

Lennox Village

Stormwater Management Report

Prepared for: Challenger Investment Partners

Date: 26th June 2020

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Ref: 46949

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Revision

Site Address: 1 Pyramid Street Emu Plains NSW 2750

Proposed Development: Expansion of the ALDI store

Client: Challenger Investment Partners
Local Authority Penrith Council
Authority Reference #: N/A
Wood & Grieve Reference: 46949



Ian Harris

For and on behalf of

Stantec

Revision	Date	Comment	Prepared By	Approved By
001	08.05.20	Draft Issue	GYD	IAH
002	29.05.20	Draft Issue	GYD	IAH
003	12.06.20	Issued for Approval	GYD	IAH
004	26.06.20	Issued for Approval	GYD	IAH

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1. Introduction

Stantec have been commissioned by Challenger Investment Partners to prepare this Stormwater Management Plan (SMP) in support of the Development Application for the proposed development at 1 Pyramid Street Emu Plains NSW 2750.

This SMP outlines the conceptual stormwater management design for the proposed redevelopment of the site including expansion of the ALDI store and upgrade of the associated carpark.

The purpose of this SMP is to evaluate the stormwater management methodology associated with the proposed development plan so as to demonstrate that the appropriate strategies have been adopted.

The SMP specifically addresses the following items for both the construction and operational phases of the development:

- Flood Impacts
- Stormwater runoff volumes and detention (Stormwater Quantity)
- Stormwater quality treatment measures (Stormwater Quality)
- Erosion and Sedimentation Control



2. Relevant Policies, Standards and Guidelines

The following listed policies, standards and guidelines were referred to in the preparation of this report:

- Penrith Council DCP 2014
- Penrith City Council WSUD technical Guidelines 2015
- Australian Rainfall & Runoff 2016;
- AS3500 parts 0-5: 2018 Plumbing and Drainage
- AS2890 parts 1-6: 2009 Parking Facilities
- AS1428 parts 1-5: 2010 Design for Access and Mobility
- Landcom Managing Urban Stormwater: Soils and Construction Volume 1 2004
- NSW Floodplain Development Manual 2005



3. Existing Site Characteristics

3.1 Property Detail

Addresses: **1 Pyramid Street Emu Plains, NSW 2750**

Total Site Area: 0.179Ha

The proposed development can be seen on the concept design drawings in Appendix A of this report.

The proposed development will consist of the partial demolition of the existing ALDI store prior to the extension of the building as well as the demolition of 18 parking bays and construction of 30 new parking bays including 2 loading bays.

As can be seen in the site location aerial photo below (Figure 1), the proposed site is located on the corner of Pyramid Street and Water Street.



Figure 1 - Site Location Plan



3.2 Stormwater Catchments

The surrounding area has been investigated to determine the likely impact of existing external stormwater catchments on the proposed site. It has been determined that there are no external catchments impacting the site.

3.3 Existing Drainage Line

Through desktop analysis it has been determined that there is existing pit and pipe stormwater drainage present in the vicinity of the site. It can be seen that there are pit and pipe systems in both Pyramid Street and Water street.

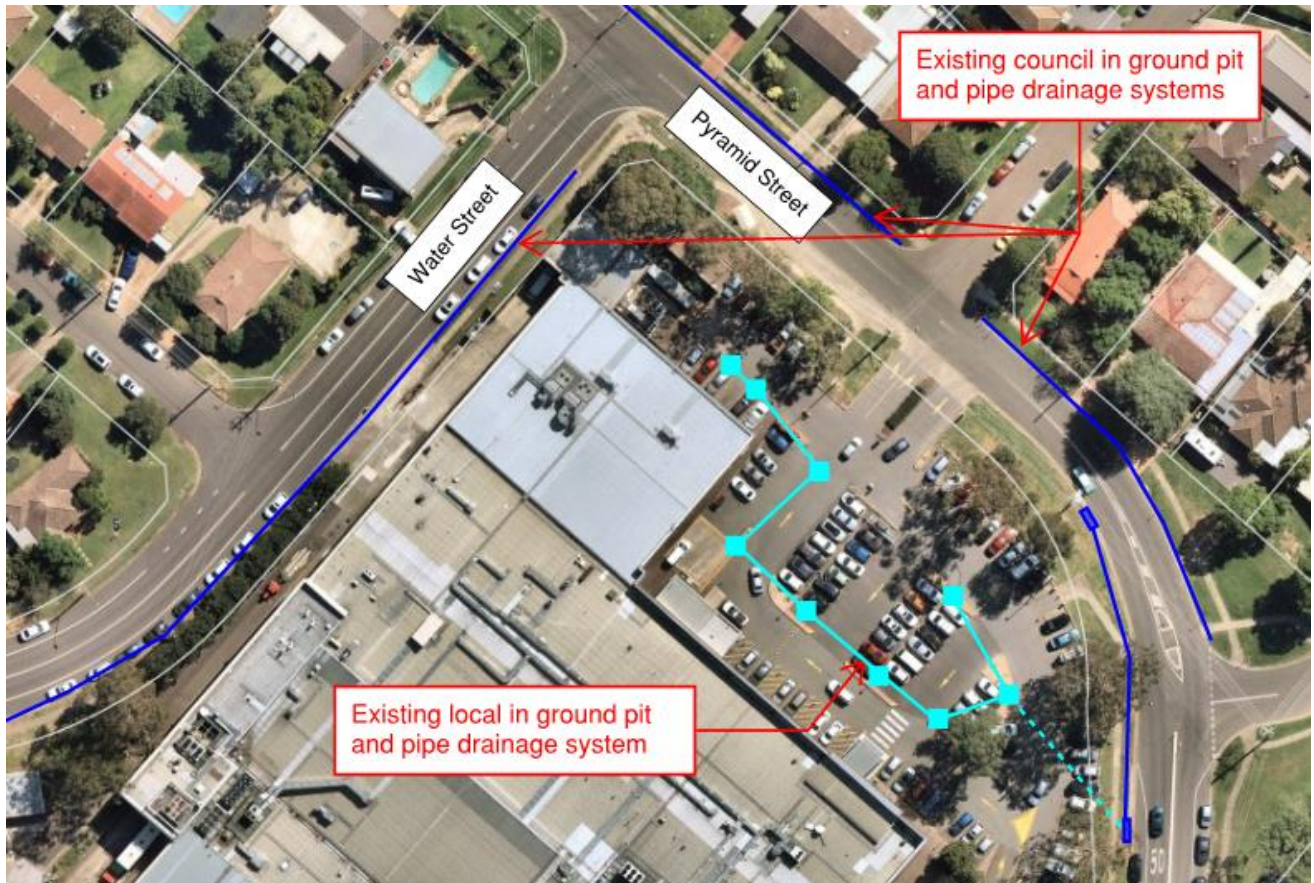


Figure 2 - Existing site stormwater drainage system

3.4 Existing Stormwater Discharge

Through desktop analysis it is assumed that the site discharges stormwater to a council kerb inlet pit on Pyramid Street as indicated in Figure 2 above.



4. Local Authority Requirements

4.1 Local Council

Design requirements for water management on the site has been set in the Penrith City Council Development Control Plan. These requirements are summarised in the sections below.

4.1.1 Stormwater Conveyance Requirements

Penrith City Council Development Control Plan requires that new on-site pit and pipe systems are designed to convey 5-year ARI storms under normal operating conditions. Overland flow paths must be designed for 100-year ARI storms in all areas.

4.1.2 On Site Detention Requirements

Penrith City Council Development Control Plan states the minimum requirements for the design of stormwater detention infrastructure. The DCP states that for all rainfall events up to and including the 100-year ARI event new developments and redevelopments must not increase stormwater peak flows.

4.1.3 WSUD Development Controls

The Penrith City Council Development Control Plan states that developments greater than 250m² must comply with the Stormwater Quality (DCP 5.b) and Stormwater Quantity – Stream Forming Flow (DCP 5.c) requirements set out below:

Stormwater Quality Reduction Targets:

The Penrith City Council Development Control Plan outlines the following pollution reduction targets:

90% reduction in the post development mean annual load total gross pollutant (greater than 5mm);
85% reduction in the post development mean annual load of Total Suspended Solids (TSS);
60% reduction in the post development mean annual load of Total Phosphorus (TP);
45% reduction in the post development mean annual load of Total Nitrogen (TN);
90% Free Oils and Grease with no visible discharge.

Stormwater Quantity – Stream Forming Flows:

The Penrith City Council Development Control Plan states that the post development duration of stream forming flows must not exceed 3.5 times the pre-development duration.



5. Flood Impact Assessment

When considering a new development, it is important to assess the impact of existing flooding on the proposed development as well as the impact of the proposed development on existing or potential flooding both upstream and downstream of the development.

5.1 Impacts of Existing Flooding on the Development

The Penrith Council DCP outlines the 1% AEP flood event as the critical flood. Flood mapping obtained from the SES website indicate that the site is not affected by flooding in the 1% AEP flood event.



Figure 3 – 100-year flood extent (SES Flood Mapping)

5.2 Impacts of the Development on Flooding

Increases in impervious area arising from development can result in increased stormwater discharge from the site which can increase the risk of flooding on surrounding properties. The proposed development does not increase the impervious area, nor does it increase discharge (in all rainfall events up to and including the 1% AEP storm) and therefore it can be concluded that the development will not have adverse impacts on flooding.



6. Stormwater Conveyance

This section of the report discusses the systems proposed to allow for stormwater to be conveyed across the site to the legal point of discharge.

As discussed in section 4.1.1 of this report The Penrith Council DCP sets the minimum design parameters for the design of stormwater conveyance infrastructure through the site.

6.1 Surface Drainage

The surface areas will be drained through a variety of methods, discussed below, in accordance with AS3500.3:2018 and Council's stormwater drainage guidelines.

6.1.1 In-Ground Drainage

The in-ground drainage has been designed to meet the following criteria:

- In the minor design storm event (5-year ARI storm) there will be no surcharging of the in-ground drainage system and;
- In the major design storm event (100 year) there will be no uncontrolled discharge from the site.

Surface runoff from the development site will be directed to stormwater inlet structures using the design topography of these elements. The inlet structures have been designed to adequately convey the surface runoff into the in-ground drainage network. The runoff will then be conveyed through a pit and pipe system to the legal point of discharge using gravity and the geometric falls of the pipe system.

6.2 Legal Point of Discharge

There will be one legal point of discharge for the development as shown on the Civil Drawings provided in Appendix A. The site will maintain the current discharge point into Pyramid Street.

7. Stormwater Attenuation

Penrith City Council's DCP states that on-site detention shall be designed to ensure that discharge from the site is not increased in any rainfall event up to and including the 1% AEP rainfall event.

As the site does not include any increase in impervious areas unattenuated discharge from the site post development is equal to pre-development discharge and on-site detention is not required.



8. Stormwater Quality Treatment

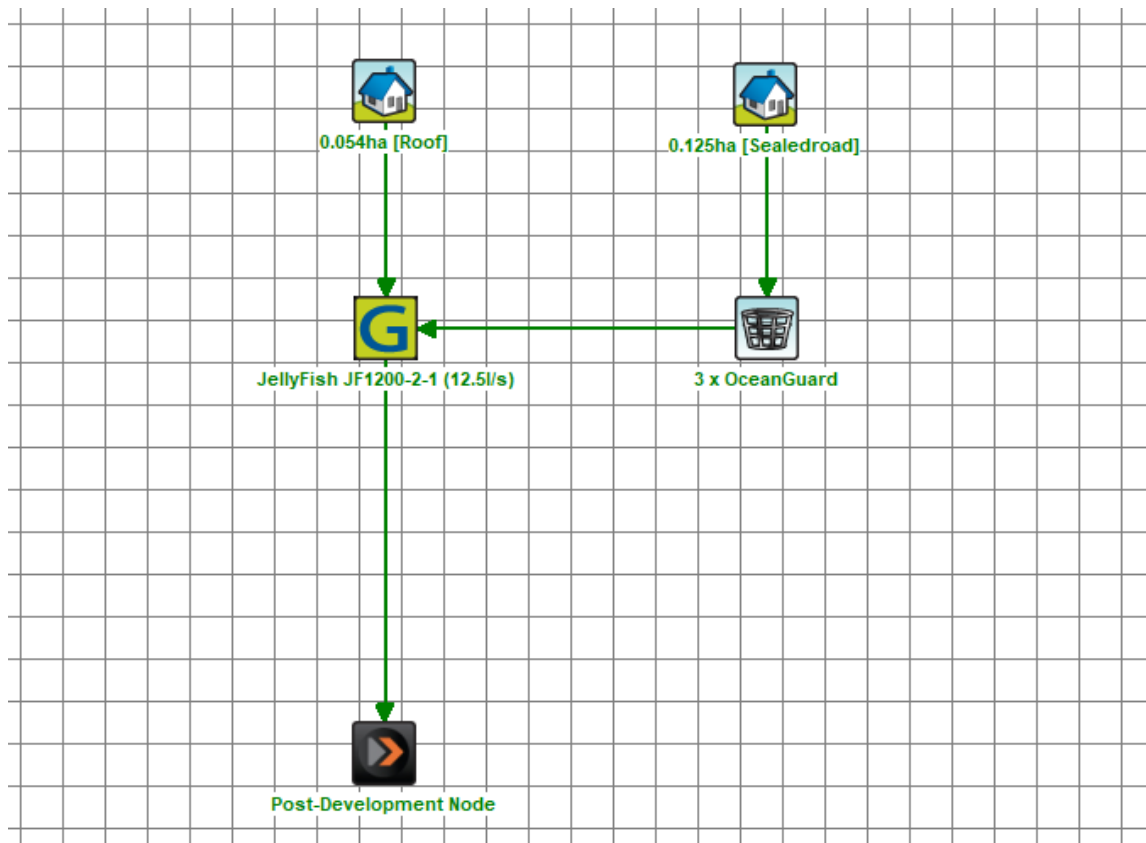
As discussed in section 4.1.3 The Penrith City Council sets targets for the reduction of water borne pollution being conveyed from the site through the stormwater drainage system.

This section of the report demonstrates the Stormwater Quality Improvement Devices (SQID's) to be implemented and the Pollutant Export Modelling undertaken to demonstrate the effectiveness of the treatment system in achieving the reduction targets set by council.

8.1 Pollutant Reduction System

In order to achieve the pollutant reduction targets specified in section 4.1.3 of this report a series of treatment devices are proposed which together form a treatment train. The proposed treatment train includes the following:

- 3 x Ocean Protect OceanGuard Filters
- JF1200-2-1 Jellyfish Unit



The following are the treatment reductions as determined by the MUSIC model.

Treatment Train Effectiveness - Post-Development Node			
	Sources	Residual Load	% Reduction
Flow (ML/yr)	2.41	2.41	0
Total Suspended Solids (kg/yr)	626	20.9	96.7
Total Phosphorus (kg/yr)	1.13	0.398	64.7
Total Nitrogen (kg/yr)	5.59	2.58	53.8
Gross Pollutants (kg/yr)	58.4	0.615	98.9

Pollutant/Issue	Target	Reduction	Target Achieved
TSS	85%	96.7%	YES
Phosphorus	60%	64.7%	YES
Nitrogen	45%	53.8%	YES
Gross Pollutants	90%	98.9%	YES

As can be seen in the table above, the MUSIC model shows that the proposed design meets council's reduction targets.



9. Erosion & Sedimentation Control

Landcom have published a design guide entitled “Managing Urban Stormwater - Soils and Construction” which is regarded as the standard to which erosion and sedimentation control should be designed to within NSW. Penrith City Council specifies compliance with the Landcom design guide in their Stormwater and Floodplain Management Technical Manual.

The control of erosion and sedimentation describes the measures incorporated during and following construction of a new development to prevent the pollution and degradation of the downstream watercourse.

A Soil and Water Management Plan has prepared as part of the development application documentation and is included in Appendix A of this report.

Stormwater Drainage Infrastructure Inlets

Risk:

- Sediment from the construction site washing into the existing stormwater drainage inlet infrastructure.

Consequence:

- The sediment will then be conveyed into the downstream waterbody by stormwater runoff, contaminating the waterbody.
- The sediment will build up blocking the stormwater infrastructure and preventing stormwater conveyance to the downstream waterbody and impacting drainage upstream.

Mitigation:

- Sandbag protection will be installed surrounding all existing stormwater drainage infrastructure inlets to prevent sediment entering the system.

Maintenance:

- Frequent inspection of the sandbags to ensure they are arranged in a manner that prevents sediment from accessing the drainage system. If sediment is building up on the sandbags they should be cleared of sediment and re-established.

Construction Exit Protection

Risk:

- Spoil such as soil being conveyed from the site on the wheels of vehicles.

Consequence:

- Spoil being tracked onto the public road corridors where it is then washed into the existing stormwater drainage infrastructure and is then washed downstream polluting the downstream waterbody.
- Spoil being tracked onto the public road creating dangerous driving conditions for other road users.

Mitigation:

- A shaker grid and wash down facility will be installed at all exits from the construction site. All vehicles leaving the site will have their wheels washed down and pass over the shaker grid to remove any spoil collected on their wheels and retaining the spoil on site.

Maintenance:

- Frequent inspection of the shaker grid to ensure it is clean and still functioning.

Downstream Site Boundaries

Risk:



- Rainfall runoff falling on the site collecting sediment from the construction site and conveying it overland onto downstream properties and waterbodies.

Consequence:

- Sediment discharge polluting downstream properties and waterbodies.

Mitigation:

- Installation of sediment fences on all downstream boundaries of the site to collect sediment and prevent it discharging onto downstream properties or waterbodies.

Maintenance:

- Regular inspection of the sediment fences to ensure they are functioning correctly and are intact.
- If sediment build up is present it should be removed to ensure correct functionality of the fences.



Appendix A Civil Drawings



CIVIL ENGINEERING WORKS



Sheet List Table	
Sheet Number	Sheet Title
CI-000-01	COVER SHEET
CI-070-01	EROSION AND SEDIMENT CONTROL PLAN
CI-076-01	EROSION AND SEDIMENT CONTROL DETAILS
CI-520-01	STORMWATER MANAGEMENT PLAN
CI-526-01	STORMWATER DRAINAGE DETAILS

CHALLENGER INVESTMENTS PARTNERS

CLIENT

LENNOX VILLAGE - ALDI

PROJECT



46949

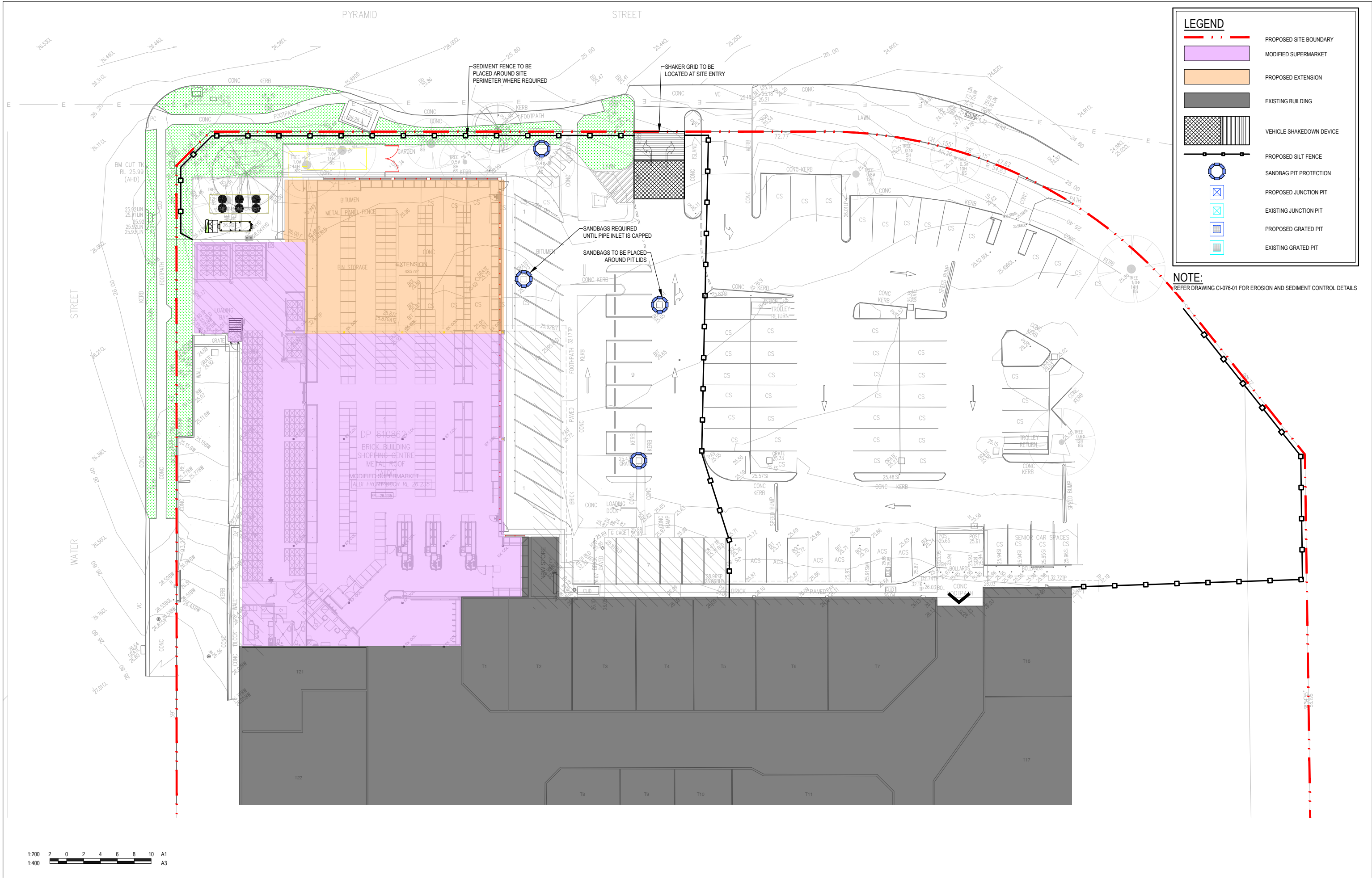
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CI-000-01

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A

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A	ISSUED FOR DA	CPO	IAH	29.05.20
Docu	Rev	SB	ID	92322
Description				
Drawn	App'd	Date		

Drawn:	CPO
Designed:	GYD
Verified:	IAH 29.05.20
Approved for Tender:	...
Approved for Construction:	...

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LENNOX VILLAGE - ALDI

EROSION AND SEDIMENT
CONTROL PLAN

PROJECT

TITLE

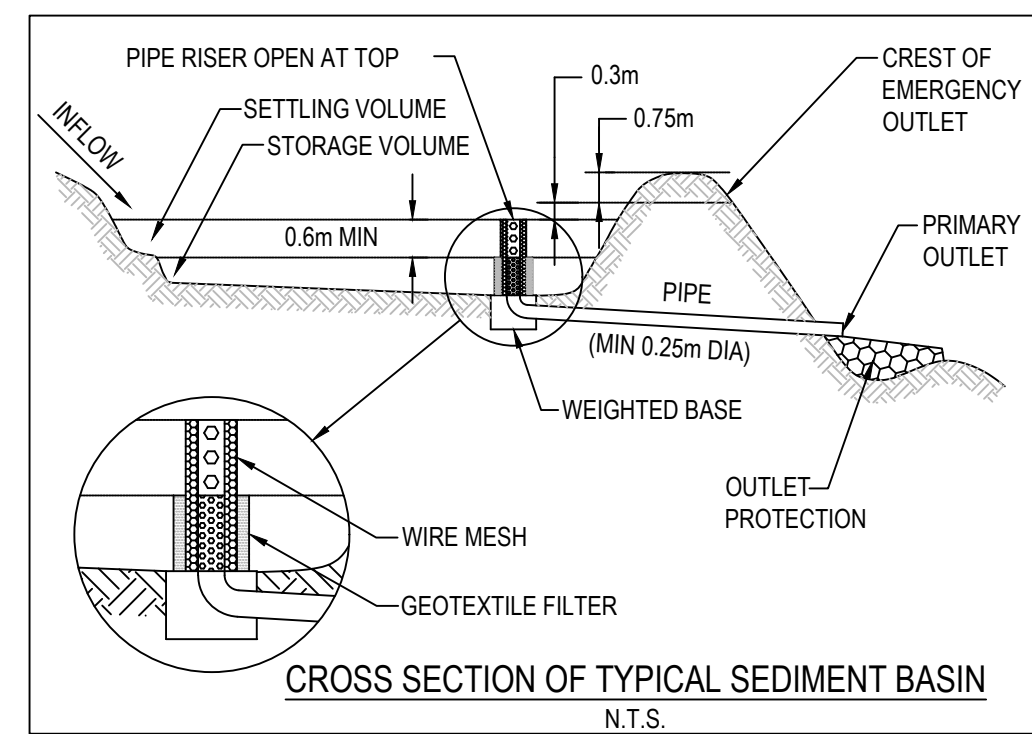
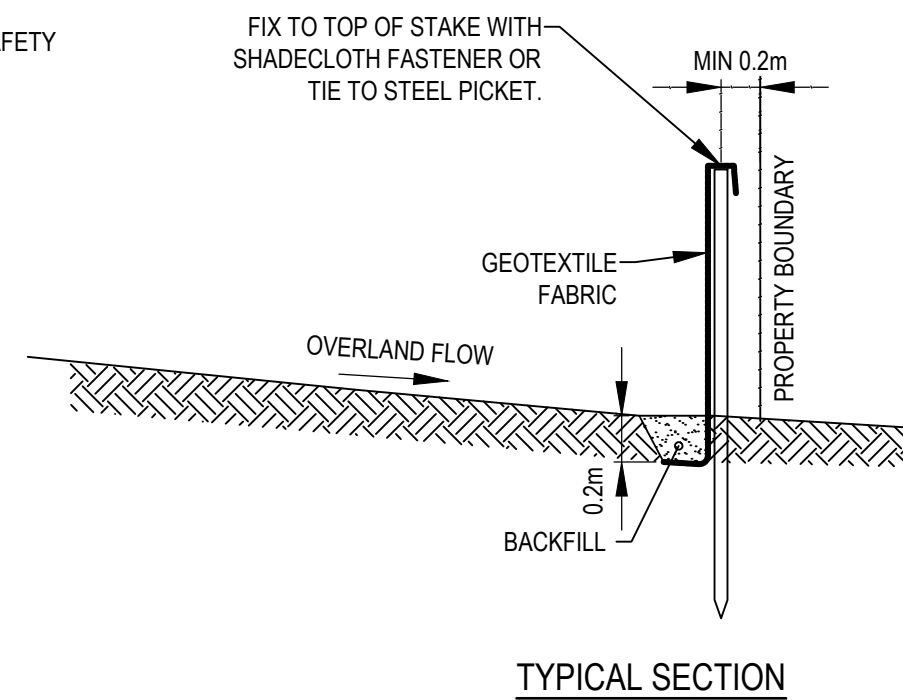
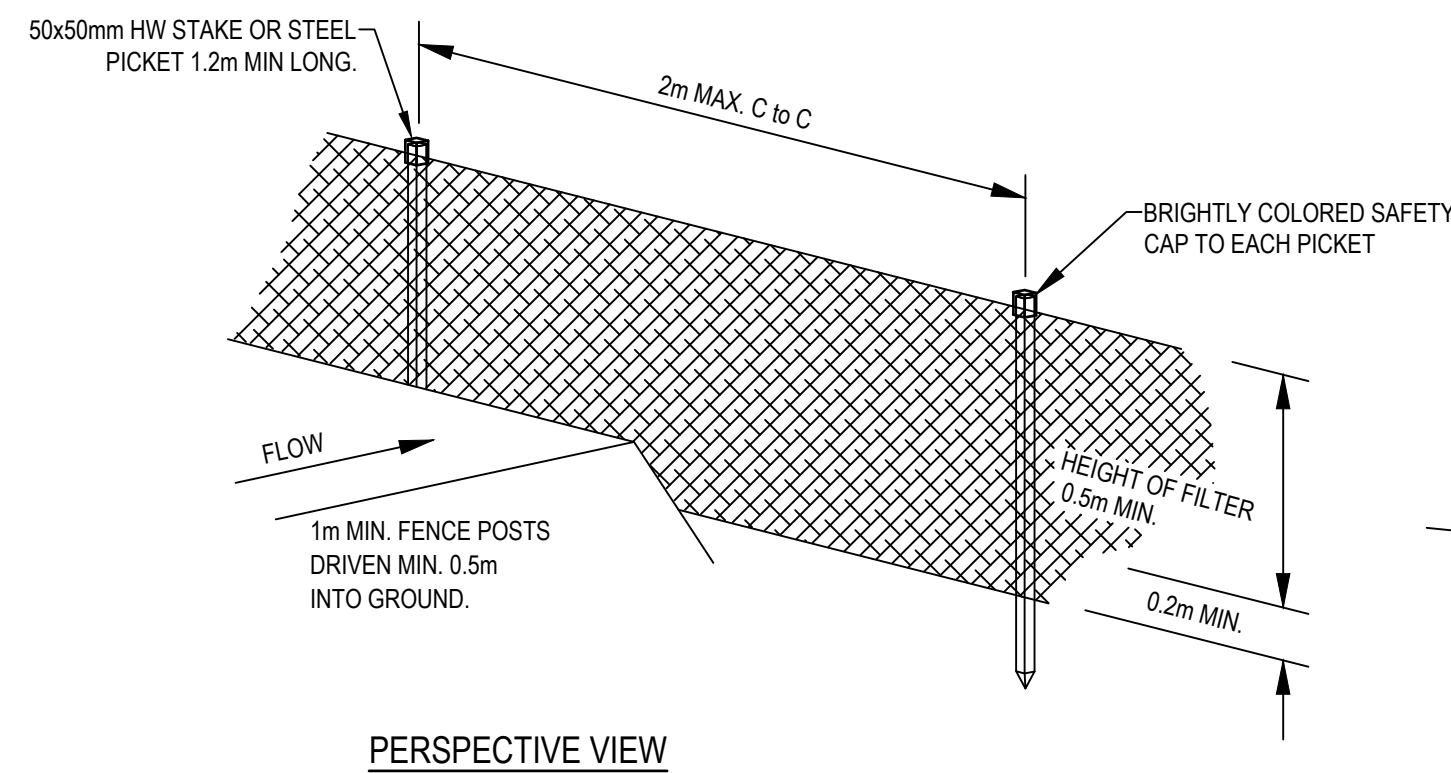
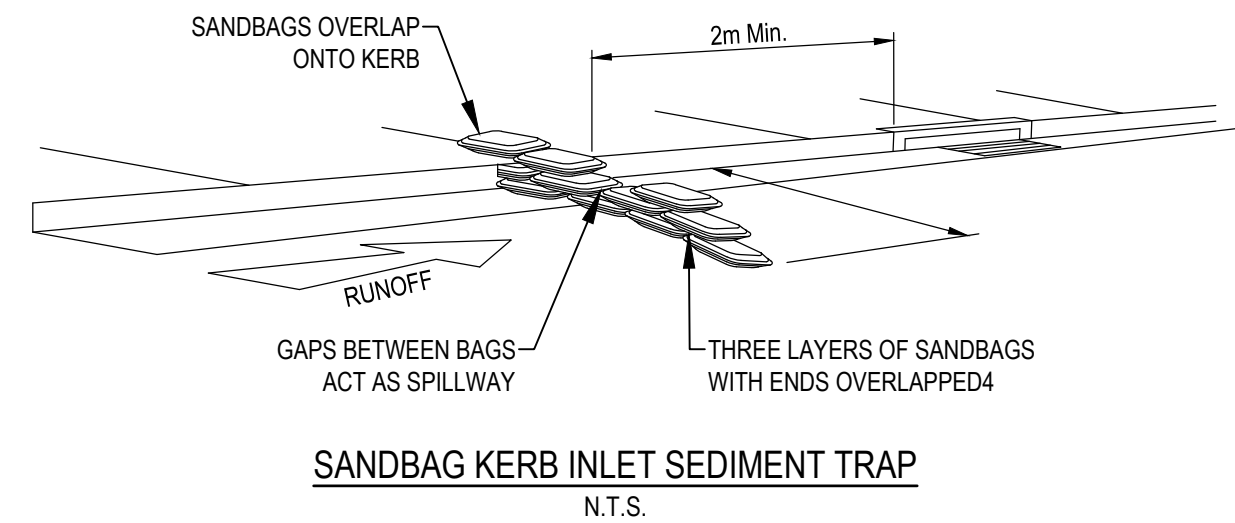
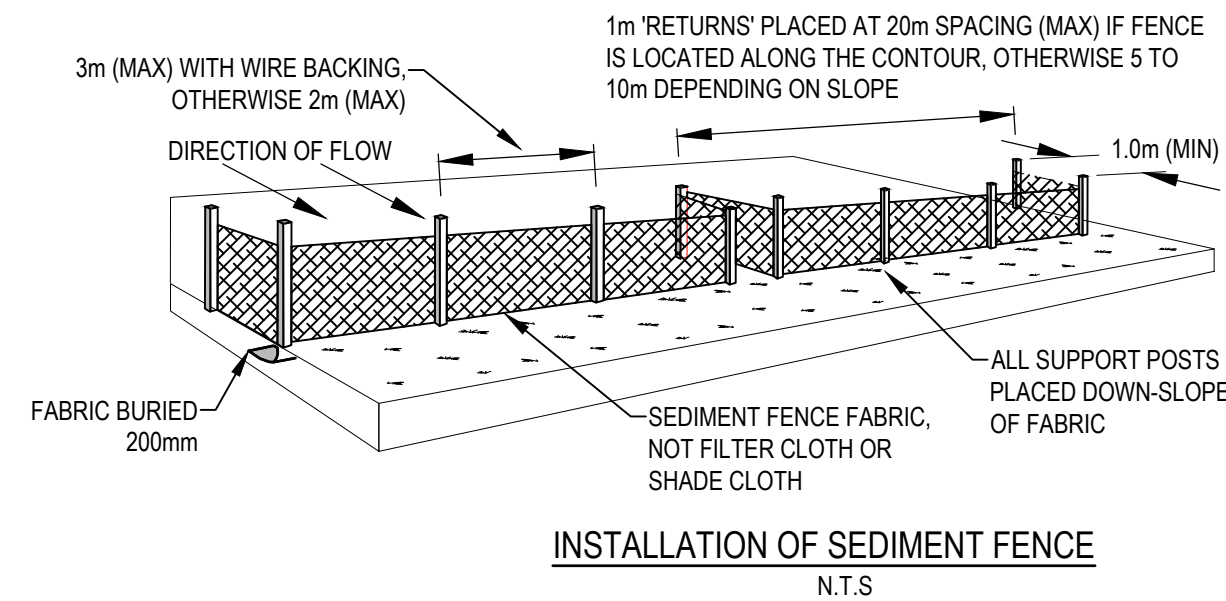
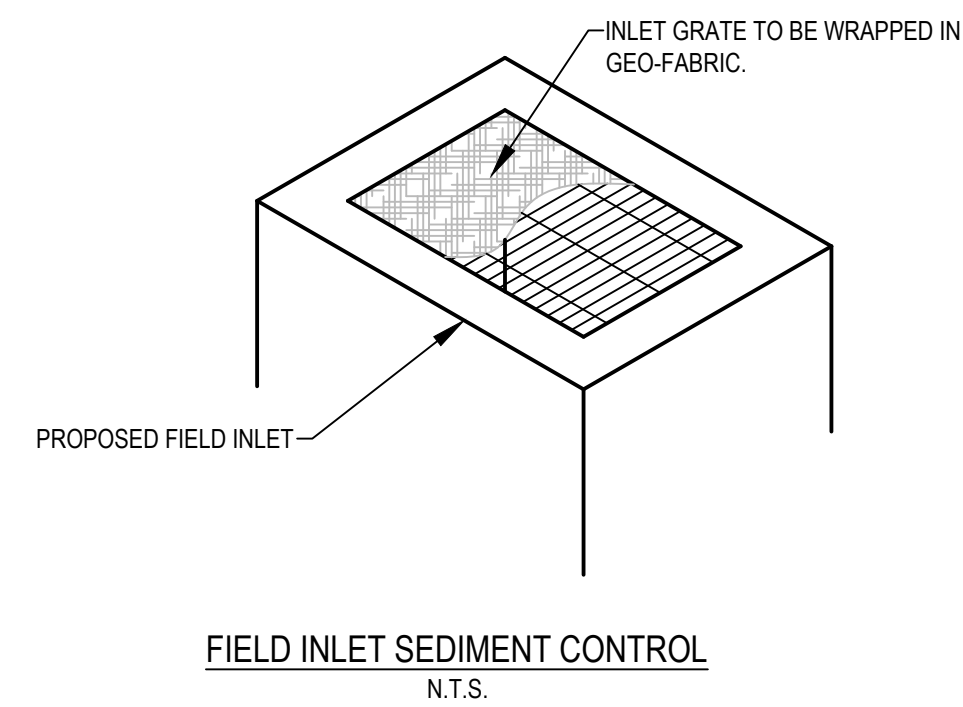
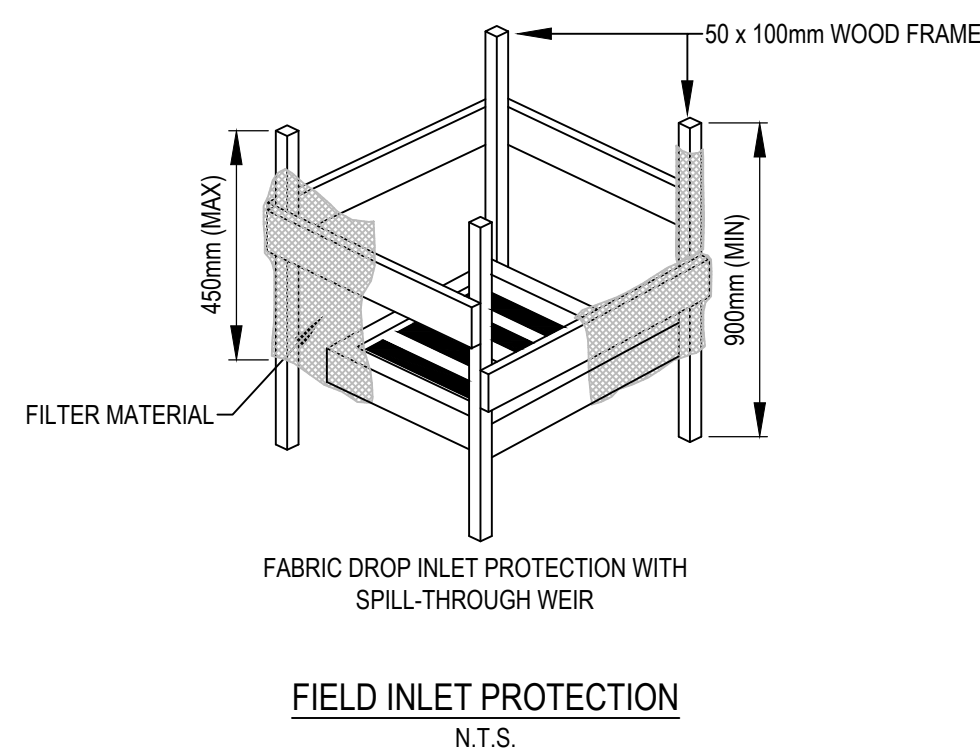
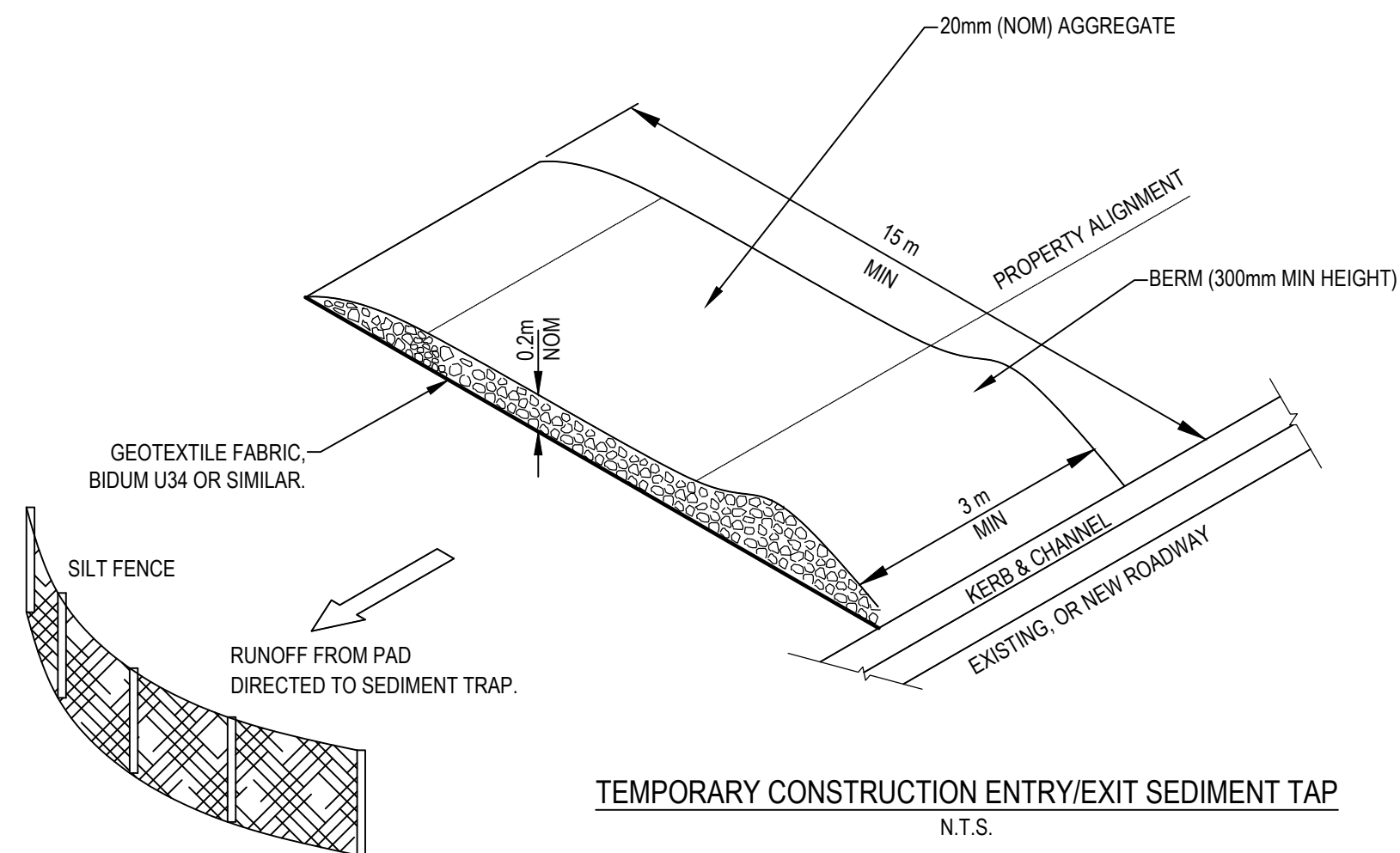


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DRAWN:	CPO
DESIGNED:	GYD
VERIFIED:	IAH 29.05.20
APPROVED FOR TENDER:	... J.J.
APPROVED FOR CONSTRUCTION:	... J.J.

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CHALLENGER
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LENNOX VILLAGE - ALDI

EROSION AND SEDIMENT
CONTROL DETAILS

PROJECT

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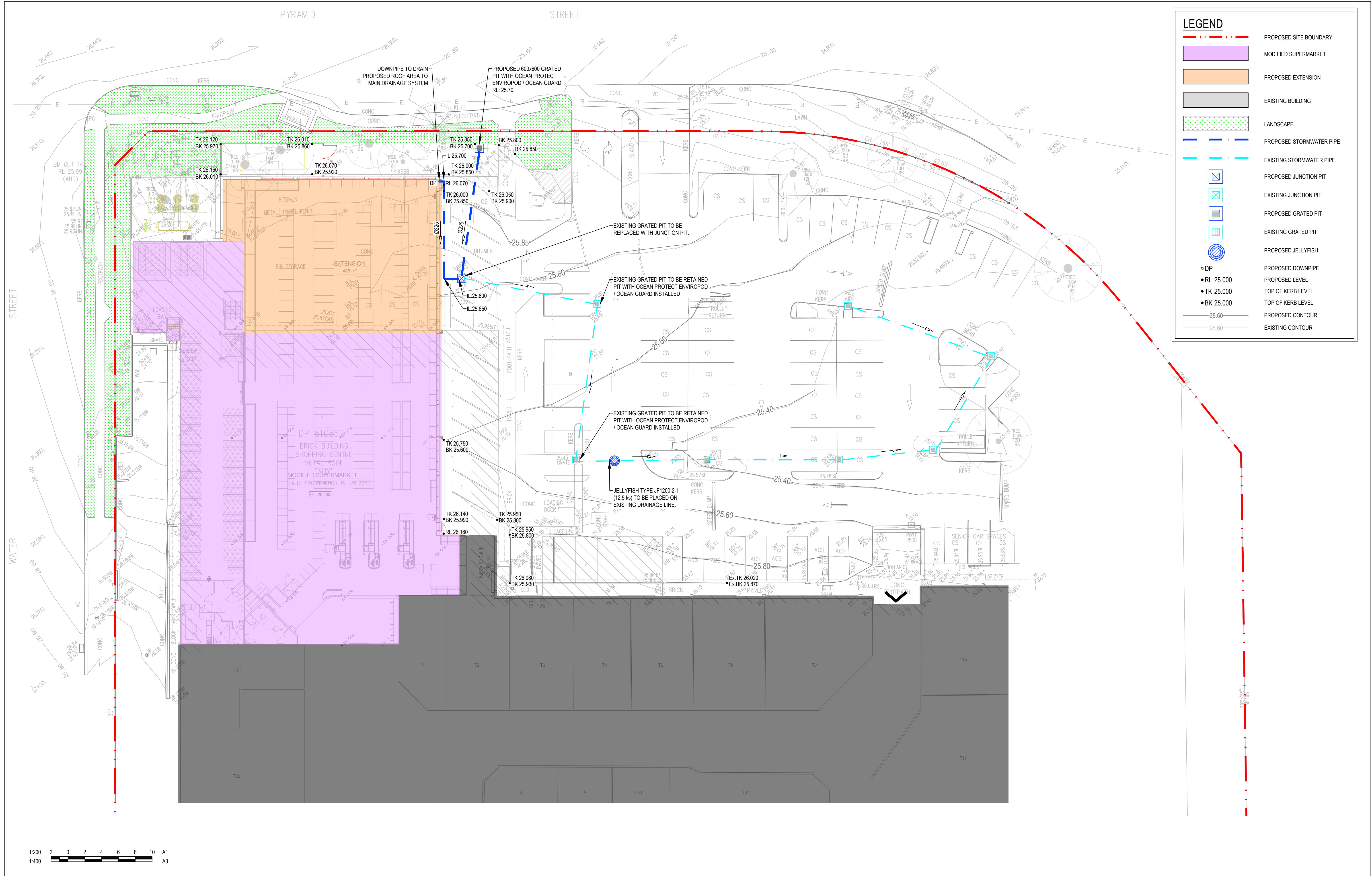
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A	ISSUED FOR DA	CPO	IAH	29.05.20

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APPROVED FOR CONSTRUCTION:	...

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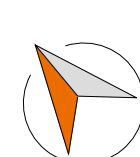
ARCHITECT/CLIENT

LENNOX VILLAGE - ALDI

STORMWATER MANAGEMENT
PLAN

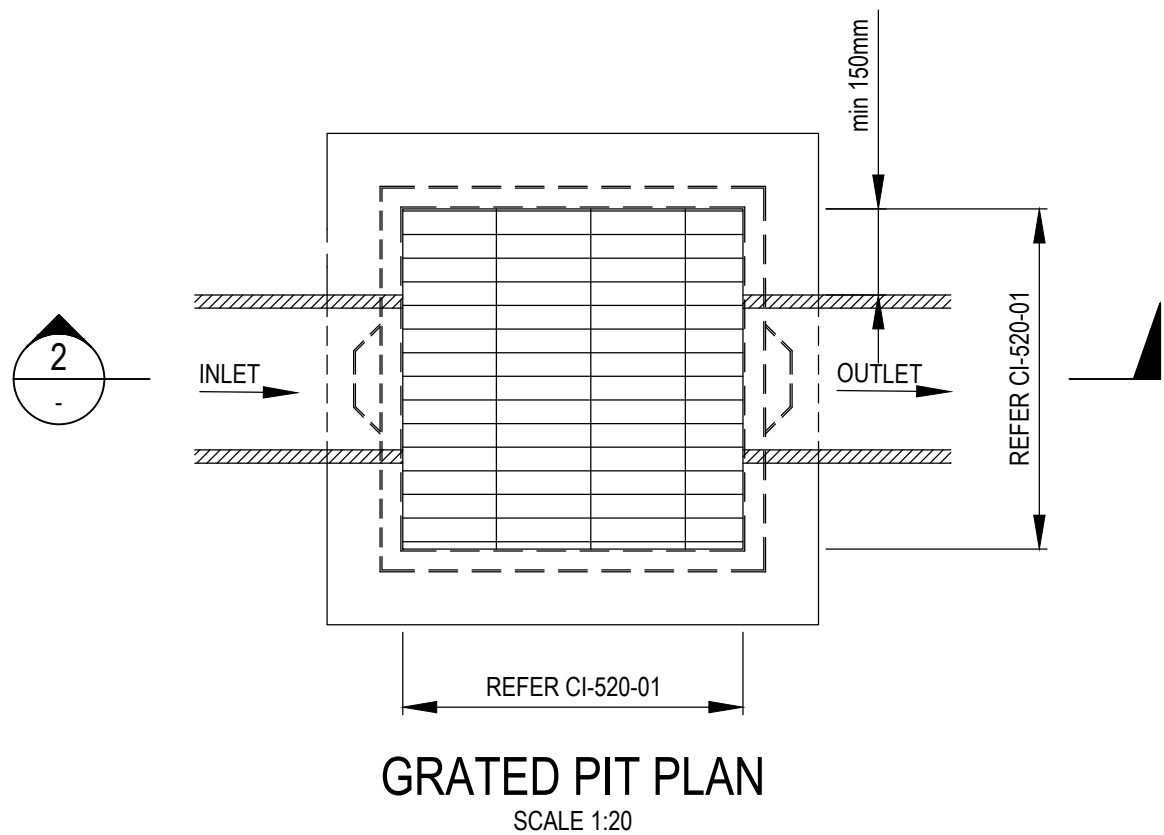
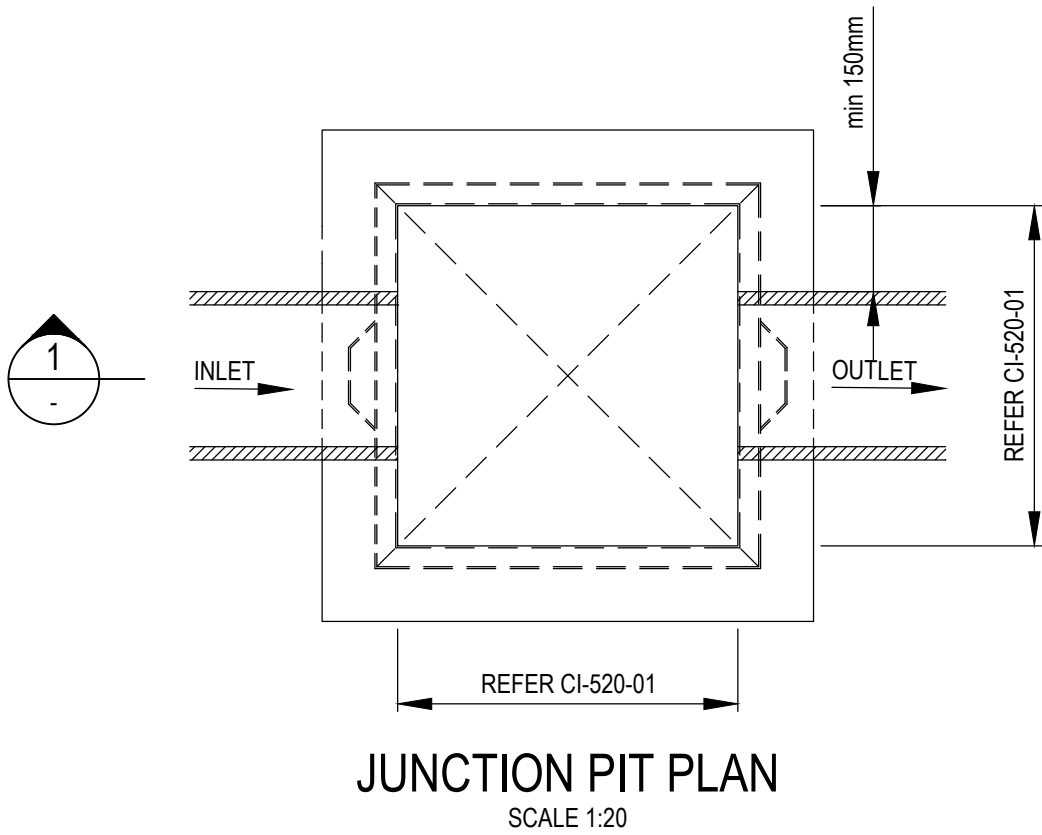
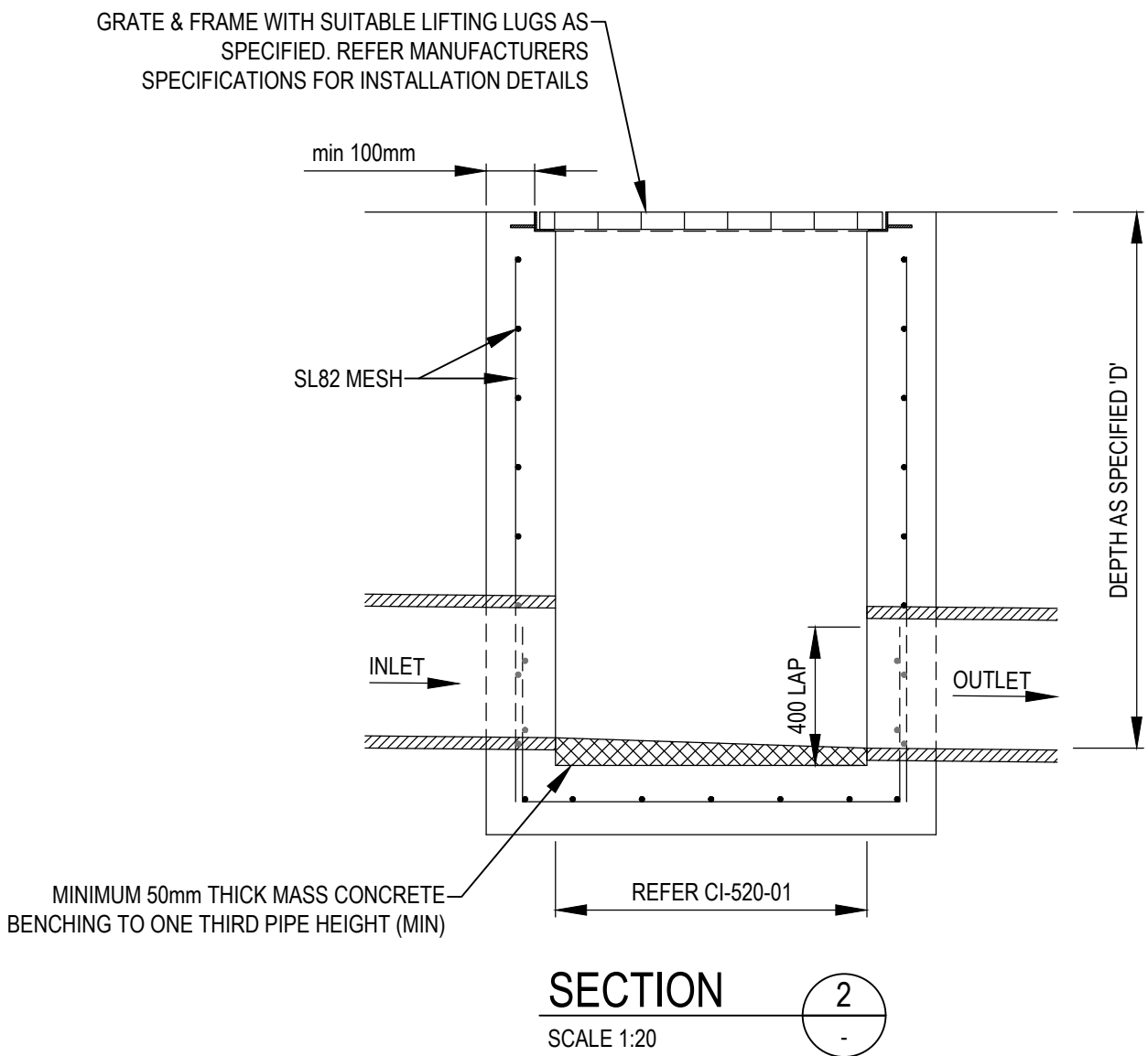
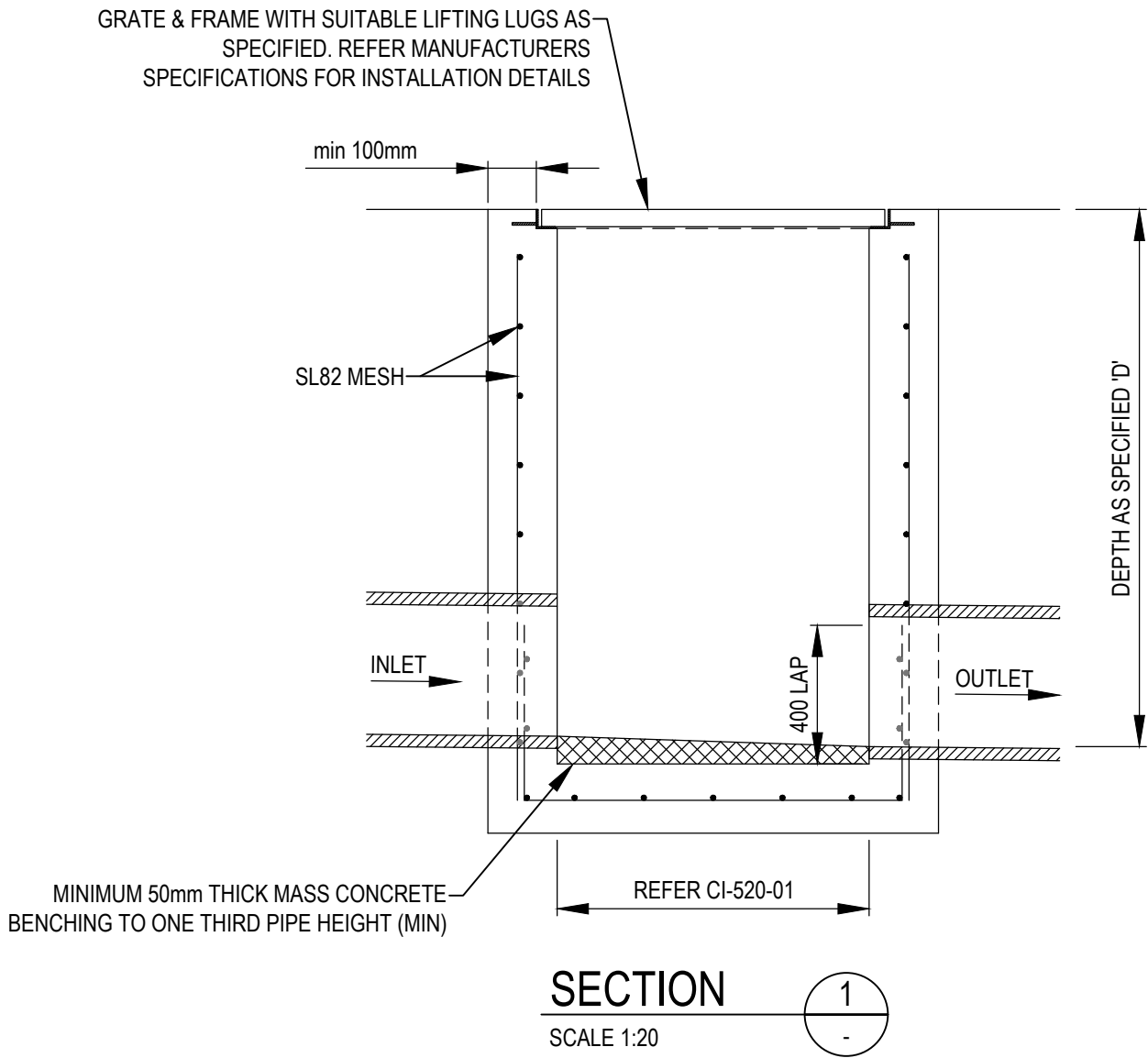
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APPROVED FOR CONSTRUCTION:	... J.J.

i2C	CHALLENGER INVESTMENTS PARTNERS
ARCHITECT/CLIENT	

PROJECT	LENNOX VILLAGE - ALDI	TITLE	STORMWATER DRAINAGE DETAILS
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Design with
community in mind

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