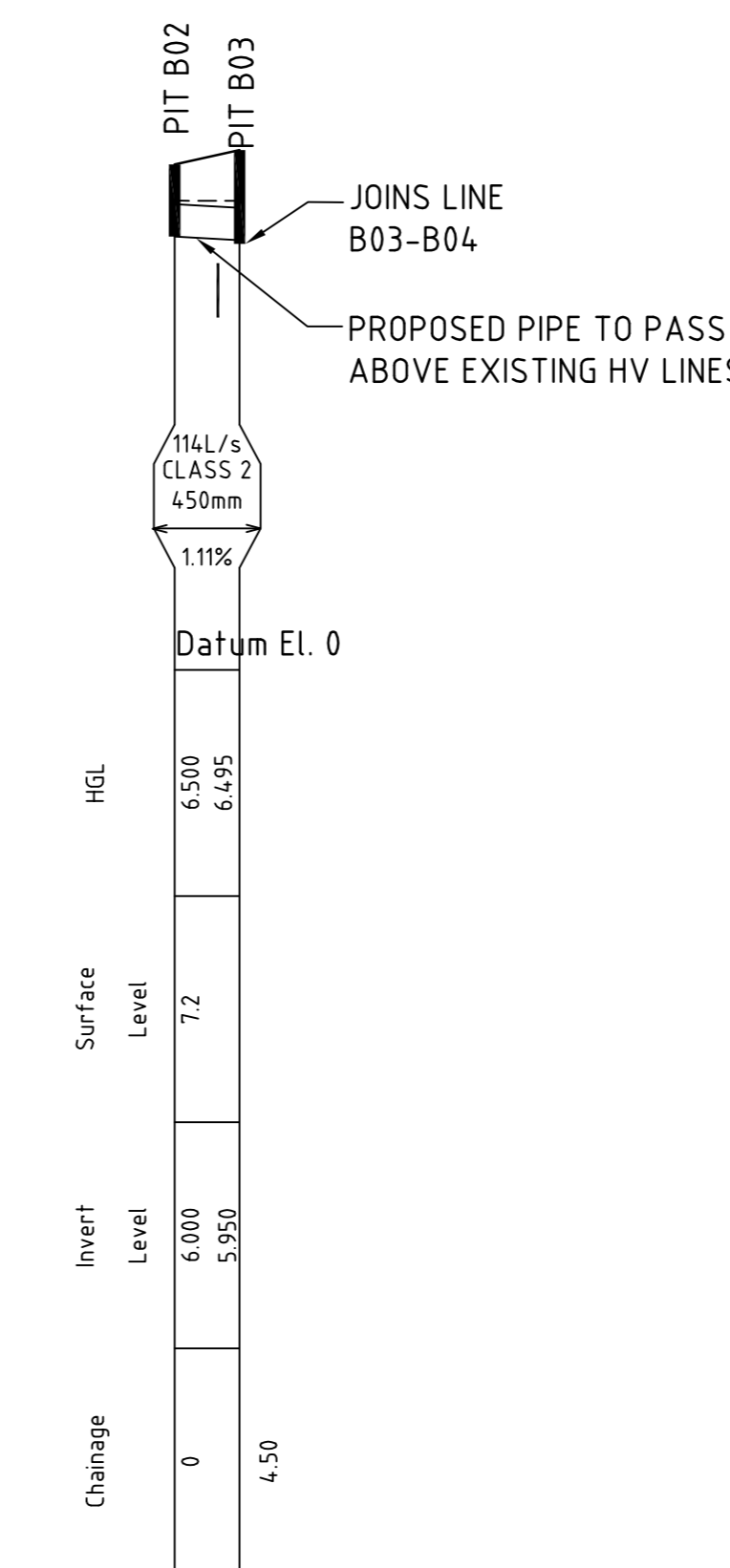
LONG SECTION - PIT A09 TO PIT A10
SCALE 1:500 HORIZONTAL
1:100 VERTICAL



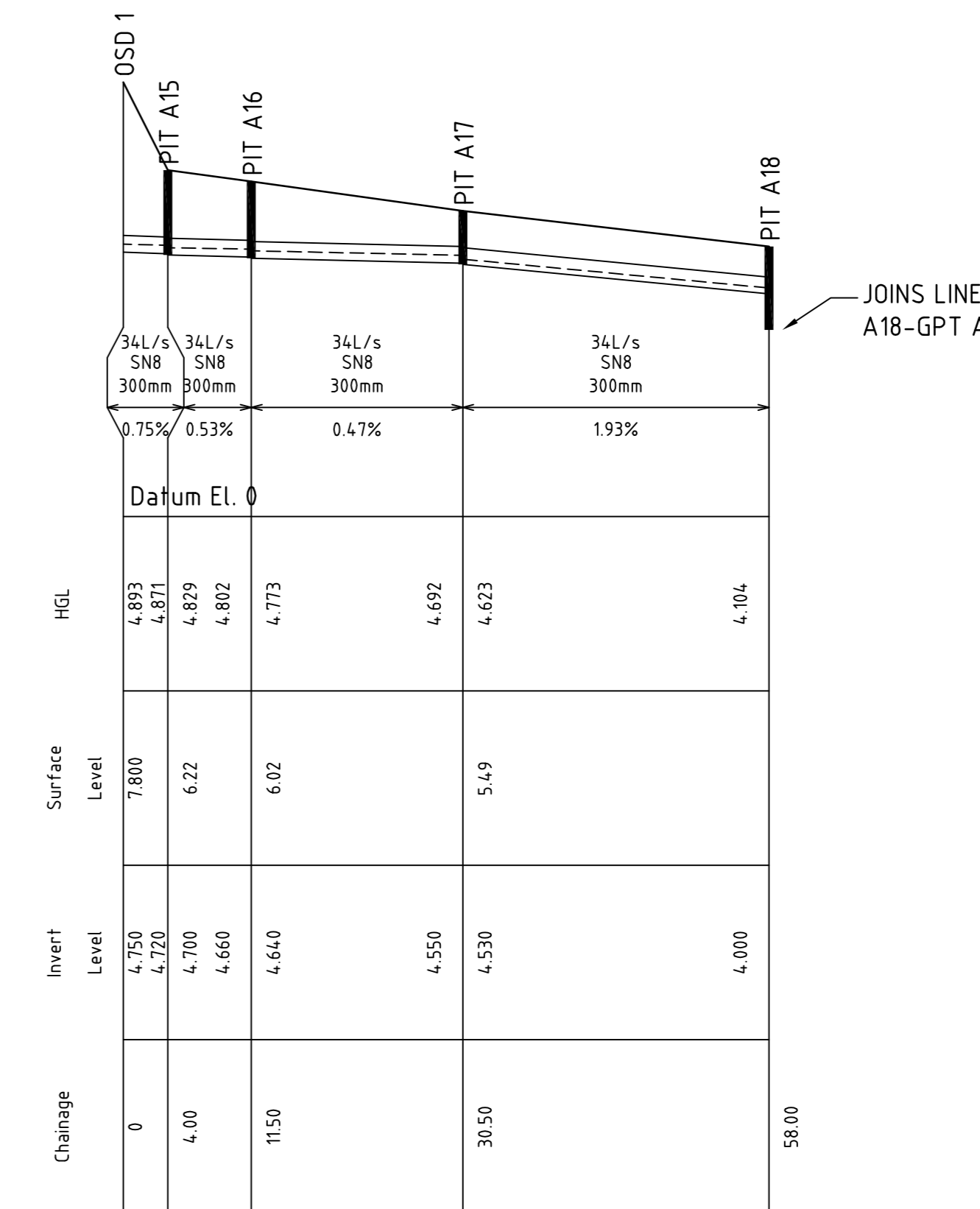
LONG SECTION - PIT A11 TO OSD 2
SCALE 1:500 HORIZONTAL
1:100 VERTICAL



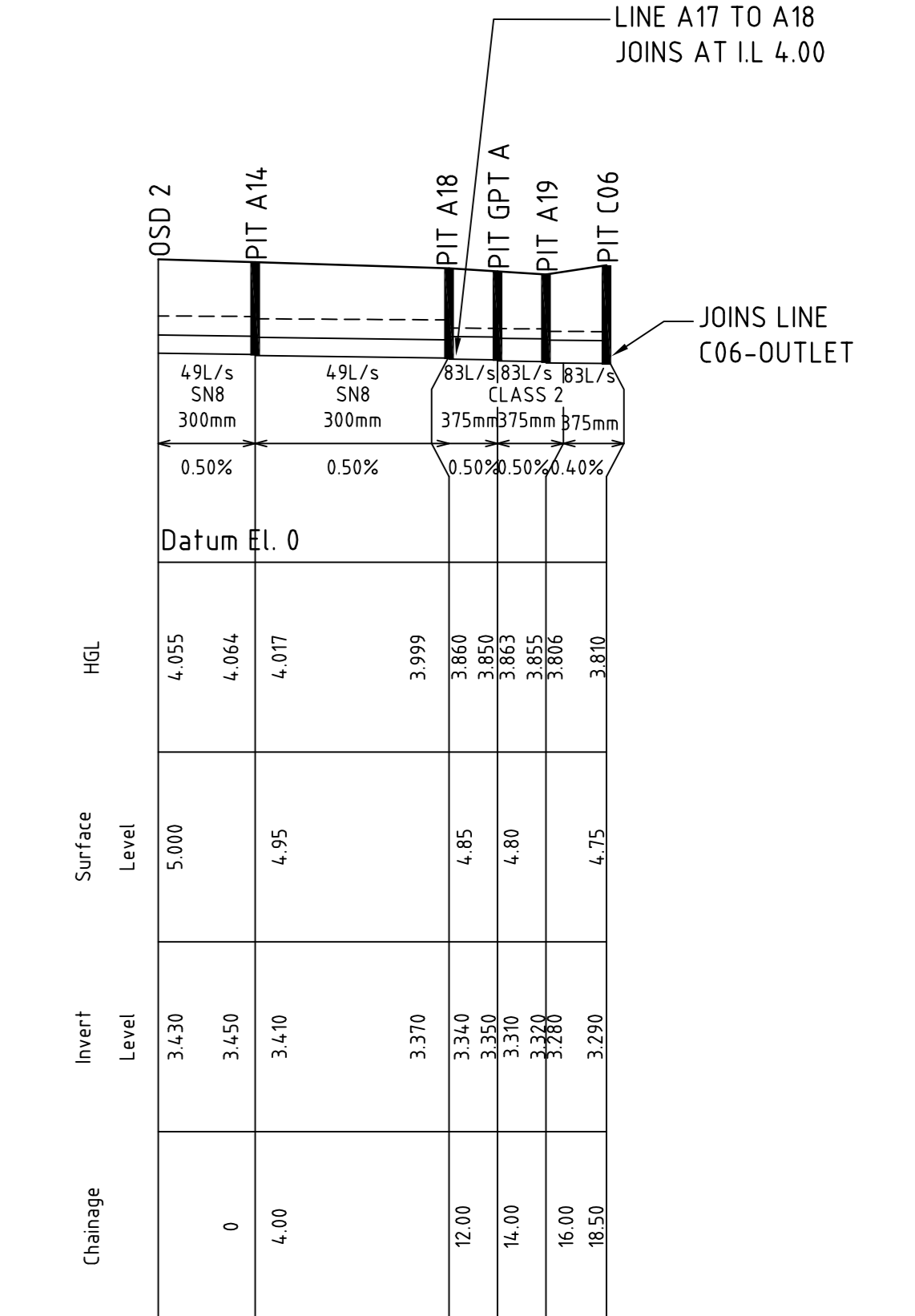
LONG SECTION - PIT B01 TO OSD 3
SCALE 1:500 HORIZONTAL
1:100 VERTICAL
Q5 ARI SHOWN



LONG SECTION - PIT B02 TO PIT B03
SCALE 1:500 HORIZONTAL
1:100 VERTICAL

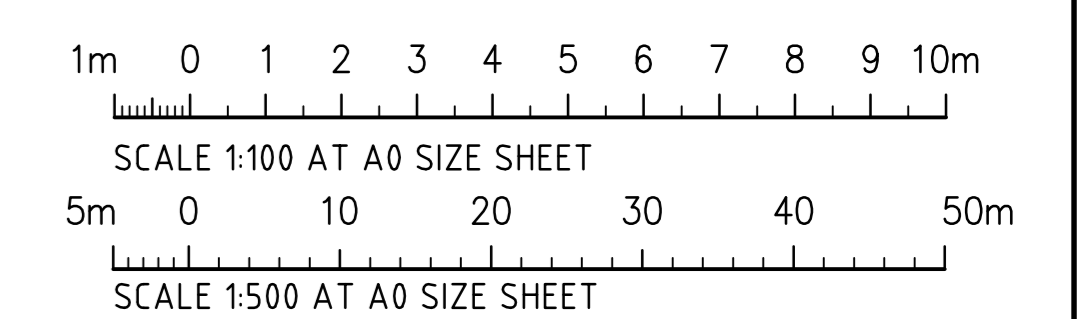


LONG SECTION - OSD 1 TO PIT A18
SCALE 1:500 HORIZONTAL
1:100 VERTICAL



LONG SECTION - OSD 2 TO PIT C06
SCALE 1:500 HORIZONTAL
1:100 VERTICAL

NOTE:
H.G.L & FLOWRATE SHOWN FOR Q20 A.R.I STORM EVENT UNO



FOR CONSTRUCTION CERTIFICATE

REVISIONS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
REVISED AS CLOUDED	11.02.16	F			
REVISED AS CLOUDED FOR OSD 3 INLET PIPES	07.12.15	E			
LONGSECTIONS UPDATED	26.10.15	D			
ISSUED FOR CONSTRUCTION CERTIFICATE	12.06.15	C			
ALL LONGSECTIONS REVISED	01.06.15	B			
ISSUED FOR INFORMATION	22.05.15	A			

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE



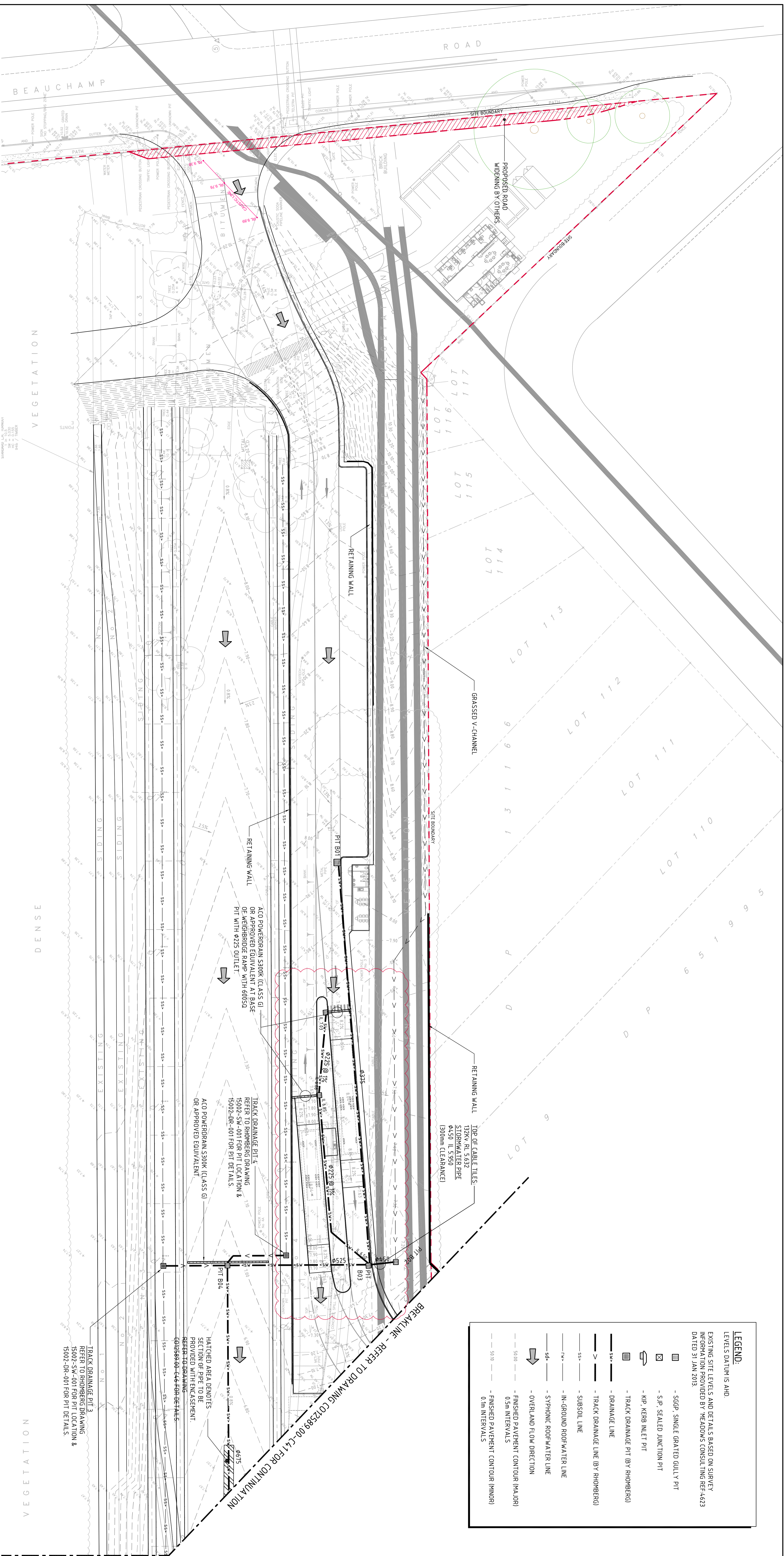
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M.W.	X.C.			A0	AS SHOWN	12589.00-C43

PROJECT
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DRAWING TITLE
STORMWATER DRAINAGE LONGSECTIONS - SHEET 1
DRAWING NO. **C012589.00- C43** ISSUE **F**



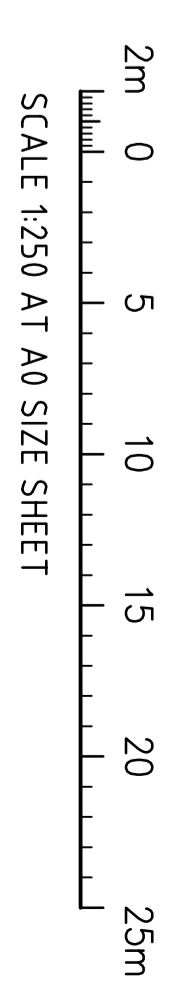
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LEVEL'S DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MEADOWS CONSULTING REF:623 DATED 31 JAN 2013

[Symbol]	- SGGP - SINGLE GRATED GULLY PIT
[Symbol]	- SJP - SEALED JUNCTION PIT
[Symbol]	- KIP - KERB INLET PIT
[Symbol]	- TRACK DRAINAGE PIT (BY RHONBERG)
[Symbol]	- DRAINAGE LINE
[Symbol]	- TRACK DRAINAGE LINE (BY RHONBERG)
[Symbol]	- SUBSOIL LINE
[Symbol]	- IN-GROUND ROOF-WATER LINE
[Symbol]	- SYPHONIC ROOF-WATER LINE
[Symbol]	- OVERLAND FLOW DIRECTION
[Symbol]	- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
[Symbol]	- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

STORMWATER DRAINAGE PLAN - SHEET 2
SCALE 1:250

STORMWATER DRAINAGE NOTES:
REFER TO DRAWING C40 FOR STORMWATER DRAINAGE NOTES.
REFER TO DRAWING C40 FOR PIT SCHEDULE.



REVISION	DATE	ISSUE	APPROVED
1	24.03.15	G	
2	24.03.15	G	
3	24.03.15	G	
4	24.03.15	G	
5	24.03.15	G	
6	24.03.15	G	
7	24.03.15	G	
8	24.03.15	G	
9	24.03.15	G	
10	24.03.15	G	
11	24.03.15	G	
12	24.03.15	G	
13	24.03.15	G	
14	24.03.15	G	
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47	24.03.15	G	
48	24.03.15	G	
49	24.03.15	G	
50	24.03.15	G	

FOR CONSTRUCTION CERTIFICATE

VEOLIA

LIPMAN

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PROJECT: VEOLIA TERMINAL
MEPHERSON STREET, BANKSHEAD

CONSULTANT: CostinRoe Consulting Pty Ltd
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Email: info@costinroe.com.au

DRAWING TITLE: STORMWATER DRAINAGE PLAN
SHEET 2
ACCESS ROAD

PROJECT NO: C072589-00-C42

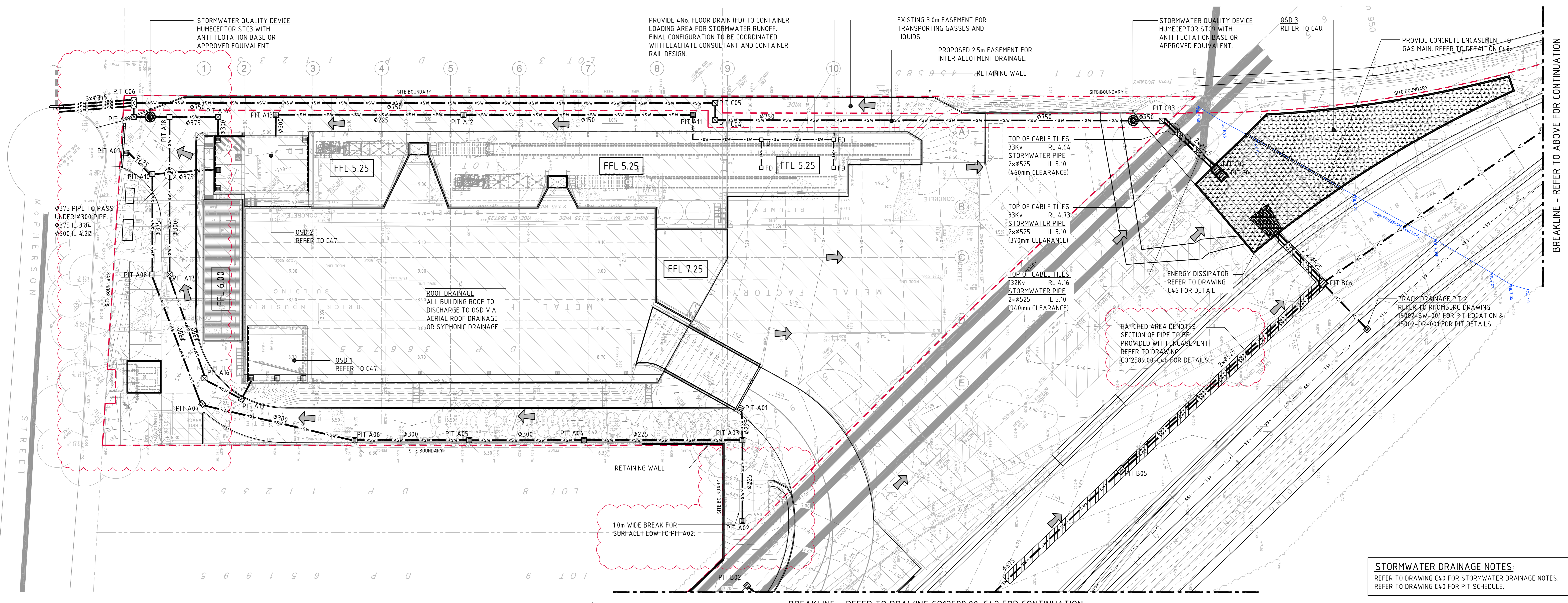
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LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY MEADOWS CONSULTING REF-4623 DATED 31 JAN 2013.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- TRACK DRAINAGE PIT (BY RHOMBERG)
- DRAINAGE LINE
- TRACK DRAINAGE LINE (BY RHOMBERG)
- SUBSOIL LINE
- IN-GROUND ROOFWATER LINE
- SYPHONIC ROOFWATER LINE
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

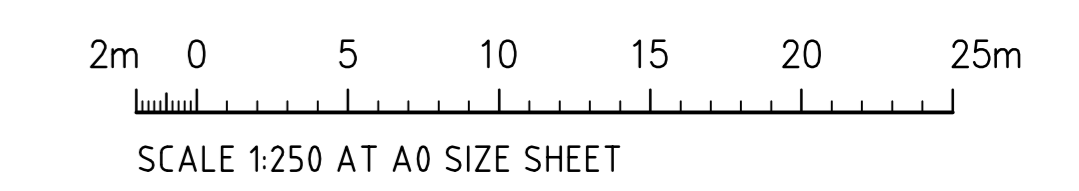
BREAKLINE - REFER TO BELOW FOR CONTINUATION

STORMWATER DRAINAGE PLAN - SHEET 1 (CONT'D)
SCALE 1:250



BREAKLINE - REFER TO ABOVE FOR CONTINUATION

STORMWATER DRAINAGE NOTES:
REFER TO DRAWING C40 FOR STORMWATER DRAINAGE NOTES.
REFER TO DRAWING C40 FOR PIT SCHEDULE.



STORMWATER DRAINAGE PLAN - SHEET 1
SCALE 1:250

FOR CONSTRUCTION CERTIFICATE

AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE	AMENDMENTS	DATE	ISSUE
RAIL SIDING LEVELS REVISED & TRACK DRAINAGE & SERVICES ADDED	31.07.15	F						
REVISED FOR UPDATED ARCH LAYOUT	17.07.15	E						
ISSUED FOR CONSTRUCTION CERTIFICATE	12.06.15	D						
STORMWATER REVISED AS CLOUDED	01.06.15	C	REVISED AS CLOUDED	11.02.16	I			
STORMWATER REVISED	22.05.15	B	REVISED AS CLOUDED FOR OSD3 INLET PIPES & GAS MAIN ENCASUREMENT	07.12.15	H			
ISSUED FOR INFORMATION	15.05.15	A	REVISED AS CLOUDED	26.10.15	G			



PROJECT
VEOLIA TERMINAL
MCPHERSON STREET, BANKSMEDDOW

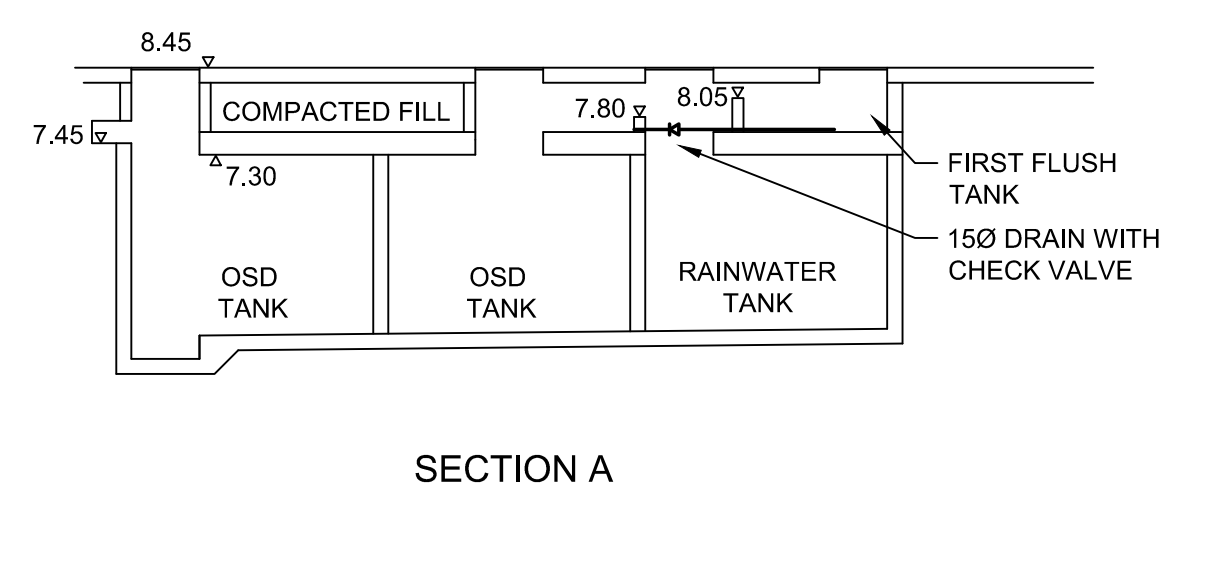
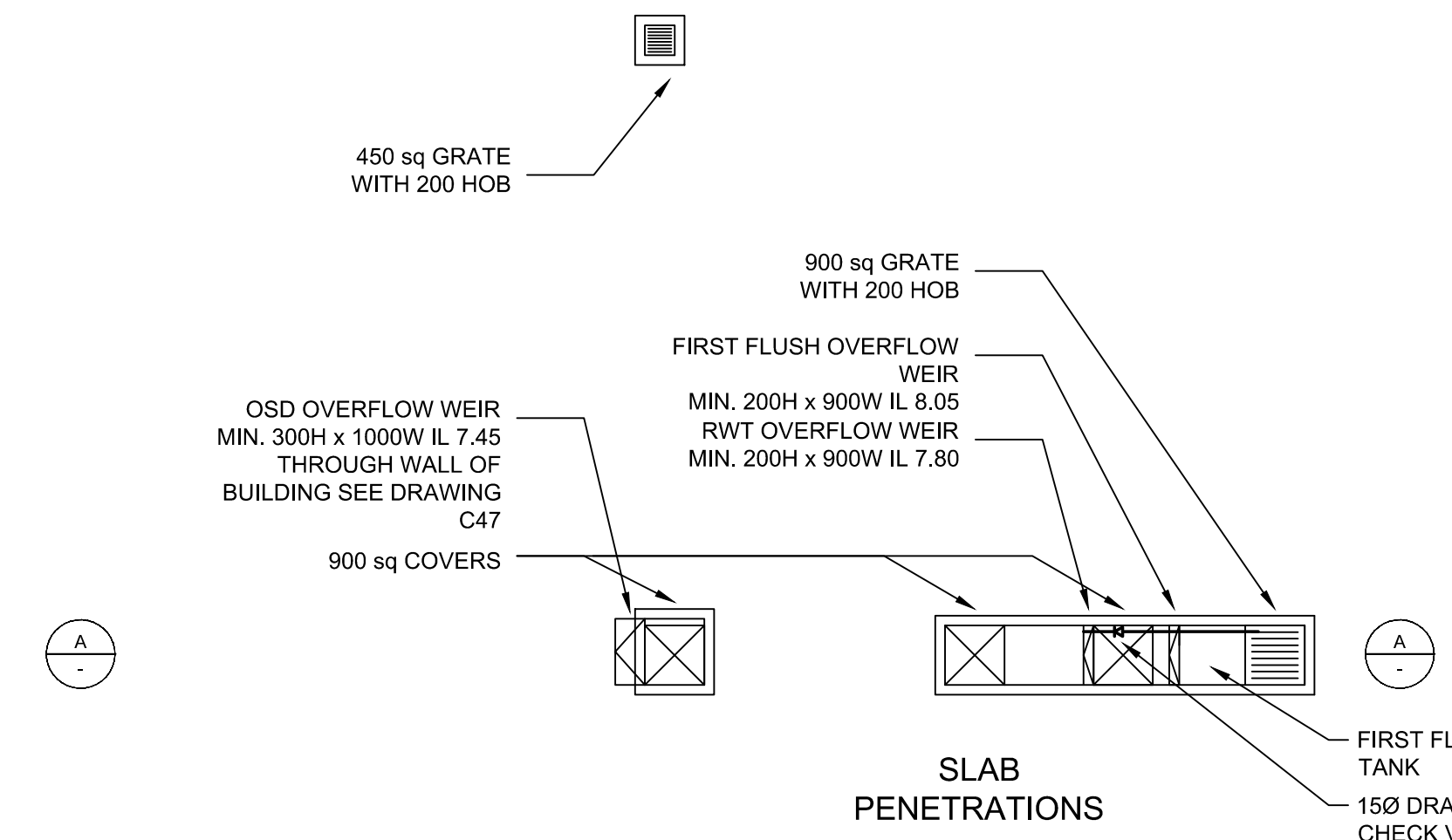
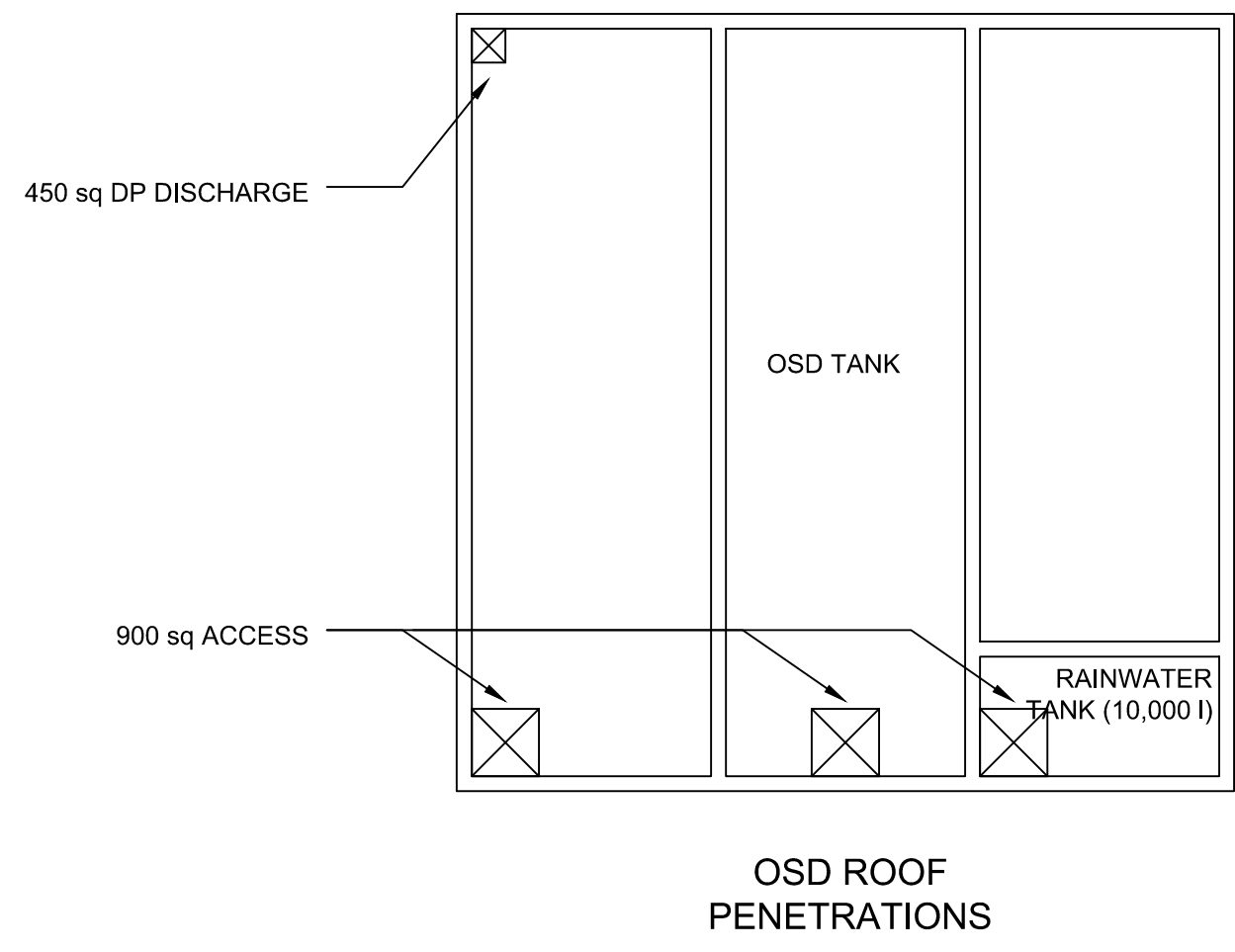
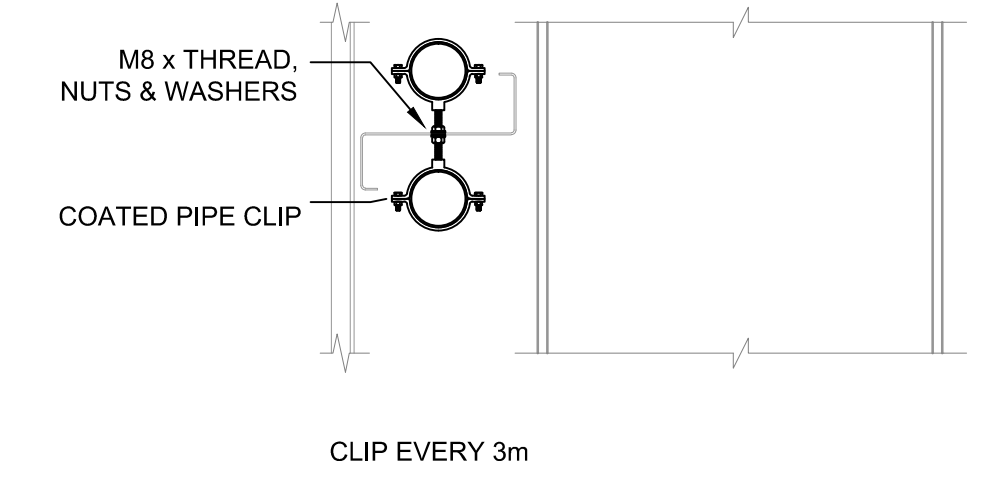
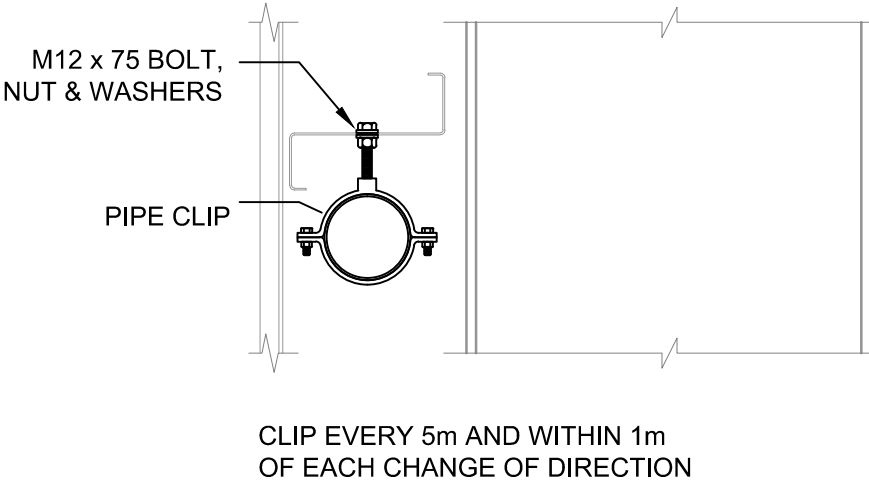
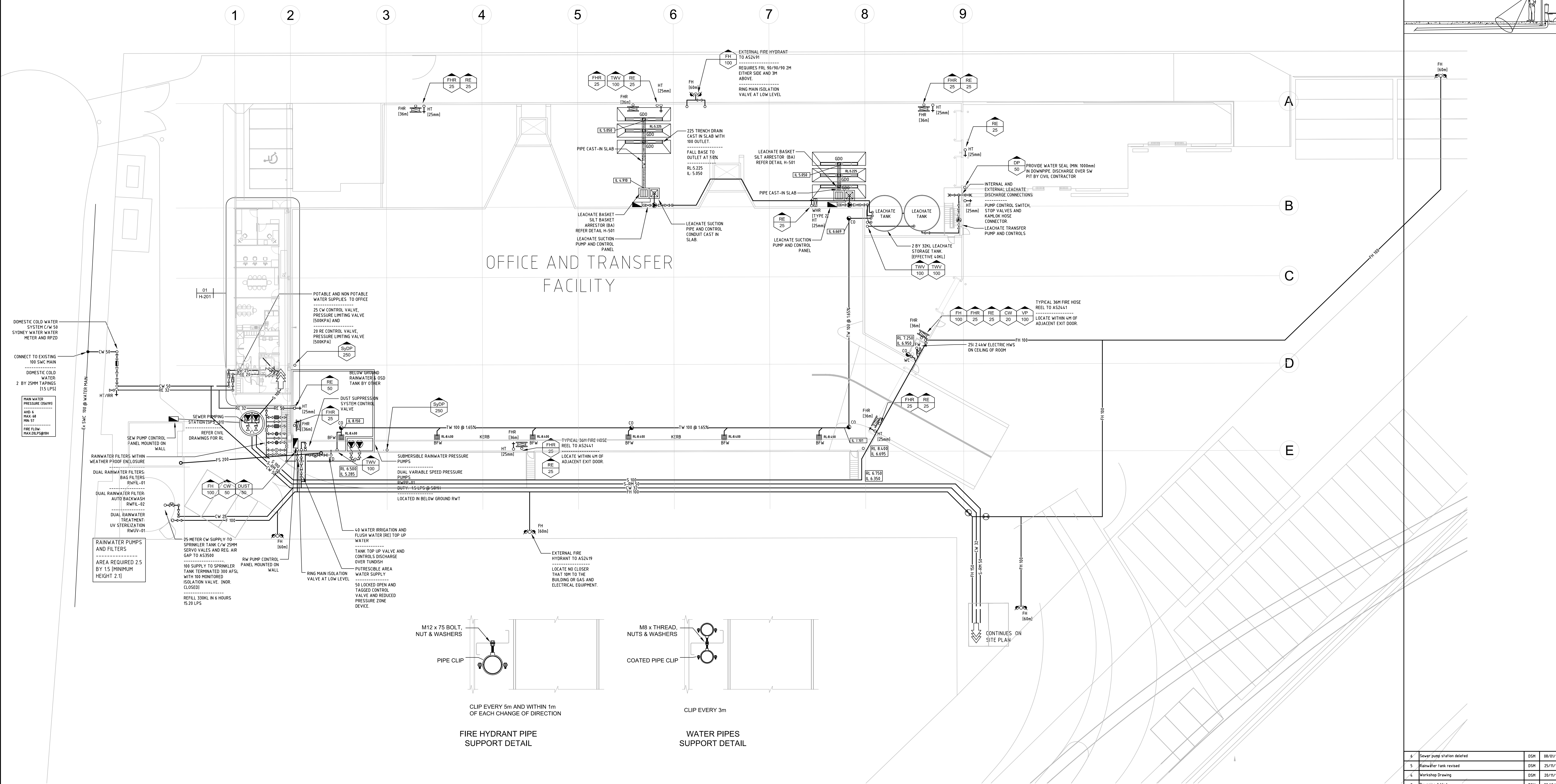
DESIGNED: M.W. DRAWN: X.C. DATE: CHECKED: SIZE: A0 SCALE: AS SHOWN CAD REF: 12589.00-C41

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DRAWING TITLE
STORMWATER DRAINAGE PLAN SHEET 1 PROPOSED SITE
DRAWING NO: **C012589.00-C41**

Notes:
 SERVICES ON THIS DRAWING ARE SHOWN OUT OF THE STRATA U.N.O.



REV.	DESCRIPTION	BY:	DATE:
6	Sewer pump station deleted	DSM	08/01/16
5	Plan for tank revised	DSM	25/11/15
4	Workshop Drawing	DSM	20/11/15
3	Overpipe Added	DSM	22/10/15
2	For Construction	DSM	12/10/15
1	Preliminary	DSM	06/10/15

STATUS: For construction

Morrell Plumbing & Maintenance Pty Ltd

3/12-14 Norman St
 Peakhurst NSW 2210
 +61 2 9717 2600
 estimating@morrellplumbing.com.au

CLIENT: Lipman Ltd
 Level 6, 66 Berry Street,
 North Sydney NSW 2060

ARCHITECT:

SITE: Veolia Banksmeadow WTS

TITLE: Hydraulic Services Warehouse Plan

SCALE AT BY:	DATE:	DRAWN:	CHECKED:
1:200	6/10/15	DSM	GTM

JOB NO.	DRAWING NO.	REVISION:
285	H-200	6

Appendix B Stormwater Infrastructure Maintenance Schedule

STORMWATER INFRASTRUCTURE MAINTENANCE SCHEDULE

Stormwater infrastructure is monitored on a regular basis to ensure that each component is properly operated and maintained. The following table provides a list of key maintenance actions, the frequency of inspections, responsibility and procedure. These frequencies may vary depending on site specific attributes and rainfall patterns. In addition to the nominated frequencies, inspections will also be undertaken following large storm events.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
			Cut hole in fabric and revegetate.
RAINWATER TANK			
Check for any clogging and blockage of the first flush device	Monthly	Maintenance Contractor	First flush device to be cleaned out
Check for any clogging and blockage of the tank inlet - leaf/litter screen	Six monthly	Maintenance Contractor	Leaves and debris to be removed from the inlet leaf/litter screen
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable depth as specified by the hydraulic consultant
INLET & JUNCTION PITS			
Inside Pit	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of Pit	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
STORMWATER SYSTEM			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.
HUMECEPTOR			
Refer Manufacturers Operation and Maintenance Manuel for maintenance requirements.	Refer Manufacturers Operation and Maintenance Manuel	Maintenance Contractor	Refer Manufacturers Operation and Maintenance Manuel
OSD TANK/ BASINS			
Inspect and remove any blockage from	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen to inspect orifice.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
orifice			
Inspect trash screen and clean	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen if required to clean it.
Inspect flap valve and remove any blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate. Ensure flap valve moves freely and remove any blockages or debris.
Inspect pit sump for damage or blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate & screen. Remove sediment/ sludge build up and check orifice and flap valve is clear.
Inspect storage areas and remove debris/ mulch/ litter etc likely to block screens/ grates.	Six Monthly	Maintenance Contractor/ Owner	Remove debris and floatable materials.
Check attachment of orifice plate and screen to wall of pit	Annually	Maintenance Contractor	Remove grate and screen. Ensure plate or screen mounted securely, tighten fixings if required. Seal gaps if required.
Check orifice diameter is correct and retains sharp edge.	Five yearly	Maintenance Contractor	Compare diameter to design (see Work-as-Executed) and ensure edge is not pitted or damaged.
Check screen for corrosion	Annually	Maintenance Contractor	Remove grate and screen and examine for rust or corrosion, especially at corners or welds.
Inspect overflow weir and remove any blockage	Six monthly	Maintenance Contractor/ Owner	Ensure weir is free of blockage.
Inspect walls for cracks or spalling	Annually	Maintenance Contractor	Remove grate to inspect internal walls, repair as necessary.
Check step irons	Annually	Maintenance Contractor	Ensure fixings are secure and irons are free from corrosion.

Appendix C Hot Load Management Specification

NSW Banksmeadow Transfer Terminal Specifications for Hot Load Area & Equipment

Specifications

In the event that a waste transporting vehicle arrives to Banksmeadow carrying waste that is identified as smoldering (i.e hot load) it will be managed in a dedicated external area. The area will be located on the south-western corner on the entrance to the site, adjacent to the inbound access road as waste vehicles approach the incoming weighbridge. The area will be a clearly defined as emergency only parking area.

The hot load area is basically the same dimensions of a rigid truck and it is located in proximity to a fire hydrant which will be used in the event that a hot load is identified. The total estimated flow needs to be 1.0L per second. If any waste is dumped in the hot load area, the waste will be saturated with water.

Once the incident has been controlled, the majority of the waste will be collected by a front end loader and the remainder of the cleaning will be undertaken by a road sweeper and a skid steer.

The water that is utilised during the hot load incident and gets in contact with the smoldering waste will be classified as fire water. The majority of the water utilised will be absorbed by the waste based on the absorption capacity of putrescible waste. Putrescible waste has a moisture content of 20% and a saturation point of 50%, therefore there is 30% capacity for the fire water to be absorbed before we see any run-off.

With the existing flows of 1.0L per second and 6,000L to saturate the waste, it is very unlikely that a hot load would continue to be dealt with in 1hr 40min to reach saturation point.

However, in the event that there is excess run-off of fire water, it will drain towards pit B01. The pit will have drain protections installed as soon as the site is aware that there is a hot load event taking place. In addition to this protection, the road sweeper will be used to intercept any fire water and litter that may try to enter pit B01.

In the event that the closure of pit B01 is missed, the excess fire water will run into the site internal stormwater management system, specifically OSD 3. If any waste is identified in OSD 3, it will be accessed, cleaned & removed.

The discharge of OSD3 goes straight into a gross pollutant trap (GPT). The GPT will intercept any pollutant that would have made it to the stormwater drain. The GPT will be scheduled for cleaning as necessary. This process follows the "Guidelines for Contaminated Water retention and Treatment systems" of NSW.

Dimensions

Surface area at least 3m (W) x 12.5m (L)

Total width of truck is 2.47m

Same area as a temporary truck parking space

Construction

Materials for floor same as road access area (concrete)

NSW Banksmeadow Transfer Terminal

Specifications for Hot Load Area & Equipment

Surface area must follow the same slope as the rest of the site for managing stormwater.

Pipework & Hoses Specification

Suitable to achieve 1.0L/s flow at the fire hydrant discharge point

Suitable to resist heat (i.e. no plastic but stainless steel)

Drain Specification

Suitable to deal with leachate and fire water (i.e. 316 stainless steel)

Size of drain pipe as per pit B01

1x drain on pit B01.

Ease of access for maintenance and cleaning (i.e. at least 300mm SS drain)

Calculations on capacity

7 tonnes maximum payload per waste disposal truck

0.35 t/m³ density of the waste once tipped

20m³ of volume from the waste

20% moisture content of putrescible waste

50% Worst case saturation capacity for putrescible waste

10m³ Maximum volume of water that would saturate the hot load

10,000L Maximum amount of moisture content before saturation of the putrescible waste

4,000L is 20% of the existing moisture content on the waste

6,000L is 30% absorption capacity for the putrescible waste before saturation

Calculations on flow

1.0L/s total flow at the discharge points

60L per minute over the hot load

1hr 40mins time before saturation of the hot load waste at 50% saturation point

Supporting Documentation

- CO12589.00-C41-E – Stormwater Drainage Plan Sheet 1
- CO12589.00-C42-E – Stormwater Drainage Plan Sheet 2
- H-100[07] - HYDRAULIC SERVICES SITE PLAN

Appendix D Baseline Water Data

Tuesday, 8 March 2016

DL3541_S004265

Danny Germanos
AWJ Civil Pty Ltd
155 Newton Rd
Wetherill Park, NSW 2154

Danny@awj.com.au

Dear Sir,

Re: Groundwater Discharge to Stormwater Suitability – 34-36 McPherson Street, Banksmeadow NSW 2019.

DLA Environmental Services (DLA) was requested by AWJ Civil on the behalf of LIPMAN Pty Ltd to prepare a letter documenting the monitoring outcomes of groundwater dewatering works during discharge to stormwater at the property identified as 36 McPherson Street, Banksmeadow, NSW 2019.

Groundwater dewatering is an integral part of the planned construction program for the Site. The potential need to discharge on a daily basis is to allow Site excavations to proceed in a safe and efficient manner. As such, a responsible strategy for safeguarding environmental concerns and managing all potential risks associated with the dewatering exercise was implemented in the report titled: *Groundwater Dewatering Management Plan – 34-36 McPherson Street, 14 Beauchamp Road, Banksmeadow, NSW 2019* (DLA, 2015, ref: DL3541_S003091_R2). Permission to extract groundwater at the Site during excavation works has been provided by NSW Department of Primary Industries (DPI) Water.

DLA attended the Site on the 23rd February 2016 to undertake sample collection during dewatering activities. The water samples were collected from the discharge point currently in use at the Site, located on 34-36 McPherson Street directly adjacent the Site. The Site is not subject to consistent ongoing dewatering and only dewaterers during selective civils work, thus giving rise to the irregular frequency of the sampling events.

The results are as follows:

Table 1 – Monitoring Results (µg/L, unless specified otherwise)

Parameters	Trigger Levels	Action Criteria	23 rd March 2016
pH		<6.5 - >8.5 [^]	7.2
Suspended Solids (TSS)	Visually turbid	50mg/L	nd
EC	750µs/cm	1000µs/cm	1800
Hydrocarbons			
Benzene	475µg/L	712.5µg/L	nd
Ethylbenzene	40µg/L*	60µg/L	nd
Toluene	55µg/L*	82.5µg/L	nd
p-Xylene	100µg/L	150µg/L	nd
o-Xylene	175µg/L	262.5µg/L	nd
TRH	300µg/L**	450µg/L	13
Metals			
Arsenic	12µg/L	18µg/L	3
Cadmium	0.35µg/L	0.53µg/L	nd
Chromium (III)***	13.5µg/L	20.3µg/L	2
Copper	0.7µg/L	1.1µg/L	nd
Lead	2.2µg/L	3.3µg/L	nd
Mercury	0.5µg/L	0.75µg/L	0.18
Nickel	5.5µg/L	8.3µg/L	2
Zinc****	7.5g/L	11.25µg/L	20
Chlorinated Compounds			
Chloroform*	30 µg/L		2
1,1 dichloroethane*	30 µg/L		nd
1,1,1 trichloroethane*	270 µg/L		nd
Trans-1,2 dichloroethene+	100 µg/L		nd
Cis-1,2 dichloroethene*	70 µg/L		2
Trichloroethene*	330 µg/L		3
Tetrachloroethene*	70 µg/L		2

nd = not detected above Laboratory NATA accreditation level of detection.

* Criteria taken from Australian and New Zealand Guidelines for Fresh and Marine Water Quality Guidelines 2000, marine waters at 95% protection. In the absence of high reliability trigger value, the moderate or low reliability trigger guideline concentration has been quoted.

** Criteria taken from Dutch Intervention Levels (Ministry of Housing and the Environmental, 2000).

*** GIL for Marine Waters has been utilised as no value is available for Fresh Waters.

**** Trigger and Action levels to be taken into context with regional influences.

+ Derived from the US EPA Regional Screening Levels.

Refer to **Attachment 1 – NATA Certified Analytical Data.**

Laboratory analysis recorded concentrations of Electrical Conductivity and Zinc above the adopted discharge criteria. The results are considered to be ubiquitous with the expected regional background concentrations associated with the Botany aquifer. In general the heavy metal and Electrical Conductivity results are minor in exceedance to the criteria and are not expected to pose an unacceptable risk to health or the environment.

Additionally the recorded levels of Zinc are not uncommon in a stormwater system due to the effect of urban environment runoff. The ANZECC 2000 trigger values Guidelines are a Tier 1 screening risk assessment. The trigger values are a conservative in measure and generally do not take into account the effects of urban environment runoff.

It is also considered that the recorded Electrical Conductivity concentrations do not prohibit groundwater discharge to stormwater as the receiving waters (Botany Bay) are a saline environment.

No other exceedances were noted for heavy metals and all other concentrations were less than the Laboratory Limit of Reporting or did not exceed the adopted criteria. On the basis of this information, it is considered that dewatering practices have not impacted on-site water quality and that groundwater dewatering may continue in this manner or alternatively discharge to the reinjection area already established on Site.

Monitoring will continue to be undertaken by DLA during the next phase of dewatering works to further manage all potential risks associated with the dewatering exercise.

Yours faithfully,

DLA ENVIRONMENTAL SERVICES



John Browne

Environmental Consultant

ATTACHMENT 1 – NATA CERTIFIED ANALYTICAL DATA



CERTIFICATE OF ANALYSIS

142043

Client:

DLA Environmental Services Pty Ltd
Unit 3, 38 Leighton Pl
Hornsby
NSW 2077

Attention: John

Sample log in details:

Your Reference:	<u>DL3541, Banksmeadow</u>
No. of samples:	1 Water
Date samples received / completed instructions received	22/02/2016 / 22/02/2016

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data. Samples were analysed as received from the client. Results relate specifically to the samples as received. Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date: 29/02/16 / 29/02/16
Date of Preliminary Report: Not Issued
NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:


Jacinta Hurst
Laboratory Manager

VHC's in water		
Our Reference:	UNITS	142043-1
Your Reference	-----	DW
	-	
Date Sampled	-----	19/02/2016
Type of sample		Water
Date extracted	-	24/02/2016
Date analysed	-	25/02/2016
Dichlorodifluoromethane	µg/L	<10
Chloromethane	µg/L	<10
Vinyl Chloride	µg/L	<10
Bromomethane	µg/L	<10
Chloroethane	µg/L	<10
Trichlorofluoromethane	µg/L	<10
1,1-Dichloroethene	µg/L	<1
Trans-1,2-dichloroethene	µg/L	<1
1,1-dichloroethane	µg/L	<1
Cis-1,2-dichloroethene	µg/L	3
Bromochloromethane	µg/L	<1
Chloroform	µg/L	2
2,2-dichloropropane	µg/L	<1
1,2-dichloroethane	µg/L	<1
1,1,1-trichloroethane	µg/L	<1
1,1-dichloropropene	µg/L	<1
Carbon tetrachloride	µg/L	<1
Dibromomethane	µg/L	<1
1,2-dichloropropane	µg/L	<1
Trichloroethene	µg/L	3
Bromodichloromethane	µg/L	<1
trans-1,3-dichloropropene	µg/L	<1
cis-1,3-dichloropropene	µg/L	<1
1,1,2-trichloroethane	µg/L	<1
1,3-dichloropropane	µg/L	<1
Dibromochloromethane	µg/L	<1
1,2-dibromoethane	µg/L	<1
Tetrachloroethene	µg/L	2
1,1,1,2-tetrachloroethane	µg/L	<1
Chlorobenzene	µg/L	<1
Bromoform	µg/L	<1
1,1,2,2-tetrachloroethane	µg/L	2
1,2,3-trichloropropane	µg/L	<1
Bromobenzene	µg/L	<1
2-chlorotoluene	µg/L	<1
4-chlorotoluene	µg/L	<1
1,3-dichlorobenzene	µg/L	<1
1,4-dichlorobenzene	µg/L	<1
1,2-dichlorobenzene	µg/L	<1

VHC's in water		
Our Reference:	UNITS	142043-1
Your Reference	-----	DW
	-	
Date Sampled	-----	19/02/2016
Type of sample		Water
1,2-dibromo-3-chloropropane	µg/L	<1
1,2,4-trichlorobenzene	µg/L	<1
Hexachlorobutadiene	µg/L	<1
1,2,3-trichlorobenzene	µg/L	<1
Surrogate Dibromofluoromethane	%	97
Surrogate toluene-d8	%	96
Surrogate 4-BFB	%	97

vTRH(C6-C10)/BTEXN in Water		
Our Reference:	UNITS	142043-1
Your Reference	-----	DW
	-	
Date Sampled	-----	19/02/2016
Type of sample		Water
Date extracted	-	24/02/2016
Date analysed	-	25/02/2016
TRHC ₆ - C ₉	µg/L	12
TRHC ₆ - C ₁₀	µg/L	13
TRHC ₆ - C ₁₀ less BTEX (F1)	µg/L	13
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	101
Surrogate toluene-d8	%	96
Surrogate 4-BFB	%	97

svTRH (C10-C40) in Water		
Our Reference:	UNITS	142043-1
Your Reference	-----	DW
	-	
Date Sampled	-----	19/02/2016
Type of sample		Water
Date extracted	-	24/02/2016
Date analysed	-	25/02/2016
TRHC ₁₀ - C ₁₄	µg/L	<50
TRHC ₁₅ - C ₂₈	µg/L	<100
TRHC ₂₉ - C ₃₆	µg/L	<100
TRH>C ₁₀ - C ₁₆	µg/L	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50
TRH>C ₁₆ - C ₃₄	µg/L	<100
TRH>C ₃₄ - C ₄₀	µg/L	<100
Surrogate o-Terphenyl	%	105

PAHs in Water Our Reference: Your Reference	UNITS ----- -	142043-1 DW
Date Sampled Type of sample	----- -----	19/02/2016 Water
Date extracted	-	24/02/2016
Date analysed	-	24/02/2016
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate <i>p</i> -Terphenyl-d14	%	118

HM in water - dissolved		
Our Reference:	UNITS	142043-1
Your Reference	-----	DW
	-	
Date Sampled	-----	19/02/2016
Type of sample		Water
Date prepared	-	23/02/2016
Date analysed	-	23/02/2016
Arsenic-Dissolved	µg/L	3
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	2
Copper-Dissolved	µg/L	<1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	0.18
Nickel-Dissolved	µg/L	2
Zinc-Dissolved	µg/L	20

Miscellaneous Inorganics		
Our Reference:	UNITS	142043-1
Your Reference	-----	DW
	-	
Date Sampled	-----	19/02/2016
Type of sample		Water
Date prepared	-	22/02/2016
Date analysed	-	22/02/2016
pH	pH Units	7.2
Electrical Conductivity	µS/cm	1,800
Total Suspended Solids	mg/L	<5

MethodID	Methodology Summary
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-019	Suspended Solids - determined gravimetrically by filtration of the sample. The samples are dried at 104+/-5oC.

Client Reference: DL3541, Banksmeadow

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
VHC's in water						Base II Duplicate II %RPD		
Date extracted	-			24/02/2016	142043-1	24/02/2016 24/02/2016	LCS-W2	24/02/2016
Date analysed	-			25/02/2016	142043-1	25/02/2016 25/02/2016	LCS-W2	25/02/2016
Dichlorodifluoromethane	µg/L	10	Org-013	<10	142043-1	<10 <10	[NR]	[NR]
Chloromethane	µg/L	10	Org-013	<10	142043-1	<10 <10	[NR]	[NR]
Vinyl Chloride	µg/L	10	Org-013	<10	142043-1	<10 <10	[NR]	[NR]
Bromomethane	µg/L	10	Org-013	<10	142043-1	<10 <10	[NR]	[NR]
Chloroethane	µg/L	10	Org-013	<10	142043-1	<10 <10	[NR]	[NR]
Trichlorofluoromethane	µg/L	10	Org-013	<10	142043-1	<10 <10	[NR]	[NR]
1,1-Dichloroethene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,1-dichloroethane	µg/L	1	Org-013	<1	142043-1	<1 <1	LCS-W2	94%
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	142043-1	3 3 RPD: 0	[NR]	[NR]
Bromochloromethane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Chloroform	µg/L	1	Org-013	<1	142043-1	2 2 RPD: 0	LCS-W2	96%
2,2-dichloropropane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,2-dichloroethane	µg/L	1	Org-013	<1	142043-1	<1 <1	LCS-W2	94%
1,1,1-trichloroethane	µg/L	1	Org-013	<1	142043-1	<1 <1	LCS-W2	96%
1,1-dichloropropene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Carbon tetrachloride	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Dibromomethane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,2-dichloropropane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Trichloroethene	µg/L	1	Org-013	<1	142043-1	3 3 RPD: 0	LCS-W2	97%
Bromodichloromethane	µg/L	1	Org-013	<1	142043-1	<1 <1	LCS-W2	96%
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,3-dichloropropane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Dibromochloromethane	µg/L	1	Org-013	<1	142043-1	<1 <1	LCS-W2	99%
1,2-dibromoethane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Tetrachloroethene	µg/L	1	Org-013	<1	142043-1	2 2 RPD: 0	LCS-W2	101%
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Chlorobenzene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Bromoform	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	142043-1	2 1 RPD: 67	[NR]	[NR]
1,2,3-trichloropropane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Bromobenzene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
2-chlorotoluene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
4-chlorotoluene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]

Client Reference: DL3541, Banksmeadow

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
VHC's in water						Base II Duplicate II %RPD		
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Hexachlorobutadiene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-013	96	142043-1	97 99 RPD: 2	LCS-W2	101%
Surrogate toluene-d8	%		Org-013	98	142043-1	96 97 RPD: 1	LCS-W2	101%
Surrogate 4-BFB	%		Org-013	96	142043-1	97 99 RPD: 2	LCS-W2	101%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Water						Base II Duplicate II %RPD		
Date extracted	-			24/02/2016	142043-1	24/02/2016 24/02/2016	LCS-W2	24/02/2016
Date analysed	-			25/02/2016	142043-1	25/02/2016 25/02/2016	LCS-W2	25/02/2016
TRHC ₆ - C ₉	µg/L	10	Org-016	<10	142043-1	12 11 RPD: 9	LCS-W2	99%
TRHC ₆ - C ₁₀	µg/L	10	Org-016	<10	142043-1	13 14 RPD: 7	LCS-W2	99%
Benzene	µg/L	1	Org-016	<1	142043-1	<1 <1	LCS-W2	98%
Toluene	µg/L	1	Org-016	<1	142043-1	<1 <1	LCS-W2	97%
Ethylbenzene	µg/L	1	Org-016	<1	142043-1	<1 <1	LCS-W2	101%
m+p-xylene	µg/L	2	Org-016	<2	142043-1	<2 <2	LCS-W2	100%
o-xylene	µg/L	1	Org-016	<1	142043-1	<1 <1	LCS-W2	100%
Naphthalene	µg/L	1	Org-013	<1	142043-1	<1 <1	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	103	142043-1	101 99 RPD: 2	LCS-W2	98%
Surrogate toluene-d8	%		Org-016	98	142043-1	96 97 RPD: 1	LCS-W2	101%
Surrogate 4-BFB	%		Org-016	96	142043-1	97 99 RPD: 2	LCS-W2	101%

Client Reference: DL3541, Banksmeadow

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH(C10-C40) in Water						Base II Duplicate II %RPD		
Date extracted	-			24/02/2016	[NT]	[NT]	LCS-W2	24/02/2016
Date analysed	-			25/02/2016	[NT]	[NT]	LCS-W2	25/02/2016
TRHC ₁₀ - C ₁₄	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W2	102%
TRHC ₁₅ - C ₂₈	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	119%
TRHC ₂₉ - C ₃₆	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	106%
TRH>C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W2	102%
TRH>C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	119%
TRH>C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	106%
Surrogate o-Terphenyl	%		Org-003	99	[NT]	[NT]	LCS-W2	116%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Water						Base II Duplicate II %RPD		
Date extracted	-			24/02/2016	[NT]	[NT]	LCS-W2	24/02/2016
Date analysed	-			24/02/2016	[NT]	[NT]	LCS-W2	24/02/2016
Naphthalene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	89%
Acenaphthylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	96%
Phenanthrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	94%
Anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	86%
Pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	90%
Benzo(a)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	101%
Benzo(b,j+k)fluoranthene	µg/L	2	Org-012	<2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W2	99%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	132	[NT]	[NT]	LCS-W2	103%

Client Reference: DL3541, Banksmeadow

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
HM in water - dissolved						Base II Duplicate II %RPD		
Date prepared	-			23/02/2016	[NT]	[NT]	LCS-W1	23/02/2016
Date analysed	-			23/02/2016	[NT]	[NT]	LCS-W1	23/02/2016
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	98%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W1	102%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	94%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	100%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	107%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-W1	100%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	98%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	98%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Miscellaneous Inorganics						Base II Duplicate II %RPD		
Date prepared	-			22/02/2016	[NT]	[NT]	LCS-W1	22/02/2016
Date analysed	-			22/02/2016	[NT]	[NT]	LCS-W1	22/02/2016
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-W1	100%
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	LCS-W1	103%
Total Suspended Solids	mg/L	5	Inorg-019	<5	[NT]	[NT]	LCS-W1	82%

Report Comments:

Asbestos ID was analysed by Approved Identifier: Not applicable for this job
Asbestos ID was authorised by Approved Signatory: Not applicable for this job

INS: Insufficient sample for this test

PQL: Practical Quantitation Limit

NT: Not tested

NR: Test not required

RPD: Relative Percent Difference

NA: Test not required

<: Less than

>: Greater than

LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

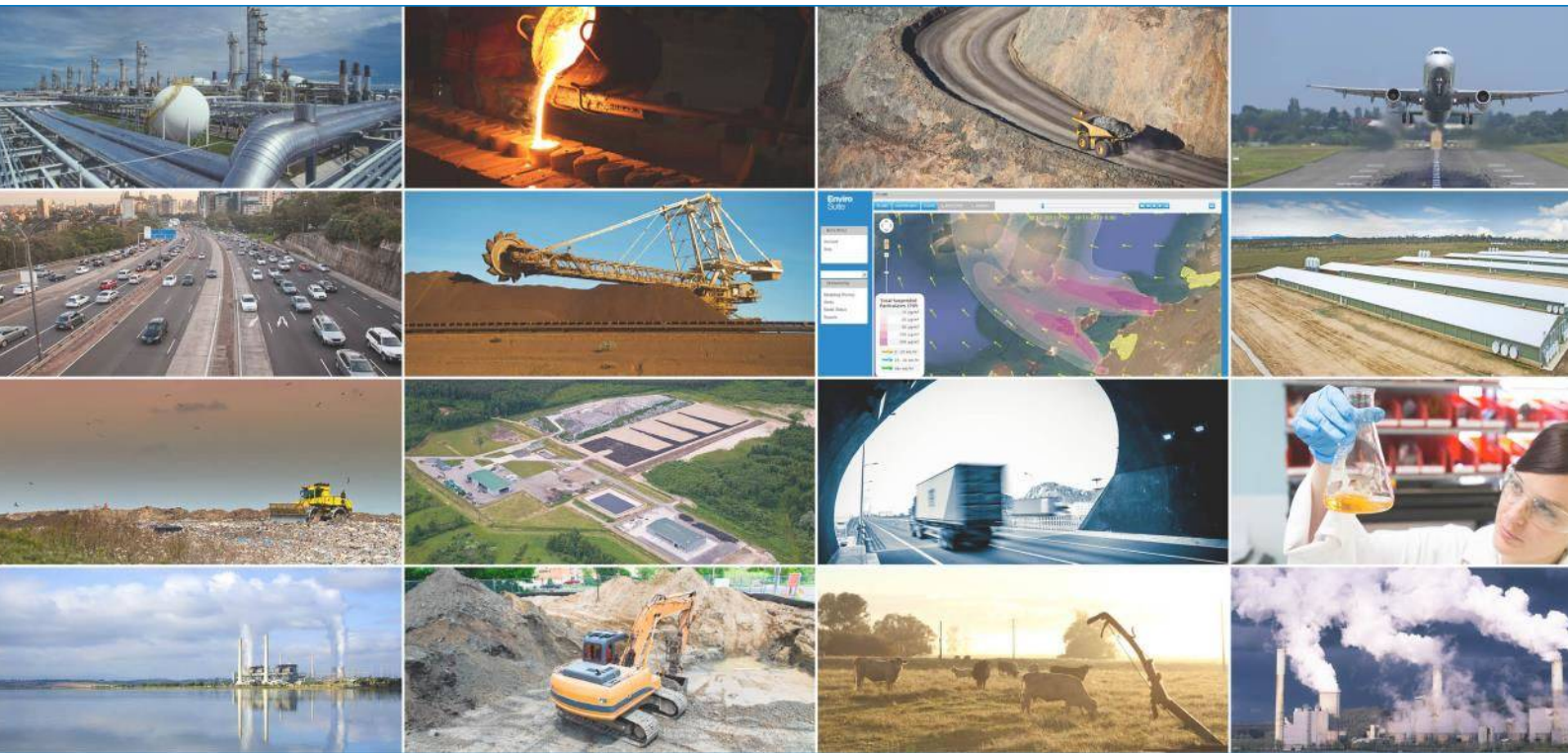
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Appendix E Long Term Environmental Management Plan



Environmental Management Plan

34-36 McPherson Street
Banksmeadow
NSW 2019

Lipman Pty Ltd

DL3541_S004923

July 2016

PROJECT NAME	Veolia Waste Transfer Facility - 34-36 McPherson Street, Banksmeadow, NSW.
PROJECT ID	DL3541
DOCUMENT CONTROL NUMBER	S004923
PREPARED FOR	Lipman Pty Ltd
APPROVED FOR RELEASE BY	David Lane
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APPENDICES

Appendix A	Veolia Acknowledgement Letter
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1.0 INTRODUCTION

1.1 General

DLA Environmental Services (DLA) was commissioned by Lipman Pty Ltd to perform a Validation Assessment for the property identified as:

34-36 McPherson Street, Banksmeadow NSW 2019 (the Site).

The project objectives of the Validation Report are to demonstrate that the Site is suitable for the proposed future land use, in accordance with the objectives of the remediation strategy developed for the Site.

From the results of previous assessments, it was apparent that friable asbestos appeared to be present in the absence of significant bonded asbestos and was relatively widespread or randomly distributed in heterogeneous fill across the Site at low concentrations. DLA considered that asbestos at the Site will not pose a risk to human health as long as it remains undisturbed beneath the proposed development. A major component of the remediation and validation program therefore entailed management of the asbestos risk through capping and containing the Site with the new development.

To assist with maintaining protection from, and restricting inadvertent contact to, potential contamination in residual soils at the Site, an Environmental Management Plan (EMP) has been prepared for the Site. The EMP has been developed in accordance with the *Guideline for the Preparation of Environmental Management Plans* (DIPNR, 2004).

1.2 Objectives

The principal objectives of the EMP are as follows:

- Define details of who, what, where and when ongoing management and environmental mitigation measures are to be implemented;
- To provide Site manager or owner, government agencies, contractors, developers and other stakeholders better onsite environmental management control over the life of the property;
- Allow property managers to ensure their contractors fulfil environmental obligations on their behalf; and,

- Demonstrate due diligence by providing guidance on any excavation/disturbance of the soil within the subject area and therefore prevent any adverse impacts on human health or the environment.

1.3 EMP Audience

The EMP has been developed to address the management of site-specific environmental concerns associated with the potential for residual contamination at the Site. Asbestos fibres pose a risk to maintenance workers accessing services. Service trenches are the most likely part of the Site to be accessed in the future. **The presence of asbestos impacted fill in service trenches and the corresponding control measures are therefore more relevantly directed at future maintenance workers.**

Management protocols in this EMP are also relevant to:

- Future Site managers and owners;
- Future construction workers; and,
- Future resale/redevelopment agencies.

Although a potential for exposure to contamination by Site visitors and occupants cannot be discounted, the likelihood of this occurrence is anticipated to be low considering the land use scenario. Future Site visitors and occupants are not specifically relevant to this EMP due to the use of the Site as Waste Transfer Facility.

2.0 SITE DESCRIPTION

The Site identification details are summarised in **Table 2a** below:

Table 2a – Site Identification Summary

ITEMS	DETAILS
Site Name	Veolia Waste Transfer Facility
Address	34-36 McPherson Street
Local Government Authority	City of Botany Bay
Lot and Deposited Plan	Lots A & B, D.P. 366725 and Lot 1, D.P. 435497
Development Controls	Botany Bay Local Environmental Plan 2013
Site Zoning	MD – SEPP (Major Development) 2005
Current Use (NEPM 2013 Table 1A(1))	Commercial/Industrial
Proposed Use (NEPM 2013 Table 1A(1))	Commercial/Industrial
Site Area (approx.)	9,800 m ² (0.98 ha)
Locality Map	Refer to Figure 1 – Site Location

Refer to **Figure 1** – Site Location and **Figure 2** – Site Development Plan.

3.0 SUMMARY OF CONTAMINATION

3.1 Contaminants of Potential Concern

DLA undertook an asbestos quantification assessment concurrent to the completion of the RAP. The objective of that assessment was to quantify the concentrations of asbestos in in-situ soils and to evaluate the potential for any unacceptable risks to human health or the environment with regards to the presence of asbestos in soils. The report drew conclusions on the land use suitability of the Site with regards to asbestos contamination and provided recommendations to enable such conclusions for integration into the RAP developed for the Site.

Asbestos quantification analysis was undertaken at all 17 sample locations with a total of 37 primary samples collected with an additional four duplicate samples. Fill soils were field screened with suspected Asbestos Containing Materials (ACM) retained on the sieve screen in two test pits. Laboratory analysis later confirmed that all fragments retained above the sieve did not contain asbestos.

Following field screening, soils were laboratory tested for Asbestos Fines / Friable Asbestos (AF/FA) content. AF/FA detections were recorded in eight of the 41 samples analysed. Concentrations were reported in excess of Health Screening Levels (HSLs) in one test pit location for two samples – S24 TP14 (0.2-0.4m) and S25 TP14 (0.5-1.5m). Concentrations of AF/FA were reported at 0.001% w/w in S3 TP-3 (0.1-0.6m) and S20 TP11 (0.8-0.9m). All other areas of the Site reported detections of AF/FA orders of magnitude below the adopted HSL or less than the laboratory limit of reporting.

From the results, it was apparent that AF/FA appeared to be present in the absence of significant ACM and was relatively widespread or randomly distributed in heterogeneous fill across the Site at low concentrations.

3.2 Asbestos in Service Trenches

Fill materials sourced from the Site which have a potential to contain asbestos have been used to backfill service trenches. Asbestos fibres pose a risk to maintenance workers accessing services. Service trenches are the most likely part of the Site to be accessed in the future.

3.3 Exposure and Risks to Human Health

Considering asbestos is the principal contaminant of concern, the relevant release and transport mechanism is primarily limited to in-situ disturbance in soils and subsequent dispersion into air.

Asbestos does not have the capacity to leach into soils or groundwater and when confined to the soil matrix and absent of external disturbance, the contaminant is generally non-mobile. Based on asbestos being identified as the principal contaminant of concern and future potential site development activities, the relevant exposure pathway for the Site's use is inhalation of asbestos-contaminated dust.

The potential sensitive receptors of environmental impacts present at the Site include:

- Present and future workers of the Site, who may potentially be exposed to asbestos fibres through inhalation of dust associated with disturbed and impacted soils;
- Present and future workers of properties adjacent to the Site, who may potentially be exposed to asbestos fibres through inhalation of dust associated with disturbed and impacted soils;
- Maintenance workers conducting activities at the Site, who may potentially be exposed to asbestos fibres through inhalation of dust associated with disturbed and impacted soils.

Complete exposure pathways exist for present and futures works at the Site. The physical capping mechanism installed across the Site, in conjunction with long-term management controls, will significantly mitigate exposure of asbestos-impacted soils to future patients, visitors and users.

Human health risks to asbestos in soils are summarised in the document, *Managing Asbestos in or on Soil*, published by WorkCover NSW in 2014. The guide provides the following information regarding the human health risks to asbestos in soils:

"Asbestos only poses a risk to human health when elevated levels of asbestos fibres are breathed in.

The likelihood of exposure occurring depends upon the potential for the asbestos material to release fibres, whether the asbestos material is contained or covered, and any operational control measures or personal protective equipment which have been applied to limit the generation and/or inhalation of airborne fibres.

Non-friable asbestos, previously referred to as 'bonded asbestos', in sound condition represents a low human health risk. However, friable asbestos materials or damaged, crumbling bonded asbestos, have the potential to generate, or be associated with, free asbestos fibres and therefore must be carefully managed to minimise the release of asbestos fibres into the air."

The *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (Western Australia Department of Health, 2009) states:

“If deposited in the lungs, [asbestos] fibres can initiate diseases that take many years to produce major health effects. These effects include asbestosis, lung cancer and the normally rare cancer mesothelioma that affects certain chest membrane linings. These impacts tend to be the result of higher levels of exposure, most often occupational, but mesothelioma can also result from low level exposures.”

4.0 CAPPING AND CONTAINMENT

The management strategy for the risk of asbestos in soils is through capping and containing the Site with the proposed development. The details of the capping and containment strategy are outlined below:

4.1 Areas of Deep Imported Fill

For areas of deep imported fill (between 1.0m and 4.0m depth), the future disturbance of soils is unlikely under the proposed development. Capping and containing the Site with the proposed development was considered adequate for these areas.

4.2 Areas of Shallow Imported Fill

The areas of shallow imported fill (between 0.1m and less than 1.0m depth), the risk of future disturbance of soils is greater under the proposed development. A marker layer (brightly coloured non-woven geotextile polyester continuous filament) was placed over in situ fill in these areas to provide adequate visual warning during any future ground disturbance. The areas were then capped and contained with the proposed development (i.e. compactor slabs, roadways and building footprints).

4.3 Areas of Soft Landscaping

The areas of garden beds/soft landscaping where less than 1.0m of filling is proposed, the potential for disturbance of insitu fill materials such as through gardening and future maintenance activities is high. Soils in garden beds/soft landscaping areas were excavated to a minimum depth of 500mm. A marker layer was placed over insitu fill in these areas provides adequate visual warning during any future ground disturbance. A capping layer of minimum 500mm thick consisting of material validated as suitable for the proposed land use was installed over the marker layer in these areas.

Refer to **Figure 3** – Fill Depths and Marker Layer and **Figure 6** – Landscaping Areas.

5.0 HIERARCHY AND RESPONSIBILITIES

5.1 Management Body

It is understood that the Site will be managed by VEOLIA. Under the *Contaminated Land Management Act 1997* (NSW), VEOLIA (nominated party) has the primary responsibility for all matters associated with the works, maintenance issues and accountability of the containment system. In this document, 'containment system' refers to the physical barriers installed at the Site to reduce exposure to the identified contaminants and includes:

- Marker Layer and 500mm of capping material in garden beds/soft landscaping areas; and,
- Marker Layer, concrete slabs, roadways and building footprints areas.

Any future use of the affected land or any building thereon shall include the detail of this management plan and clear agreement as to the responsibilities detailed above between parties.

5.2 Responsibilities of Management Body

The responsibilities of VEOLIA with regard to this EMP are:

- To notify the Botany Bay City Council whenever excavation/disturbance of the ground in the subject area is required;
- To seek approval from Botany Bay City Council whenever excavation/disturbance of the ground in the subject area is required;
- Prior to intrusive works, to notify relevant personnel to any potential risks on-site and the relevant content of this document; and,
- To engage an environmental consultant to oversee the excavation/disturbance and ensure compliance with this EMP.

5.3 Site Inspection Report

A Site Inspection Report must be developed to ensure that capping system controls are regularly monitored and managed for effectiveness. VEOLIA will be responsible for undertaking the inspection and report. An inspection of the capping layer should be performed on a weekly basis. **Table 5a** provides a non-exhaustive list of items to be included in the inspection checklist:

Table 5a – Site Inspection Checklist

	CHECKLIST ITEM	DESCRIPTION
Before Inspection	Site Reference Location Associated Plans and Drawing Date of Inspection Person Undertaking Inspection	Area(s) to be covered under Site Inspection. Obtain all relevant diagrams relating to Site Inspection areas. -- Name and position.
During Inspection	Accurate Description of Capping Layer	Integrity, Durability, Damage, Deterioration. Include photographs.
After Inspection	Conformance Actions Improvement Works Verification Reporting	Description of action(s) required to improve/maintain integrity of capping layer. Commissioning of contractor/worker to undertake improvement(s) Inspection after work was completed to ensure that conformance action was completed to requisite standard. Completion of a report highlighting the outcomes of the inspection including improvement works.

5.4 Site-Specific Awareness

VEOLIA will be responsible for ensuring that all personnel working on-site (including contractors and subcontractors) have received general awareness and instruction of their obligations under the EMP to ensure due diligence with environmental matters, including:

- Site induction;
- Environmental emergency response training; and,
- Familiarisation with site environmental controls;

A register will retain records of the individuals inducted, the date and a brief summary of the induction content.

Changes to the EMP will be communicated to the appropriate level of responsibility through inductions, on-going training and the issue of revised documentation (where necessary).

6.0 MANAGEMENT CONTROLS

The subsequent sections of this report outline Site Management Procedures. These procedures are provided to prevent potential adverse impacts to human health, Site amenity or the environment from any residual contamination at the Site. The procedures have been designed to minimise the potential for the generation of, or exposures to, asbestos in soils.

6.1 Maintenance of the Containment System

To ensure that potential contamination in residual soils remains effectively isolated under the containment system, the integrity of the containment system is considered paramount. The following items address how the physical integrity of the containment system will be appropriately managed.

Control: Demonstrate that the structural integrity of containment system will be maintained for the life of the Site's use.

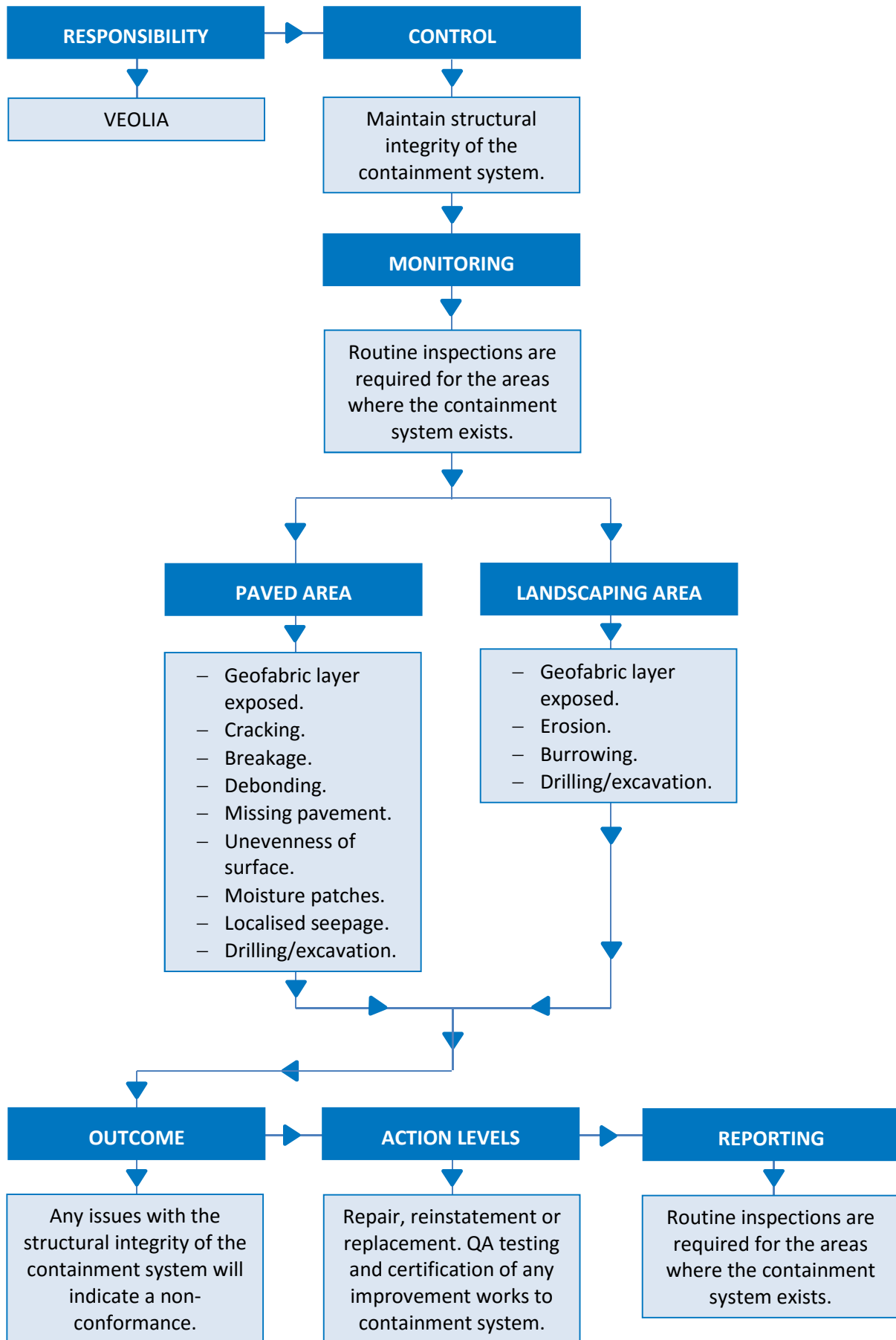
Monitoring: Routine weekly inspections are required for the areas where the containment system exists. The inspections should be in accordance with the Site Inspection Report checklist stipulated in **Section 5.3** of this report. Particular attention must be given to the nature of the containment system and the structural characteristics of the material. **Table 6a** below provides examples of typical symptoms associated with issues in the integrity of the containment system.

Table 6a – Examples of Structural Integrity Issues

PAVED AREA	LANDSCAPING AREA
<ul style="list-style-type: none"> – Cracking. – Breakage. – Debonding. – Missing pavement. – Unevenness of surface. – Moisture patches. – Localised seepage. – Drilling/excavation. 	<ul style="list-style-type: none"> – Geofabric layer exposed. – Erosion. – Burrowing. – Drilling/excavation.

-
- Responsibility:** VEOLIA will be responsible for conducting routine inspections of the containment system.
- Outcomes:** Any issues with the structural integrity of the containment system (such as those listed in **Table 6a** above) will indicate a non-conformance for the purposes of this EMP.
- Action Levels:** Any non-conformance in the physical qualities of the containment system will be appropriately addressed through repair, reinstatement or replacement. Any repairs to the containment system should be tested for Quality Assurance (QA) and certified to comply with the original design specifications.
- Reporting:** Records should include (but are not limited to): date of inspection, items inspected, condition of item and if action is required. Records should be kept for the life of the containment system or until such time that the covenant requiring land owners to monitor and maintain the containment system is no longer in force. On completion of any improvement works to the containment system, the report should also include a description of the sealed finish compliant with the requirements of the approved Remedial Action Plan – 34-36 McPherson Street (DLA, November 2015, ref: DL3541_S003641 (Rev 2.2)).

A schematic of this process is provided below.



6.2 Future Works On-Site

Approval for the works above or below the marker layer must be sought from the Site Environmental Manager or person responsible for the EMP enforcement. This EMP must be read, understood and followed by any person proposing to undertake works (maintenance of services, construction or otherwise) on the Site which involve disturbance of the containment system and/or excavation of soil. VEOLIA will be responsible for appropriately notifying workers and associated personnel of the requirement to review this document.

6.2.1 Landscaping Works

All casual landscaping activities are to be restricted to the areas above the marker layer less than 0.3m bgl. Landscaping activities below the marker layer are strictly prohibited.

6.2.2 Intrusive Works Above the Marker Layer

Soils above the marker layer comprise capping material validated as suitable for the Site's Commercial/Industrial land use. The risk of encountering asbestos and significant or other widespread contamination is considered to be low.

Personnel being employed to undertake any intrusive works above the marker layer must develop a specific Safe Work Method Statement (SWMS) which adequately manages the potential for exposure to contaminants in soils, including both asbestos and chemical contamination. The Unexpected Finds Protocol (**Appendix B**) is considered adequate to provide a management framework and procedure for these type of works.

6.2.3 Intrusive Works Below the Marker Layer

1. In accordance with Clause 458 of the *Work Health and Safety Regulation 2011* (NSW), only Class A asbestos removal licence holders are permitted to conduct asbestos removal work or asbestos-related work that involves friable asbestos. Considering the potential for friable asbestos in soils underlying the marker layer and within material backfilled into the service trenches, all intended asbestos removal works are required to undertaken and/or supervised by a WorkCover Class A licensed asbestos contractor.
2. Personal Protection Equipment (PPE) must be worn by all maintenance and construction workers including:
 - Disposable overalls;

- Respiratory protection (P2 Minimum);
 - Safety boots; and,
 - Hard hat.
3. Personnel being employed to undertake any intrusive works on the containment system must develop a specific SWMS which limits the potential for exposure to any contaminants below the barriers and ensure that the system integrity is re-instated upon completion of works. The SWMS must also adequately manage any exposure to contaminants below the barriers. Works undertaken in soils below the containment system must be undertaken by an adequately experienced Contractor and must account for all potential exposures, due to the fact that asbestos has been identified in fill material underlying the marker layer and across the whole Site at low concentrations.
4. The works will be undertaken works in accordance with the following:
- *Work Health and Safety Act 2011 (NSW)* and associated regulations;
 - *Managing Asbestos in or on soils* (WorkCover NSW, 2014);
 - *How to Safely Remove Asbestos Code of Practice* (Safe Work Australia 2011);
 - *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC:2018] (2005); and,
 - *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres* [NOHSC:3003 (2005)]
5. Designate the proposed service trench / excavation area. Prior to the commencement of works in the designated area, establish a 10 m exclusion zone with the installation of safety warning signs and barricade measures around the boundary.
6. Excavate and undertake maintenance/construction activities to the required depth, ensuring:
- The excavator operator and transport vehicle operator within enclosed cabs are to remain inside their vehicle during the loading operation;
 - The air-conditioning is to be on 'recirculate' or switched off. If the cab is not enclosed, full PPE is to be worn;
 - Unauthorised access is to be prevented within the exclusion zone; and,
 - During the loading operation the materials are too be wetted thoroughly.
7. In the event that soils are excavated, allowance should be made to dispose of the excavated material in accordance with the established Waste Classification Guidelines in force at that

time. Any soil/fill excavated during onsite works, such as maintenance of underground services, must be securely stockpiled separately from the marker/barrier layer material. Where possible, stockpiles should be placed on a sealed surface or on plastic sheeting to prevent cross contamination of unsealed surfaces. If it is not possible to stockpile on a sealed or plastic covered surface, the unsealed surface within the footprint of the stockpiles must be visually inspected by a person who is appropriately qualified to recognise asbestos, and samples collected and analysed to confirm that cross-contamination has not occurred. Stockpiles must be placed in a secure location on-site and covered if they are to remain for more than 24 hours.

8. On completion of the works, the operators and vehicles/equipment should move to the relevant decontamination area. This includes the removal of all disposable overalls and bagging them for disposal. Vehicles should also be decontaminated. Respirators can then be removed.
9. It is required that an appropriate environmental professional is consulted to monitor the works and to advise on the management of exposure and methodology of works to be undertaken. Work methodologies should include appropriate notification regarding the intended level of impact on the containment system and the condition of the impacted area at the completion of works. This should also include any integrity QA certification which should be filed as a permanent record to be kept on-site, with file copies being distributed to relevant stakeholders.
10. Any new service trenches should be backfilled with certified Virgin Excavated Natural Material (VENM) and appropriately re-instated.

A plan showing the location of services installed at the Site has been included as **Figure 5** of this document.

6.3 Land Re-Use or Redevelopment

6.3.1 Resale

If structures are to be maintained upon resale of the property, this document should form part of the sale contract information. The risk to the integrity of the containment system would therefore be minimal assuming the stipulated maintenance program is continued.

6.3.2 Redevelopment

If the land is to be redeveloped by removing or refurbishing above ground structures, the process introduces a risk of compromising the effectiveness of the containment system. Prior to the commissioning of any new building, the engineered barrier surfaces and design plans should be inspected by a competent professional who can give assurance that the structures continue to comply with the original design specification.

If the containment system is to be removed as part of the development, there is a risk of exposure to, or release of, contaminated soils. It is expected that such a development would be regulated by Council Development Regulations, including obligations under SEPP 55 – Remediation of Land. Risk to human health or the environment therefore is considered to be mitigated under this circumstance by governmental regulation, which should ensure the appropriate management strategy at that time.

7.0 EMP REVIEW

7.1 Auditing

The implementation and effectiveness of the EMP will be undertaken in conjunction with the Weekly Site Inspection Checklist undertaken by VEOLIA; this will determine whether the management plan has been properly maintained. External auditing may be commissioned when VEOLIA deems that procedures delineated in the EMP are not yielding a successful management outcome so that the plan can be reviewed and appropriately amended for a more relevant purpose.

7.2 On-Going Applicability

The EMP should be updated in the following circumstances (if necessary):

- Subsequent to significant environmental incidents, such as a major breach in the containment system;
- Where maintenance of the EMP has indicated a need to improve performance in an identified area of environmental impact;
- At the completion of internal and/or external environmental audits;
- At the completed of Site Inspection Reports; and,
- At the completion of works which could have disturbed the capping layer.

VEOLIA will be required to commission an appropriate environmental professional agency to review and amend the EMP and ensure its conformance with statutory or regulatory instruments.

7.3 Current Emergency Contact

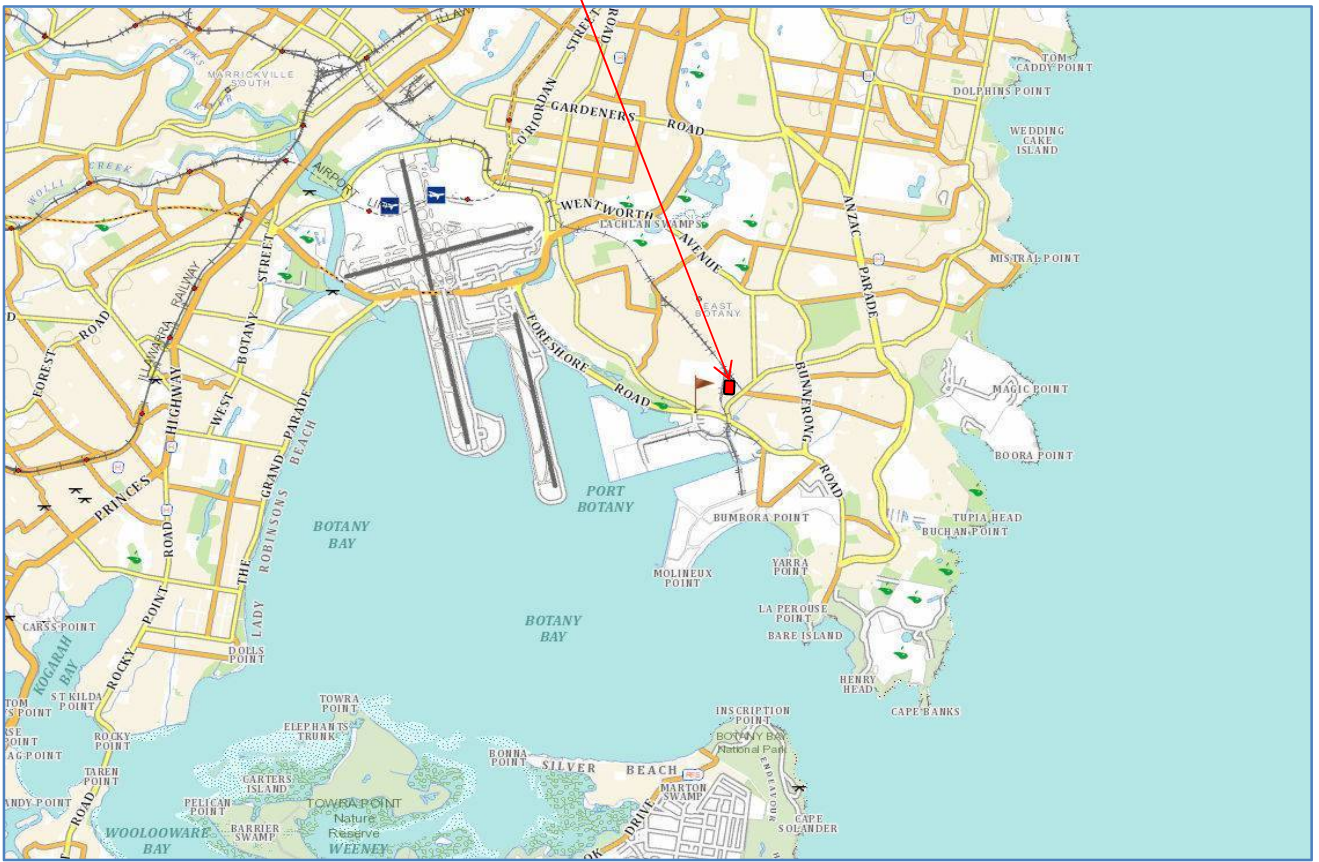
In the case of an emergency, the contact details for VEOLIA at the date of this report are provided below:

NAME	POSITION	PHONE NUMBER	MOBILE NUMBER
Emergency contact details are to be completed by an authorised VEOLIA representative			

FIGURE 1 – SITE LOCATION



Site Location



SITE LOCATION



Unit 3/38 Leighton Place
Hornsby, NSW 2077

DESIGNED:
DLA
COMPILED:
NL
PROJ. No.
DL3541

CLIENT:
Lipman
LOCATION:

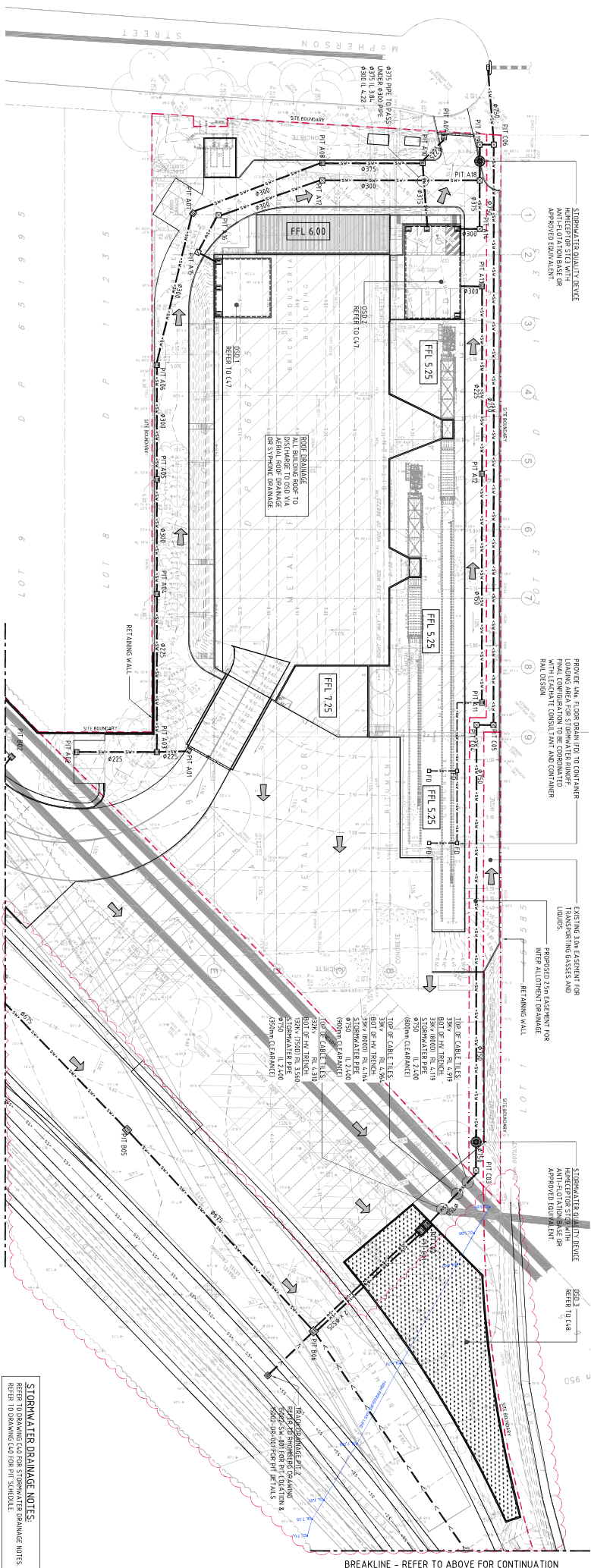
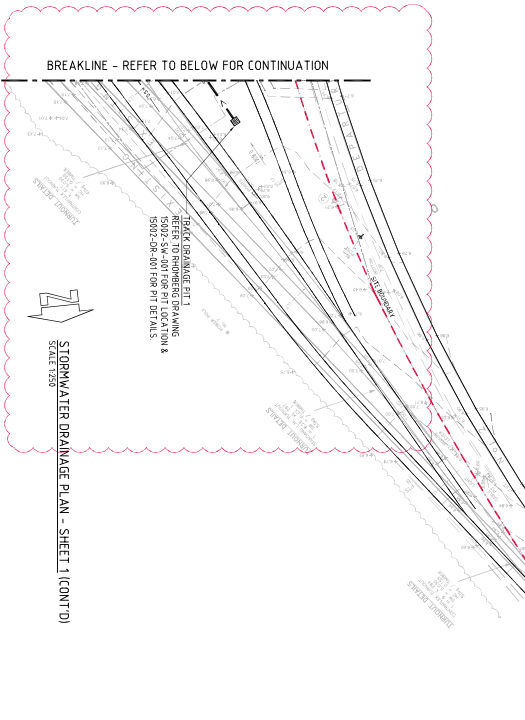
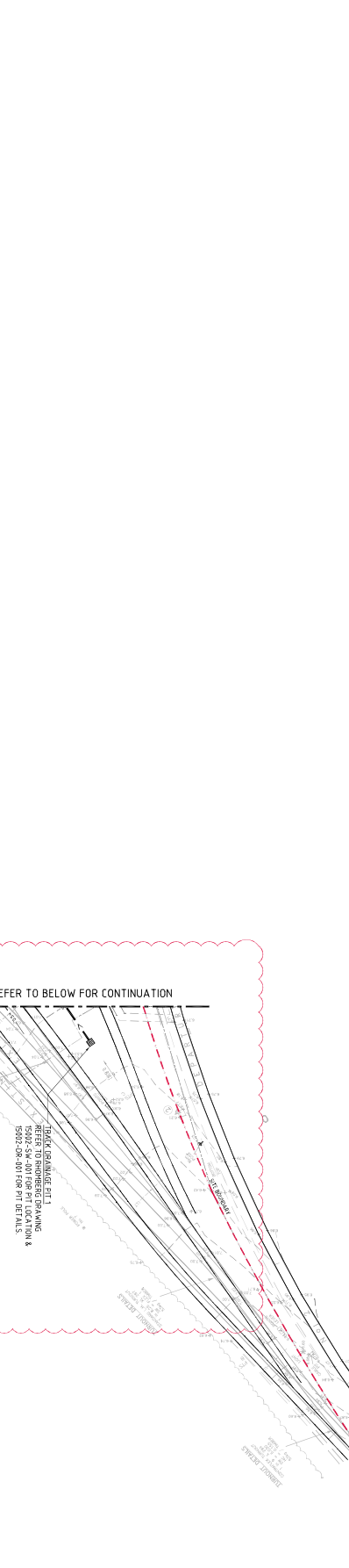
Lipman
34-36 Mcpherson Street, Banksmeadow NSW

DRAWING:
15.09.15
FIGURE:
1

FIGURE 2 – SITE DEVELOPMENT PLAN

LEGEND:
LEVELS (DATUM IS AHD)

- SLOPE SINGLE GRATED GULLY PIT
- S-P SEALED JUNCTION PIT
- K&P AREA INLET PIT
- TRACK GRABBER PIT BY SHIMBERG
- TRACK GRABBER PIT BY SHIMBERG
- TRACK GRABBER LINE BY SHIMBERG
- SUBSOIL LINE
- IN-GROUND ROOF-WATER LINE
- SYNCHRON ROOF-WATER LINE
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (HALLOW)
- FINISHED PAVEMENT CONTOUR (MINORS)
- FINISHED PAVEMENT CONTOUR (MINORS)
- FINISHED PAVEMENT CONTOUR (MINORS)



STORMWATER DRAINAGE PLAN - SHEET 1
SCALE 1:250

FOR CONSTRUCTION CERTIFICATE

STORMWATER DRAINAGE NOTES:
REFER TO DRAWING C40 FOR PIP SCHEDULE.
SCALE 1:250 AT A0 SIZE SHEET

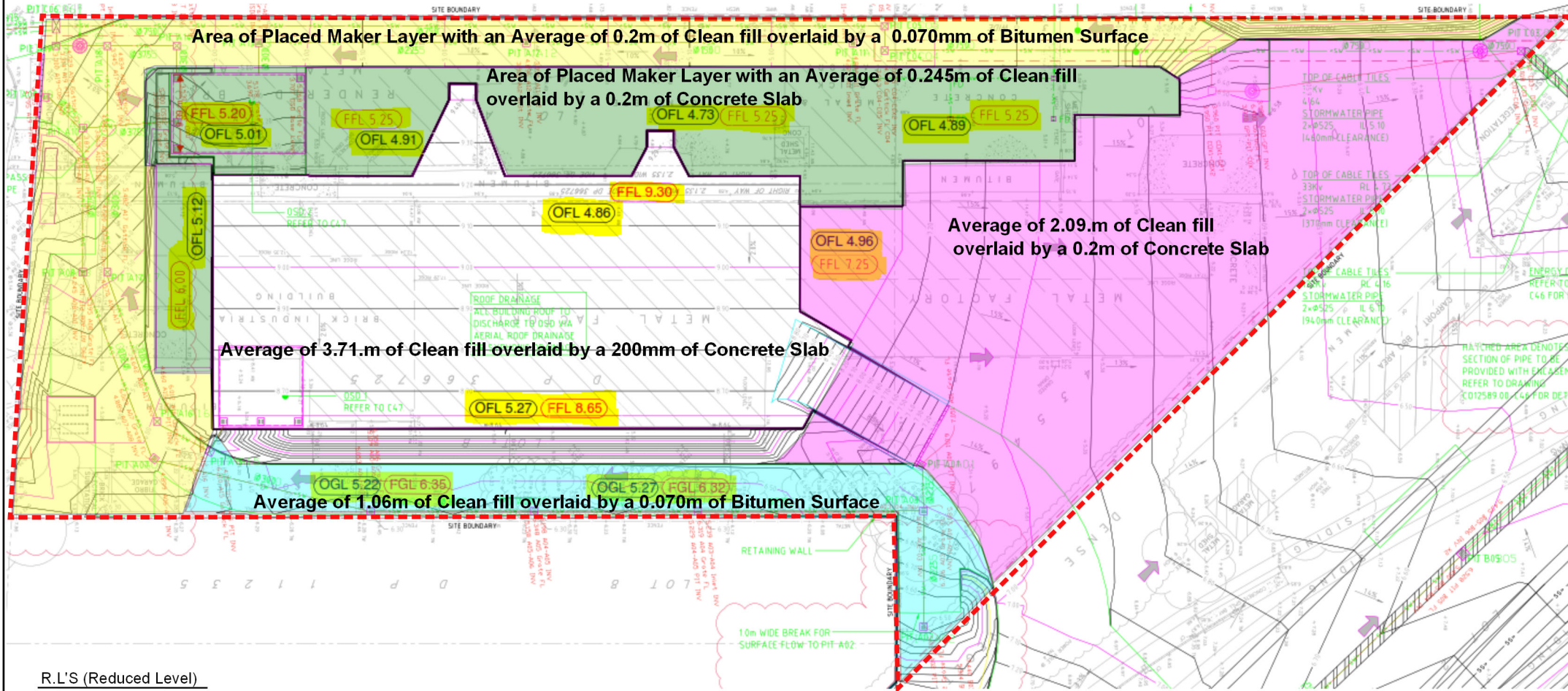
STORMWATER DRAINAGE PLAN
SHEET 1
PROPOSED SITE
PROJECT NO: C022589.00-C41

VEOLIA
LIPMAN

VEOLIA TERMINAL
HYPERION STREET BANKSHELDON
Cecil Roe Consulting Pty Ltd
Consulting Engineers
100-102 Cecil Street
Sydney NSW 2000
Phone: +61 (0)2 9232 8888
Email: info@cecon.com.au

Value in Engineering and Management
Consulting

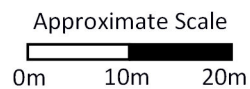
FIGURE 3 – FILL DEPTHS AND MARKER LAYER



R.L'S (Reduced Level)
 OGL = Original Ground Level (via Survey)
 OFL = Original Surface Level (via Survey)
 FGL = Finished Ground Level (via Survey)
 FFL = Finished Floor Level (via Survey)

Legend

- Approximate Site Boundary
- Area of Placed Maker Layer with an Average of 0.2m of Clean fill overlaid by a 0.070mm of Bitumen Surface
- Area of Placed Maker Layer with an Average of 0.245m of Clean fill overlaid by a 0.2m of Concrete Slab
- Average of 1.06m of Clean fill overlaid by a 0.070m of Bitumen Surface
- Average of 3.71.m of Clean fill overlaid by a 200mm of Concrete Slab
- Average of 2.09.m of Clean fill overlaid by a 0.2m of Concrete Slab



DLA Environmental Services
 A Pacific Environment company

Sydney Office
 Phone (02) 9476 1765
 Fax (02) 9476 1557

Maitland Office
 Phone (02) 4933 0001

Title: Summary of Fill Depths and Hardstand Finishes			
Client:	Project No.	Figure No	Date
Lipman Pty Ltd	DL3541		22.07.16
Scale:	Completed	Revision	
As Shown	JB	R00	

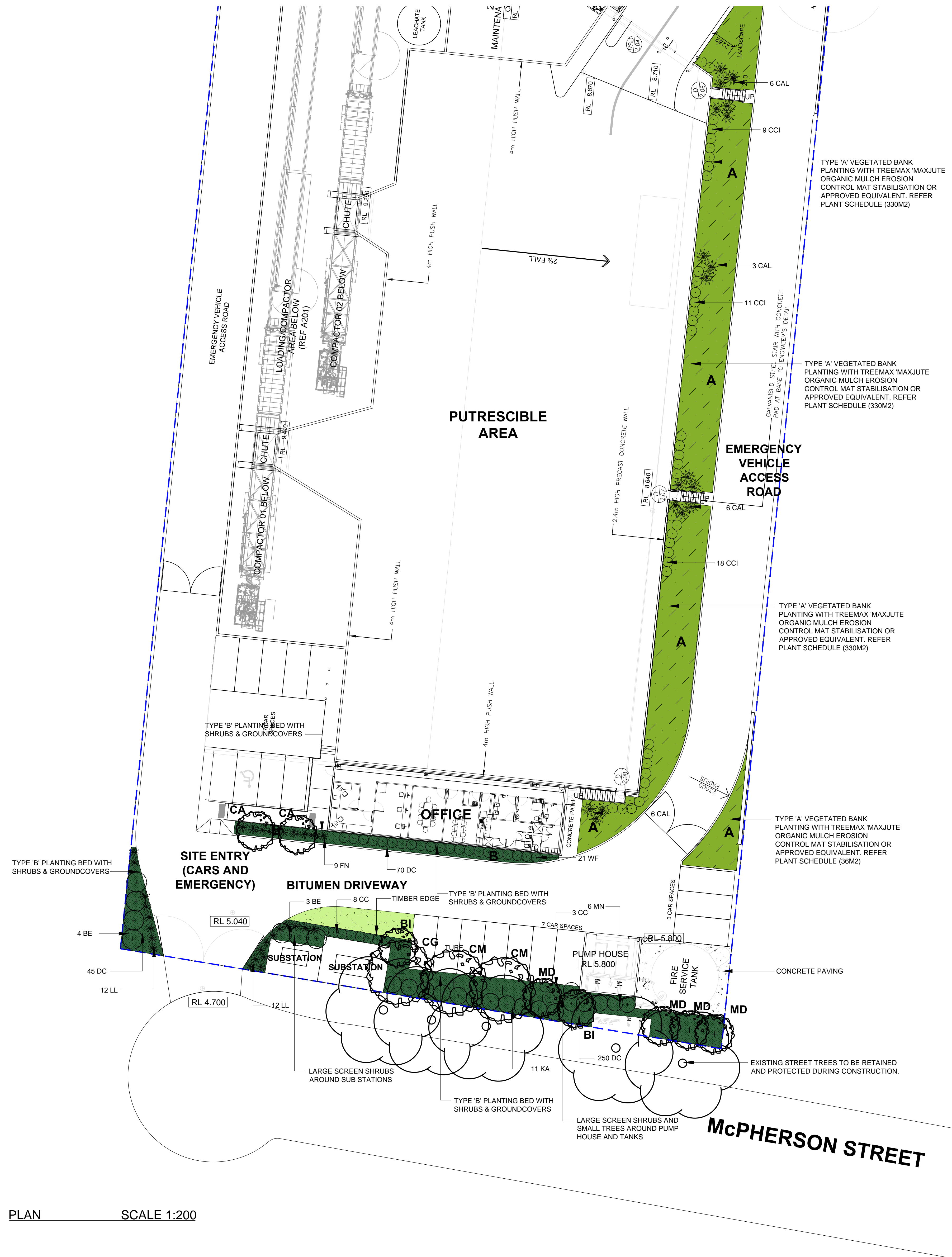


Capping Layer Survey Data

Project Name		Veolia Banksmeadow				Project Number	727
Survey Number	Point Number	Easting	Northing	R.L of Capping Layer	Finish Surface Level	Depth of Clean Fill	Comments
Survey 1000	1001	335520.708	6241090.138	6.488	6.992	0.504	
Survey 1000	1002	335520.451	6241084.234	6.317	6.824	0.507	
Survey 1000	1003	335525.778	6241083.977	6.185	6.688	0.503	
Survey 1000	1004	335529.565	6241091.550	6.437	6.942	0.505	
Survey 2000	2000	335469.297	6241119.788	4.953	5.265	0.312	
Survey 2000	2001	335473.308	6241117.958	4.968	5.279	0.311	
Survey 2000	2002	335469.368	6241114.159	4.936	5.254	0.318	
Survey 2000	2003	335472.568	6241113.295	4.963	5.268	0.305	
Survey 2000	2004	335469.086	6241105.574	4.946	5.252	0.306	
Survey 2000	2005	335477.249	6241104.941	4.988	5.291	0.303	
Survey 2000	2006	335468.242	6241097.342	4.917	5.226	0.309	
Survey 2000	2007	335476.334	6241095.653	4.969	5.279	0.310	
Survey 2000	2008	335466.483	6241087.983	4.909	5.222	0.313	
Survey 2000	2009	335477.671	6241086.646	4.951	5.263	0.312	
Survey 2000	2010	335465.990	6241078.554	4.911	5.232	0.321	
Survey 2000	2011	335477.741	6241077.076	4.978	5.282	0.304	
Survey 2000	2012	335465.498	6241068.140	4.935	5.24	0.305	
Survey 2000	2013	335474.645	6241066.522	4.966	5.275	0.309	
Survey 3000	3000	335464.378	6241128.848	5.184	5.9	0.716	
Survey 3000	3001	335465.044	6241136.038	5.094	5.802	0.708	
Survey 3000	3002	335465.664	6241141.597	5.15	5.853	0.703	
Survey 3000	3003	335466.239	6241147.868	5.192	5.798	0.606	
Survey 3000	3004	335466.836	6241153.680	5.159	5.864	0.705	
Survey 3000	3005	335467.594	6241159.101	5.202	5.912	0.710	
Survey 3000	3006	335468.076	6241162.915	5.397	6.099	0.702	
Survey 3000	3007	335473.635	6241165.763	5.61	6.112	0.502	
Survey 3000	3008	335479.470	6241169.875	5.53	6.035	0.505	
Survey 3000	3009	335477.219	6241173.183	5.528	6.029	0.501	
Survey 3000	3010	335474.302	6241170.771	5.582	6.086	0.504	
Survey 3000	3011	335469.891	6241167.210	5.654	6.158	0.504	
Survey 3000	3012	335468.375	6241171.575	5.629	6.129	0.500	
Survey 3000	3013	335469.688	6241178.152	5.561	6.063	0.502	
Survey 3000	3014	335474.062	6241177.367	5.526	6.034	0.508	
Survey 4000	4000	335465.225	6240987.188	4.596	5.104	0.508	
Survey 4000	4001	335464.822	6240983.435	4.562	5.068	0.506	
Survey 4000	4002	335470.893	6240987.440	4.667	5.171	0.504	
Survey 4000	4003	335470.691	6240982.453	4.703	5.209	0.506	
Survey 4000	4004	335475.754	6240986.861	4.807	5.314	0.507	
Survey 4000	4005	335475.528	6240981.999	4.799	5.305	0.506	
Survey 4000	4006	335480.389	6240981.319	4.841	5.349	0.508	
Survey 4000	4007	335484.697	6240980.916	4.927	5.43	0.503	
Survey 4000	4008	335489.256	6240980.362	5.037	5.541	0.504	
Survey 4000	4009	335493.161	6240979.455	5.19	5.699	0.509	
Survey 4000	4011	335497.191	6240979.480	5.3	5.806	0.506	
Survey 4000	4012	335501.952	6240977.868	5.369	5.876	0.507	
Survey 4000	4013	335505.882	6240977.137	5.519	6.027	0.508	
Survey 4000	4014	335501.631	6240981.080	5.512	6.014	0.502	
Survey 4000	4015	335506.952	6240980.387	5.539	6.045	0.506	
Survey 4000	4016	335508.432	6240984.890	5.702	6.217	0.515	
Survey 4000	4017	335502.481	6240984.858	5.578	6.078	0.500	
Survey 6000	6000	335450.575	6241000.916	4.606	4.907	0.301	
Survey 6000	6001	335455.738	6241000.617	4.696	4.996	0.300	
Survey 6000	6002	335452.221	6241009.372	4.7	4.999	0.299	
Survey 6000	6003	335456.337	6241009.372	4.7	5.008	0.308	
Survey 6000	6004	335452.596	6241017.752	4.7	5	0.300	
Survey 6000	6005	335456.412	6241017.378	4.78	5.087	0.307	
Survey 6000	6006	335453.419	6241027.480	4.733	5.043	0.310	
Survey 6000	6007	335457.834	6241026.956	4.767	5.076	0.309	
Survey 6000	6008	335454.242	6241037.881	4.7	5.006	0.306	
Survey 6000	6009	335458.806	6241036.908	4.7	5.008	0.308	
Survey 6000	6010	335456.337	6241048.581	4.7	5.004	0.304	
Survey 6000	6011	335460.228	6241048.132	4.7	4.998	0.298	
Survey 6000	6012	335456.667	6241061.226	4.745	5.051	0.306	
Survey 6000	6013	335461.450	6241060.671	4.79	5.085	0.295	
Survey 6000	6014	335457.878	6241070.932	4.713	5.018	0.305	
Survey 6000	6015	335462.243	6241070.339	4.758	5.061	0.303	
Survey 6000	6016	335459.040	6241079.702	4.618	4.917	0.299	
Survey 6000	6017	335463.376	6241079.029	4.661	4.986	0.325	
Survey 6000	6018	335460.345	6241090.102	4.627	4.935	0.308	
Survey 6000	6019	335464.261	6241089.596	4.688	4.987	0.299	

Survey 6000	6020	335460.808	6241099.112	4.714	5.019	0.305	
Survey 6000	6021	335465.552	6241098.709	4.754	5.055	0.301	
Survey 6000	6022	335462.225	6241108.447	4.821	5.13	0.309	
Survey 6000	6023	335466.264	6241108.034	4.841	5.148	0.307	
Survey 6000	6024	335462.932	6241116.234	4.932	5.241	0.309	
Survey 6000	6025	335466.706	6241116.117	4.945	5.246	0.301	
Survey 6000	6026	335463.871	6241123.189	5.373	5.681	0.308	
Survey 6000	6027	335467.774	6241121.973	5.556	5.856	0.300	
Survey 7000	7000	335460.407	6241018.286	4.909	5.209	0.300	
Survey 7000	7001	335468.645	6241017.497	4.915	5.228	0.313	
Survey 7000	7002	335470.047	6241027.399	4.982	5.294	0.312	
Survey 7000	7003	335460.495	6241029.240	4.908	5.214	0.306	
Survey 7000	7004	335460.894	6241037.900	4.945	5.247	0.302	
Survey 7000	7005	335471.843	6241036.879	4.935	5.25	0.315	
Survey 7000	7006	335473.333	6241048.414	4.99	5.299	0.309	
Survey 7000	7007	335462.819	6241049.530	4.92	5.231	0.311	
Survey 7000	7008	335464.346	6241058.987	4.927	5.229	0.302	
Survey 7000	7009	335474.273	6241057.988	4.93	5.234	0.304	
Survey 8000	8000	335505.142	6241003.910	6.066	6.371	0.305	
Survey 8000	8001	335509.673	6241002.562	6.011	6.311	0.300	
Survey 8000	8002	335506.677	6240997.394	5.9	6.2	0.300	
Survey 8000	8003	335502.483	6240999.079	5.9	6.203	0.303	
Survey 8000	8004	335503.831	6240994.062	5.802	6.101	0.299	
Survey 8000	8005	335503.682	6240991.590	5.781	6.09	0.309	
Survey 8000	8006	335508.887	6240990.804	5.939	6.248	0.309	
Survey 8000	8007	335508.287	6240986.310	5.82	6.209	0.389	
Survey 8000	8008	335502.371	6240987.022	5.757	6.065	0.308	
Survey 8000	8009	335495.631	6240987.883	5.534	5.842	0.308	
Survey 8000	8010	335496.043	6240991.590	5.627	5.937	0.310	
Survey 8000	8011	335494.208	6240993.837	5.681	5.982	0.301	
Survey 8000	8012	335488.741	6240992.863	5.491	5.797	0.306	
Survey 8000	8013	335488.741	6240988.669	5.386	5.692	0.306	
Survey 8000	8014	335480.653	6240993.537	5.255	5.562	0.307	
Survey 8000	8015	335480.578	6240988.295	5.158	5.464	0.306	
Survey 8000	8016	335480.690	6240984.700	5.171	5.472	0.301	
Survey 8000	8017	335491.512	6240984.700	5.448	5.748	0.300	
Survey 8000	8018	335473.800	6240994.399	5.082	5.386	0.304	
Survey 8000	8019	335472.452	6240990.055	4.93	5.233	0.303	
Survey 8000	8020	335465.600	6240995.222	4.881	5.185	0.304	
Survey 8000	8021	335465.375	6240990.504	4.728	5.028	0.300	
Survey 8000	8022	335460.919	6240985.786	4.432	4.938	0.506	
Survey 8000	8023	335453.505	6240986.835	4.529	4.837	0.308	
Survey 8000	8024	335457.474	6240989.943	4.547	4.854	0.307	
Survey 8000	8025	335450.921	6240992.564	4.511	4.815	0.304	
Survey 8000	8026	335456.426	6240995.222	4.629	4.929	0.300	
Survey 8000	8027	335450.584	6240996.870	4.556	4.862	0.306	

FIGURE 4 – SITE SURFACE FINISHES AND LAYOUT



PLAN SCALE 1:200

PLANTING SCHEDULE (BOTH DRAWINGS)

BOTANIC NAME	TYPE 'A' AREA ESTIMATED QTY'S	TYPE 'B' AREA ESTIMATED QTY'S	COMMON NAME	MATURE HEIGHT & SPREAD	CONTAINER SIZE	APPROXIMATE PLANT DENSITIES
TREES						
BI <i>Banksia integrifolia</i>	-	2	Coast Banksia	5.0 x 4.0m	45L	As shown
CG <i>Corymbia gummifera</i>	-	1	Red Bloodwood	8.0 x 5.0m	25L	As shown
CM <i>Corymbia maculata</i>	-	2	Spotted Gum	12.0 x 6.0m	25L	As shown
CA <i>Cupaniopsis anacardioides</i>	-	2	Tuckeroo	6.0 x 4.0m	45L	As shown
MD <i>Melaleuca decora</i>	-	4	White Feather Myrtle	8.0 x 4.0m	45L	As shown
SHRUBS						
(5 plants per 10m ²)						
CAL <i>Correa alba</i>	18	-	White Correa	1.0 x 1.0m	140mm	As shown
CC <i>Casuarina 'Cousin It'</i>	38	-	Prostrate She Oak	1.0 x 1.0m	140mm	As shown
BE <i>Banksia ericifolia</i>	-	7	Heath Banksia	3.0 x 2.0m	200mm	As shown
BS <i>Banksia spinulosa</i>	-	11	Hairpin Banksia	1.5 x 1.5m	200mm	As shown
CC <i>Callistemon citrinus</i>	-	8	Crimson Bottlebrush	2.0 x 2.0m	200mm	As shown
KA <i>Kunzea ambigua</i>	-	11	Tick Bush	2.0 x 2.0m	200mm	As shown
MN <i>Melaleuca nodosa</i>	-	6	Ball Honeymyrtle	2.0 x 2.0m	200mm	As shown
WF <i>Westringia fruticosa</i>	-	21	Coast Rosemary	1.5 x 1.5m	140mm	As shown
GROUNDCOVERS						
(1 plant 1m ²)						
CGL <i>Carpobrotus glaucescens</i>	1,060 (366)	-	Coastal Pigface	N/A	Viro-Tube	1 / 1 sq metre
DC <i>Dianella congesta</i>	-	365	Flax Lily	N/A	Viro-Tube	1 / 1 sq metre
FN <i>Ficinia nodosa</i>	-	9	Club Rush	N/A	Viro-Tube	1 / 1 sq metre
LL <i>Lomandra longifolia</i>	-	12	Mat Rush	N/A	Viro-Tube	1 / 1 sq metre
MP <i>Myoporum parvifolium</i>	1,060 (366)	-	Creeping Boobialla	N/A	Viro-Tube	1 / 1 sq metre

Note: Quantities in brackets denote Type 'A' Plants occurring on Drawing No 5114 - 02 only, to be planted at the density of 2 plants per sq.metre.

REFER DWG NO 5114 - 01 FOR LANDSCAPE SPECIFICATIONS

NOTE:
 PLANTS ARE LIVING ORGANISMS. IF THEY ARE MAINTAINED IN A HEALTHY CONDITION THEY SHALL CONTINUE TO GROW. IT WILL THEREFORE BE NECESSARY TO REGULARLY MONITOR THE GROWTH OF THE PLANTS SO THAT THEY CAN BE PRUNED OR OTHERWISE ATTENDED TO SO THAT THEY DO NOT OUTGROW THEIR ALLOTTED SPACE.
 EXACT LOCATION OF SITE BOUNDARIES ARE TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF WORK.
 WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED MEASUREMENTS. ALL DIMENSIONS AND LEVELS SHALL BE VERIFIED BY CONTRACTOR ON SITE. CONTRACTOR SHALL OBTAIN LANDSCAPE ARCHITECT'S WRITTEN APPROVAL OF INITIAL SETOUT PRIOR TO COMMENCEMENT OF WORK. IF IN DOUBT, CONTACT LANDSCAPE ARCHITECT.
 ANY BATTER GREATER THAN 1 IN 3 SHALL BE STABILISED BY APPROVED GEOTEXTILE OR OTHER EROSION CONTROL MEASURE, TO SATISFACTION OF LANDSCAPE ARCHITECT.
 FINAL PLANT SIZES MAY BE ADJUSTED AS NECESSARY TO SUIT AVAILABILITY OF PLANT SPECIES AT TIME OF IMPLEMENTATION AND FINAL PROJECT BUDGET.
 SHOULD PROPOSED TREE LOCATION HAVE THE POTENTIAL TO INTERFERE WITH EXISTING OR PROPOSED UTILITIES, CONTRACTOR SHALL ADVISE LANDSCAPE ARCHITECT AND AVOID INSTRUCTIONS PRIOR TO PROCEEDING.

LEGEND

- HYBRID COUCH TURF TO OFFICE FRONTAGE AND NATURE STRIP. REFER SPECIFICATION.
- TYPE 'A' VEGETATED BANK PLANTING. REFER PLANT SCHEDULE AND SPECIFICATIONS. DRIP IRRIGATION NOT REQUIRED.
- TYPE 'B' PLANTING BEDS WITH DRIP IRRIGATION. REFER PLANT SCHEDULE AND SPECIFICATIONS.
- EXISTING TREES TO BE RETAINED AND PROTECTED DURING CONSTRUCTION
- PLANTING BED TIMBER EDGING AS SPECIFIED

ISSUE	DESCRIPTION	DATE
E	GROUNDCOVER REDUCTIONS	02/06/16
D	PLANTING REDUCTIONS	14/04/16
C	ISSUED FOR CONSTRUCTION	10/08/15
B	ISSUED FOR APPROVAL	26/05/15
A	FOR REVIEW AND DISCUSSION	15/05/15

Peter Glass & Associates
 Landscape Architects
 Environmental Planners
 Pool Designers
 69 Christie Street, St Leonards NSW 2065
 Phone (02) 9906 2727 Fax (02) 9906 4470
 Email: design@peterglass.com.au
 Web: www.peterglass.com.au

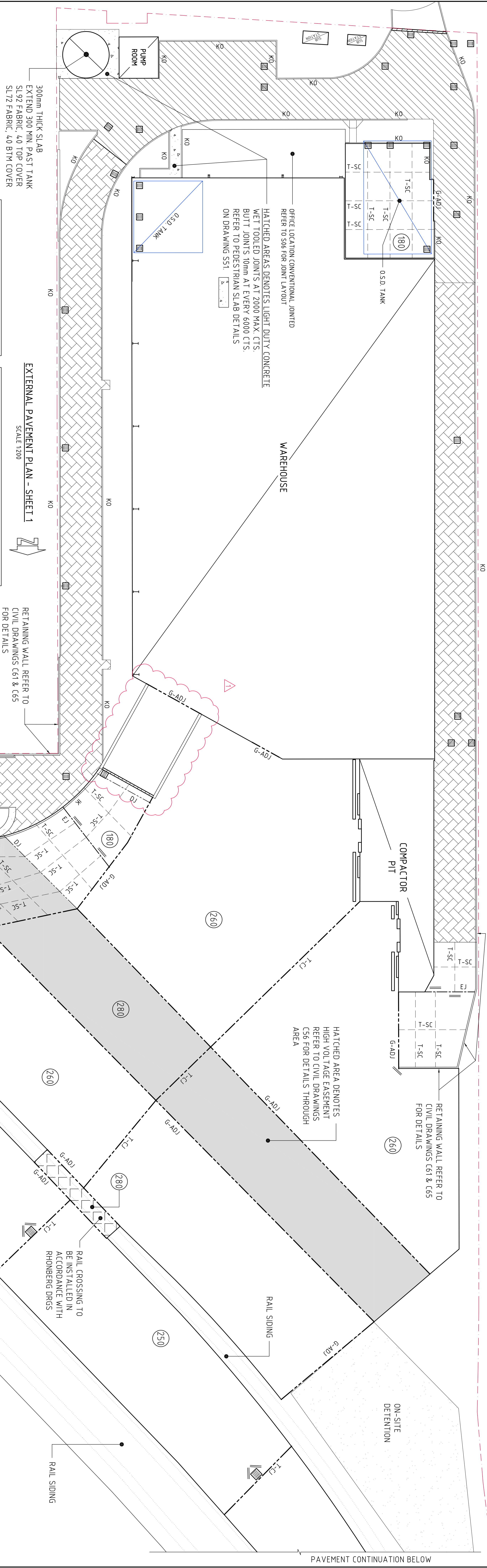
CLIENT
LIPMAN PTY LTD

PROJECT
BANKSMEDOW TERMINAL

DRAWING TITLE
LANDSCAPE PLAN - BUILDING SURROUNDS

SCALE 1:200 @ B1 : 1:500 @ A3
 DESIGNED/DRAWN PL/CW
 CHECKED PL
 DATE 15/05/2015
 JOB NUMBER 5114

DRAWING NUMBER	ISSUE/ISSUE
5114 - 02	E



LEGEND

G-ADJ	DENOTES GALV. ARMoured DOWELLED JOINT	DI	DOWEL JOINT	2x6	DENOTES THICKNESS OF SLAB
T-CI	TIED CONSTRUCTION JOINT	IK	INTERNAL KERB	(180)	2x16 TRIMMERS, 1500 MIN LONG TIED TO UNDERSIDE OF FABRIC
T-SC	TIED SOFT SAW CUT	KO	KERB ONLY	50mm	EXTENT OF ASPHALT PAVEMENT
SC-CJ	DOWELLED SAW CUT				
EL	EXPANSION JOINT				

EXTERNAL SLAB NOTES

ISOLATE ALL COLUMNS, WALLS & PITS USING 10mm ABELFLEX OR EQUIVALENT.
 RECESSES, LEVELS & FALLS IN SLAB TO CIVIL ENGINEERS, ARCHITECT'S & HYDRAULIC ENGINEERS' DETAILS.
 BAR CHAIRS AT 600 CTS, EACH WAY.
 SLAB CURING METHOD TO BE COMPATIBLE WITH ARCHITECTURAL FINISHES & CURRENT AUSTRALIAN STANDARDS.
 TEXTURED STEEL THROWEL FINISH UNO. ON PLAN.

CONCRETE QUALITY

ELEMENT	SLAB/PAVEMENT TYPE	SLAB/PAVEMENT THICKNESS	CONCRETE CLASS	FINISH
PAVEMENT SLABS	80	20	NIL	4.0 FLEX, 32 MPa

MAXIMUM 56 DAY SHRINKAGE 650 MICROSTRAIN

EXT. SLAB NOTES OVER HV EASEMENT - 280 THICK:

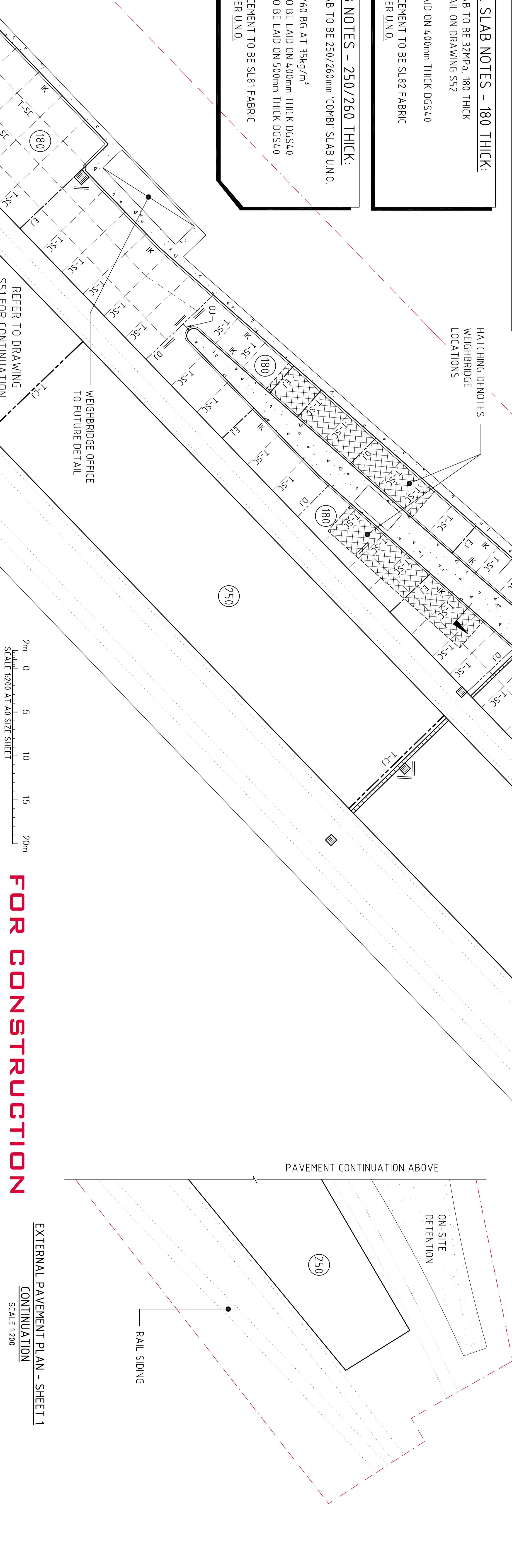
EXTERNAL SLAB TO BE 280mm 'COMBI' SLAB UNO.
 f'c - 32MPa
 DRAMIX 4D 65/60 BG AT 35kg/m³
 SLAB TO BE LAID ON 500mm THICK TR0.7 MATERIAL
 REFER TO CIVIL ENGINEERING DRAWING C56 FOR DETAILS
 SLAB REINFORCEMENT TO BE SL81F FABRIC
 40mm TOP COVER UNO.

EXTERNAL SLAB NOTES - 180 THICK:

EXTERNAL SLAB TO BE 32MPa, 180 THICK
 REFER TO DETAIL ON DRAWING S52
 SLAB TO BE LAID ON 400mm THICK DGS40
 SLAB REINFORCEMENT TO BE SL82 FABRIC
 40mm TOP COVER UNO.

EXT. SLAB NOTES - 250/260 THICK:

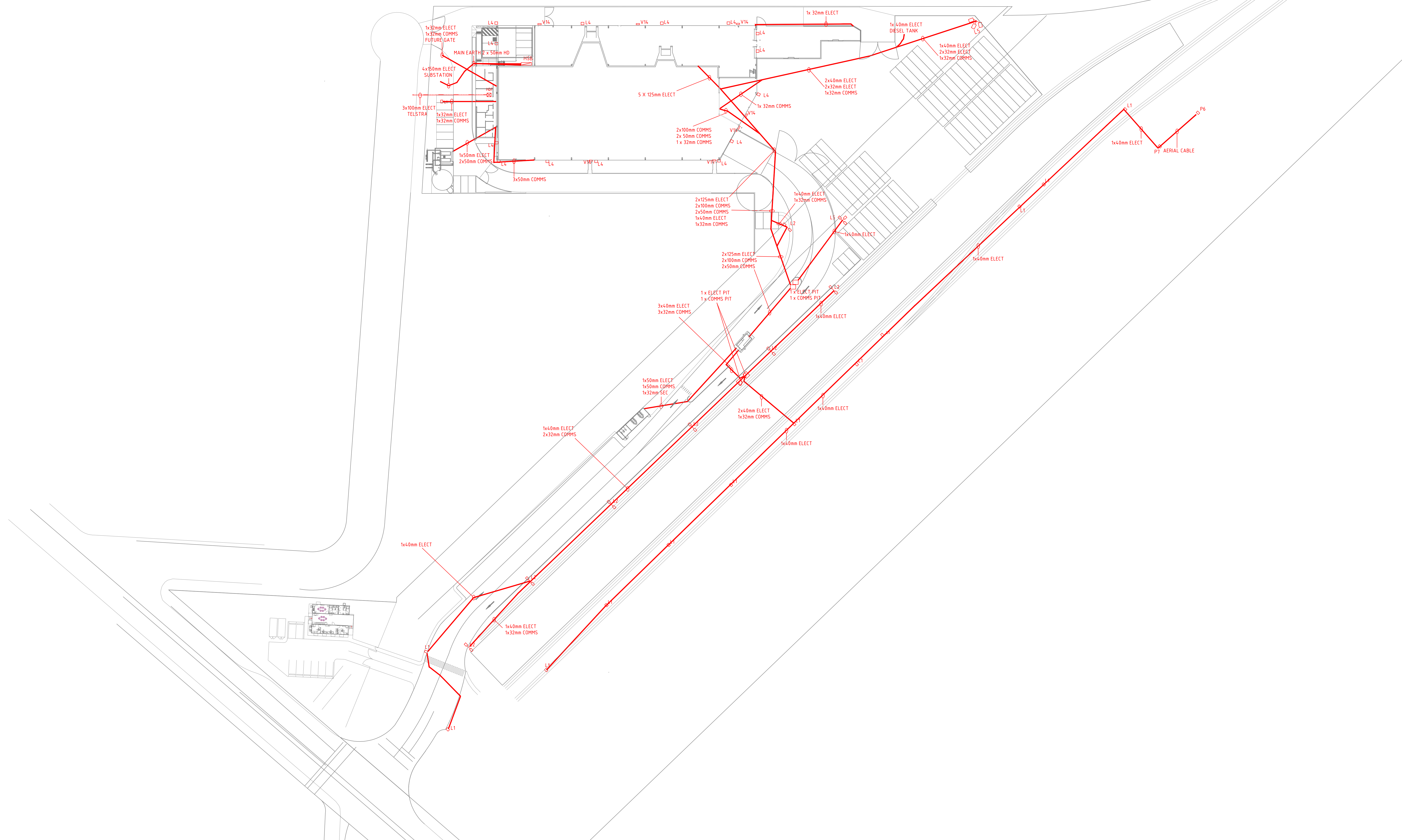
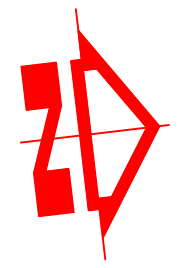
EXTERNAL SLAB TO BE 250/260mm 'COMBI' SLAB UNO.
 f'c - 32MPa
 DRAMIX 4D 65/60 BG AT 35kg/m³
 250mm SLAB TO BE LAID ON 400mm THICK DGS40
 260mm SLAB TO BE LAID ON 500mm THICK DGS40
 SLAB REINFORCEMENT TO BE SL81F FABRIC
 40mm TOP COVER UNO.



FOR CONSTRUCTION

<p>ACCESS RAMP JOINTS REMOVED - 1-COURED</p> <p>ASBESTOS SURVEY - NOT APPLICABLE</p> <p>ASBESTOS SURVEY - NOT APPLICABLE</p> <p>RE-INSURED FOR CONSTRUCTION CERTIFICATE</p> <p>RE-INSURED FOR CONSTRUCTION CERTIFICATE</p> <p>ISSUED FOR CONSTRUCTION CERTIFICATE</p> <p>DATE: 24.07.15</p> <p>SCALE: A</p>	<p>24.07.15</p> <p>22.12.15</p> <p>23.09.15</p> <p>28.08.15</p> <p>28.07.15</p>	<p>1</p> <p>0</p> <p>C</p> <p>B</p> <p>A</p>	<p>ARCHITECT</p> <p>SHARON WOODWARD ARCHITECTS</p> <p>1001 WILSON ROAD</p> <p>WILSON ROAD</p> <p>WILSON ROAD</p>	<p>CAD</p> <p>LIPMAN</p> <p>VEOLIA</p>	<p>PROJECT</p> <p>BANKSMEADOW TERMINAL</p> <p>200 WILSON ROAD</p> <p>WILSON ROAD</p> <p>WILSON ROAD</p>	<p>CONSULTING ENGINEERS</p> <p>Costin Roe Consulting Pty Ltd</p> <p>Level 1, 2 Windmill Street</p> <p>Macleay Park, Sydney NSW 2207</p> <p>Phone: 02 9399 3333</p> <p>email: info@costinroe.com.au</p>	<p>Volume in Engineering and Management</p> <p>Costin Roe Consulting</p> <p>COMBING TITLE</p> <p>EXTERNAL PAVEMENT - SHEET 1</p> <p>Drawing No: C075289.00 - S50</p>
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FIGURE 5 – SERVICES PLAN



SITE SERVICES LAYOUT

REV	DETAILS	DATE	BY
A	WORKSHOP ISSUE	3/7/15	BW
B	ISSUED FOR CC	9/7/15	BW
C	Poles P6 & P7 added, Cable tray added	21/8/15	RR
D	LIGHTING CHANGES	26/8/15	RR
E	ISSUED FOR CONSTRUCTION	5/12/15	RR
AB	AS-BUILT	23/6/16	BC

DESIGN & CONSTRUCT
ELECTRICAL PTY LTD

Unit 7/10-12 Montrose Rd, Minto 2566
PO Box 821 Nanellan, NSW 2567
Phone: (02) 9820 4225
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VEOLIA
ENVIRONMENTAL SERVICES

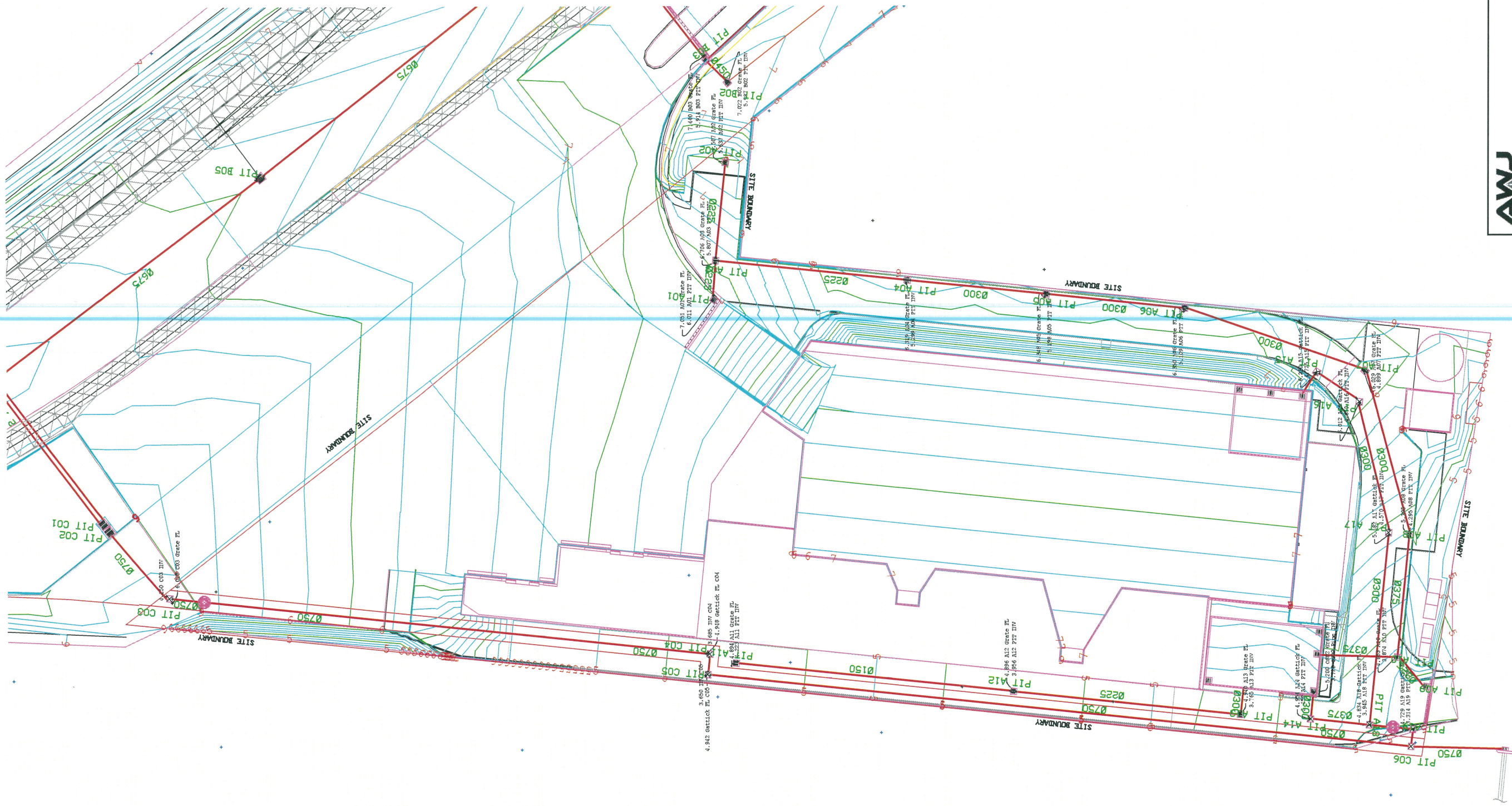
PROJECT: **BANKSMEADOW TERMINAL**
CLIENT: **LIPMAN PTY LTD**

PROJECT NUMBER: **LV**
DRAWING NAME: **SITE SERVICES LAYOUT**

DRAWING NUMBER: **E-001**
REVISION: **AB**

DRAWING STATUS: **CONSTRUCTION**
SCALE: **1:500@B1**
DATE: **23/06/16**
DRAWN: **BC**

ALL WORKS TO FOLLOW WRITTEN DIMENSIONS. DO NOT SCALE DIMENSIONS



PROJECT: VEOLIA BANKSMEADOW
 ADDRESS: 34-36 McPHERSON ST
 BANKSMEADOW
 CLIENT: LIPMAN CONSTRUCTIONS
 DRAWING: STORMWATER SURVEY

FIGURE 6 – LANDSCAPING AREAS

APPENDIX A – VEOLIA ACKNOWLEDGEMENT LETTER



12 July 2016

To whom it may concern,

**Re: 34-36 McPherson St, Banksmeadow
Site Audit Report**

I refer to the email dated 7 July 2016 from Graeme Nyland to John Browne regarding the Site Audit Report for 34-36 McPherson St, Banksmeadow ("Land") In particular, I refer to points 20 (a), (g), 21 and 22 of this email.

Please be advised that the Long Term Environmental Management Plan prepared by DLA for the Land has been appended to the Soil, Water and Leachate Management Plan, which forms part of the Banksmeadow Transfer Terminal Operational Environmental Management Plan (OEMP). The OEMP was approved by the Secretary of the Department of Planning and Environment on 28 June 2016 and will form the basis for environmental controls to be implemented on site during operations.

Further to this commitment by Veolia, please be advised that the integrity of the cap on the Land will be inspected as part of the Weekly Site Inspection Checklist to ensure that the surface of the Land has not been disturbed or compromised.

Also, please be advised that if required, drawings showing services below the ground on the Land, which have been included in the Validation Report prepared by DLA will be registered with Dial Before You Dig.

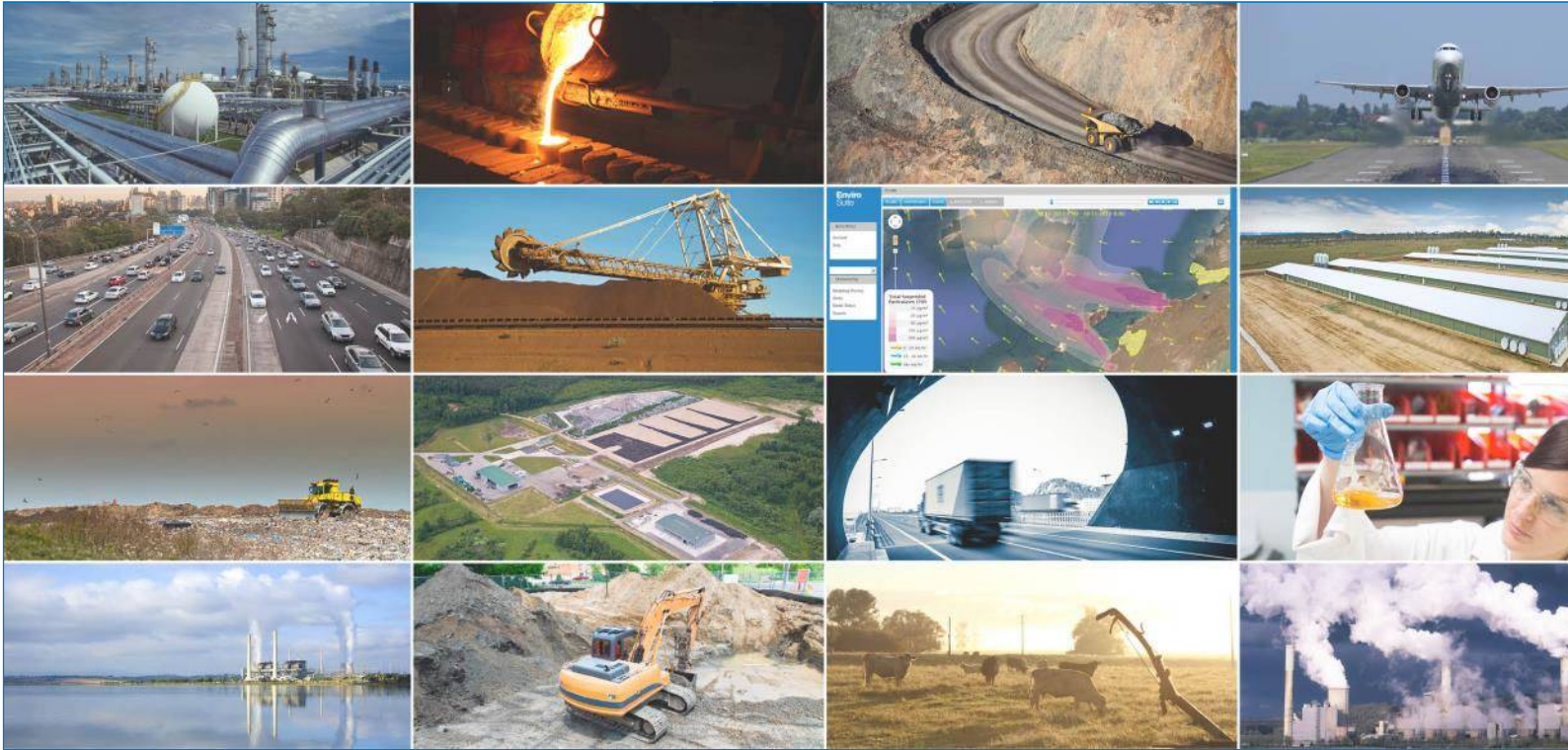
I trust that this information provides sufficient confirmation that Veolia is committed to implementing measures to ensure that the integrity of the cap is maintained on the Land.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Christine Hodgkiss", written over a white background.

Christine Hodgkiss
General Manager – Strategic Planning, Development and Projects NSW
Veolia Australia and New Zealand

APPENDIX B – UNEXPECTED FINDS PROTOCOL



Unexpected Finds Protocol

34-36 McPherson Street
Banksmeadow
NSW 2019

Lipman Pty Ltd

July 2016

PROJECT NAME	Veolia Waste Transfer Facility - 34-36 McPherson Street, Banksmeadow, NSW.
PROJECT ID	DL3541
DOCUMENT CONTROL NUMBER	
PREPARED FOR	Lipman Pty Ltd
APPROVED FOR RELEASE BY	David Lane
DISCLAIMER AND COPYRIGHT	This report is subject to the copyright statement located at www.pacific-environment.com © Pacific Environment Operations Pty Ltd ABN 86 127 101 642

DOCUMENT CONTROL

VERSION	DATE	COMMENT	PREPARED BY	REVIEWED BY
Version 1.0	13.07.16		John Browne	Anthony Richard

DLA Environmental Services Pty Ltd: ABN 80 601 661 634

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1.0 INTRODUCTION

DLA Environmental Services (DLA) was commissioned by Lipman Pty Ltd to prepare an Unexpected Finds Protocol (UFP) for the property identified as:

34-36 McPherson Street, Banksmeadow NSW 2019 (the Site).

This UFP has been developed as part of the Long-term Environmental Management Plan for the Site. From the results of previous assessments, it was apparent that friable asbestos appeared to be present in the absence of significant bonded asbestos and was relatively widespread or randomly distributed in heterogeneous fill across the Site at low concentrations. DLA considered that asbestos at the Site will not pose a risk to human health as long as it remains undisturbed beneath the proposed development. The asbestos contaminated fill was management through capping and containing the Site with the new development.

If future works are to be undertaken on the Site which involve disturbance of the containment system and/or excavation of soil. It is thought prudent to implement a UFP to cover all possible potential contamination scenarios. Potential contamination on the Site which may exist outside the scope of the past environmental investigations will be managed through the following UFP.

2.0 TYPICAL FEATURES OF 'UNEXPECTED FINDS'

The main features to look for are:

- Material containing anthropogenic artefacts such as rubble, plastics, metal etc.;
- Material with an obvious unnatural odour, i.e. fuel, solvent, burnt odour;
- Material that is noticeably stained in colour;
- Asbestos or suspected asbestos containing material;
- Material with fibres visible; and,
- Any material that has evidently been dumped at the Site.

3.0 IMPLEMENTATION OF THE PROTOCOL

3.1 General

Prior to the commencement of any excavation or construction works onsite, an occupational health and safety induction should be attended by all Site staff. The aim and importance of the UFP and how it is to be implemented should be discussed at this time. Responsibility for its implementation will be assigned to the Principal Contractor.

Monitoring of environmental issues will be undertaken on a daily basis. If an unexpected find is revealed during Site works, the following protocol is to be followed.

3.2 Implementation Process

1. Cease disturbance of the affected portion of the site and evacuate the immediate area.
2. Contact the Principal Contractor and the Contractors Environmental Representative (CER).
3. Principal Contractor and CER to conduct an assessment of the location and extent of the unexpected find.
4. High risk areas should be isolated and secured against unintended access.
5. Temporary encapsulation (sealing) of the high risk area to ensure no airborne spread of contamination occurs may be appropriate. This may involve clean soil, plastic sheeting, etc.
6. Dust should be prevented by wetting the soil and drainage controls should be arranged where there is a potential for runoff to occur (runoff should be minimised).
7. Warning signs should be placed in the vicinity.
8. If the Principal Contractor and CER considers that the material warrants further investigation, the area is to be barricaded to provide an exclusion zone.
9. If necessary, environmental controls should be established to minimise the potential for migration of contaminants from the impacted area.

10. Principal Contractor to complete UFP form (refer to **Section 4.0**) and issue to all relevant stakeholders.
11. Further visual assessment and sample collection and analysis undertaken by a qualified environmental consultant. If necessary, samples will be sent to a NATA registered laboratory.
12. Evaluation of analytical data with respect to specific health screening levels to be undertaken. Contaminated soil incident report amended with final classification of soils, including whether the soils are suitable for the proposed land use, need to be remediated or disposed of offsite to a suitably licensed facility. If soils are suitable to remain on-site and/or the area is found to be clean, a work instruction will be provided by the CER to this effect. A waste classification letter must be provided prior to any offsite disposal.
13. If the material is subsequently found to contain asbestos, an appropriately licensed contractor will be employed to remove it.
14. Affected areas will be reopened for earthworks following a clearance of the location and issuance of a report by CER.

3.3 Notes

1. Any suspected asbestos containing should be left in place and not disturbed. The CER will organise appropriate environmental professionals for further investigation purposes.
2. It is essential that material of differing compositions not be mixed.
3. All sampling for validation, waste classification or characterisation purposes will be carried out in accordance with the following documents:
 - *Contaminated Sites: Sampling Design Guidelines* (NSW EPA, 1995);
 - *National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1)* (NEPC, 2013);
 - *Contaminated Sites: Guidelines for Assessing Service Station Sites* (NSW EPA, 1994);
 - *Waste Classification Guidelines* (NSW EPA, 2014).

4. Any unexpected finds encountered should be listed on a UFP register, which should include the action taken and the status of the unexpected find. A suitable register is included in **Section 5.0**.
5. Once an unexpected find has been identified and a UFP form filled in the Principal Contractor and CER should liaise with the client as to the appropriate means of managing the situation. This should include discussions around the handling, treatment and disposal of material, OH&S considerations and how the affected area will be validated and reopened for works.
6. Prior to closing out an unexpected find it will be important to ensure the appropriate documentation is obtained, such as: photographs, the UFP form, waste classification letter(s) and a validation report or letter.
7. A UFP form should be completed on each day of the remedial works as part of the daily site records. This will ensure that the process is being undertaken even if no unexpected finds are encountered. The form should include the name, company and the position of the person undertaking the field observations.

4.0 UNEXPECTED FINDS PROTOCOL FORM

To be completed by the Site Controller/Environmental Representative

SITE: _____

PERSONNEL ON-SITE: _____

DATE: _____

DAILY SUMMARY:

1. Suspect material encountered during daily activities: YES NO
(if YES, complete 2 to 5)
2. CER contacted: YES NO
3. UFP Reference Number _____
(label occurrences sequentially 1, 2, 3, etc.).

DESCRIPTION OF MATERIAL ENCOUNTERED:

4. Asbestos or suspected ACM present: YES NO
5. Brief written description of material:

6. Material isolated: YES NO
7. Location of contaminated material (incl. field sketch/map if required):
8. Photographs taken: YES NO

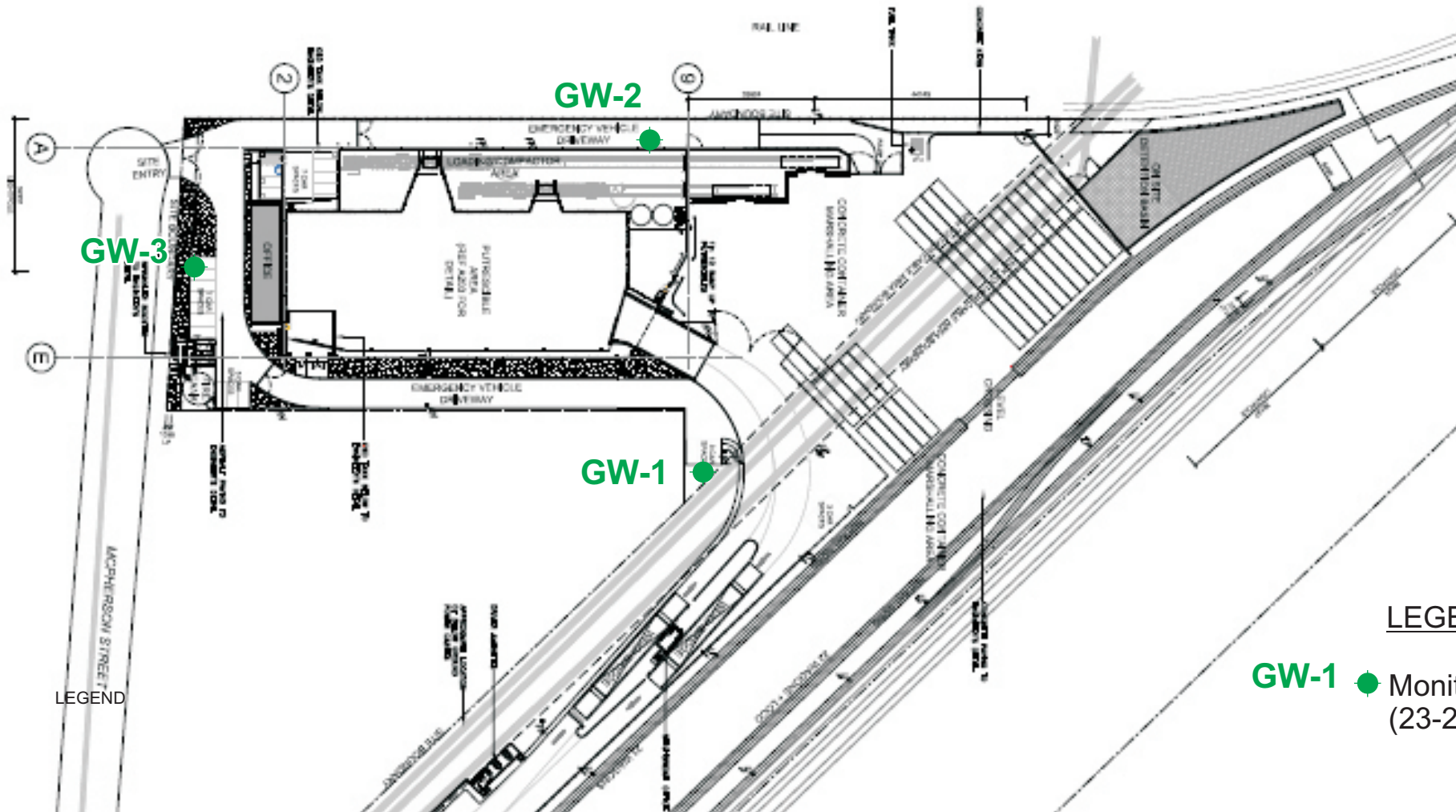
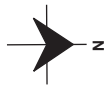
NAME: _____

SIGNATURE: _____

5.0 UNEXPECTED FINDS REGISTER

UNEXPECTED FINDS REGISTER						
UFP No.	Date Found	Suspect Material	Description	Recorded on UFP Form	Action Taken	Status
				YES <input type="checkbox"/> NO <input type="checkbox"/>		
				YES <input type="checkbox"/> NO <input type="checkbox"/>		
				YES <input type="checkbox"/> NO <input type="checkbox"/>		
				YES <input type="checkbox"/> NO <input type="checkbox"/>		
				YES <input type="checkbox"/> NO <input type="checkbox"/>		
				YES <input type="checkbox"/> NO <input type="checkbox"/>		

Appendix F Groundwater wells locations



LEGEND

GW-1 ● Monitoring well
 (23-2-2017)

Site Layout & Well Network (Feb 2017)